



# Land Acknowledgement

Sidewalk Labs recognizes that this land we now call Toronto has been the site of human activity for over 15,000 years; we are within the Treaty Lands and claimed Territory of the Mississaugas of the Credit. Toronto is now home to many diverse First Nations, Inuit, and Métis peoples. It is the responsibility of all people to share in wise stewardship and peaceful care of the land and its resources. We are mindful of a history of broken treaties, and of the urgent need to work continuously towards reconciliation, and we are grateful for the opportunity to live and work on this land.

Toronto

When we ask Torontonians  
what they dream about for  
their future neighbourhoods,  
we don't hear about dreams  
of jetpacks and flying cars.  
We don't hear about  
21st-century modern  
high-rises and flashy finishes.  
What we hear are dreams  
that are far more basic,  
more human,  
more fundamental.

A place with safer streets.  
More breathable air.  
More walkable sidewalks.  
A place where people  
are more engaged with their world  
than with their phones.  
A place that's both inspiring  
and affordable.  
A place that's welcoming  
for artists and entrepreneurs,  
for the creative class and  
the working class.  
A place where, quite simply,  
everyone who wishes  
to call it home, can.

What do  
you see  
in your  
dream city?









**Dreams of a city** / A city that wants me to stay forever / **A city where neighbours have my back** / A city that wants me to be with people more than with technology / A city that never breaks my stride / A place that makes it possible to have a home for my family / **A place where my son can ride his bike in the middle of the street and be totally safe** / A city that brings out the best in me / A city that helps my mommy not be so tired / A city that is just as obsessed with the old as it is with the new / A city that invests in creative artists / A city that reminds me to breath / **A city that cares about inclusion more than it does about growth** / A place where I don't need to own a car / A city that can feel urban and tranquil at the same time / A place with plenty of jobs / A city that doesn't look too shiny / A place that doesn't forget about me / **A city without rush hours** / A city that reinvents on-top of itself without losing its soul / **A city that knows the difference between good friction and bad friction** / A city with homes that can move anywhere, even on water / A city that looks like a playground during recess / A city that feels like a reflection of me / A city with robots who clean up my room for me / A place that always feels warm, even if it's -15 / A city that gives second, third, and fourth chances / **A place that opens my mind to new things** / A place that feels old even though it's new...like a retro future city / A city that believes in the value of a weekday siesta / **A city that has enough room for my grandma to live with us** / A place that doesn't make me feel guilty for being grumpy / Everything feels within my grasp / A place that sells the best street food from all over the world / **A city that makes my daddy smile** / A city that always leaves room for the community to create new things / That doesn't need a state of emergency to bring people together / **People I love are within walking distance** / A city that never stops trying / **A city that works for all stages of life** / A future city that has charms of old villages / A city that doesn't try to fix everything / A city that lets me be anonymous when I want to be / A city that gets people off their phones and into the streets / A city that cares more about building the community than condos / **A city that gives more than it takes** / A city that grows hometown

heroes / A neighbourhood that is happy just being itself, without apology / **A future city that doesn't get lost in technology** / A place where I randomly run into friends on the street / A city that attracts the world's most talented artists / A place that helps me feel rooted / **A city that doesn't try to be too perfect** / A city with the best sprinkled donuts / A place that feels like Alice's Wonderland / A city that makes me laugh and dance with euphoria / A place that never makes people wait outside in a long line / **A city that leaves room for beautiful imperfections** / Lets me sing all day long with my friends / A place that feels like a wild forest for me to run in / A place that doesn't force me to have an annoying roommate / A place that doesn't make me worry for my children / **A city that doesn't get spoiled by its own success** / A place that designs knowing we all have abilities that may come and go / **A city that will always feel like home, even if I move away** / A place that cares about the depth of the human to human relationship / A city that births new movements of creativity and philosophy / A place that fills my lungs with the freshest air / A city that can grow and still feel contentment / A city that doesn't force its ideals on me / **Where my sister doesn't have to struggle to get into buildings** / A city that's filled with the sounds of laughing children / **A place that people write songs about** / A city that lets me age more gracefully / **A city that brings me true love** / A city that doesn't make everyone work so much / **A city that gives my kids a worldly view of life** / A city that no matter how bad the day is, makes me feel lucky to be living there / **A city that is as stimulating for my daughters as it is for their grandparents** / A place that has more bikes than cars / **A city that makes winters less of a bummer** / Where I see my kids more than my colleagues / Where I can make whatever I want / Where all my friends want to come and visit / **Where my grandma has as many friends as I do** / Where I can always get a taste of my favourite pastries from the old country / **Where my feet are always warm** / Where people look into each other's eyes more than a screen / Where doors always open for me like I'm a queen / Where new and old can live together / It works perfectly well without a smartphone / **A city that builds character**

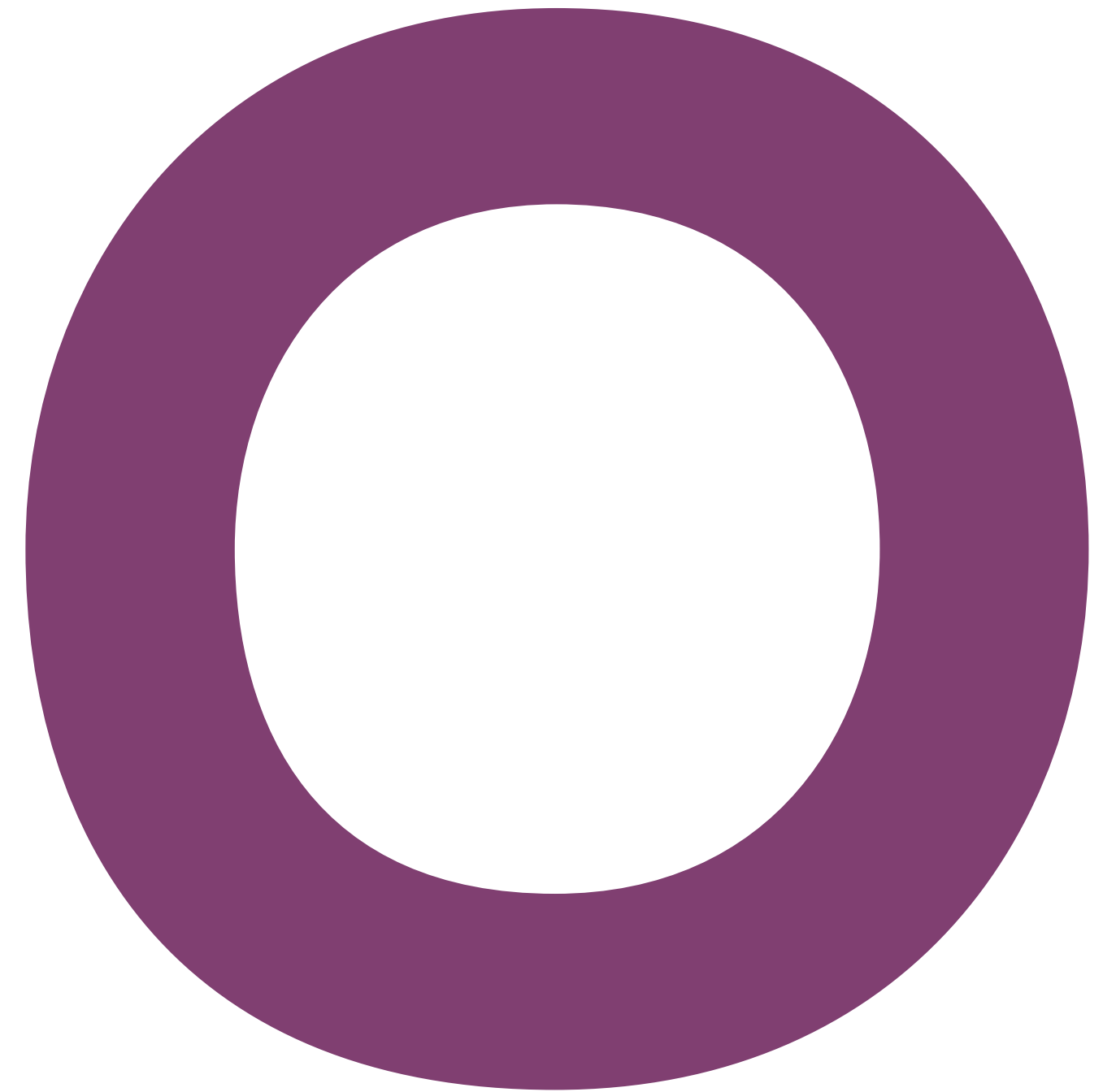
Toronto

Tomorrow

# Toronto Tomorrow

A new approach for  
inclusive growth

SIDE WALK LABS



# Overview

# Foreword

It snowed heavily in Toronto on March 2, 2019, the weather worsening all day. In 307, our workshop space along the waterfront, we watched the weather reports with a mixture of excitement and worry. That day we had planned to unveil a series of prototypes by a group of Toronto-based designers on, ironically, how to mitigate the impact of bad weather and create outdoor spaces that could remain comfortable for more of the year. Now the weather was striking back. We were ready for the showdown. But we wondered if anyone would be able to see it.

At 3 p.m. the event began — outside. And hundreds of Torontonians were waiting. Then hundreds more arrived. They kept coming. By the end of the day, nearly 800 people from across the city had braved the weather to test our heated pavers as they melted the ice, stand inside the “building Raincoats” as the snow swirled outside, and experience an art installation featuring projections of paintings by community members.

They had questions, ideas, experiences to share, and concerns to raise. They came from all over the city, with different ages, backgrounds, and careers, but they were bound by a commitment to Toronto’s future and a belief that it is possible to make urban life better for everyone. They were ready to be part of the solution and willing to give us a chance to prove we were worthy of being their partner.

We are grateful for the opportunity to continue that conversation through this Master Innovation and Development Plan, a proposal for how the city can transform a small piece of the eastern waterfront into a global model for urban innovation. It reflects 18 months of input from more than 21,000 Torontonians; all levels of government; dozens of meetings with local experts, non-profits, and community stakeholders; and the research, engineering, and design work of more than 100 local firms.

The MIDP includes three volumes. Volume 1 takes a detailed look at the planning concepts and proposed operational systems. Volume 2 offers an in-depth exploration of the urban innovations, organized around key areas like mobility and public realm. Volume 3 provides an explanation of the novel partnership that we hope could provide a model for future ambitious public-private collaborations in the service of improving urban life.

It hasn’t always been an easy journey to this point. And to their credit, Torontonians challenged us at every step — and made the plan better.

While we understood that affordable housing was an important issue, as we listened it became clear that it is among the most critical. We redoubled our efforts and now offer what we feel is a viable path forward for 40 percent below-market housing, supported by new private funding sources.

We heard lots of concerns about privacy. The approach we’ve developed is in direct response to those conversations, vesting the control of urban data in a democratic, independent process that would apply in addition to existing privacy laws in Ontario and Canada. The approach outlined in the MIDP will set a standard for the world.

A third thing that quickly became clear was the importance of connecting the eastern waterfront with mass transit. That pushed us to think about creative ways to accelerate the light rail construction and secure financing, given the scarcity of public resources.

We also heard strongly that Torontonians felt that the vast majority of the eastern waterfront should be developed by local developers. We listened and proposed restricting our development role to a small geographic area to prove the feasibility of the riskiest innovations, then stepping back so others can take the lead.

Every idea and modification has been in service of the bold ambition outlined by Waterfront Toronto: a groundbreaking project that generates extraordinary numbers of jobs and economic benefits for Torontonians, while achieving new

levels of environmental sustainability, pioneering a 21st-century mobility network, producing record numbers of affordable housing, and establishing a new model for urban innovation.

That’s not easy.

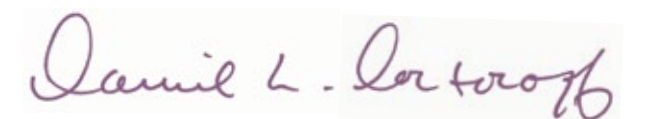
After a year and a half of intensive research, prototyping, design, and planning about these diverse pieces and how they fit together, we are proud to say with confidence that these aspirations are not merely dreams. They can be achieved.

The MIDP represents our best thinking to date on the path to creating the most innovative place in the world that can set a new standard for urban life in the 21st century.

But it is just a step in the process. The plans will continue to evolve and improve through extensive discussions with the public, community stakeholders, and government agencies, and through the formal consultation process led by the City of Toronto.

We are excited and honoured by the opportunity.

Sincerely,



Dan Doctoroff  
CEO, Sidewalk Labs  
May 2019

## Overview Contents

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### Section A Project Background

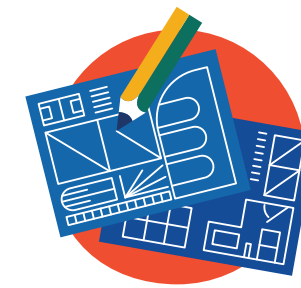
p40



---

### Section B The Plans

p88



---

### Section C Priority Outcomes

p162



---

### Section D The Partnership

p194



---

### Endnotes

p244

---

### MIDP Acknowledgements

p250

## Overview

### Contents

---

## Section A

### Project Background

<b>Part 1:</b> Toronto's Waterfront: A Historic Opportunity for Inclusive Growth	p42
<b>Part 2:</b> Seeking a "Unique Partner" to Help Set New Standards for City Building	p54
<b>Part 3:</b> Launching the Sidewalk Toronto Project and a Robust Public Engagement Process	p66

---

## Section B

### The Plans

<b>Part 1:</b> Introduction to the Plans: Geography, Role, and Innovation Approach	p90
<b>Part 2:</b> Quayside: A Complete Community and a Proving Ground for Innovation	p96
<b>Part 3:</b> The River District: Creating an Innovation Ecosystem to Build on Quayside's Impact	p130
<b>Part 4:</b> Committing to Diversity, Equity, and Inclusion	p150
<b>Part 5:</b> A New Economic Engine That Drives Outsized Job Growth on an Accelerated Timeline	p156

---

## Section C

### Priority Outcomes

<b>Part 1:</b> Striving to Meet Waterfront Toronto's Five Priority Outcomes	p164
<b>Part 2:</b> Impact Summary: Achieving the Ambitious Priority Outcomes	p166

---

## Section D

### The Partnership

<b>Part 1:</b> A New Type of Partnership to Catalyze Inclusive Growth in the Digital Age	p196
<b>Part 2:</b> Summary of the Proposed Innovation and Funding Partnership	p202
<b>Part 3:</b> Summary of the Financial Terms	p212
<b>Part 4:</b> How the Proposal Reflects the Transaction Principles A Vision of the Waterfront in 2050: A Global Model for Inclusive Growth	p222 p240

---

<b>Endnotes</b>	p244
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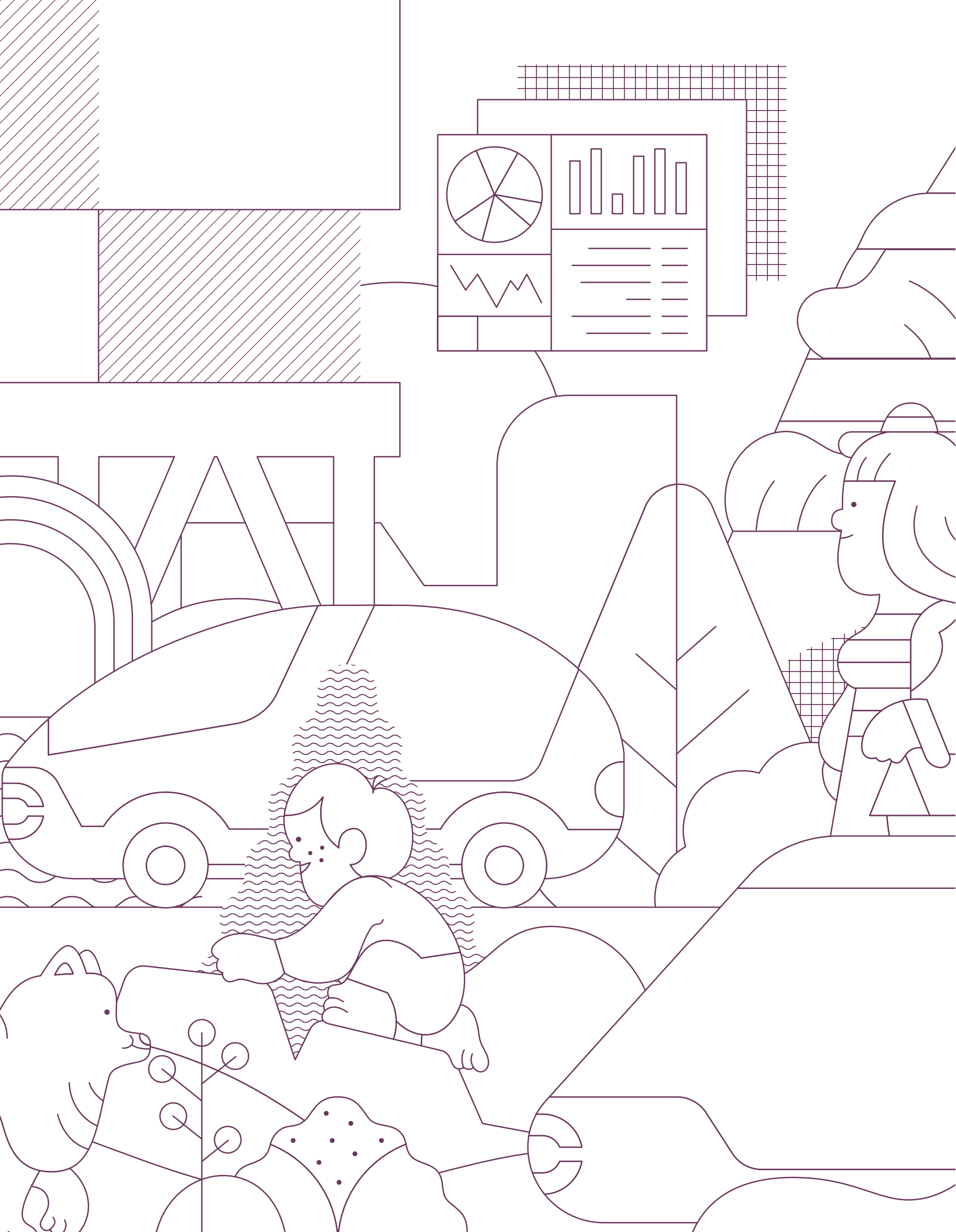
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<b>MIDP Acknowledgements</b>	p250
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# Overview







Toronto's eastern waterfront presents Waterfront Toronto, the City of Toronto, the governments of Ontario and Canada, and the people of Toronto with an extraordinary opportunity to shape the city's future and provide a global model for inclusive urban growth.

The three-volume Master Innovation and Development Plan (MIDP) is a comprehensive proposal for how to realize that potential. Sidewalk Labs submits this plan for consideration as a work-in-progress meant to be refined by further consultation.

This Overview provides a high-level summary of these volumes and the project as a whole.

# Five things to know about the Sidewalk Toronto project

# 1

**This Master Innovation and Development Plan reflects the engagement of tens of thousands of Torontonians and their public officials.**

Since being selected Innovation and Funding Partner in October 2017, Sidewalk Labs has solicited an unprecedented range of feedback from residents, researchers, community leaders, and government agencies, including in-person conversations with more than 21,000 Torontonians.

That input has profoundly shaped this proposal, leading to dramatic changes, including a new focus on accelerating light rail extension, rethinking the way buildings are constructed to increase affordability, setting a new standard for data privacy and governance in cities, and scaling back the role of Sidewalk Labs so local third parties can lead most of the real estate and technology development.

# 2

**The successful execution of the highly detailed plan would produce the most innovative district in the world.**

Across nearly every dimension of urban life — mobility, sustainability, public realm, buildings, and digital innovation — the plan breaks new ground. That includes the first neighbourhood built entirely of mass timber, dynamic streets that can adapt to a neighbourhood's changing needs, weather mitigation systems, and a thermal grid for heating and cooling.

All together, more than five dozen innovations would be combined in a single place for the first time, creating a global model for combining cutting-edge technology and great urban design to dramatically improve quality of life.

# 3

**The plan shows that inclusive, sustainable growth is achievable.**

The innovations are designed to work together to create diverse, thriving, mixed-income neighbourhoods.

A new factory-based construction process would lead to faster and more predictable projects — unlocking billions in private funding that could be applied towards a precedent-setting housing program with 40 percent of units at below-market rates. New mobility initiatives — combined with expansions to public transit and cycling infrastructure — would eliminate the need to own a car, saving a two-person household \$4,000 every year. Advanced energy systems would help create the largest climate-positive community in North America while keeping costs the same, or lower, for residents and businesses.

The resulting place would set a new standard for urban life in the 21st century.

# 4

**The plan would generate an economic windfall for Toronto, Ontario, and Canada.**

By its 2040 completion, the project would create 93,000 total jobs (including 44,000 direct jobs) and become a tremendous revenue source for government, generating \$4.3 billion in annual tax revenue and \$14.2 billion in annual GDP.

That is nearly seven times the economic impact projected to occur by that time under more traditional development in the area. But the benefits go beyond dollars. Accelerating the development schedule can also deliver critical public transit infrastructure and thousands of affordable housing units many years earlier than anticipated.

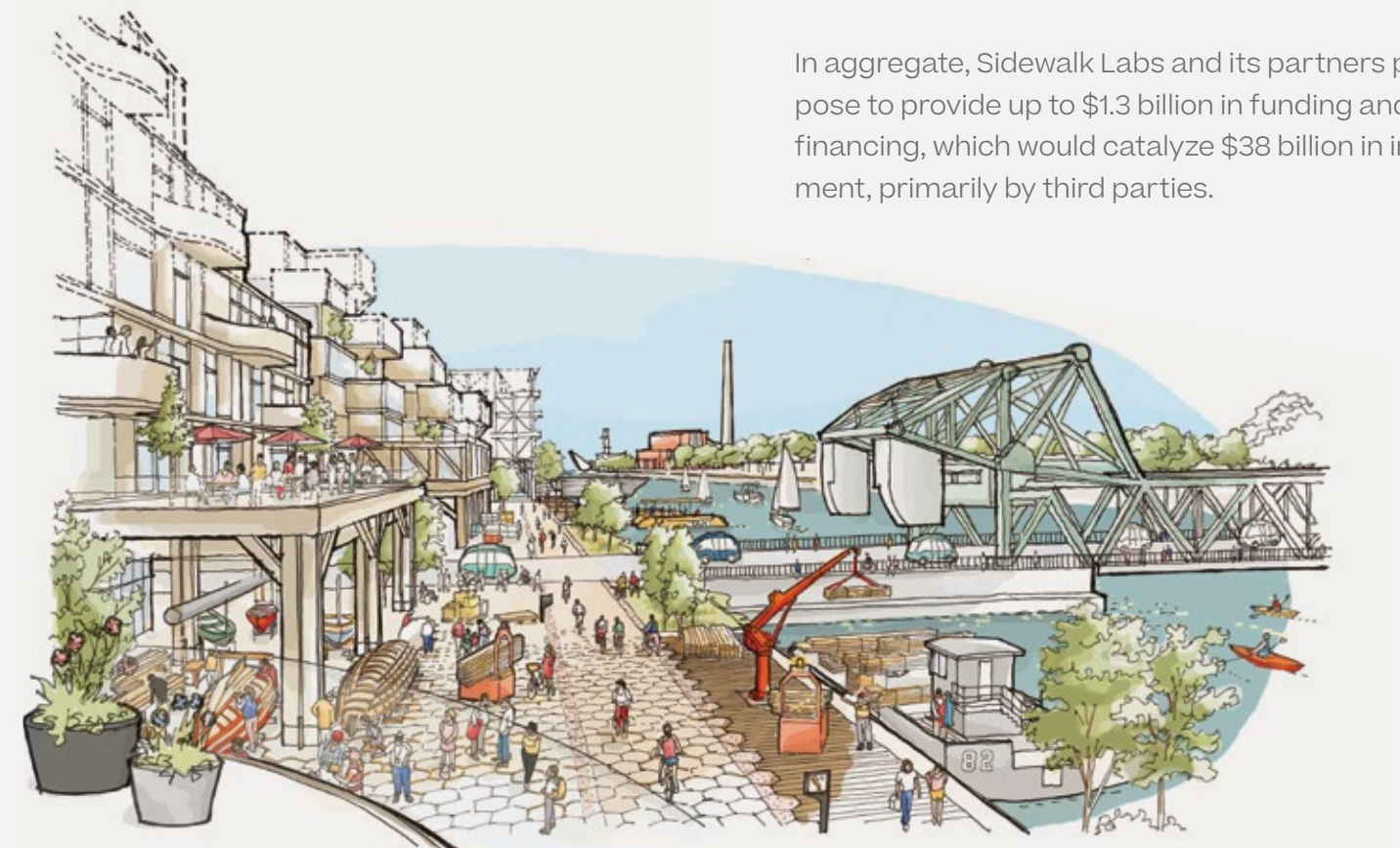
# 5

**Sidewalk Labs' proposed role is designed to support the public sector and create the conditions for others to thrive.**

This plan proposes a limited role for Sidewalk Labs with government in the lead, and milestones that must be met for each project phase. Working with local partners, Sidewalk Labs would develop less than 7 percent of the eastern waterfront — the minimum necessary to prove the market viability of its innovations and spark economic growth through an innovation campus, featuring a new Google Canadian headquarters and Urban Innovation Institute.

For the rest of the project, Sidewalk Labs would advise on innovation planning, design, and implementation; deploy limited technology (sharing profits with the public sector in certain cases); and provide the option to finance critical infrastructure like the light rail expansion. Sidewalk Labs would earn profits on real estate development, fee income, and interest on infrastructure finance if used.

In aggregate, Sidewalk Labs and its partners propose to provide up to \$1.3 billion in funding and financing, which would catalyze \$38 billion in investment, primarily by third parties.



The Sidewalk Toronto project would help the eastern waterfront reach its full potential for sustainable, inclusive growth.

# Summary of the MIDP's three volumes

Informed by more than 18 months of public consultation, the MIDP proposes a comprehensive planning and partnership model that sets a new standard for urban development in the 21st century. It is a work-in-progress meant to be refined by further consultation — not a finished product.

Across three volumes, the MIDP outlines a new vision for how cities can integrate physical, digital, and policy innovations to produce dramatic improvements in quality of life and generate significant economic opportunity. While the MIDP is meant first and foremost as a proposed plan for Toronto, it is also intended to provide a new urban toolkit for the digital age and to spark the imagination of cities tackling the challenges of diverse, equitable, and inclusive growth around the world.



## Volume 1: The Plans

Volume 1 begins by outlining a proposed development plan, led by Sidewalk Labs, for the five-hectare Quayside neighbourhood. This plan aims to integrate a wide range of urban innovations to create a true live-work community for Torontonians of all incomes, ages, backgrounds, and abilities.

While focusing on Quayside, Volume 1 also explores a larger geography to achieve the most ambitious quality-of-life targets in a financially feasible manner. This geography is identified as a 62-hectare River District consisting of five distinct neighbourhoods: Villiers West, Villiers East, Keating Channel, McCleary, and Polson Quay. Volume 1 describes the role of Villiers West as a catalyst for economic development focused on urban innovation, and features concept plans for the other River District neighbourhoods to demonstrate how the innovative development approach initiated in Quayside and Villiers West would enable Waterfront Toronto, governments, and others to begin revitalizing the eastern waterfront.

Together, Quayside and the River District would form an Innovative Design and Economic Acceleration (IDEA) District subject to a special set of regulatory and policy tools to promote innovation and accelerate development. The vast majority of this area (representing less than a third of the entire eastern waterfront) would be developed by third parties. Sidewalk Labs proposes a role as lead real estate developer (with local partners) restricted to two areas, Quayside and Villiers West, undertaken for the limited purpose of proving out the innovative development approach. Together, these areas represent just 16 percent of the proposed IDEA District and less than 7 percent of the eastern waterfront.

Volume 1 closes with a plan for inclusive economic development capable of generating up to 93,000 total jobs, \$4.3 billion in tax revenues, and an estimated \$14.2 billion in annual economic output for Canada across the IDEA District by 2040 — all of which could be delivered on a far more accelerated timeline compared to plans in place today to activate the waterfront. These efforts would help the eastern waterfront become a global hub for the emerging field of urban innovation.



## Volume 2: The Urban Innovations

Volume 2 provides greater detail on the technology, design, and policy innovations that make it possible to address some of the toughest challenges facing Toronto at this unique moment in time across core areas of urban life.

This volume includes comprehensive visions for mobility, the public realm, buildings and housing, sustainability, and digital innovation. While these innovation plans focus on Toronto, they also represent a general toolkit that could be applied in different ways to other growing cities around the world.



## Volume 3: The Partnership

Volume 3 describes how the public and private sectors could work together to achieve a set of shared objectives. It includes a proposal for the IDEA District to be led by a public administrator to ensure public accountability as well as a comprehensive innovation strategy that involves a wide array of third parties.

Volume 3 describes the primary roles Sidewalk Labs envisions playing as Innovation and Funding Partner, including a role as lead developer of real estate (with local partners) and of advanced systems (such as essential energy, mobility, or utility infrastructure) — both limited to Quayside and Villiers West; an advisory role around innovation planning, design, and implementation; a limited role in technology deployment, including a proposal for the public sector to share in profits; and an optional role in infrastructure financing.

Volume 3 also outlines financial terms of the proposed transaction, as well as steps towards implementation, including a series of milestones (or “stage gates”) required for the project to advance.

# Project Back- ground

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**Part 1**  
Toronto's Waterfront:  
A Historic Opportunity  
for Inclusive Growth

p42

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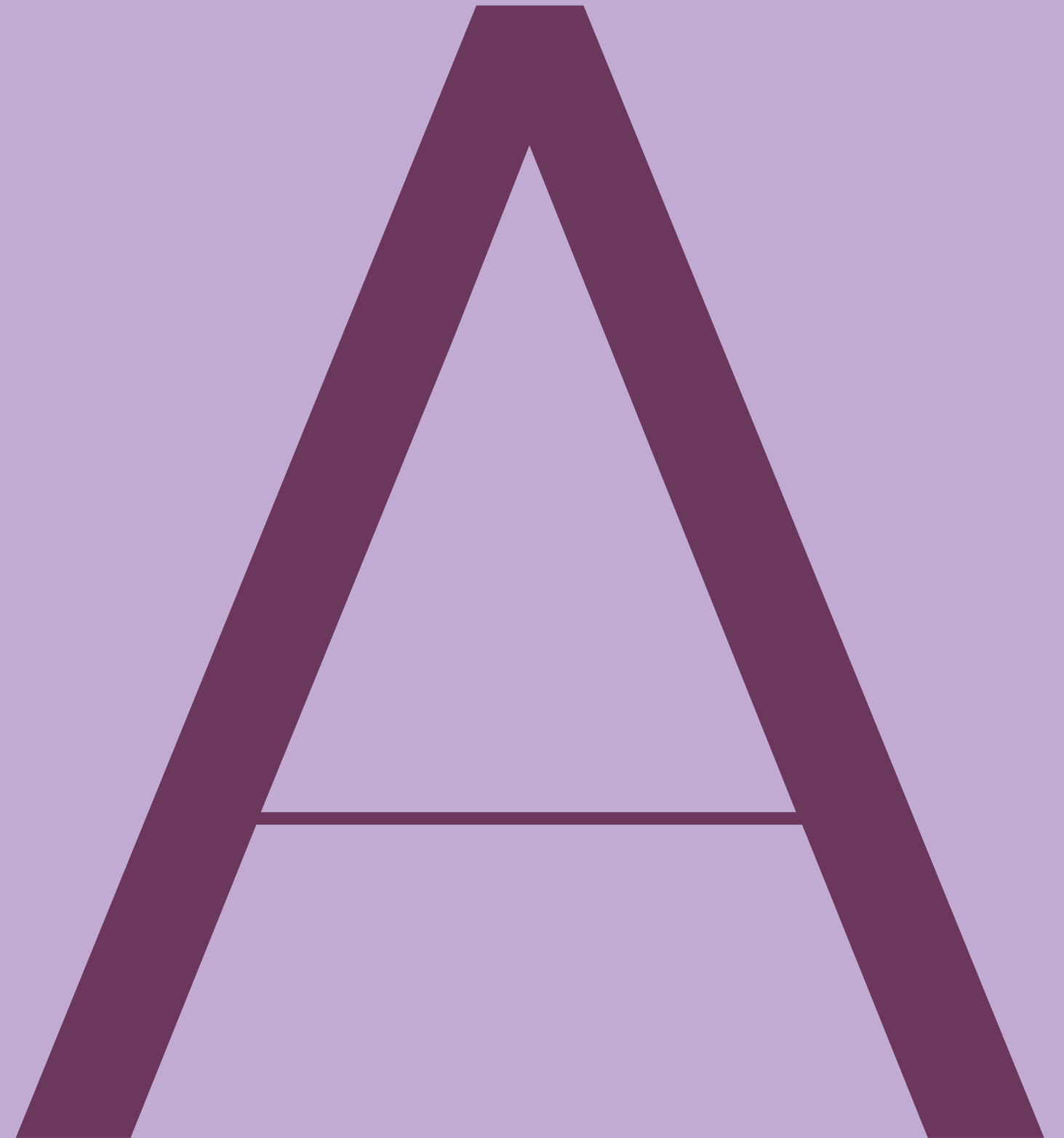
**Part 2**  
Seeking a "Unique Partner"  
to Help Set New Standards  
for City Building

p54

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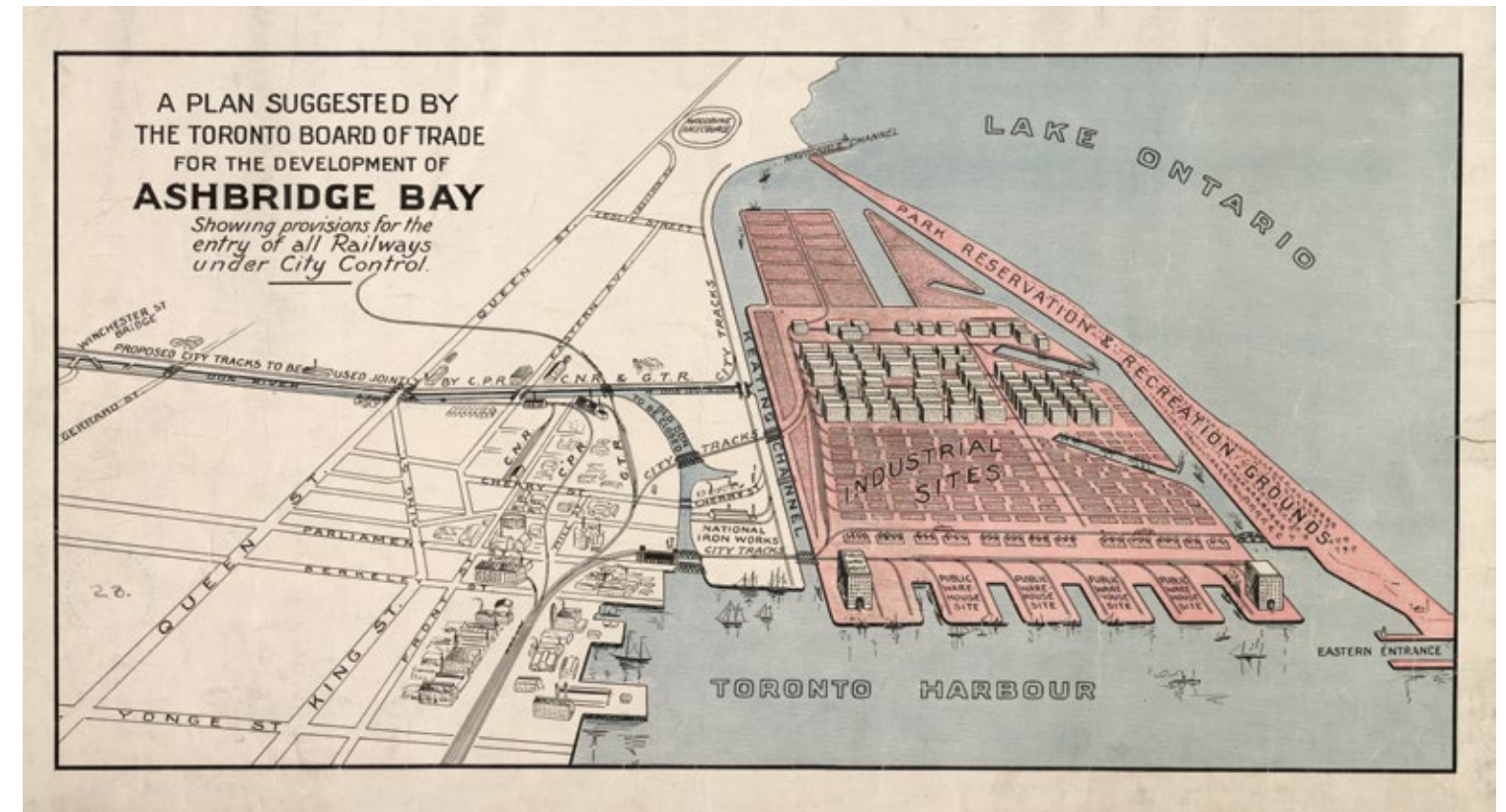
**Part 3**  
Launching the  
Sidewalk Toronto Project  
and a Robust Public  
Engagement Process

p66



# Part 1 Toronto's Waterfront: A Historic Opportunity for Inclusive Growth

Toronto's success and growth have given rise to new challenges, straining the city's ability to live up to its values of openness and opportunity for all. After a century of efforts to develop the eastern waterfront as a growth outlet, the moment is finally right to realize its potential and show the way forward for inclusive urban development.



The Ashbridges Bay Development Plan — one of the earliest proposals for the eastern waterfront, from the Toronto Board of Trade in 1909 — envisioned Ashbridges Bay as an island encircled by shipping channels with rail-only access. Credit: Toronto Public Library

For over 100 years, public officials and developers in Toronto have looked to the eastern waterfront to help address the growth challenges of the day. Early last century, they envisioned this area as a new lakefill home for the city's growing industrial base.<sup>1</sup> For a variety of reasons, including economic timing and a lack of supporting infrastructure, this original plan for the eastern waterfront never lived up to its lofty expectations.

After World War II, Toronto's economy shifted away from manufacturing — as was the case in many cities across North America — leaving the waterfront's industrial areas to enter a long period of decline and neglect. Towards the close of the 20th century, Toronto's waterfront remained underutilized and in need of the critical infrastructure necessary for a post-industrial revival, but there was no single entity tasked with creating a cohesive vision for the waterfront's future.

Today, beyond the important Film District, the eastern waterfront is largely a storage ground whose remaining industrial structures serve as a testament to the difficulty of large-scale urban development.

As the 21st century beckoned, public leaders took the first steps towards bringing the long-neglected waterfront to life. This effort began as part of an Olympics bid, with the bid committees strategically locating many proposed venues along the waterfront.<sup>2</sup> Although the Olympics never materialized, the waterfront's economic potential became a focal point of Toronto's civic imagination, and a new resolve emerged from all three orders of government to revitalize the waterfront.<sup>3</sup>

This renewed focus ultimately led to the creation of Waterfront Toronto — a public corporation established in 2001 by the Government of Canada, the Province of Ontario, and the City of Toronto.



This aerial view of Toronto's waterfront from circa 1933, looking east towards the Port Lands, shows the industrial area created by filling in Ashbridges Bay marsh. Credit: City of Toronto Archives

# Waterfront Toronto: Born to raise the bar on urban development

**Waterfront Toronto has overseen the transformation of nearly 100 hectares of waterfront.**

The three orders of government formed Waterfront Toronto to unlock the social and economic potential of the waterfront by using best practices in urban planning and innovative development approaches – and to advance core public priorities, such as economic opportunity, sustainability, and affordable housing.

As a proponent of community-led change, Waterfront Toronto was established to work with the people of Toronto to make sure waterfront development serves their needs. Its mission includes the following objectives:

- ↳ **Reconnecting** the city with the water's edge as a place that belongs to every Torontonian
- ↳ **Creating** not just new buildings but new neighbourhoods where people can live, work, and thrive
- ↳ **Catalyzing** economic activity in emerging areas, such as technology
- ↳ **Pursuing** groundbreaking solutions to some of Toronto's most pressing issues: urban sprawl, affordable housing, climate change, mobility, and economic growth

Over the years, Waterfront Toronto has made important progress, reviving the waterfront through new approaches to urban design, prioritization of the public realm, and the delivery of critical infrastructure.

Waterfront Toronto has guided roughly 2.5 million square feet of development (completed or planned) and leveraged initial government funding to spur \$4.1 billion in economic output for the Canadian economy.<sup>4</sup> The agency's achievements also include attracting a privately funded fibre-optic gigabit network, leading the creation of new public transit corridors and active streets, guiding over 36 hectares of parks and public spaces, and helping secure roughly 600 units of affordable housing (completed or nearing completion).<sup>5</sup>

The waterfront revitalization area under Waterfront Toronto's scope is 800 hectares, and to date, the agency has overseen the transformation of nearly 100 hectares of waterfront lands.<sup>6</sup>

# A view of the eastern waterfront today

Credit: DroneBoy



## Waterfront Toronto case studies

### A track record of progress

Since its inception in 2001, Waterfront Toronto has made important progress revitalizing the city's waterfront. Some of its key projects include:<sup>7</sup>

**Corktown Common.** Located at the southeasternmost corner of the West Don Lands, Corktown Common serves the role of neighbourhood centrepiece: a 7.3-hectare public park that includes a playground, splash pad, play field, and firepit, situated in naturalized environments such as marshlands and prairies. The park's unique features include its position atop a landform that protects over 200 hectares from flooding. In addition to serving as an important community asset, the award-winning project has been widely recognized, including as a recipient of the Federation of Canadian Municipalities Sustainable Communities Award for Neighbourhood Development in 2014.<sup>8</sup>

**Queens Quay West.** The waterfront's primary east-west street, Queens Quay West underwent a decade-long transformation, beginning in 2006 with a successful pilot project to reconfigure the street for more pedestrian and cycling traffic. The revitalization enabled easier access to the water, added a double-row of new trees, eliminated elevated curbs, increased the public realm with a wide granite pedestrian promenade, and added a new stretch of the Martin Goodman Trail — altogether making Queens Quay Toronto's first "complete street."

**West Don Lands.** Located in the elbow where the Don Valley Parkway meets the Gardiner Expressway, the West Don Lands was, by the late 20th century, an abandoned and flood-prone industrial area. A two-year public consultation process resulted in a 2005 precinct plan calling for a forward-thinking mix of residential and commercial spaces, an abundance of park space, and a higher standard for green buildings found in few other parts of Toronto. Following extensive flood-remediation efforts, the first developments were completed prior to the Pan American games in 2015, which catalyzed more recent development and the growth of the area known as the Canary District, today home to the George Brown College student residence and a new YMCA facility. The West Don Lands project, which now includes nearly 500 affordable housing units, has received a number of awards, including the Urban Land Institute's Global Award of Excellence in 2017/18.<sup>9</sup>

**Other key projects** include the Intelligent Community initiatives and partnership with telecommunications provider Beanfield to promote innovation and digital inclusion; construction of the unique and popular Spadina, Rees, and Simcoe Wave-Deck boardwalks along the shoreline; the redevelopment of the Harbourfront Centre surface parking lot at York Quay into underground parking, the Ontario Square plaza, and the public art installation *Light Cascade*; and the revitalization of Harbour Square Park and the Jack Layton Ferry Terminal at the foot of Bay Street.



Corktown Common  
Credit:  
Waterfront Toronto



Queens Quay West  
Credit:  
Waterfront Toronto



West Don Lands  
Credit:  
Waterfront Toronto



# A vision for unlocking the eastern waterfront's potential

In the past few years, development has marched towards the eastern waterfront: an area of more than 300 hectares<sup>10</sup> just southeast of downtown, including a five-hectare parcel called Quayside that serves as a connection point to the city centre.

The eastern waterfront represents the city's last great frontier for downtown growth and the largest underdeveloped parcel of urban land in North America, extending around the inner harbour and encompassing the industrial areas surrounding Parliament Slip, the mouth of the Don River, the Ship Channel, and the Turning Basin.<sup>11</sup>

In 2017, Waterfront Toronto took a key step towards unlocking the eastern waterfront by securing an extraordinary \$1.25 billion investment in flood mitigation from all three levels of government. By rerouting the Don River, this flood-mitigation project will result in the creation of a new area for development called Villiers Island, which will feature 16 hectares of interconnected parkland along its renaturalized banks and beyond.<sup>12</sup>

When approaching the revitalization of this critical growth outlet, Waterfront Toronto could have used a traditional model: bidding out a series of development parcels, with market-rate condos dominating the mix. But several emerging trends rightly led Waterfront Toronto



Map  
**Quayside and the eastern waterfront within the Designated Waterfront Area**

Toronto's eastern waterfront occupies some 300 hectares of the 800-hectare Designated Waterfront Area just southeast of downtown, with the five-hectare Quayside area serving as a connection point to the city centre.

**“Toronto’s eastern waterfront, with more than 300 hectares (750 acres) of land subject to future revitalization, presents a unique opportunity for governments, private enterprise, technology providers, investors and academic institutions to collaborate on these critical challenges and create a new global benchmark for sustainable, inclusive and accessible urban development.”**

Waterfront Toronto RFP No. 2017-13 (March 17, 2017)

to choose a different path — one more focused on helping the city address its population growth challenges.

**Toronto’s success is threatening its inclusivity.**

Toronto is rapidly becoming one of the world’s most popular and productive cities.

The city boasts an exceptionally diverse population thanks to its welcoming immigration policies, with nearly half its

population foreign-born.<sup>13</sup> This openness has led people and companies to flock to the Greater Toronto Area (GTA), which is projected to add 2.8 million people by 2041, including nearly 1 million new residents within Toronto city limits.<sup>14</sup> It has top academic institutions, a rich legacy of urban planning, and a booming tech sector — the fourth-largest in North America.<sup>15</sup>

But like a lot of global urban centres, Toronto is becoming a victim of its own

success. As the city continues to grow, Toronto has become less and less able to provide the opportunities that powered this growth in the first place. The result is a widening gap between Toronto's deep commitment to diversity and inclusion and the city's capacity for inclusive growth.

This gap is widest when it comes to finding an affordable place to live. Home prices in the GTA have more than doubled since 2006, far outpacing earnings.<sup>16</sup> Rental prices have ballooned as well.<sup>17</sup> The high demand for urban living has created a geographic disparity known locally as the "Three Cities": Toronto's neighbourhoods are increasingly segregated by income, with wealthy areas downtown, low-income areas forced to the edges, and middle-income pockets that continue to shrink.<sup>18</sup>

As households move farther from job centres, traffic congestion has steadily increased, with Toronto now having the second-longest average commute time among North American cities, according to a recent study by the Toronto Region Board of Trade.<sup>19</sup> Rapid transit infrastructure has struggled to keep pace with growth. The vast majority of households across the city own a car, as do nearly half of households downtown,<sup>20</sup> despite the high financial cost — let alone other costs of safety, productivity lost to traffic, and pollution.

Add to these challenges the urgency of climate change. The same development patterns pushing families to the fringes are at odds with the type of dense urban neighbourhoods that increase sustainable living. Merely cutting energy use is no longer enough — to make a dent in global

warming, communities must remove carbon from the environment, and do so in an affordable way.

All of these problems have disproportionate impacts on the most vulnerable populations in urban communities.

**Recognizing the need for a new type of development.**

Given this complex set of urban challenges — starting with affordability and extending to sustainability, inclusivity, economic opportunity, and mobility — Toronto is the perfect place to demonstrate forward-thinking planning and drive the future of urban development in the digital age.

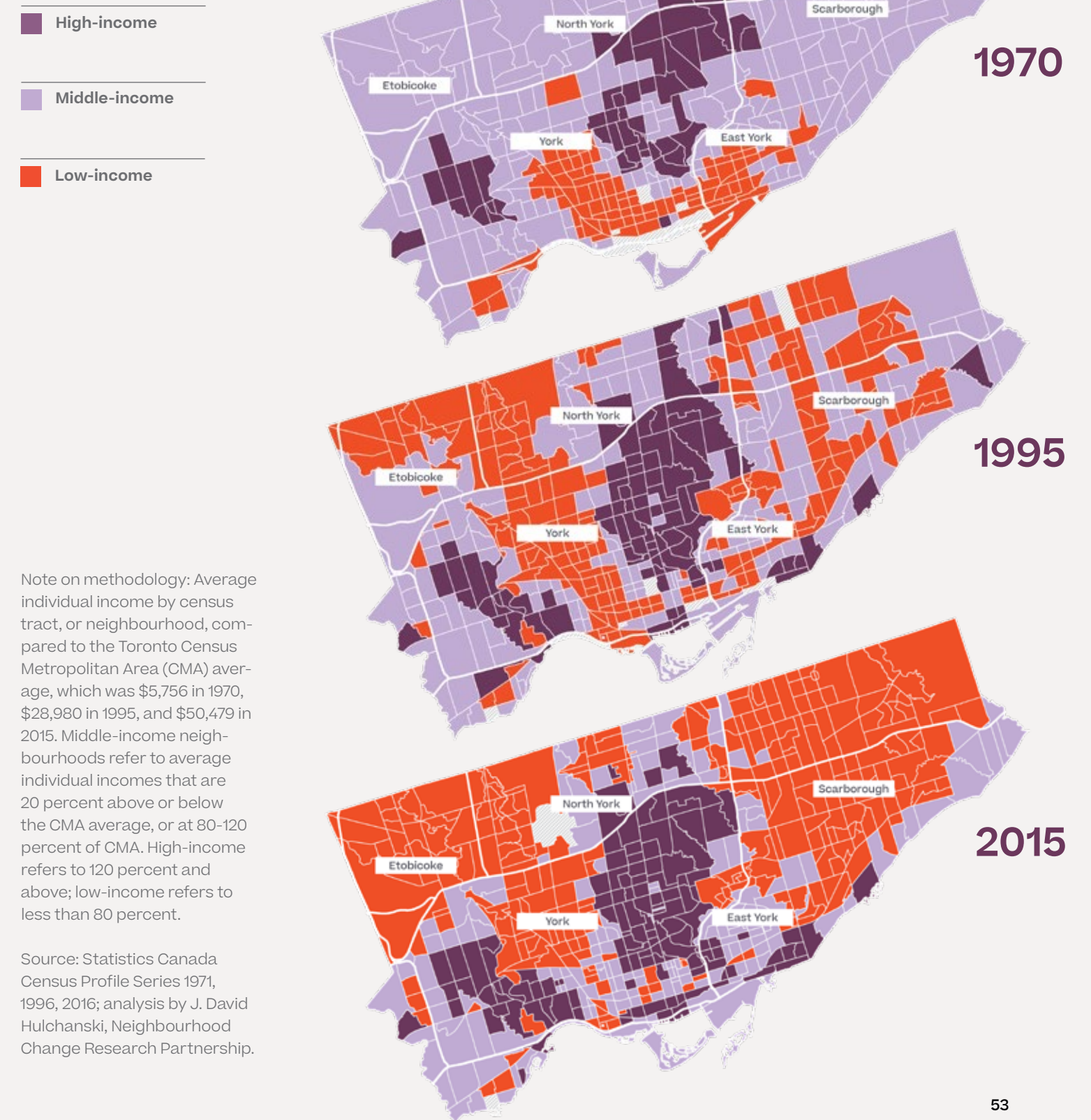
*In spring 2017, Waterfront Toronto issued a Request for Proposals (RFP) for an Innovation and Funding Partner that identified the eastern waterfront as a "unique opportunity for governments, private enterprise, technology providers, investors and academic institutions to collaborate on these critical challenges and create a new global benchmark for sustainable, inclusive and accessible urban development."*

The RFP was a recognition that more of the same development would no longer be sufficient for inclusive growth, given the severity of Toronto's urban challenges. Traditional development — with its low levels of affordability, lack of public realm, lack of commercial space — would not help meaningfully address emerging challenges around sustainability, inclusion, economic opportunity, and mobility.

Instead, these types of trends would require a different path with a different partner: one that could help devise, finance, and implement a bold vision of urban progress for the eastern waterfront.

## Toronto's fading middle-income neighbourhoods

Since 1970, Toronto's neighbourhoods have become increasingly segregated by income, with wealthy areas downtown, low-income areas forced to the edges, and middle-income pockets that continue to shrink.



**Key Term**  
**RFP No. 2017-13**

Waterfront Toronto issued this Request for Proposals in March 2017 to find an "Innovation and Funding Partner."

# Part 2

## Seeking a “Unique Partner” to Help Set New Standards for City Building

Waterfront Toronto’s RFP sought an Innovation and Funding Partner to help advance a new model of urban development that used emerging capabilities to help tackle the toughest urban growth challenges. After a global competition, Waterfront Toronto selected Sidewalk Labs as this partner, given the company’s unique mission to integrate urban planning, technology, and policy to radically improve quality of life for all.

**“Waterfront Toronto is seeking a unique partner, one with invention ingrained in its culture, which can transform conventional business practices and help to establish a benchmark climate positive approach that will lead the world in city building practices.”**

Waterfront Toronto RFP No. 2017-13 (March 17, 2017)

The RFP sought proposals for achieving a series of objectives that went far beyond narrow economic goals.<sup>21</sup>

Specifically, the RFP sought a partner to help achieve a series of “ambitious, high-level objectives” around sustainability, inclusion, economic development, and financial feasibility. These objectives included:

- **Creating** “a globally significant demonstration project that advances a new market model for climate-positive urban developments”
- **Establishing** “a complete community that emphasizes quality of place, and provides a range of housing types for families of all sizes and income levels within a robust mix of uses”
- **Providing** “a testbed for Canada’s cleantech, building materials and broader innovation-driven sectors to support their growth and competitiveness in global markets”

→ **Developing** “a new partnership model that ensures a solid financial foundation, manages financial risk and secures revenue that funds future phases of waterfront revitalization”

Achieving any single one of these objectives would be difficult. Achieving them all in one comprehensive project is a challenge that has eluded large-scale developments in high-demand cities around the world.

For that reason, the RFP recognized the need for this project to become a model for others: a “globally-significant community that will showcase advanced technologies, building materials, sustainable practices and innovative business models.”

**To fully realize key objectives, the RFP noted the potential need to scale new solutions “to subsequent developments on the eastern waterfront.”**

The RFP also recognized the potential challenges of realizing all these goals in a neighbourhood the size of Quayside, including a requirement for respondents to describe their “ability and readiness to take the concepts and solutions deployed on Quayside to scale in future phases of waterfront revitalization.”

To fully realize key objectives, the RFP noted that “it may be beneficial to advance the solutions, processes and partnerships proven successful through the Project to subsequent developments on the eastern waterfront.”

Instead of a more traditional plan, which might lead mainly to condo towers, the RFP sought to forge a new model for a complete, mixed-use community, with outsized levels of affordable and below-market housing. Rather than looking to Quayside for incremental improvements over past development, the RFP sought to use the area as a demonstration for how advances in technology and design can yield substantial improvements in quality of life for residents, visitors, and workers. And instead of seeking modest sustainability gains, the RFP sought an extraordinarily ambitious goal: a climate-positive community.

The RFP was a recognition that today’s developers can do far more to improve urban life using new digital and design innovations, seeking out a partner with “invention ingrained in its culture” to help transform conventional approaches to urban development. The RFP also identified the need for “new and innovative partnerships, funding and investment models” in an era of “constrained” government resources.

Thus, the Innovation and Funding Partner would serve as more than the developer of Quayside, but a partner to work alongside Waterfront Toronto to conceive and execute a forward-looking vision for the eastern waterfront — a partner with the right level of ambition, innovation expertise, and financial resources.

Several local and international firms submitted responses to Waterfront Toronto’s RFP, describing their vision, team strength and experience, and financial capacity. [Following a rigorous evaluation process, Waterfront Toronto selected Sidewalk Labs as Innovation and Funding Partner.](#)

## A new set of capabilities has emerged to address urban challenges

Waterfront Toronto’s RFP emerged at a moment when technology has advanced enough to make genuine breakthroughs on tough urban challenges, if applied with the right level of thought and care.

Cities have always been humanity’s greatest engines of opportunity, invention, and community through their ability to connect so many diverse people in the same place. But they have reached a pivotal moment in their development. The quality-of-life challenges facing Toronto are being experienced by rapidly growing metros around the globe, from New York to San Francisco to London and beyond.

Income inequality is growing, with more and more households unable to afford homes near their jobs.<sup>22</sup> Commuters spend hours a day trapped in traffic congestion. Energy consumption must get leaner and cleaner to protect the environment. Downtown neighbourhoods with limited developable space are squeezed for parks, open spaces, schools, health services, and community centres. The proliferation of data and digital devices in cities has left people rightly concerned about their privacy.

While every city faces these problems in its own way, the symptoms are consistent: places that are less livable, affordable, and sustainable — with fewer chances for the broadest diversity of residents to thrive.

As these challenges rise, so too has the opportunity to address them using emerging digital and physical capabilities, including ubiquitous connectivity, artificial intelligence, and sensing tools, as well as new design and fabrication techniques, including the use of robotics.

This suite of capabilities represents a fourth urban technological revolution of the modern era, potentially every bit as transformative for cities as the steam engine, electric grid, or automobile before it. But as the history of those prior revolutions shows, innovation can have great social benefits or significant drawbacks depending on how thoughtfully it is incorporated into urban life.

The steam engine gave rise to industry and brought new job opportunities, but it led to terrible smog and poor work conditions. Electricity brought cities 24/7 activity, elevators, and skyscrapers, but it furthered reliance on fossil fuels. The automobile made it easier to get people and goods in and out of cities, but it generated enormous congestion and led households to leave cities for the suburbs.

**Applying new technology to cities in a thoughtful way is difficult.**

The urban technologies emerging today face an inflection point.

Self-driving vehicles have the potential to make city streets dramatically safer, but only if they always follow the rules of the road. Factory-based construction can meaningfully improve housing affordability and accelerate development, but these savings must support below-market housing programs and robust public policies to reach their full benefit. Digital connectivity can expand job opportunities and encourage innovation, but it must come with a process that protects privacy and the public good.

The lesson from history, as well as from the recent smart cities movement, is clear: technology is not a quick fix for complicated urban challenges. Instead, new advances must be incorporated into the city with great care to improve urban life, not undermine it.

But infusing new capabilities into the urban environment is hard. Cities are complex places. The technologists who produce ambitious solutions do not speak the same language as the urbanists who must find ways to implement them in the public interest — an “urbanist-technologist” divide. These two groups have very different tolerances for risk, different requirements for transparency, and different expectations for how long it should take to get things done.

That is why no single city stands as a new model for a brighter urban future.

# The four urban tech revolutions



# What makes Sidewalk Labs a unique Innovation and Funding Partner

Sidewalk Labs is an Alphabet company (and a sibling company of Google) founded in 2015 for the very purpose of delivering dramatic improvements in urban life — on the belief that tackling these challenges is possible with careful integration of emerging innovations and people-first urban design. To fulfill that mandate, Sidewalk Labs assembled a unique team from across the worlds of urban planning, urban development, and digital technology.

This diverse team shares a set of beliefs and founding principles about what makes cities great (see sidebar on Page 60), with a company mission “to combine forward-thinking urban design and cutting-edge technology to radically improve urban life.” The team also formed a set of founding objectives, all working towards the goal of creating a district that could set a new standard for urban life:

- ↳ Enable a meaningfully superior quality of life for a diverse population
- ↳ Establish the world’s most innovative urban district
- ↳ Attract and sustain a diverse 21st-century economy, including a cluster focused on urban innovation
- ↳ Create a replicable model that can be implemented around the world
- ↳ Provide financial viability for long-term investors

Following its formation, Sidewalk Labs entered a period of intensive research and development. This work involved consulting outside experts from around the world to advise on the impact of technology on urban life; evaluating hundreds of emerging urban innovations, from self-driving vehicles to new fabrication techniques to clean energy systems; reviewing 50 years of precedents for innovation districts or “smart city” initiatives; and creating the framework for planning a large-scale district with innovation built into its foundation.

Sidewalk Labs undertook feasibility studies based on this concept with several key assumptions. The district would have to be socio-economically diverse, closely connected to the surrounding metropolitan area, and of sufficient scale to support key infrastructure systems.

## Company spotlight

# Sidewalk Labs' founding principles

### People.

Cities are about people. Whenever we improve the human experience, we improve the city. Whenever we ignore it, we make things worse.

### Interactions.

Cities serve people by fostering interactions, both planned and unplanned, among individuals, their ideas, and their creations. Whenever cities are divided — by wealth, race, or any other factor — their people suffer.

### Opportunity.

Cities are engines of opportunity. They are the most effective tool humanity has for lifting people out of poverty, and for enjoying a high quality of life without destroying our planet.

### Community.

The inherent power of cities is that they are shared, which can help everyone realize greater benefits. Cities are ecosystems where people can connect with each other, influence their environment, and contribute to community well-being.

### Adaptability.

Cities thrive when they are able to evolve to meet the diverse and changing needs of their residents, workers, and visitors.

### Diversity.

Openness to people from all backgrounds and walks of life, from Indigenous people to newcomers, is what keeps even the oldest cities moving forward.

### Coordination.

Cities require coordinated actions among people, whether to manage congestion or to preserve public safety. But the most effective coordination prioritizes community-led innovation rather than prescribing solutions.

Based on this analysis, Sidewalk Labs concluded that it could achieve all five founding objectives and create a fundamentally more vibrant, livable, and affordable place: a district that significantly reduces cost of living while providing better housing options (in particular for families), cuts greenhouse gas emissions by at least two-thirds, and gives people back at least an hour of time every day thanks to better transportation options and live-work neighbourhoods leading to shorter commutes.

By the time Waterfront Toronto issued its RFP seeking an Innovation and Funding Partner in spring 2017, Sidewalk Labs had spent more than a year creating this vision and searching the world for the right place to bring it to life.

Toronto — with its devotion to inclusive growth, the challenges it faced, the opportunity along the waterfront, and Waterfront Toronto's shared belief in creating something so much greater than a traditional real estate project — was the perfect match.

## Three capabilities unique to Sidewalk Labs

Several attributes make Sidewalk Labs the ideal partner for delivering an urban project to match the ambitions of Waterfront Toronto and the three levels of government it represents. These include a novel approach to innovation drawn from an interdisciplinary team of urbanists and technologists, the benefits of long-term thinking possible with patient capital, and the ability to catalyze economic development.

# 1

### An interdisciplinary approach to urban innovation.

To achieve its core mission of radically improving urban life for all, Sidewalk Labs has developed a cross-disciplinary team that fundamentally differentiates it from a traditional development partner, drawing leading professionals from the diverse disciplines necessary to plan and execute a project of this scope and magnitude, including urban planning, digital technology, policy, architecture, engineering, real estate development, and finance.

Sidewalk Labs has brought together former public servants — many with backgrounds in city government — who are sensitive to urban issues and respectful of the public sector; urban developers, architects, and planners deeply familiar with the practical challenges of creating places that are both appealing and affordable; and some of the most innovative thinkers, specifically technologists sensitive to urban issues.

Collectively, this team has worked on numerous innovative projects in large cities around the world. These efforts include several major initiatives in New York City, including:

- The transformation of Manhattan's Far West Side, unlocked by the innovative financing approach that sparked the city's first subway expansion in 25 years
- The redevelopment of an unused elevated freight track into the celebrated High Line park
- The design of the pioneering sustainability plan called PlaNYC
- The creation or preservation of 165,000 units of affordable housing across the city
- The development of Cornell Tech, a sustainable academic campus focused on technology and entrepreneurship
- The launch of Google's first engineering office outside Silicon Valley, helping to jumpstart New York City's now booming tech ecosystem

Sidewalk Labs also has established a significant Toronto presence, with more than 30 employees working out of a new office and innovation workshop called "307," which was launched in 2018 in a former fish-processing plant in Quayside.

The High Line converted an abandoned elevated rail line into an internationally acclaimed park that has spurred a dramatic economic resurgence in surrounding neighbourhoods. Credit: Sidewalk Labs



An innovative “value capture” financing approach enabled the extension of the 7 train into the new Hudson Yards development on Manhattan’s Far West Side, New York City’s first subway expansion in 25 years. Credit: iStock



This underutilized site on Roosevelt Island was transformed into Cornell Tech, a technology campus that set new sustainability standards and has helped catalyze New York’s tech ecosystem. Credit: Sidewalk Labs



The Bentway reimagined the area beneath the Gardiner Expressway as a vibrant public space connecting multiple neighbourhoods and offering an exhilarating entrance to Toronto’s waterfront with creative year-round programming. Credit: Ken Greenberg



## Key Term Urban Innovation

is the integration of physical, digital, and policy advances to improve urban life.

This Toronto-based team also includes a mix of civil servants, urban planners, and technologists who have played a role in Toronto’s [West Don Lands](#) and [East Bayfront](#) developments, the [Bentway](#) park beneath the Gardiner Expressway, the [Evergreen Brick Works](#) site, the [Eglinton Crosstown](#) rapid transit line, and many other innovative projects. This team has also worked closely with every public-sector development agency, including [CreateTO](#), [Toronto Community Housing Corporation](#), and [Infrastructure Ontario](#).

Together, this team has developed a unique approach to “urban innovation,” broadly defined as the integration of physical, digital, and policy advances into

the urban fabric to improve quality of life in cities. Much more than just the pursuit of isolated efficiencies associated with “smart cities,” urban innovation requires a thoughtful interdisciplinary approach that sits at the intersection of two of the defining trends of the 21st century: global urbanization and technological change.

Sidewalk Labs team members identify innovations that are beginning to be deployed to improve life in cities, drawing inspiration from the cutting-edge work being done by urban planners and designers around the world, as well as from the capabilities being developed by leading technologists. As a subsidiary of Alphabet, Sidewalk Labs has close

familiarity with many of the technological assets in development by its sibling companies, many of which are highly relevant to urban innovation, ranging from digital infrastructure and geospatial mapping to self-driving vehicles and energy management.

Critically, this approach does not presume that Sidewalk Labs alone would develop all the innovations a city might need. On the contrary, Sidewalk Labs aims to create the open conditions for ongoing improvement – recognizing that the best solutions to urban challenges come not from the top down but rather from the community up.

Of course, in proposing a project that includes digital technology as one tool (among many) to help drive innovation, questions about data collection and management are critical. Sidewalk Labs recognizes that information collected in public space must be put to use for the greater good, protected by a transparent and independent process and robust privacy safeguards, and made publicly accessible for anyone to build on.

# 2

## Access to patient capital that enables a long-term vision.

A second factor that makes Sidewalk Labs unique is that, as a subsidiary of Alphabet, it has an ability to invest in long-term projects.

Sidewalk Labs is a for-profit but mission-driven company backed by Alphabet’s patient capital. That profile makes Sidewalk Labs uniquely suited to pursue longer-term returns, conduct far more robust research and development than a typical real estate developer, and build foundational pieces of urban technology that neither the market nor government can or will, with the goal of jumpstarting innovation by others.

For example, there is no significant marketplace to fund next-generation stormwater infrastructure that responds to heavy rain forecasts, or next-generation energy infrastructure that draws electricity when the power grid is cleanest, or next-generation digital connectivity that creates a secure personal network for households or businesses across an entire neighbourhood.

Backed by Alphabet, Sidewalk Labs can explore new services, tools, and financing structures that can bring these ideas to life over the long term.

Alphabet has a demonstrated commitment to taking a long-term view of investing, where warranted. To take just one example, the Alphabet company Waymo, which focuses on self-driving vehicle technology, has been patiently developing its work for more than a decade, and has now completed millions of miles of test driving.


Sidewalk Labs can likewise take a longer view. This longer view is critical to the innovative urban model sought in the RFP, which calls for a longer investment horizon than traditional real estate. Accordingly, this approach requires financial backers committed to seeing it through – to prove out the initial innovations and ultimately achieve economic viability.

This long-term perspective allows Sidewalk Labs to commit more resources to research and development than a typical real estate developer, to invest in hard assets with higher capital requirements than a typical technology company, and to be patient about earning a reasonable return.

# 3

## An uncommon ability to catalyze economic development.

A third aspect that makes Sidewalk Labs unique is its ability to leverage its approach to urban innovation as well as its relationship with Alphabet to create jobs and new industries that lead to inclusive economic growth – recognizing that this approach must benefit everyone by planning for prosperity with equity.

As described further on Page 156 of this Overview, Sidewalk Labs plans to help catalyze an economic cluster focused on urban innovation, building on Toronto’s substantial existing leadership in emerging fields of technology and urban design. This effort is anchored by the relocation of Google’s Canadian headquarters to the eastern waterfront as part of a new innovation campus. 

Google has a well-documented history of acting as a catalyst for economic development when it commits to expand in a region. When it reaches a critical mass of employees in a city, time and again, significant growth follows.

A Sidewalk Labs study of several U.S. cities found that Google’s arrival correlated with an increase in office value in the area, as well as an uptick in the local retail and residential inventory of 20 to 108 percent, above and beyond the growth exhibited in each city’s central business district.<sup>23</sup> In Chicago, for example, the Fulton Market area experienced a 108 percent increase in office inventory, while growing office space value by 5.7 percent.

More broadly, high concentrations of tech employment in cities have been demonstrated to increase the overall number of non-tech jobs as well, amounting to approximately five new non-tech jobs for every new tech job created.

These efforts would follow initiatives designed to accelerate development through long-term investments in critical infrastructure, such as light rail transit; to implement a general approach to people-first planning that aims to attract talent through a vibrant mix of homes, offices, shops, civic amenities, and open spaces; and to support the creation of an Ontario-based mass timber factory to catalyze an industry centred on this sustainable building material of the future.



See the “Economic Development” chapter of Volume 1, on Page 420, for more details on Sidewalk Labs’ proposals for an urban innovation cluster and prosperity with equity.

The benefits of patient capital include:  
→ More resources for research and development  
→ An ability to prioritize long-term benefits over immediate profits  
→ A willingness to fund foundational urban technologies like next-generation stormwater infrastructure



# Part 3 Launching the Sidewalk Toronto Project and a Robust Public Engagement Process

The Sidewalk Toronto project teams solicited a wide range of feedback from residents, researchers, community leaders, and government agencies across the city. This unprecedented level of preliminary public input — reaching more than 21,000 Torontonians in person to date — helped shape the plan.

**Consultation by the numbers**  
→ ~21,000 people engaged in person during Sidewalk Toronto and 307 events  
→ ~280,000 online views of live-streamed events or videos  
→ More than 11,000 visitors to 307 since June 16, 2018

To date, the Sidewalk Toronto public engagement program has reached more than 21,000 Torontonians of all ages.  
Credit: Jenna Wakani

After Sidewalk Labs was selected by Waterfront Toronto as Innovation and Funding Partner, the Sidewalk Toronto project launched in October 2017. In fact, this designation merely gave Sidewalk Labs the exclusive right to work with Waterfront Toronto and governmental partners to develop a plan and partnership proposal for creating a new type of community on the waterfront.

Public engagement began shortly after the project launch and occurred alongside this period of intensive planning work. This type of extensive engagement from the outset is critical to designing a plan that truly reflects the aspirations and ideas of Torontonians.

In November 2017, some 530 Torontonians showed up on a chilly evening, packing the St. Lawrence Centre for the Arts to hear about the Sidewalk Toronto project. The live-streamed discussion from this initial Town Hall has since been viewed by over 5,000 people online.<sup>24</sup> It was the start of a sprawling conversation that, over the course of the next 18 months, would

become one of the city's largest-ever public discussions on an urban development — and it is still ongoing.

At that first Town Hall, Torontonians said they wanted a community engagement process that would be inclusive, transparent, frequent, wide-reaching, and meaningful. Soon after, Sidewalk Labs released its participation plan: 13 different programs that would ultimately connect the project with tens of thousands of Torontonians.<sup>25</sup>

Sidewalk Labs' subsequent outreach has included dozens of community meetings and programs.<sup>26</sup> A series of large-scale roundtable meetings helped to keep people informed of the latest project updates and asked them to weigh in on key topics, from the principles guiding the planning process to the initial drafts of the plan for Quayside. A series of public talks brought local and global experts to broaden the conversation on safe street design, housing affordability, accessibility, and sustainable buildings.

The engagement plan included two intensive programs for representative groups of Torontonians. One was the Sidewalk Toronto Residents Reference Panel: a group of 36 residents from every corner of the city and diverse backgrounds. Across six Saturday sessions, spread over nine months and dozens of hours, the panelists received an in-depth look at many aspects of the Sidewalk Toronto project and provided a detailed set of recommendations, helping to shape the plan in the best interests of all Torontonians.<sup>27</sup>

The other intensive program was the Sidewalk Toronto Fellows program, designed as an opportunity for



12 early-career Torontonians aged 19 to 24 to travel to cities across North America and Europe and learn about waterfront revitalization and the use of technology. The fellows represented a range of perspectives, skills, and educational backgrounds from all over Toronto. They synthesized their learnings and published a report of recommendations that has directly influenced Sidewalk Labs' planning teams.



Sidewalk Labs' Amina Mohamed discusses a student-created model imagining the future of Quayside with visitors to 307. More than 11,000 Torontonians have visited 307 since it opened in June 2018. Credit: Jenna Wakani

The outreach effort stretched across all ages, including a partnership with the YMCA that led to a kids camp.

Bringing informed scrutiny into the heart of the project was essential. Sidewalk Labs convened six topic-specific advisory boards filled with local experts to challenge and improve the project's assumptions. Project members also held hundreds of one-on-one or small group meetings — including concerted outreach to the business, academic, non-profit, and institutional sectors — and engaged extensively with Waterfront Toronto and public officials at all three levels of government.

This programming was complemented by consultations held by Waterfront Toronto, including Civic Labs that focused on digital

elements of the project and “design jams” that provided stakeholders and residents with an opportunity to engage deeply with aspects of the project focused on vertical living, cycling, and the water.

## Learning from many voices

In June 2018, Sidewalk Labs opened a Toronto office and innovation workspace in Quayside called 307, housed in a former fish-processing plant in Quayside. All summer long, 307 hosted special events that attracted residents, artists, and innovators to learn more about the Sidewalk Toronto project, engage with early explorations into a variety of urban innovations, and provide valuable feedback.<sup>28</sup>

Since its opening, 307 has welcomed more than 11,000 people, creating a dynamic and original venue for consultation and exploration.

In the latter half of 2018, Sidewalk Labs reached out to groups whose voices had been missing and brought them to the design and planning table, and also sought to meet people in their own communities.

Teams worked with members of the Indigenous community for a design workshop; engaged seniors in a charrette around housing; travelled to middle schools to ask children and youth for their ideas; and held a series of co-design sessions with members of the accessibility community and with people with lived experience of addiction and mental health challenges, in collaboration with the Inclusive Design Research Centre at the Ontario College of Art and Design University.<sup>29</sup>

### Consultation by the numbers

- 100+ hours spent co-designing with communities
- ~1,700 total hours volunteered by Resident Reference Panel members
- ~2,300 total hours committed by Sidewalk Toronto fellows
- Worked with 75 experts, across six expert advisory groups


Consultations were also held with residents and students from the inner suburbs of Rexdale and Scarborough, with the Lived Experience Advisory Group to the City of Toronto's Poverty Reduction Strategy, and with the Toronto Community Benefits Network to explore ways in which the project could drive equity, opportunity, and social inclusion.

Planning teams also commissioned ethnographic research that emphasized the inclusion of diverse voices or voices often missed in the traditional public engagement process for reasons such as geography, awareness, or access. These studies focused on public space, family housing, and community care.

### “North of the Water”:

#### Generating open space principles.

Sidewalk Labs collaborated with Dublin, Deloitte's consulting practice on human-centred design, and Park People, Canada's leading charity devoted to improving public space, to understand which factors contribute to a sense of belonging in public space. The “North of the Water” research involved 40 Torontonians who had previously not participated in a formal public engagement process, representing 23 different neighbourhoods and a mix of ages and backgrounds.

The work drew from in-depth interviews, “research walks” through public space, and daily diaries. A final report — available on the Sidewalk Toronto website — resulted in six design principles for great, inclusive public space. 

### “Living Well on the Waterfront”:

#### Understanding health needs.

Sidewalk Labs commissioned the design firm Idea Couture to provide an understanding of the health needs of Torontonians. Twenty residents

and service providers — from a mix of age groups and cultural, professional, and political backgrounds — were interviewed in their homes and communities. Idea Couture and Sidewalk Labs then hosted a co-design charrette at the Centre for Social Innovation in Toronto, with participants from both the public and private sectors, to co-create more than 90 ideas on the future of community care. The resulting report sketched out a concept for a new type of community-based care hub in Quayside.<sup>30</sup>

### “Family Lifestyles”:

#### Informing a new housing toolkit.

With SHS Consulting, a Toronto-based housing research firm, Sidewalk Labs conducted research with 25 low- or middle-income couples and families to uncover the housing needs of Torontonians — beyond the typical downtown resident. This work interviewed couples and families from the Toronto core, Etobicoke, and Scarborough in their homes and conducted a three-hour co-design workshop at 307, where families responded to a unit mock-up, tried out digital prototypes, and filled out workbooks. This direct feedback helped the Sidewalk Labs planning teams develop and validate certain concepts in a new housing toolkit.

To date, Sidewalk Labs has heard first hand from more than 21,000 Torontonians.

But the listening does not stop here. Sidewalk Labs will continue learning from Torontonians and incorporating their feedback as the plans for Quayside and the eastern waterfront come to life.



See the “Public Realm” chapter of Volume 2, on Page 118, for more details on this research.



# Consultation milestones

Spotlight

November 2017 **First Town Hall**  
More than 530 people attend the Sidewalk Toronto project's first town hall meeting, at the St. Lawrence Centre for the Arts, with another 5,700 more participating via livestream.

February 2018 **Public engagement plan release**  
The Sidewalk Toronto team releases its full public engagement plan, outlining dozens of ways for Torontonians to get involved across a variety of programs.

March 2018 **First public roundtable**  
Waterfront Toronto and Sidewalk Labs host the first public roundtable. Roughly 800 people attend in person, with another 1,700 joining via livestream.

May 2018 **Initial data framework and second public roundtable**  
Sidewalk Labs issues its initial Responsible Data Use Policy Framework, laying out the project's proposed approach to data privacy, stewardship, access, and security, and raises the possibility of a data trust to ensure transparent governance over data issues. Sidewalk Labs presents the framework for feedback at the second public roundtable, which is attended by roughly 400 people, with another 1,300 joining via livestream.

June 2018 **Opening of 307**  
Sidewalk Labs opens a Toronto office and experimental workspace at 307 Lake Shore Boulevard East, welcoming the public to learn about the Sidewalk Toronto project and participate in regular programs held in partnership with local vendors. About 2,000 Torontonians attend.

August 2018 **Third public roundtable**  
Waterfront Toronto and Sidewalk Labs host the third public roundtable, focused on initial thinking for public realm, streets, and buildings. Roughly 460 people attend in person, with another 8,700 joining via livestream.

September 2018 **Design jams**  
Waterfront Toronto hosts three "design jams": full-day sessions for local residents to help shape the project. Themes include vertical living, water connections, and cycling.

November 2018 **First look at the plan**  
Sidewalk Labs releases its Draft Site Plan for Quayside, laying out specific goals for the neighbourhood: 40 percent below-market housing, mass timber construction up to around 30 storeys, a 75 percent reduction in greenhouse gas emissions, and more.

December 2018 **Fourth public roundtable**  
Waterfront Toronto and Sidewalk Labs host the fourth public roundtable. Roughly 400 people attend in person, with another 3,400 joining via livestream.

January 2019 **Advisory Working Groups' final meetings**  
After six months to a year of meetings, the Advisory Working Groups — which include 75 experts from across six critical areas: community services, sustainability, mobility, digital governance, housing, and public realm — meet for the final time.

February 2019 **Draft accessibility principles**  
After participating in 70 hours of co-design sessions with the accessibility community and hosting 14 accessibility-related events, Sidewalk Labs releases a set of draft accessibility principles to guide the planning process for the Sidewalk Toronto project.

March 2019 **Unveils new prototypes**  
At the fourth of a series of Open Sidewalk events at 307, Sidewalk Labs unveils two new prototypes: the modular pavement and building Raincoat systems. About 785 people attend.

May 2019 **Reference Panel recommendations**  
The 36-member Residents Reference Panel releases its 60-page final report. Across six sessions spread over nine months, and a collective 1,728 hours, the residents received an in-depth look at the Sidewalk Toronto project, provided feedback, and helped to shape the plan in the best interests of Torontonians.

June 2019 **Draft MIDP release**  
Sidewalk Labs submits its Master Innovation and Development Plan to Waterfront Toronto and the City of Toronto for consideration.

# What we heard: The big themes that emerged during public consultation



For more examples of how public consultation influenced the MIDP, see the “Public Engagement” sections of every chapter in Volume 2.

After each public event, a summary report was produced and posted online, often garnering further comments and interaction. Together, all of these events, consultations, and online postings generated thousands of comments.

Next, the Sidewalk Labs public engagement team sorted through this feedback — all the reports, meeting minutes, session notes, 307 “feedback cards,” and more — and presented it to the planning teams. This process came to characterize the deeply iterative nature of the project, leading from an initial, high-level vision to a detailed final proposal that reflects the shared aspirations of thousands of Torontonians.

Sidewalk Labs has reflected deeply on how this feedback could help the MIDP achieve Waterfront Toronto’s priority outcomes. Throughout all these

consultation touchpoints, several key themes emerged, and each one is reflected in Sidewalk Labs’ proposals throughout the MIDP.

## Theme 1: Focus on priority outcomes

Overwhelmingly, Torontonians have expressed a desire for the project to achieve objectives that match Waterfront Toronto’s priority outcomes: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility (including accessibility to ensure outcomes are available to the broadest diversity of Torontonians), and urban innovations (including data privacy and governance).

**“When I think of the environment, I think of the stewardship of our planet. The things we do have ripple effects beyond our own neighbourhood or our city. And we can try to be carbon-neutral but it’s just not possible in the city we have now. We have to use our resources responsibly.”**

Fatema G., Regent Park

Two visitors who attended “Open Sidewalk: The Accessible City” chat by the picnic tables outside 307. Credit: Jenna Wakani



## How we responded

### Achieving the priority outcomes.

Sidewalk Labs proposes a new development approach that not only meets Waterfront Toronto’s five ambitious priority outcomes but exceeds them beyond the ability of any traditional developer, across the full scale of the proposed IDEA District (see Page 162 for more):

- Generating 93,000 total jobs (including 44,000 direct jobs) and \$14.2 billion in annual GDP output by 2040
- Creating 2,500 manufacturing jobs and catalyzing the mass timber industry through a new Ontario factory
- Realizing a climate-positive district that cuts greenhouse gases by 89 percent
- Generating \$1.4 billion in private funding for below-market housing, supporting an ambitious housing vision with the potential to create 13,600 below-market units (with additional government support)
- Enabling 77 percent of all trips to be made by public transit, walking, or cycling
- Increasing pedestrian space on streets by 91 percent, as compared to traditional development
- Enabling an open ecosystem for urban innovations to flourish, establishing the eastern waterfront as a global hub for new city solutions
- Setting a new standard for responsible data use in cities by protecting privacy and the public good while still supporting innovation

**“I think affordable housing is Toronto’s biggest challenge, and once we put our minds to tackling that, other things will come in its wake. Sidewalk Toronto says there are innovative ways to build pre-fabricated housing so that they can be built faster and less expensively. ... Toronto has a reputation for inclusiveness. I hope it stays that way.”**

Shaheen M., Etobicoke, near the subway terminal

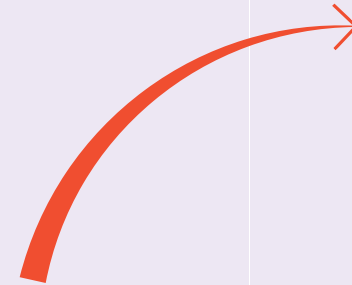


Sidewalk Labs  
Director of Public Realm  
Jesse Shapins presents  
initial ideas for the Quay-  
side plan at a session of  
the Sidewalk Toronto  
Residents Reference  
Panel. Credit: David Pike

## Theme 2: Be inclusive and make room for all

To create a welcoming, inclusive community, Torontonians urged Sidewalk Labs to plan the Sidewalk Toronto project with a broad diversity of populations in mind. All Torontonians should be able to live in, work in, and visit Quayside and the broader eastern waterfront. As round-table participants noted, services and opportunities in these places should be accessible to people elsewhere across the city.

Additionally, Torontonians want to see a broad group of businesses, non-profit organizations, and innovators actively participate in the new opportunities created by the project — especially Canadian companies and entrepreneurs. Consequently, they want to see open standards (“no technology lock-in”), so multiple parties can develop innovations in response to tastes, trends, and technological advances.



## How we responded

### Prioritizing affordability.

Planning for a place where people of all ages, abilities, incomes, and backgrounds can thrive and belong means prioritizing affordability. Towards this end, Sidewalk Labs’ proposals include:

- Setting a housing vision that includes 20 percent affordable housing units (with at least a quarter going towards households with “deep” affordability needs) and 20 percent of units for middle-income households
- Creating adaptable spaces, flexible lease terms, co-tenancy options, new operating tools, and a small business incubator program, making it easier for community groups, arts and cultural installations, and startups to occupy ground-floor space
- Going all-electric affordably through a suite of energy innovations, including an advanced power grid that would keep bills comparable to existing ones while reducing greenhouse gas emissions
- Designing an integrated mobility package that would provide access to a full range of affordable trip options, saving households \$4,000 a year by reducing the need to own a car

### Ensuring accessibility.

To ensure that the IDEA District is accessible to all Torontonians, Sidewalk Labs’ proposals include:

- Continuing to work with the accessibility community to ensure the physical and digital accessibility of the IDEA District
- Extending public transit and connecting into Toronto’s broader

system, helping the whole city access the waterfront

- Expanding publicly accessible spaces open to all, including a wide range of pedestrian-only streets, wide promenades, parks, plazas, and water spaces

### Catalyzing an open ecosystem.

To ensure that Canadian businesses, non-profit organizations, and innovators benefit from the opportunities generated by the project, Sidewalk Labs’ proposals include:

- Identifying appropriate local partners to deliver many of the elements described in the MIDP. The actual business arrangements could take various forms, including but not limited to partnerships, joint ventures, and licence arrangements
- Purchasing third-party technology whenever there are existing companies that have the capability to implement the systems required. Sidewalk Labs plans to give priority to technology local to Toronto, Ontario, or Canada
- Publishing properly protected data in standard formats and making software source code public under free software licences
- Seeding \$10 million to launch a new venture fund focused on Canadian startups

### Creating opportunities for all.

To ensure that the opportunities created by the IDEA District are accessible to everyone, Sidewalk Labs proposes to launch a new workforce development program and a construction jobs program for equity-seeking populations.

### Theme 3: No tech for tech's sake

Torontonians felt strongly that technology should not be the go-to answer for every problem, but used only if it can demonstrably prove to be a better alternative to an existing solution or approach. They want technology that targets significant urban challenges, not technology for its own sake.

As participants from the first public roundtable pointed out, technology alone does not make a community great, but it can potentially enhance a community. As the Residents' Reference Panel put it: "technology should only exist to serve people."



### How we responded

#### Establishing an independent Urban Data Trust.

Sidewalk Labs proposes a new category of data called "urban data," which includes both personal information and information collected in a physical space in the city, where meaningful consent prior to collection and use is hard, if not impossible, to obtain. Sidewalk Labs proposes that an independent, government-sanctioned entity called the Urban Data Trust manage urban data and establish a transparent process for approving the use or collection of urban data — given its potential to impact people's daily lives.

#### Ensuring responsible data use.

To ensure that digital technology is being used to help address significant urban challenges, Sidewalk Labs proposes that the independent Urban Data Trust establish a set of Responsible Data Use Guidelines, and recommends that these guidelines include the need to outline a clear beneficial purpose for the proposed use or collection of urban data.

**“The challenge is to find ways for technology to help foster a sense of community. That seems utopian but it’s possible. ... We can find a way to make it happen. I think Toronto can be a global model for a new kind of technology that helps keep us human.”**

Annick B., West Hill (Lawrence Avenue East and Kingston Road)



Participants at a public roundtable discussion at 307 give feedback on plans and concepts for the Sidewalk Toronto project. Credit: David Pike

## Theme 4: Make sure the public sector has a strong role

Many participants were unsure about the nature of Sidewalk Labs' relationship with government.

While some were excited about the potential of a private company to improve government responsiveness, others were concerned that the project would lead to the privatization of public services. The Residents Reference Panel noted that, historically, government has not kept up with the rapid pace of technological innovation and may not be able to provide appropriate oversight of the project.

Torontonians stressed the importance of public entities having clear mandates and adequate resources to negotiate with Sidewalk Labs effectively, and then to provide strong ongoing oversight and accountability of the partnership as it unfolds.



### How we responded

#### Defining public- and private-sector roles.

A project of this scope, complexity, and duration requires strong public oversight and a regulatory framework predisposed to new approaches. To ensure this outcome, Sidewalk Labs' proposals include:

- Calling for government to designate a public entity to serve as revitalization lead for the IDEA District, with this public administrator empowered to hold Sidewalk Labs and others working in the district accountable
- Establishing a supporting role for Sidewalk Labs that includes providing advisory services, limited technology deployment, and optional infrastructure financing – doing only what is needed to ensure the MIDP's innovative approaches are properly implemented
- Limiting Sidewalk Labs' role as lead real estate developer (working with local partners) to Quayside and Villiers West, for the purposes of proving out the innovative development approach

**“I think I understand the concern about privacy. I share it, too. But in the overall scale I am positive about it, because I think of technology as a tool. Technology does not have a life of its own. It’s humans who decide how it gets used to the benefit or detriment of society. I believe that through proper governance we will strive for good.”**

Ray J., Willowdale

A member of the Residents Reference Panel hands over written notes to a facilitator. Public engagement teams presented all feedback to the Sidewalk Labs planning teams and put the information on the project website for anyone to review. Credit: David Pike



## Theme 5: Prove out the concept

Participants were concerned that, as a project proposed by a private American company, Sidewalk Toronto would not actually benefit Toronto or Torontonians. They urged Sidewalk Labs to be mindful of the project's Canadian context, to engage with local experts and companies, to reach out to Indigenous peoples, and to embrace the idea of "nothing about us without us."

Torontonians expressed concern about the potential that a complex, large-scale, long-term plan could fail. They support achieving a big vision through a phased approach: to prove out the development approach in Quayside as a demonstration project, before extending to successive phases.

As one advisory council member noted, Sidewalk Labs must demonstrate its ability to execute, to earn the right to proceed further.

### How we responded

#### Building trust.

To ensure that the Sidewalk Toronto project benefits Toronto, Sidewalk Labs' proposals include:

- Engaging meaningfully by maintaining its significant Toronto presence via 307, its Toronto workspace that houses public events and local employees
- Continuing to solicit input from diverse groups of Torontonians, including the community, Indigenous groups, Waterfront Toronto, the City of Toronto, and other levels of government
- Starting small and working up to larger areas as urban innovations are proven and priority outcomes are achieved
- Proposing to pay the public sector a share of the upside value if Quayside and Villiers West prove more profitable than expected, as well as a profit-sharing model through which the public sector would receive a share of the profits generated by certain technologies first tested and deployed in the IDEA District
- Earning a "performance payment" if (and only if) Sidewalk Labs reaches a series of performance and growth targets directly tied to Waterfront Toronto's priority outcomes

**"If we are successful Toronto can be a model for other cities. There are lots of concerns but they can all be managed. We can create standards that are better than what we have now. Let's build it so that people will come and say: 'Wow!'"**

Jack G., Sunnyside

## Theme 6: Build on what has been done

Over time, Toronto has made progress in developing the waterfront and in trying new ways to solve urban challenges, thanks in large part to the work of Waterfront Toronto. Torontonians emphasized the importance of building on this record and of recognizing and expanding approaches that have been successful.

From Indigenous consultations, Sidewalk Labs was further reminded that this land has a long history that precedes both industrialization and revitalization. Sidewalk Labs is committed to engaging in ongoing conversations and collaboration with Indigenous communities in Toronto, to treating the land with respect and humility, and to sharing peaceably in its resources.

### How we responded

#### Advancing the work of others.

To ensure that Sidewalk Labs is advancing the work of others who have a proven track record along Toronto's waterfront, Sidewalk Labs' proposals include:

- Taking an evolutionary approach that builds on existing planning approaches, including the Villiers Island, East Bayside, and Keating Channel precinct plans and the Port Lands Planning Framework
- Building on Canada's existing timber industry through support for an Ontario-based factory focused on mass timber building parts and a plan to develop Quayside as the world's first all-mass timber neighbourhood





- Advancing Toronto's successful tech ecosystem by creating a new urban innovation campus on Villiers Island, anchored by a new Google Canadian headquarters and a non-profit, applied research Urban Innovation Institute
- Accelerating the financing of a light rail expansion, building on the extensions identified as critical by existing planning initiatives, such as Waterfront Toronto's Transit Reset efforts
- Meeting and surpassing the City of Toronto's resiliency framework for flood management and establishing an ecological foundation for new sustainable communities built around spectacular parks and nature

**“I like what Waterfront Toronto has been doing recently. ... They’re making spaces to congregate so it feels like a neighbourhood. They understand that it needs to have its own unique flavour, and be more than just condos. That makes me optimistic for Quayside.”**

Alex B. L., Yonge-Dundas Square

## Theme 7: Present a transparent business model

Torontonians highlight transparency as key to gaining public trust, particularly with respect to the financial obligations and benefits in any agreement, initially and over time. The complex and long-term nature of the transaction increases the need for clarity about roles, responsibilities, and how Sidewalk Labs intends to make money.

Common questions around the business model included: Who will own the land? What's in it for you? What's the scale of the project? Will Toronto and Canadian tech companies, real estate developers, or other third parties be involved? And will they be able to work together to solve Toronto's most pressing challenges?



### How we responded

#### Designing a fair transaction.

Sidewalk Labs proposes to make money from the real estate development it does, charges on any financing it provides, and, if all goes well, a performance payment considered at a time when the project's success against agreed-upon metrics can be judged. The project's finances and transactional framework are designed to ensure that all project participants, public and private, are treated fairly, and that the public interest is protected.


**“People want to live in cities, but things like congestion and transit are problems everywhere. Eventually, the cities that figure out a better way to organize themselves are going to win.”**

Jason S., First Chinatown, then Riverdale

# Sidewalk Labs' intentions for the Sidewalk Toronto project

Sidewalk Labs' motives for pursuing Waterfront Toronto's RFP and its overall business model have been subject to speculation, even a fair amount of cynicism. Many of these concerns can be addressed upfront with a few clear statements:

Sidewalk Labs is not seeking to sell personal information or use it for advertising. Sidewalk Labs has committed that it would not sell personal information to third parties or use it for advertising purposes. It also commits to not disclose personal information to third parties, including other Alphabet companies, without explicit consent. Finally, Sidewalk Labs has proposed that an independent entity approve proposed collections and uses of urban data in the project area by all parties, including Sidewalk Labs.

In the view of Sidewalk Labs, digital technology is never the end goal, but rather a tool that empowers people to improve quality of life. 

Sidewalk Labs is not motivated by a desire to export Canadian talent or intellectual output to the United States. Sidewalk Labs is not an internet company that can exist anywhere. An important part of its business model involves going "all in" on physical places. This proposal seeks to make Toronto such a place. Moreover, Sidewalk Labs has committed to share profits with the public sector of certain technologies first deployed in Toronto.

Finally, Sidewalk Labs is not trying to develop the broader Port Lands. Sidewalk Labs' role as a real estate developer would be restricted to two areas, Quayside and Villiers West, and undertaken for the limited purpose of proving out the innovative development approach. Even in those locations, Sidewalk Labs expects to have local partners. In total, Sidewalk Labs proposes leading development (with local partners) on less than 7 percent of the eastern waterfront. (See Page 90 for more details on proposed project roles.)

Sidewalk Labs' two primary goals are quite simple.

## In the view of Sidewalk Labs, digital technology is never the end goal, but rather a tool that empowers people to improve quality of life.

# 1

**Demonstrate the impact of urban innovation on quality of life.**

Sidewalk Labs is a mission-driven company. That mission is to combine forward-thinking urban design and cutting-edge technology to radically improve urban life. Sidewalk Labs is motivated to pursue this project by a desire to create places that apply 21st-century concepts in design and technology to achieve improvements in nearly every dimension important to quality of urban life, from creating jobs and reducing the cost of living to increasing mobility and advancing sustainability. This mission calls for an urban district of sufficient scale to demonstrate the value of an integrated approach for achieving measurable benefits on critical priorities.

# 2

**Earn a reasonable return.**

Sidewalk Labs is a commercial venture, and although it is mission-driven, it is also a subsidiary of a publicly owned company. Sidewalk Labs has already invested more than \$50 million USD, with no guarantees of being repaid, to develop this MIDP. This investment, however, represents a small share of the overall cost to the company if the project is approved. Sidewalk Labs would seek to earn a reasonable return on its investment.



See the "Digital Innovation" chapter of Volume 2, on Page 374, for more details on Sidewalk Labs' proposals for responsible data use.

# Submitting the Master Innovation and Development Plan

Informed by its robust engagement process, Sidewalk Labs conducted an intensive planning process over the past 18 months, with input from the local community, Waterfront Toronto, the City of Toronto, and other levels of government. This effort turned Sidewalk Labs' initial ideas, as expressed in the RFP response, into a development plan with the potential to serve as a demonstration for an inclusive community that puts urban innovation to work for better quality of life.

While this planning effort focused on the Quayside neighbourhood and surrounding parts of the eastern waterfront, Sidewalk Labs believes the innovations applied to this project can make an impact in other communities along the waterfront, throughout the city, and around the world.

It is important to note that the opportunity to conduct this planning work came with no guarantee of approval and no exchange of land. On the contrary, Sidewalk Labs, Waterfront Toronto, and the city must all agree to move forward for the project to continue. Sidewalk Labs was willing to stake \$50 million<sup>31</sup> USD to develop this plan because it believes the resulting plan will not just be “good enough” to meet approval but will demonstrate a new path forward for inclusive urban growth in the digital age.

The result of this process is this Master Innovation and Development Plan (MIDP), submitted by Sidewalk Labs for consideration to Waterfront Toronto and all levels of government. Sidewalk Labs is honoured by the opportunity to present the MIDP, and by the prospect of working alongside Waterfront Toronto and the three levels of government it represents to advance this plan for the benefit of Toronto.

The submission of this MIDP is not the end of the process — far from it. Waterfront Toronto will consult the public on the plan and run an evaluation process. Waterfront Toronto and Sidewalk Labs would then negotiate updates and revisions to the MIDP. Should both parties agree to move forward, individual components would be subject to relevant municipal, provincial, and federal approvals.

**Sidewalk Labs is  
honoured to present  
this MIDP, and to work  
towards advancing  
the plan for the  
benefit of Toronto.**

# The Plans

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## Part 1

Introduction to the  
Plans: Geography, Role,  
and Innovation Approach

p90

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## Part 3

The River District:  
Creating an Innovation  
Ecosystem to Build on  
Quayside's Impact

p130

---

## Part 5

A New Economic Engine  
That Drives Outsized  
Job Growth on an  
Accelerated Timeline

p156

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## Part 2

Quayside: A Complete  
Community and a Proving  
Ground for Innovation

p96

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## Part 4

Committing to Diversity,  
Equity, and Inclusion

p150



# Part 1 Introduction to the Plans: Geography, Role, and Innovation Approach

Sidewalk Labs proposes a vision — beginning with Quayside — designed to realize and maximize ambitious quality-of-life goals by integrating innovations into the physical development.

## Key Terms

**Quayside:**  
A five-hectare neighbourhood connecting downtown Toronto and the eastern waterfront.

**River District:**  
A 62-hectare area of the eastern waterfront consisting of five neighbourhoods (Keating East, Villiers West, Villiers East, Polson Quay, and McCleary).

**IDEA District:**  
A 77-hectare area consisting of Quayside and the River District (with optional participation for the privately held Keating West parcel) capable of maximizing quality-of-life impacts in a financially feasible way.

Throughout its planning process, Sidewalk Labs has tried to directly respond to Waterfront Toronto’s priority outcomes as well as the City of Toronto’s Official Plan, which embraces the use of “innovative implementation solutions” to help address tough urban challenges and describes the future city as one where “the private sector marshals its resources to help implement public objectives.” Specifically, the Official Plan calls for leaders in the private sector “with the courage to take risks, develop proactive solutions and then follow through.”<sup>32</sup>

Consistent with these values, the plans and ideas introduced here put forward innovative implementation solutions, aim to leverage private resources to realize public objectives, and advocate for sustainable communities along the eastern waterfront.

To achieve these goals, the MIDP proposes to transform a small portion of the eastern waterfront — less than one-third, to be developed over 20 years — into a 77-hectare IDEA District that represents an innovative new development model for how the private sector can support the public sector in tackling the toughest growth challenges. The IDEA District consists of two phases.

## 1

### Quayside.

The first phase of the IDEA District would be Quayside, a five-hectare neighbourhood that sits at the crucial transition point to the broader eastern waterfront. The Quayside development plan provides the opportunity to lay out the foundations for achieving the priority outcomes,

forming the basis for identifying the required innovations and the critical and advanced infrastructure to make it all happen.

Sidewalk Labs proposes to lead this development, working with local partners, and to take the risk of proving the market viability of a proposed development model that incorporates urban innovations to achieve ambitious quality-of-life objectives.

## 2A

### The River District: Villiers West.

The second phase would be the River District, a 62-hectare area made up of five neighbourhoods surrounding the renaturalized Don River: Keating East, Villiers West, Villiers East, Polson Quay, and McCleary. Extending Quayside’s innovations into the River District would unlock opportunities for Waterfront Toronto and the city to fully realize priority outcomes.

(A Keating West parcel of roughly eight hectares that sits between Quayside and Keating East already has approved plans; the private land-owners there can choose to participate in the IDEA District if they want.)

In Villiers West, a parcel of nearly eight hectares, Sidewalk Labs proposes to be lead developer, working with local partners. Villiers West would serve as a catalyst for a new economic cluster focused on urban innovation, anchored by a new Google Canadian headquarters and a new Urban Innovation Institute, and it could further prove out the innovations necessary to achieve Waterfront Toronto’s priority outcomes.

In total, Sidewalk Labs proposes leading development (with local partners) on less than 7 percent of the eastern waterfront.<sup>33</sup>

# 2B

## The River District: Beyond Villiers West.

Planning and development for the River District would be led by Waterfront Toronto and the City of Toronto, working with various development partners. It is Waterfront Toronto's mandate to lead the urban planning, design, infrastructure delivery, and real estate development associated with broader geographies along the eastern waterfront.

Sidewalk Labs proposes that government designate a public entity to serve — or in the case of Waterfront Toronto, continue to serve — as revitalization lead for the IDEA District.

Beyond Quayside and Villiers West, Sidewalk Labs proposes to play a different role across the IDEA District, focusing on three supportive areas:

- **Planning, design, and implementation.** In this role, Sidewalk Labs proposes to support Waterfront Toronto's ability to provide cutting-edge infrastructure and development that meets agreed-upon guidelines and standards for innovation, with the goal of realizing key quality-of-life objectives around economic opportunity, affordability, mobility, and sustainability. Building on the Quayside innovations, Sidewalk Labs proposes to work with Waterfront Toronto to prepare a set of "Innovative Design Guidelines

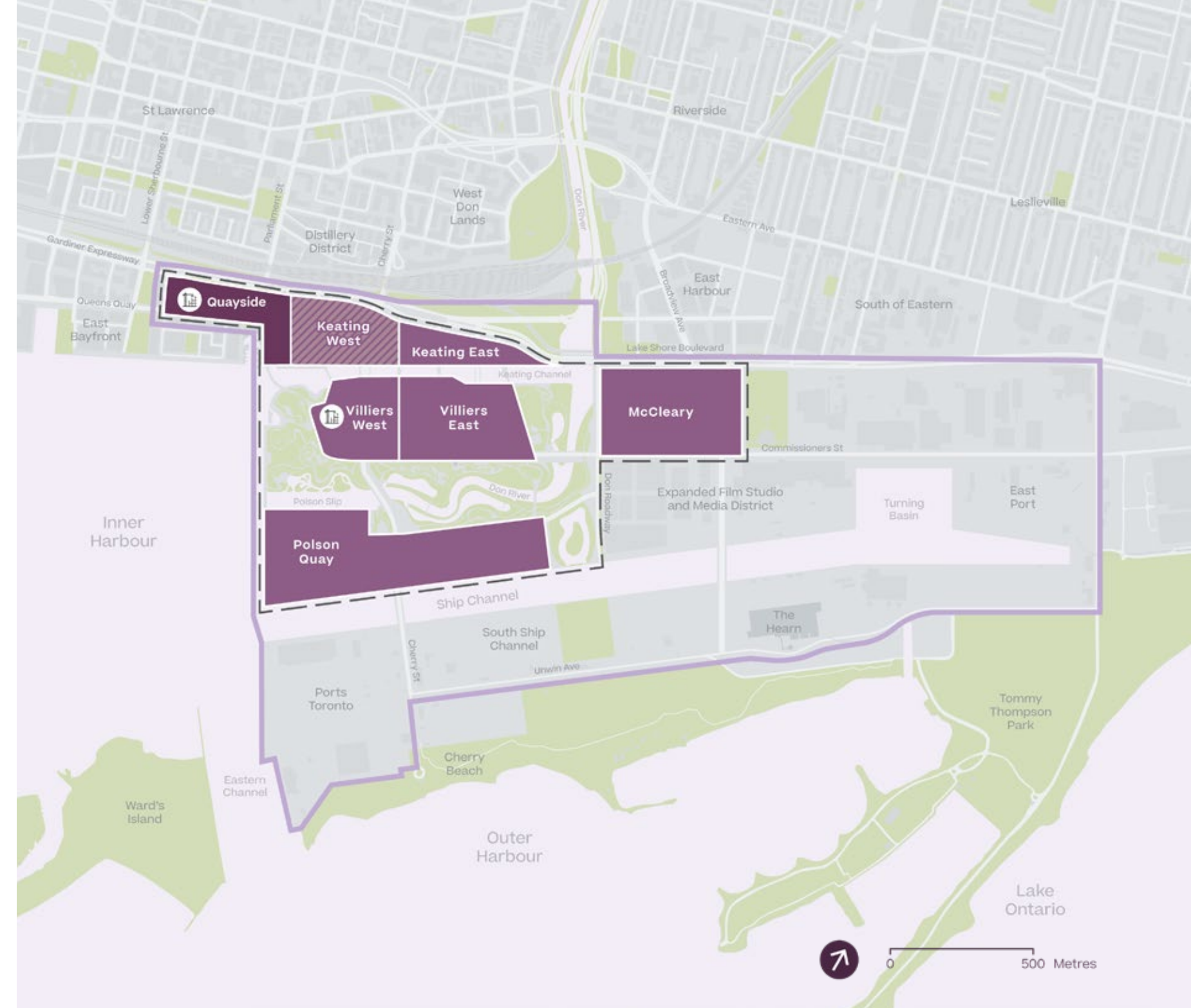
and Standards" that can be used to ensure that all developments in the IDEA District achieve the desired outcomes. Waterfront Toronto would be responsible for working with government to approve them and then ensure their implementation as development proceeds.

- **Technology support.** In this role, Sidewalk Labs proposes to deploy a limited set of technologies required to achieve key project objectives — defined in Waterfront Toronto's original RFP as "purposeful solutions" — including a dynamic curb that can adjust throughout the day to accommodate vehicle traffic or pedestrian uses, and a standardized mount system that can help catalyze digital innovation by third parties.
- **Optional infrastructure financing.** In this role, Sidewalk Labs proposes to provide optional support financing critical infrastructure, such as upfront debt service, to help ensure that the city and waterfront can invest holistically in systems that unlock the potential for future development.

These supportive roles reflect Sidewalk Labs' belief that the greatest cities are built from the community up, and that the proposed innovation strategies for achieving public policy goals can only be successful if widely adopted by Toronto's broader development and innovation communities. 🏠



See the "Innovation and Funding Partnership Proposal" chapter of Volume 3, on Page 82, for more details on Sidewalk Labs' proposed roles.



## Map The IDEA District and eastern waterfront geography

A public administrator and the three orders of government would determine whether to extend the IDEA District beyond Quayside and Villiers West. At its full anticipated scope, the IDEA District would consist of seven neighbourhoods. The neighbourhood names in the map above were drawn largely from the Port Lands Planning Framework and other city planning documents.

- Eastern waterfront
- - - IDEA District
- Phase 1: Quayside
- Phase 2: River District
- ▨ Optional participation in Phase 2
- 🏠 Sidewalk Labs develops real estate and advanced systems

# A planning approach that integrates innovations into the physical environment

The development of the IDEA District provides a rare opportunity to achieve — and exceed — the priority outcomes established by Waterfront Toronto for the MIDP: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

These objectives have proven largely elusive for a variety of reasons. They speak to problems that cannot be solved in a single development and require a scale of coordination that is difficult, if not unprecedented. In some cases, the solutions are contrary to market forces. For many of these challenges, the technology simply did not exist to successfully address the issues.

That has the potential to change today. The scale of the IDEA District offers the opportunity to create a truly transformative experience — at the moment when technology has finally advanced enough to make genuine breakthroughs, if applied with the right level of thought and care. But realizing this opportunity for the betterment of people's lives and urban economies requires a new approach to urban planning and a strong focus on quality-of-life objectives.

Sidewalk Labs' approach to planning centres around providing the physical, digital, and policy conditions for innovation on which an array of third parties can build and explore new solutions to urban challenges, with the goal of achieving long-term quality-of-life goals.

To catalyze this approach, Sidewalk Labs identified the building blocks of a neighbourhood — mobility, public realm, buildings and housing, and sustainability — and explored how urban innovations within these areas could support a new kind of community and infuse flexibility into the built environment.

Many of these advances, from mobility management systems guiding the streets to building systems optimizing energy use, are made possible by connectivity and digital innovation. Sidewalk Labs aims to establish the open foundation for a wide array of third parties to address urban challenges using urban data. To ensure that digital innovation aligns with the public interest, all digital proposals — including those by Sidewalk Labs — would be subject to approval from an independent entity tasked with overseeing a transparent process for responsible data use, which would apply in addition to existing Canadian privacy laws.

No community is complete without a cross-cutting layer of social infrastructure that could provide residents with programs to support health and well-being, education and work opportunities, civic life, and arts and culture. Sidewalk Labs' approach would integrate physical spaces, trusted delivery partners, and digital complements to enable a healthy and engaged community where everyone can grow, thrive, and belong.

Within each of these areas, the planning team incorporated innovations into the development designs with an eye towards achieving Waterfront Toronto's priority outcomes and improving quality of life for all. This goal is reflected in the vision statements for each of the urban innovation areas:

- **Mobility:** A transportation system that reduces the need to own a car by providing safe, convenient, connected, and affordable options for every trip.
- **Public Realm:** A system of streets, parks, plazas, and open spaces that encourages people to spend more time outdoors, together.

- **Buildings:** Sustainable buildings that can be constructed and adapted far more quickly and support a lively mix of uses.
- **Housing:** A program with 40 percent below-market units to improve affordability and expand options for all households.
- **Sustainability:** A new standard of sustainability that creates a blueprint for truly climate-positive communities.
- **Social Infrastructure:** Health, civic life, learning, and workforce initiatives and facilities that enable people to thrive.
- **Digital Innovation:** Catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data in cities. 



For more details on the urban innovations proposed by Sidewalk Labs, see Section C of the Overview (on Page 162) as well as Volume 2.

## Key Term Urban data

Information gathered in the city's physical environment, including the public realm, publicly accessible spaces, and even some private buildings.

## Part 2

# Quayside: A Complete Community and a Proving Ground for Innovation

Responding to the feedback from 18 months of public engagement, Sidewalk Labs proposes a plan for Quayside that would create a diverse live-work neighbourhood, connect to the GTA, generate new economic opportunity for more people, and explore new innovations to dramatically improve quality of life.



# The Quayside neighbourhood

This view of the Quayside site plan looks northeast towards the Gardiner Expressway. The plan incorporates a series of innovations around transportation, social infrastructure, housing affordability, digital tools, sustainable infrastructure, building construction,

and public space — with the goal of improving quality of life for Torontonians. It reflects 18 months of public engagement needed to refine these planning ideas and start to achieve Waterfront Toronto's ambitious priority outcomes.





This plan view of Quayside illustrates the neighbourhood's extensive pedestrian pathways, as well as a new grand public space at Parliament Plaza.

The plan for Sidewalk Toronto begins in Quayside, which marks the beginning of the eastern waterfront, at the head of Parliament Slip.

Located just southeast of downtown at the nexus of many key corridors — Queens Quay, Parliament Street, Lake Shore Boulevard East, and the Inner Harbour — Quayside can become a new connection point that draws on the energy of surrounding neighbourhoods and makes the eastern waterfront more accessible to Torontonians and better connected to the city fabric.

### Quayside as a live-work community

Quayside would have a dramatically different development profile from conventional waterfront revitalization in Toronto. Left to the market, Quayside would likely align with current zoning for the site,

which calls for primarily residential uses and 20 percent affordable housing.<sup>34</sup>

In contrast, Sidewalk Labs proposes a more diverse live-work community in Quayside, that can sooner and more dramatically realize the objectives of existing precinct plans designed for the area.<sup>35</sup>

A cornerstone of Sidewalk Labs' proposed development program for Quayside is that it calls for roughly 33 percent of the site's allowable floor area to be devoted to non-residential uses, encouraging a mix of office space for companies and startups, ground-floor commercial space for retailers and makers, and social space for schools and community groups, in addition to homes.

For Quayside's residential spaces, Sidewalk Labs proposes an unprecedented commitment to mixed-income housing, with 40 percent of housing units at below-market rates.

### Key Term AMR

The City of Toronto defines affordable rental housing as being at or below 100 percent Average Market Rent (AMR). Sidewalk Labs defines "below-market" to include mid-range rental housing at 100-150 percent AMR as well.

This housing vision includes 20 percent of units for traditional affordable housing (a quarter of which Sidewalk Labs would dedicate to "deep" affordability needs, defined by the city as being at or below 60 percent Average Market Rent). The vision further expands affordability to put 20 percent of units towards below-market housing for middle-income households.

In total, the Quayside plan calls for roughly 2,600 residential units, including roughly 1,000 below-market units.

Sidewalk Labs estimates that this live-work approach would also result in major economic development, with more than 3,900 jobs eventually located in Quayside and more than 9,000 new jobs in Ontario overall. (See Page 156 for more on economic development.)

## Quayside development table

	Quayside (approximate square feet)	Quayside (program percentages)	Zoning bylaws <sup>36</sup>
<b>Total developable space</b>	<b>2.65 million sq ft</b>	<b>100%</b>	<b>3.17 million sq ft</b>
<b>Residential space</b>	<b>1.78 million</b>	<b>67% (of total program)</b>	<b>95% (of total program)</b>
Condo	800,000	45% (of residential)	
Market rental	270,000	15% (of residential)	
Below market	710,000	40% (of residential)	
<b>Non-residential space</b>	<b>870,000</b>	<b>33% (of total program)</b>	<b>5% (of total program)</b>
Traditional commercial space	340,000	39% (of non-residential)	
Loft commercial space (3rd to 12th floors)	70,000	8% (of non-residential)	
Stoa spaces (1st or 2nd floor)	400,000	45% (of non-residential)	
Elementary school	60,000	7% (of non-residential)	

Numbers may not add up due to rounding. All numbers are subject to change based on further consultations and refinement of the plan.

# Quayside as a proving ground for urban innovations

Quayside would be a complete community and a great neighbourhood in its own right. It would also serve as a proving ground for what is possible with a new approach to development that integrates new innovations into the physical environment.

As an underutilized and predominantly publicly owned neighbourhood, Quayside presents an opportunity to explore and refine new solutions to pressing urban challenges, from energy use to housing affordability to street safety. The Quayside development plan integrates emerging physical and digital tools beyond those used in the traditional development process, with the ultimate goal of improving people's lives.



## Mobility.

The Quayside plan is built around connecting to surrounding neighbourhoods and the rest of the city through a network of people-first streets, walkable street designs, enhanced cycling options, accessibility initiatives, and new mobility services that encourage shared trips. Light rail transit would be extended through the neighbourhood to improve connections with other parts of the city.



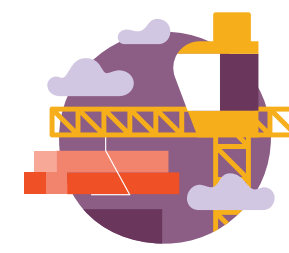
## Public Realm.

Quayside's public realm consists of an integrated set of parks, plazas, and open spaces designed to draw people of all ages and abilities outdoors year-round, as well as to bring people down to the water. This approach includes flexible lower-floor stoa spaces featuring a lively mix of traditional retailers, pop-ups, production or maker spaces, and community uses — all seamlessly integrated with the sidewalks and plazas to create a vibrant streetscape.



## Housing.

As described earlier, Quayside's residential program strives towards an unprecedented range of housing options for people of all incomes, blending market- and below-market units throughout buildings and across the neighbourhood. Additionally, a shared equity program aims to expand home-ownership opportunities for middle-income households that might otherwise not be able to afford a large down payment.



## Buildings.

All of the buildings in Quayside are planned to be built with sustainable mass timber through a modular, factory-based construction process. This approach would help catalyze an Ontario-based industry focused on sustainable construction and building technologies. Flexible Loft spaces are designed to accommodate a mix of residential and non-residential uses that can evolve to meet the neighbourhood's changing needs.



## Sustainability.

The Quayside plan would result in a low-carbon, resilient neighbourhood with a significant number of environmental innovations, including sustainable building materials and designs, an advanced power grid for electricity, a clean thermal grid for heating and cooling, a smart disposal chain designed to increase recycling, and active stormwater management.



## Digital Innovation.

Widespread digital infrastructure and ubiquitous connectivity would be incorporated in the plan through a fast and secure fibre-optics network and through standardized mounts designed to enable digital innovation by a range of community and entrepreneurs. These tools are designed to support innovation while also adhering to the appropriate guidelines, policies, and protocols to ensure privacy protection and responsible data use.



## Social Infrastructure.

In Quayside, the proposed development program would include building space for an elementary school co-located with a daycare facility, as well as ground-floor space for evolving community uses, including a neighbourhood centre for health and other care services, a community centre designed to inspire civic engagement, and ongoing educational programs.



# Mobility

A transportation system that **reduces the need to own a car by providing safe, convenient, connected, and affordable options** for every trip.

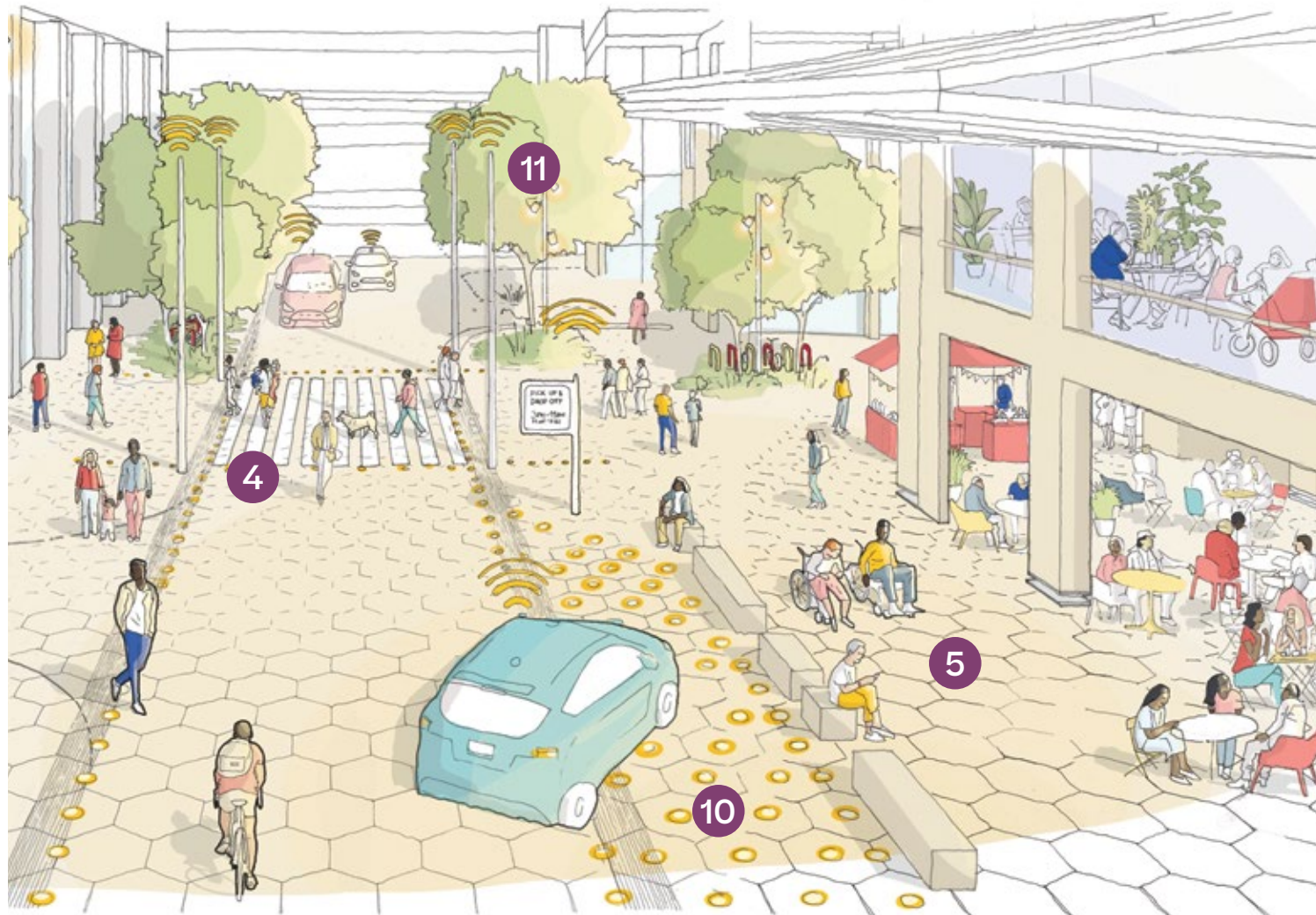
The Quayside plan integrates safe street design, innovative policy approaches, and new digital tools to create a balanced set of mobility options and connect into the surrounding city. Extensive accessibility initiatives would help meet the needs of all travellers.<sup>37</sup>

Anchored around a reimagined Queens Quay, the Quayside plan would support light rail expansion, provide exceptional

bike and pedestrian infrastructure, support new mobility services priced for sharing, and encourage electric vehicles. While designed for safe operation today, Queens Quay would also anticipate the potential benefits of self-driving technology.

Taken together, these mobility initiatives would encourage 73 percent of all trips to be made using public transit, walking, or cycling.

All streets in Quayside (such as Bonnycastle Street, shown here) would feature a range of innovations that balance the needs of all users.



## Proposed urban innovations

- 1 A self-financing light rail transit extension would connect residents to job hubs and draw workers and visitors to the waterfront from all over the city.
- 2 A vast network of pedestrian and cycling infrastructure featuring wider sidewalks, wider and heated bike lanes, and accessibility elements would encourage walking and cycling and support people using wheelchairs or other assistive devices.
- 3 New mobility services such as ride-hail, bike-share, electric vehicle car-share, and e-scooters would provide affordable alternatives to private car trips.
- 4 “People-first” street types would be designed for different speeds and primary uses, including Boulevards and Transitways for public transit and vehicle traffic, Accessways for cyclists, and Laneways for pedestrians.
- 5 A wide set of accessibility initiatives would include curbless street design, wider sidewalks, heated pavement, wayfinding beacons, and accessible ride-hail vehicles.
- 6 An integrated mobility subscription package would establish a new pricing model that enables residents and workers to see all their trip choices in real time and pay in one place.
- 7 A freight “logistics hub” would feature a consolidated shipping centre (housed alongside on-demand storage and a borrowing library) with underground delivery, reducing truck traffic on local streets and improving convenience.
- 8 A mobility management system would use real-time information to coordinate travel modes, traffic signals, and street infrastructure, and to apply pricing to curb and parking spaces — reducing congestion and encouraging shared trips.
- 9 A district parking management system would incorporate high-density on- and off-site parking, on-demand retrieval of vehicles, and electric-vehicle charging.
- 10 Dynamic curbs are flexible street spaces that would provide passenger loading zones during rush hour and public spaces in off-peak times.
- 11 Adaptive traffic signals would prioritize pedestrians who need more time to cross a street or transit vehicles running behind schedule.



# Public Realm

A system of **streets, parks, plazas, and open spaces** that **encourages people to spend more time outdoors, together.**

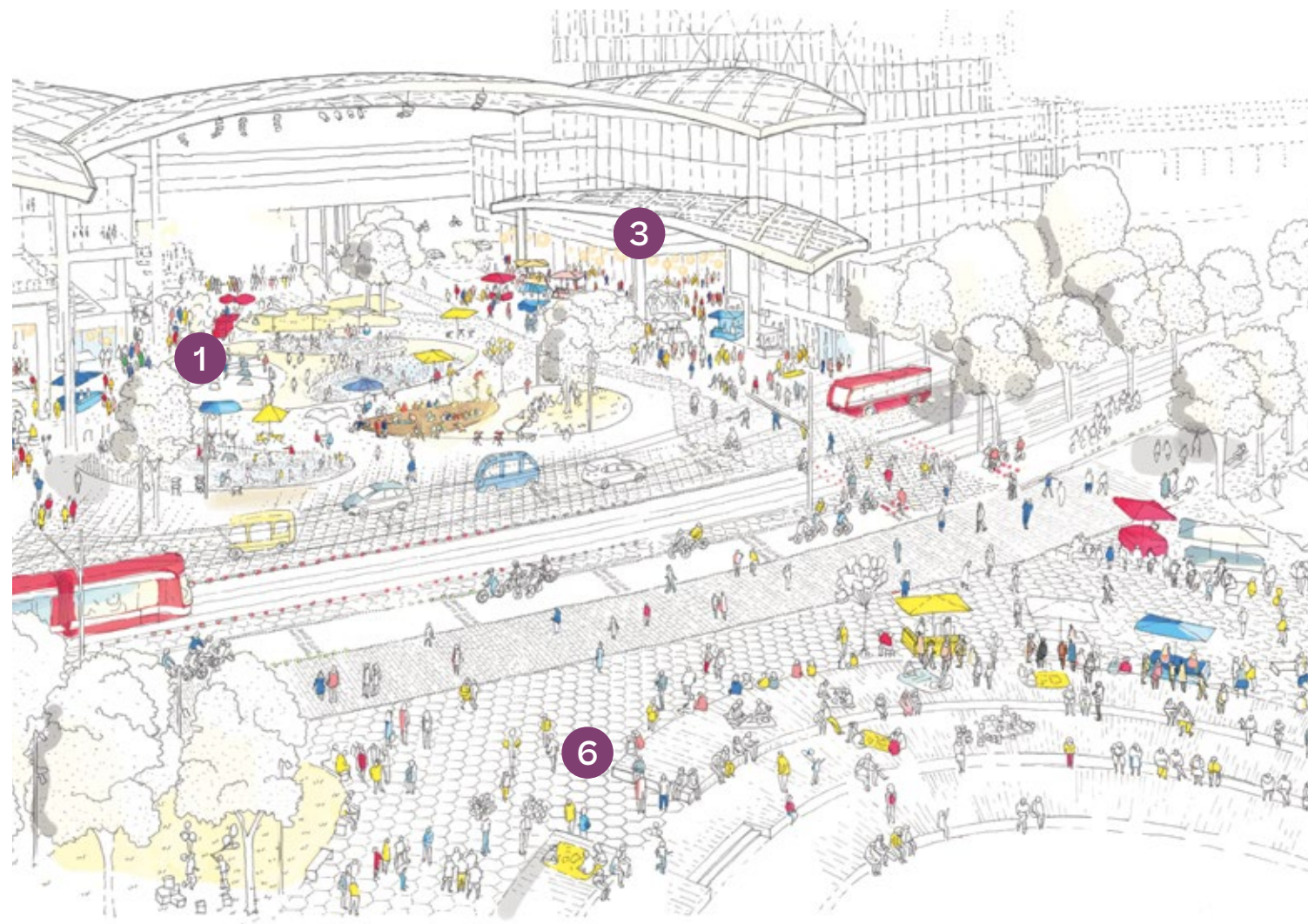
The 6,000-square-metre Parliament Plaza would be surrounded by stoa space and include dynamic water features and an overhead canopy for weather protection in all seasons.

The Quayside plan features an expansive public realm designed to bring together residents, workers, and visitors of all ages and abilities.<sup>38</sup>

The heart of Quayside's public realm is Parliament Plaza, a flexible space that incorporates water features, ground-floor markets, and public programming.

Parliament Slip would provide direct access to the water, and Silo Park would provide a lively mix of recreational facilities.

Adaptable lower-floor "stoa" spaces can support a wide variety of retail, office, production, and community uses. Outdoor comfort systems could increase the number of comfortable hours by 35 percent, drawing people outside in all seasons.



## Proposed urban innovations

1

Quayside's three primary open spaces would be infused with flexibility to encourage year-round use, including a dynamic water feature and performance space at Parliament Plaza, barges on Parliament Slip, and multi-sport fields in Silo Park.

2

An outdoor-comfort system (featuring Raincoats to shelter sidewalks; Fanshells to cover open spaces; and Lanterns to block wind) could dramatically increase the amount of time it is comfortable outside.

3

Flexible ground-floor "stoa" spaces designed to accommodate a wide range of uses beyond traditional retail would ensure that the community has a lively mix of shops, restaurants, cafés, art installations, community gatherings, and maker studios.

4

A leasing platform called Seed Space would help small businesses and other retailers book a wide range of stoa sizes, from anchor-tenant spaces to micro-stalls, for short- or long-term uses.

5

People-first street designs would eliminate curbside parking, widen sidewalks, and increase tree plantings to improve safety and activate street life.

6

Modular pavement — hexagonal pavers that can be replaced or repaired in mere hours by a single person with a handheld machine — would dramatically reduce the amount of time streets spend closed down for road or utility work and increase flexibility of street uses.

7

A proposed entity called the Open Space Alliance would coordinate programming, operations, and maintenance across Quayside's parks, plazas, streets, and water spaces for a more responsive public realm.

8

Shared programming infrastructure, such as projectors and lighting options, would enable the community to program open spaces themselves.

9

A real-time map of public realm assets — including park benches and landscaped gardens — would enable proactive maintenance and keep spaces in good condition.

10

Open access channels located under removable pavers would allow for easy utility access and greater flexibility to incorporate new systems as they are developed over time.



# Buildings and Housing

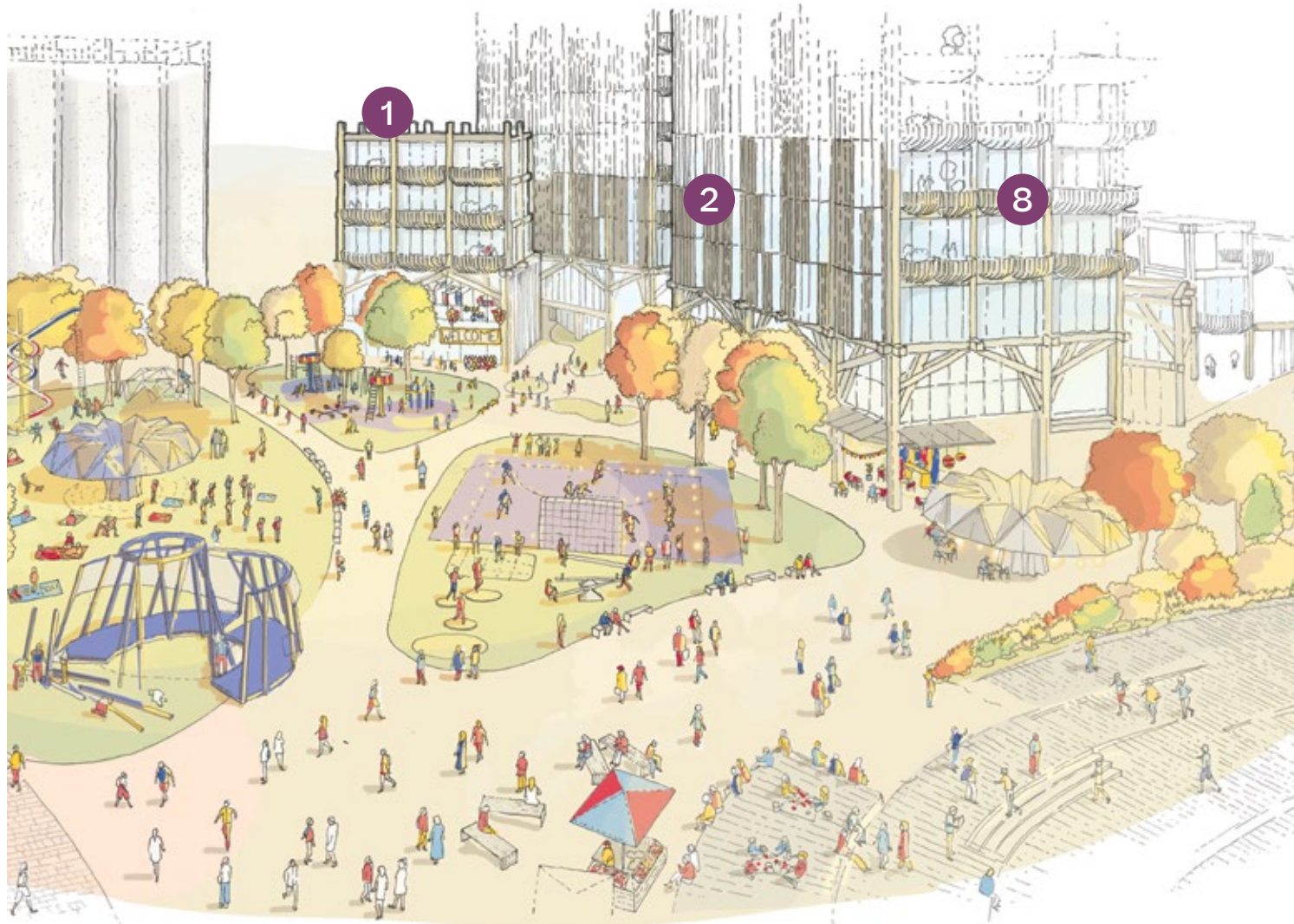
Sustainable buildings that can be constructed and adapted far more quickly, and a new set of financial and design tools that help improve affordability and expand options for all households.

Quayside's innovative approach to buildings and housing would create a neighbourhood that is more inclusive and responsive to community needs.<sup>39</sup>

An ambitious affordability program targets 40 percent of units for below-market housing. Flexible wall systems and efficient unit designs help create a range of options for families, single-person households, the elderly, and other groups currently hoping to live downtown.

The plan calls for mass timber buildings that are just as strong and fire-resistant as steel or concrete but dramatically more sustainable. Mass timber parts would be produced in an Ontario-based factory, accelerating project timelines by up to 35 percent without compromising safety or design excellence.

Quayside (with Silo Park shown here) would be the first neighbourhood built entirely of mass timber while supporting a range of housing for people across the socio-economic spectrum.



## Proposed urban innovations

- 1 An ambitious below-market housing program would feature 20 percent affordable housing units (a quarter of which would go towards “deep” affordability needs) and 20 percent middle-income housing units; half of the total proposed housing program would consist of “purpose-built” rentals critical to improving long-term affordability.
- 2 Quayside would be the first neighbourhood built entirely of “mass timber” — an emerging material every bit as strong and fire-resistant as concrete or steel but far more sustainable — including record-setting buildings of around 30 storeys.
- 3 An Ontario-based factory would produce mass timber building parts for fast assembly in Quayside, catalyzing a new industry that taps into Canada’s vast sustainable forests.
- 4 Buildings in Quayside would feature adaptable “Loft” spaces designed with flexible floor plates to accommodate residential, commercial, and light manufacturing uses, enabling a true live-work community.
- 5 A system of flexible wall panels would enable renovations to Loft and residential spaces to occur much faster than normal, reducing vacancies and helping the neighbourhood adapt to market conditions.
- 6 A proposed “outcome-based” building code system would monitor noise, nuisances, and structural integrity in real time to help a mix of residential and non-residential uses thrive without sacrificing public safety or comfort.
- 7 Middle-income housing options would include “shared equity” units designed to help households build value in their home without the high up-front cost of a traditional mortgage down payment.
- 8 Quayside would feature a set of efficient and ultra-efficient units that reduce size to enable affordability while remaining livable through thoughtful design features, such as space-saving furniture, shared building amenities, and access to off-site storage space with on-demand delivery.
- 9 This approach of “affordability by design” would enable the creation of 87 more units in Quayside than would otherwise exist in a conventional development, creating \$37 million of value that could be applied towards below-market housing.
- 10 A set of co-living units would feature shared building amenities, such as communal kitchens, to enhance community for a range of residents, including single-person households, multi-generational families, and seniors.
- 11 In Quayside, 40 percent of housing would consist of family-sized units at two bedrooms or more.



# Sustainability

A new standard of sustainability that creates a blueprint for truly climate-positive communities.

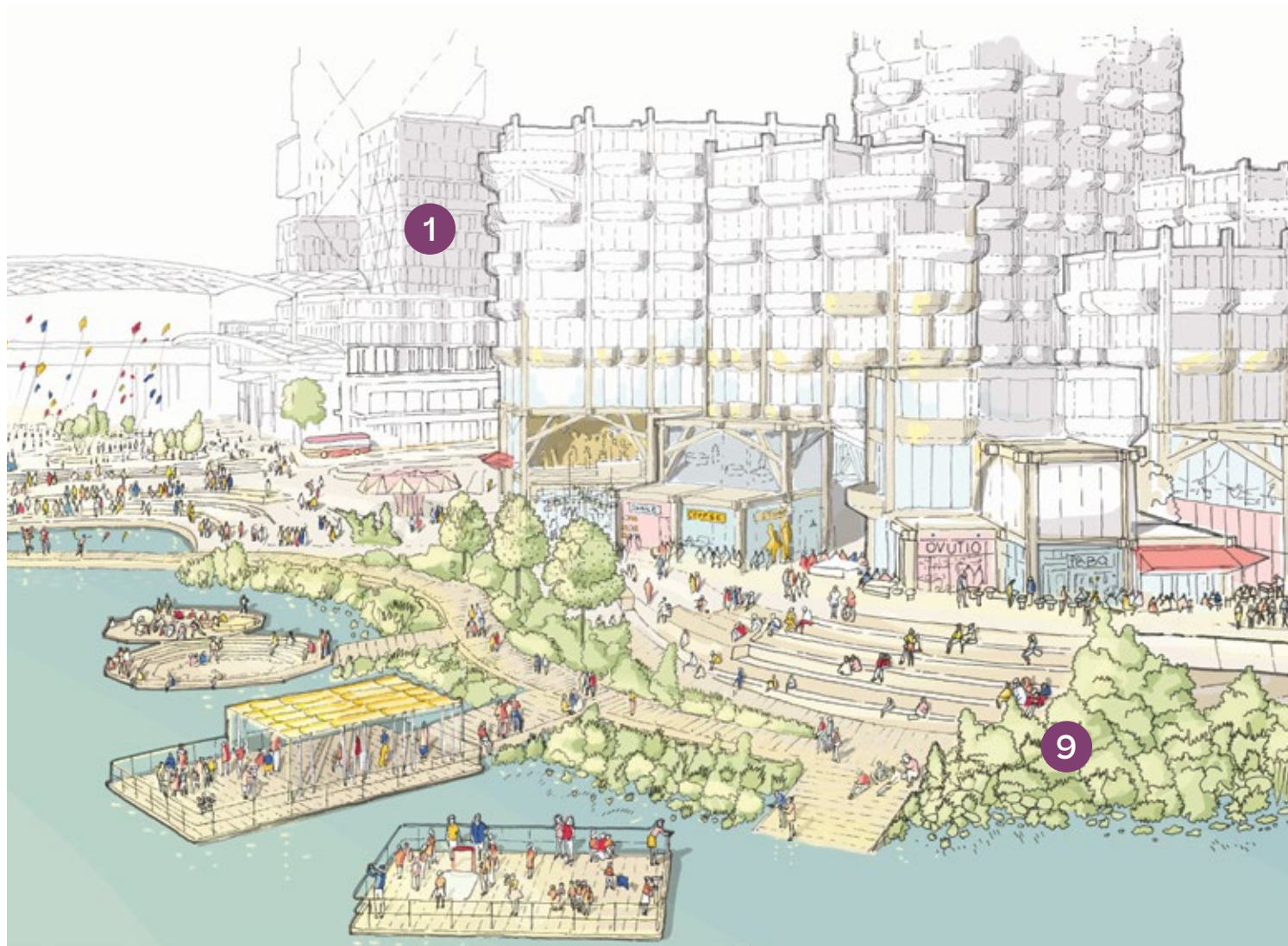
Buildings in the Quayside plan (shown here near Parliament Slip and Cove) would feature ambitious energy-efficient construction, while the public realm would incorporate green infrastructure to manage stormwater.

Following Waterfront Toronto's lead in sustainable development, the Quayside plan would create a nearly carbon-neutral neighbourhood that cuts greenhouse gases by 85 percent from the city average.<sup>40</sup>

It would achieve this outcome through a series of innovations that include relying on clean energy sources for heating and cooling; optimizing energy consumption using digital technology; designing

energy-efficient buildings that meet the Toronto Green Standard Tier 3; increasing recycling with a smart disposal chain; and deploying an active stormwater management system.

Through these initiatives, Quayside would set a new standard of sustainability that takes the first steps towards a climate-positive community on the waterfront.



## Proposed urban innovations

- 1 Low-energy building designs — inspired by the Passive House movement — would achieve Toronto Green Standard Tier 3 rating for energy efficiency and Tier 4 for greenhouse gas intensity.
- 2 Digital active energy management tools called “Schedulers” would optimize energy systems for residents, businesses, and building operators, ensuring that buildings operate in the most efficient way possible.
- 3 A district energy system called a “thermal grid” would provide heating, cooling, and domestic hot water by drawing on clean energy sources such as geothermal (underground) energy, building “waste” (or excess) heat, and wastewater heat.
- 4 An advanced power grid would use solar energy, battery storage, and time-based energy pricing to reduce reliance on the main Toronto Hydro grid during periods of peak demand and make an all-electric community affordable.
- 5 An innovative utility bill structure would enable residents and businesses to set monthly budgets for energy costs, similar to the way people pay for mobile phone plans today.
- 6 A smart disposal chain would feature real-time feedback to improve waste sorting and “pay-as-you-throw” chutes to reduce household and business waste.
- 7 An underground pneumatic tube system would separate waste streams underground, reducing contamination and centralizing trash hauling.
- 8 An anaerobic digestion facility can convert organic (food) waste into a clean energy source called biogas.
- 9 An active stormwater management system would rely on green infrastructure to capture and retain stormwater and on digital sensors to empty storage containers in advance of a storm.



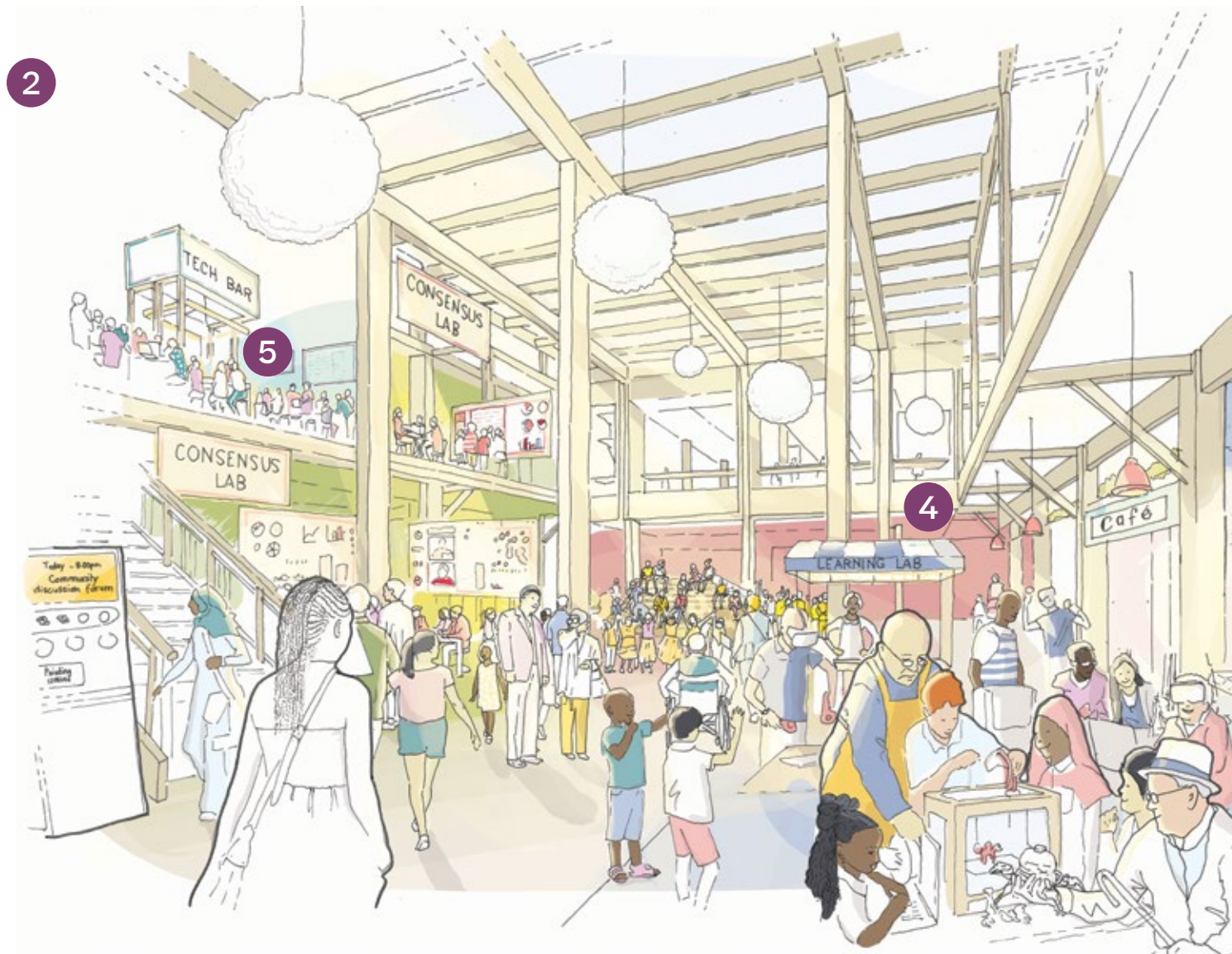
# Social Infrastructure

Health, civic life, learning, and workforce initiatives and facilities that enable people to thrive.

The Quayside plan allocates a central space called the Civic Assembly as the physical heart of civic life in the neighbourhood — a place to connect with neighbours, engage in cultural activities, access local services, and participate in community decisions.

The Quayside plan would integrate space for social infrastructure from the start, creating opportunities for community organizations and local service providers to activate these spaces, strengthen the community, and help community members thrive.<sup>41</sup> While Sidewalk Labs would not provide any community services, it would work with partners to ensure that critical services are accessible to all populations, including the most vulnerable.

Quayside's social infrastructure could feature a Care Collective dedicated to enhancing health and well-being, a Civic Assembly designed to encourage civic engagement and social cohesion, an elementary school proposed to be operated by the Toronto District School Board, and a collaboration with the Toronto Public Library.



## Proposed urban innovations

- 1 A Care Collective would provide community space dedicated to enhancing health and well-being by co-locating the delivery of health care and community services alongside proactive health programming.
- 2 A Civic Assembly, adjacent to the Care Collective, would provide neighbourhood access to spaces for community programs, civic engagement, and cultural events.
- 3 An elementary school, co-located with a childcare centre, would ensure that downtown families have access to basic education and child care needs.
- 4 A proposed collaboration with the Toronto Public Library (TPL) would explore ways to integrate the library's presence throughout the neighbourhood, resulting in potential pop-up lending services or TPL-developed classes on digital literacy.

- 5 An online resource called Collab could allow community members to decide on public space programming, giving them a nuanced understanding of trade-offs and community impact.
- 6 The Sidewalk Works jobs program would bring employers and educators into conversation, prepare workers to acquire in-demand skills, and connect employers with a diverse and talented workforce.





# Digital Innovation

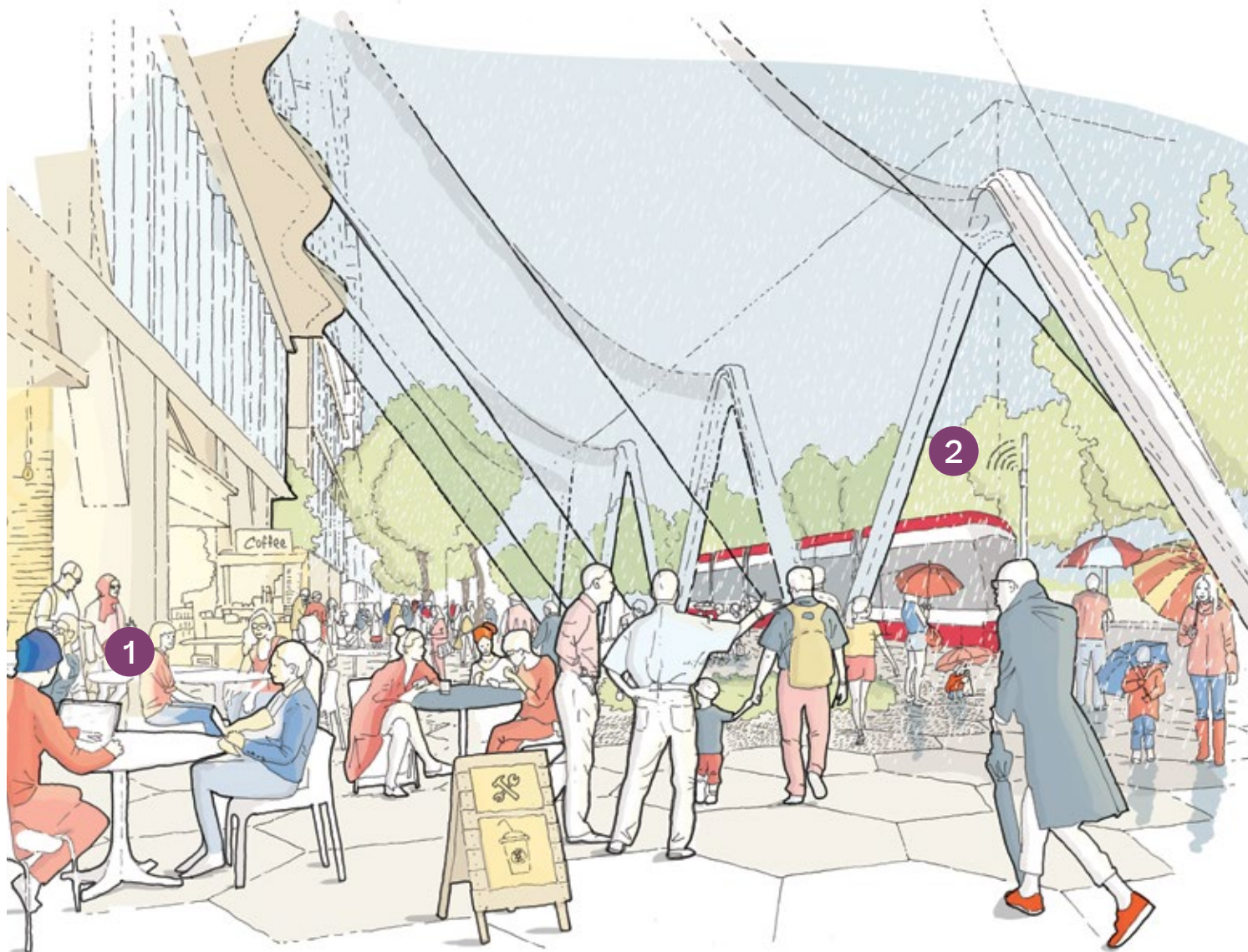
Catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data in cities.

In Quayside (here, a sidewalk cafe beneath a building Raincoat, along Queens Quay East), Sidewalk Labs proposes deployment of super-fast, super-secure Wi-Fi.

In Quayside, Sidewalk Labs proposes to take a holistic approach that creates four core conditions for digital innovation to flourish responsibly.<sup>42</sup>

These conditions include providing more affordable and flexible digital infrastructure, setting data standards that are open and secure, and launching core digital services that others can build on.

The Quayside plan would also serve as a global demonstration for responsible data use in cities by proposing that urban data be controlled by an independent entity called the Urban Data Trust, charged with balancing the interests of personal privacy, public interest, and innovation.



## Proposed urban innovations

- 1 A ubiquitous connectivity network — powered by a new Super-PON technology that reaches faster speeds with less equipment — can provide households and businesses with a secure personal network across an entire neighbourhood, indoors and outdoors.
- 2 Standardized physical mounts connected to power would dramatically reduce the cost of deploying digital innovations, serving as a sort of “urban USB port.”
- 3 Open, published standards would make properly protected urban data accessible to the community in real time, and make it easy for third parties to build new services or competitive alternatives to existing ones.
- 4 A best-in-class approach to security and resiliency would be designed to prevent disruptions, rapidly detect them, and rapidly restore functionality.
- 5 Building on existing privacy laws, a proposed independent Urban Data Trust would oversee the review and approval of all digital innovations that propose to use or collect urban data in Quayside — whether developed by Sidewalk Labs or third parties.
- 6 The proposed Urban Data Trust would be tasked with establishing clear Responsible Data Use Guidelines that safeguard the public good while enabling innovation, including by making de-identified or non-personal data publicly accessible by default.
- 7 A publicly transparent Responsible Data Use Assessment would ensure that companies or community members wishing to use urban data do so in a way that has a beneficial purpose and protects privacy.

# Pedestrian walkway: Intimate public spaces

A network of pedestrian-only pathways would be lined with a variety of retail, community, and cultural ground-floor stoa spaces, with housing and offices on upper floors to create a true live-work neighbourhood.

As the world's first all-mass timber neighbourhood, Quayside would become a global model for showcasing this sustainable, beautiful building material.



# Queens Quay: People-first streets

A redesigned Queens Quay would create expanded pedestrian spaces that benefit from animated ground floors, curbsless streets, lush plantings, and outdoor-comfort strategies that make it possible for people to spend more time outside together.

A new modular pavement system with embedded lights and heating would facilitate safe, welcoming spaces that can adapt to changing conditions.



# Parliament Plaza: Connecting land and water

A series of water-based play spaces would anchor a grand central plaza designed to draw people down to the water's edge and host a wide range of activities, from concerts to markets to art installations.

The plaza would be surrounded by two-story ground-floor stoa spaces that host diverse programming and blur the line between indoors and outdoors.



# Parliament Slip: Active in all seasons

Framed by lower-scale, intimate buildings, Parliament Slip would offer direct access to the water for activities like kayaking, educational programs, art installations, and relaxation. A new pedestrian bridge would connect the slip with the stunning new parks of Villiers Island.



Outdoor-comfort strategies, such as building Raincoats that extend over the sidewalk and temporary enclosed structures, would

support ongoing programming to ensure that the waterfront remains lively and safe year-round.



# Exploring larger scales to realize and maximize the impact achieved in Quayside

Quayside can achieve meaningful steps towards Waterfront Toronto's quality-of-life objectives and a new model for urban development. But some of the elements of the Quayside plan cannot reach their full impact at the size of a five-hectare neighbourhood, while others cannot be financed or successfully operated without a certain amount of density to support them.

More importantly, comprehensive planning and scale are necessary to realize and maximize Waterfront Toronto's ambitious priority outcomes: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

Consistent with the RFP's recognition of the potential need to explore scale, Sidewalk Labs believes in a phased approach for testing, refining, and demonstrating the impact of core innovations, beginning with a smaller setting and working up to larger areas along the eastern waterfront as project objectives are achieved.

For such reasons, Sidewalk Labs has proposed a concept plan for a wider River District geography that would make it possible to meet or exceed the ambitious priority outcomes in a way that is both financially achievable and replicable in other parts of Canada and around

the world.<sup>43</sup> The following initiatives require such scale to realize their intended impact.

## 1 Attracting new economic and jobs anchors

### Sparking an urban innovation cluster.

Quayside can establish the foundation of a district that actively supports innovation, creativity, and exploration, but the River District has sufficient space to accommodate an economic cluster's potential expansion and a sufficient density of housing, retail, and amenities to support tens of thousands of new workers and residents.

Alphabet commits to establishing a new Canadian headquarters for Google on the western edge of Villiers Island, as part of an agreed-upon transaction within the IDEA District. This new headquarters would be the centre and catalyst for a new innovation campus, which would also include a new non-profit applied research institute called the Urban Innovation Institute.

The innovation campus would be a major employment anchor for the revitalized eastern waterfront. [In total, Sidewalk Labs](#)

[estimates that 10,500 of the 93,000 IDEA District jobs would be focused on urban innovation, creating a new economic engine around this emerging area.](#)

### Catalyzing a mass timber industry.

As the world's first entirely mass-timber neighbourhood, Quayside can help demonstrate the feasibility and benefits of this new sustainable building material. But Sidewalk Labs estimates that a larger development area — roughly 6 million square feet — is needed to justify an investment in the factory-based production of mass timber, as well as for such a factory to hit peak efficiency in producing sustainable building components on a predictable timeline that developers can trust.

[Extending this approach across the River District could catalyze the creation of a new Canadian industry that capitalizes on the country's abundant green-certified forests, and could support a new modular factory that accelerates construction timelines by up to 35 percent.](#)

## 2 Supporting advanced infrastructure to achieve climate positivity

Robust energy infrastructure can reduce greenhouse gas emissions by 85 percent in Quayside compared to the status quo. But designing, implementing, and operating the advanced infrastructure systems necessary to achieve climate positivity — which requires exporting clean energy outside a project area — requires a large enough customer base to be effective and financially feasible.

Specifically, to keep Quayside resident energy bills in line with Toronto averages, the advanced power and thermal grids would require a \$19 million supplemental innovation investment based on the current plan, due to factors including the high cost of geothermal exchange and initial electric grid connections, in addition to the poor economies of scale for operating costs.

The River District would provide a large enough area to support these investments, such as a new thermal energy grid for heating and cooling buildings, because the systems scale in a financially sustainable way. With public-sector support, the Sidewalk Toronto project could become the largest, densest climate-positive district in North America and the third largest in the world — establishing a credible path forward for cities to follow.

## 3 Unlocking significant progress towards housing affordability

To make a significant dent in housing affordability, Sidewalk Labs plans to explore a series of private funding sources that can help support an ambitious below-market vision, including affordability by design (using efficient unit design to create more total units, and thus additional value); the increased value of public land due to factory-built timber construction; and a condo resale fee.

At the Quayside scale, however, only affordability by design would create value (roughly \$37 million) that could be

The full proposed IDEA District could catalyze 93,000 total jobs, including 44,000 direct jobs by 2040.

directed towards a below-market housing program. Generating land value from factory-based construction requires 6 million square feet of delivery output to refine the factory process and reliably accelerate project timelines and reduce project risks for developers. Generating funds from the resale fee requires ongoing condo turnover, and thus additional phases of development.

Quayside's proposed development of 10 buildings (roughly 2.65 million square feet) is not large enough to sustainably support the financing of the waterfront light rail. An area the size of the proposed River District (nearly 27 million square feet) could provide enough density to pursue promising self-financing methods for the light rail, such as tax increment financing.

#### Designing a network of new mobility options.

The limited street network of Quayside (four blocks) can be used to develop new ways to design streets that prioritize people and cyclists, improve the efficiency of how space is allocated as travel patterns shift across a day, and incorporate adaptable features that can respond to new mobility options as they emerge. But streets only have transformative impact when they form a network.

If Quayside's mobility innovations are applied across the River District, there would be opportunities to give residents, workers, and visitors a full set of transportation options designed to meet all of their needs without owning a car, enabling 77 percent of trips to be made through transit or active modes across the IDEA District.

The River District could also showcase the world's first street network designed to integrate self-driving vehicles in a way that supports public transit use, shared rides, and enhanced pedestrian and cycling experiences.

Applying these strategies at the scale of the River District has the potential to generate more than \$1.4 billion for below-market housing. With this approach, and additional government support, the district could include an estimated 13,600 below-market units — helping to address increasingly urgent affordable housing needs.

## 4

### Creating a 21st-century mobility network

#### Extending the LRT into the Port Lands.

Toronto has planned an extension of its public transit network across the eastern waterfront since 2006, but the plans, which could cost as much as \$1.2 billion, remain unfunded.<sup>44</sup> Sidewalk Labs is proposing, if public funding is not available, that this critical project can be built now and financed through future revenue streams generated by the development made possible by the transit extension.

Sidewalk Labs is prepared to provide financial support to this approach, but it only becomes viable if the new transit lines would serve a sufficient amount of development.

#### Housing affordability by the numbers:

- 40% below-market vision
- More than \$1.4 billion in private funding at the full IDEA District scale
- Up to 13,600 below-market units (with additional government support) at the full IDEA District scale

## 5

### Creating the conditions for urban innovation

Quayside is the perfect demonstration site to begin establishing the physical, digital, and policy conditions for urban innovation, enabling researchers, entrepreneurs, private companies, civic organizations, government agencies, and innovators to create countless new services designed to improve urban life.

At the heart of this vision is the ability to create the digital conditions for others to build on. These include:

- Providing more affordable and flexible digital infrastructure, such as ubiquitous connectivity and standardized mounts
- Setting data standards that are open and secure

- Creating a trusted process for responsible data use, with a proposed independent Urban Data Trust to oversee and approval the use or collection of urban data
- Launching core digital services that others can build on through open access to properly protected urban data

But some of these initiatives require the scale of the River District to realize their full potential.

For example, new advances in fibre-optic technology and network security can build on Waterfront Toronto's progress bridging the digital divide and enable countless new solutions to be developed by a wide array of third parties. But such an advanced network only becomes financially sustainable at the scale of the River District, given the number of residents or businesses needed to recoup the initial investment in core enabling infrastructure.

By planning holistically, and over a large enough area, these conditions would help the IDEA District become an economic engine focused on urban innovation while unlocking transformative quality-of-life improvements for all.

This is the opportunity before Toronto.

**By planning over a large enough area, the IDEA District could become an economic engine and unlock transformative quality-of-life improvements.**



# Part 3

## The River District: Creating an Innovation Ecosystem to Build on Quayside's Impact

Anchored by the relocation of Google's Canadian headquarters to Villiers West, the proposed River District would consist of five distinct neighbourhoods — together creating a new hub for urban innovation with the potential for global impact.

**Key Term**  
**The IDEA District's Innovation Framework**

a modified regulatory framework designed to foster the policy conditions necessary to tackle urban challenges using innovative solutions.

As an extension of the Quayside innovation framework and development approach at scale, Sidewalk Labs proposes Waterfront Toronto and the City of Toronto also apply this approach to a larger geography identified as the “River District,” an area spanning 62 hectares with five distinct neighbourhoods: Villiers West, Villiers East, Keating East, McCleary, and Polson Quay.

These neighbourhoods would be carefully stitched into their surrounding environments, including extending the innovation corridor along Queens Quay and into Quayside. They would also be anchored by their common connection to a newly naturalized Don River, a historic \$1.25 billion project that will eliminate flooding in the eastern waterfront and establish an ecological foundation for new sustainable communities built around spectacular parks and nature.

Planning for the River District is guided by the Port Lands Planning Framework, which lays out a vision to transform these industrial lands into an economic and innovation hub that adapts to changing conditions, enjoys ubiquitous connectivity, respects the waterfront context, and creates a network of dynamic new neighbourhoods. Plans for Villiers Island and Keating are further guided by the Villiers Island and Keating precinct plans.

While the investment in the Port Lands Flood Protection Project is extraordinary, it is only a first step. Substantial additional investments are required to fully unlock the area's potential, especially strong transit connections and basic infrastructure.

The lack of modern infrastructure and questions over how to finance it create a formidable barrier to any kind of development, let alone the standard-setting communities envisioned by Waterfront Toronto and the City of Toronto in the Port Lands Planning Framework.

**“Over the coming decades, the Port Lands will transform from a predominantly industrial district into a modern and vibrant extension of the urban metropolis. ... The Port Lands will be a showcase for innovation and a leader in environmental performance.”**

— Port Lands Planning Framework<sup>45</sup>



Through a new economic hub on Villiers West and by planning and financing innovative systems across the district, Sidewalk Labs can create the conditions to fully unlock the waterfront's potential. Credit: DroneBoy

The River District program overall is shaped by the need for enough density to achieve Waterfront Toronto's priority outcomes and make the development financially sustainable.

By moving Google's expanded Canadian headquarters to Villiers West, establishing an Urban Innovation Institute, and planning and financing innovative systems across the district, Sidewalk Labs can create the foundation to attract private development that would fully unlock the waterfront's potential as a global hub for urban innovation and North America's largest climate positive-community.

The River District is an important opportunity for Waterfront Toronto, the City of Toronto, and others to capitalize on the investments proposed by Sidewalk Labs. As Innovation and Funding Partner, Sidewalk Labs would seek to help provide the framework and funding through which this part of the eastern waterfront can finally be unlocked and achieve a vision for revitalization. The River District proposal does not include Sidewalk Labs undertaking detailed planning or leading development in this area. Instead, it aims to help create the conditions that enable both the public and private sectors to make great things happen.

## Planning spotlight

# How the River District proposal adds value to the Port Lands Planning Framework

Released in 2017 by the City of Toronto and Waterfront Toronto, the Port Lands Planning Framework outlines a high-level vision for the future development of this area over a timeline of roughly 50 years.

By extending the innovative approach to planning initiated in Quayside and leveraging long-term resources, Sidewalk Labs can not only help achieve this vision but help to accelerate it and amplify many of its core components. At nearly 27 million square feet of development, the River District envisions a density with the potential to unlock a public transit expansion, dramatically increase the supply of affordable housing, and generate billions in tax revenue for the economy — achieving city and waterfront objectives years sooner than anticipated by the framework.

Some key areas where the River District proposal adds value to the Port Lands Planning Framework include:

### Envisioning Villiers Island as a major economic hub.

The Port Lands Planning Framework identifies Villiers Island as mostly a residential mixed-use area. The River District proposal builds on this foundation by identifying the area as a potential major economic and employment hub anchored around an urban innovation campus, enabling the creation of a true live-work-make community and a significant revenue source for the city.

### Preparing for self-driving vehicles.

The framework envisions the creation of a balanced mobility system that emphasizes public

transit, walking, and cycling. The River District proposal complements that approach by designing adaptable streets that anticipate the safe arrival of self-driving vehicles operating as a shared service, dramatically reducing the need for residents and workers to own a car and enabling a significant amount of road and parking space to be reclaimed for public space. Additionally, the potential for self-driving vehicles to operate as electric vehicles is a significant component of the path toward climate positivity.

### Developing advanced energy infrastructure.

The framework calls for innovations and infrastructure that can help realize a climate-positive community but does not identify the advanced systems needed to achieve it. The River District proposal introduces a comprehensive approach towards climate positivity through advanced infrastructure systems supported by digital energy management tools as a core part of the overall planning.

### Planning for greater density to unlock a transit expansion and sustainable development.

The River District proposal envisions a greater scale of density than commonly assumed for the Port Lands Planning Framework (particularly in Polson Quay), characterized by a mixture of residential uses alongside non-residential uses such as retail, office, community, and production. Greater density unlocks the ability to finance sustainable infrastructure, such as the transit expansion and improves affordability through the delivery of a significant supply of below-market housing.

### Expanding the supply of affordable and below-market housing.

The River District proposal strives to exceed current waterfront requirements for housing affordability by promoting a housing vision defined by 40 percent below-market units. This vision targets 20 percent of housing units for middle-income households that currently do not qualify for affordable housing and envisions half of all units being purpose-built rentals to improve long-term affordability. The proposal also outlines paths for developers to support ambitious public goals for affordable housing, including through the use of new financial tools and efficient unit designs that can create new value that can be applied towards below-market programs.

### Accelerating the development timeline.

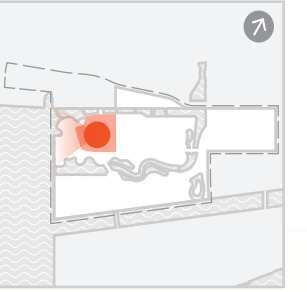
The Port Lands Planning Framework considers the area's evolution across a period of roughly 50 years. The River District proposal leverages private-sector resources to help deliver more than 30 percent more square feet of development on a timeline 10 years faster than the current plan. (The full IDEA District proposal would produce 32.8 million square feet of development by 2040, versus a baseline scenario of 24.4 million square feet by 2050.) The IDEA District has the potential to generate an enormous annual benefit to the Canadian economy, including over 93,000 jobs (with 44,000 direct jobs), \$14.2 billion in annual economic output, and \$4.3 billion in annual tax revenues.<sup>46</sup>



Map  
**River District  
geography and roles**

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- Optional participation in Phase 2
- 🏠 Sidewalk Labs develops real estate and advanced systems

# Villiers West

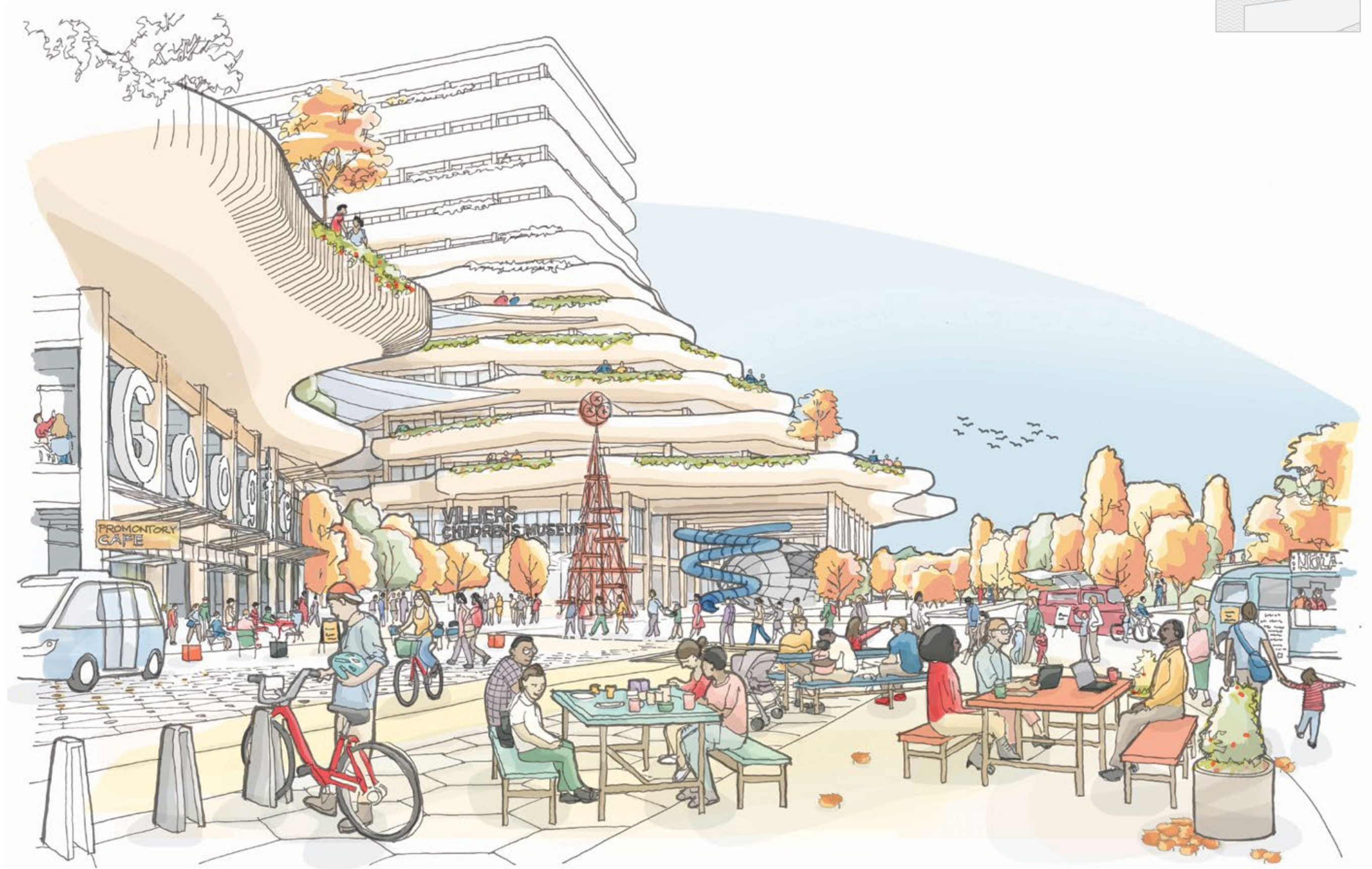


The 7.75-hectare western half of Villiers Island has the potential to catalyze economic development across the region, anchored by the new Google Canadian headquarters and an Urban Innovation Institute designed to connect seamlessly with the new Promontory Park. Sidewalk Labs proposes to act as the lead developer for this area in concert with local development partners.

Alphabet commits to establishing a new Canadian headquarters for Google on the western edge of Villiers Island, as part of an agreed-upon transaction within the IDEA District, to catalyze a new innovation campus and to amplify the area's economic potential. Alphabet would target up to 500,000 square feet, which would be sufficient to accommodate as many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring will depend on market conditions and business requirements).

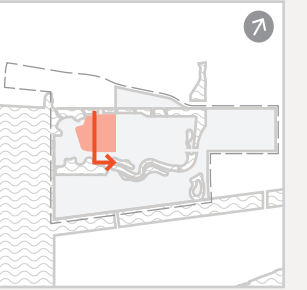
This campus would also include the Urban Innovation Institute, a new non-profit applied research institute designed to bring together academia, industry, entrepreneurs, advocates, and public agencies to collaborate on tackling urban challenges — developed with local universities and government partners.

Building on progress in Quayside towards Waterfront Toronto's priority outcomes, Villiers West would further serve to prove out innovation concepts for broader application by others across the IDEA District.



This illustration shows the Villiers West innovation campus and Promontory Park.

# Villiers West: Building an economic cluster around urban innovation



In Villiers West, Sidewalk Labs plans to help catalyze an economic cluster focused on urban innovation. This effort defines urban innovation as going beyond the mere pursuit of urban efficiencies associated with the “smart cities” movement, towards a broader set of digital, physical, and policy advances that enable government agencies, academics, civic institutions, and entrepreneurs both local and global to address large urban challenges.

Anchored by a new Google Canadian headquarters and an Urban Innovation Institute, this cluster would build on Toronto’s leadership in areas such as artificial intelligence and other technology specialties while supporting the growth — and invention — of new cutting-edge industries.

Villiers Island is uniquely situated to foster this kind of development. The proposed innovation campus would be located on the dramatic western edge, next to a new light rail stop, with enough space to accommodate new companies, start-ups, and institutions as the cluster grows. To the east, thousands of units of housing could be interlaced with retail, community, and cultural spaces, attracting companies seeking a high quality of life for their employees, who would be able to walk to work along the island’s innovative and intimate pedestrian-first street grid.

Sidewalk Labs proposes to reinvent the Keating Channel — an artificial waterway lined with a series of industrial buildings — with repurposed historic structures and new pedestrian, public transit, and cycling bridges stitching together both sides of the canal, supporting a new creative economy centred around the arts, production, and exploration.

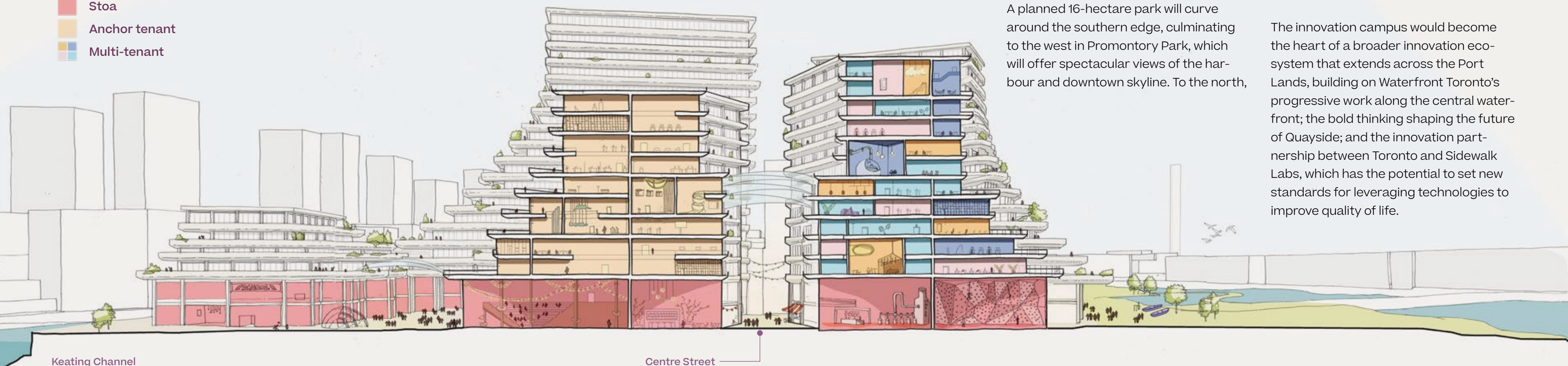
These diverse experiences could fuel each other, drawing workers and residents united by a shared commitment to exploring new ways of thinking, an excitement about the future, and a desire to be inspired, challenged, and surprised on a daily basis.

Extraordinary public spaces would define the entire perimeter of the island. A planned 16-hectare park will curve around the southern edge, culminating to the west in Promontory Park, which will offer spectacular views of the harbour and downtown skyline. To the north,

The innovation campus would become the heart of a broader innovation ecosystem that extends across the Port Lands, building on Waterfront Toronto’s progressive work along the central waterfront; the bold thinking shaping the future of Quayside; and the innovation partnership between Toronto and Sidewalk Labs, which has the potential to set new standards for leveraging technologies to improve quality of life.

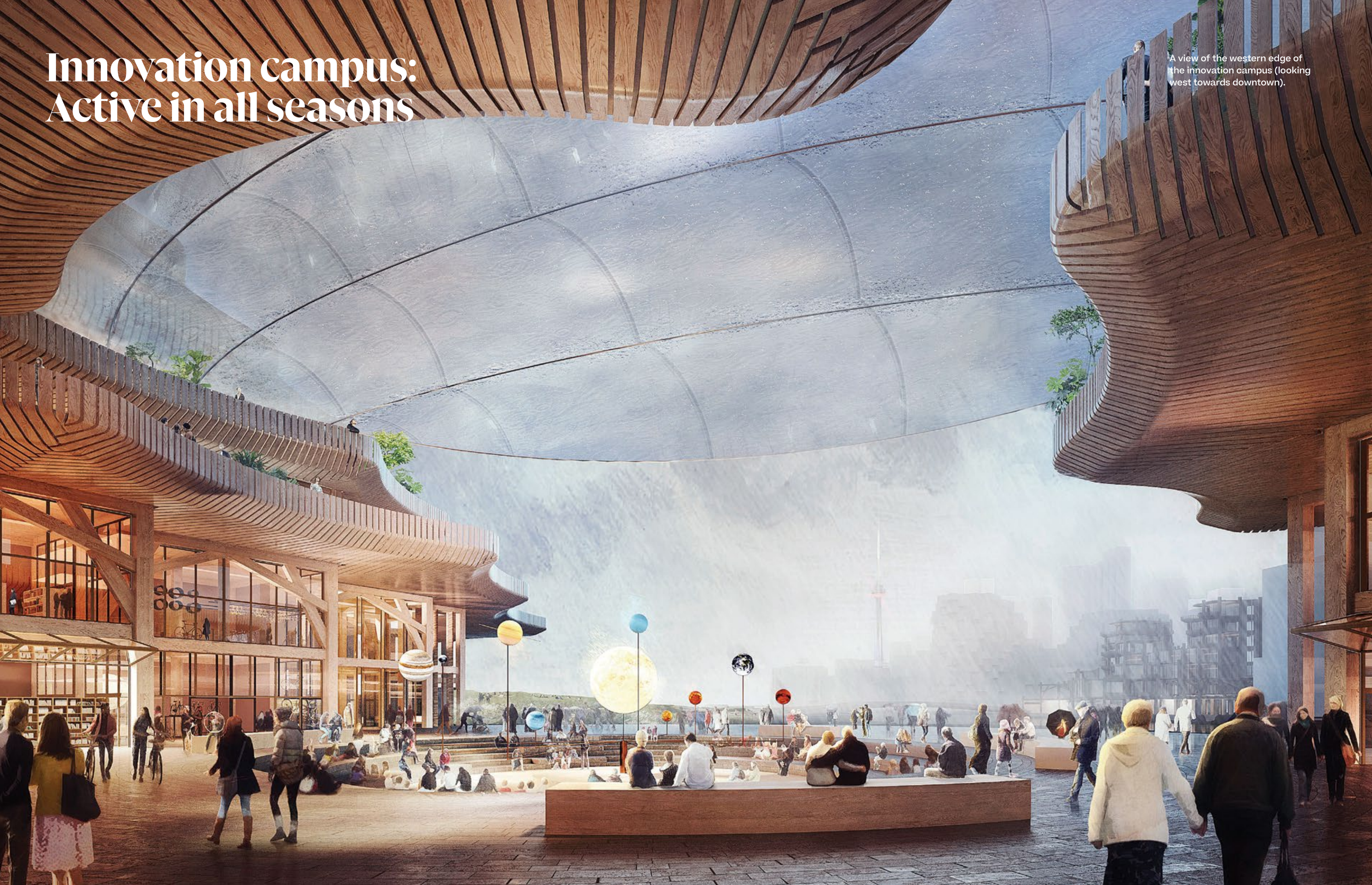
## Cross section of the innovation campus

- Stoa
- Anchor tenant
- Multi-tenant



# Innovation campus: Active in all seasons

A view of the western edge of the innovation campus (looking west towards downtown).



# Villiers West: Stitching this jobs hub into the community

Sidewalk Labs' proposed innovation campus includes four newly created city blocks on the west side of Villiers Island, straddling New Cherry Street, and could total up to 1.6 million square feet of flexible commercial space. Each of the four sites includes the potential for buildings with very large floor plates (ranging from 30,000 to 90,000 square feet) to accommodate the types of open workspaces preferred by innovation economy companies.

The campus would feature a new pedestrian bridge connection to Quayside and have access to the rest of the city through the light rail extension, which would include a new centrally located station.

A key feature of the approved precinct plan is an east-west spine down the middle of Villiers Island called Centre Street, which forms the main connection between the residential community on the east side of the island and the new parks on the west side of Villiers, including Promontory Park, with its spectacular views of the harbour and downtown.

Centre Street would culminate in Promontory Plaza, a flexible space that transitions from mixed-use buildings to the park, supporting diverse programming that spills out from public ground floors. This flexible stoa space would host retail, production, arts, and community uses, with public passageways and interior arcades providing additional ways to move through the site.

The buildings themselves would embrace Sidewalk Labs' adaptable Loft typology, which provides large floor plates for highly flexible uses. The height, bulk, and design features of the buildings would be planned in consultation with Waterfront Toronto and the city to ensure that the innovation campus fits in with the scale of the rest of Villiers Island, which Sidewalk Labs would not be responsible for developing.



## Creating a connected innovation campus

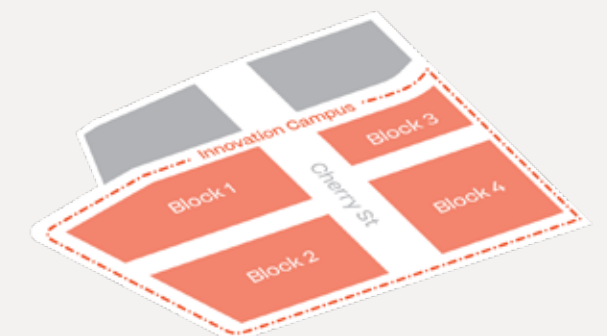
This jobs hub on Villiers West would become a true live-work neighbourhood through a set of features that include a new street network and a light rail connection that provide access to the surrounding city, an extensive park system, and mixed-use blocks.

### New public spaces:

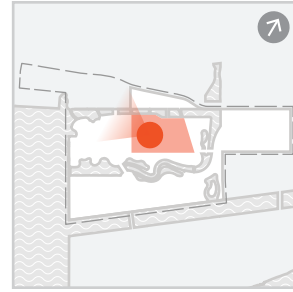
- A** Pedestrian bridge to Quayside
- B** Promontory Park
- C** Canoe Cove

### New streets:

- D** Trinity Boulevard
- E** Cherry Street
- F** Centre Street
- G** Commissioners Street



# Villiers East

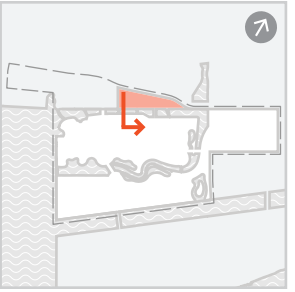


A conceptual illustration of a Villiers East Accessway and plaza, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood would be led by Waterfront Toronto and the City of Toronto.)

The 11.5-hectare eastern half of Villiers Island offers an exceptional opportunity to create an inviting, walkable live-work community. In addition to jobs, Villiers East could be filled with affordable housing options, retail and other ground-floor uses, and a new pedestrian-first street network designed to create a series of intimate walkways and courtyards, all encircled by a magnificent new park created as part of the flood protection work.

In this area, and for the rest of the River District, Sidewalk Labs would play a supporting role as innovation and funding partner, while Waterfront Toronto and the City of Toronto work with other partners to undertake development.

# Keating East



A conceptual illustration of Keating Channel, looking west, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood would be led by Waterfront Toronto and the City of Toronto.)

The planned relocation of the Gardiner Expressway will create the opportunity for a new six-hectare neighbourhood along the reclaimed Keating Channel. The Port Lands Planning Framework envisions the channel as the centrepiece of the surrounding neighbourhoods.

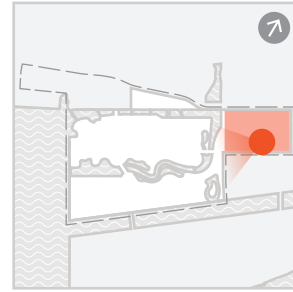
Sidewalk Labs embraces this vision and believes that the spirit of innovation animating the adjacent innovation campus can become a driving programmatic force for the channel. A Keating Channel exploration zone could become a

dynamic, water-focused spine that showcases groundbreaking work across arts, culture, and production.

Taller buildings along the highway could scale down as they approach this intimate waterway, establishing the canal as a unique place in Toronto with vibrant public space and development on both sides of the water. Multiple new pedestrian and bike bridges are proposed across the channel, creating a character similar to the canals of Amsterdam.



# McCleary

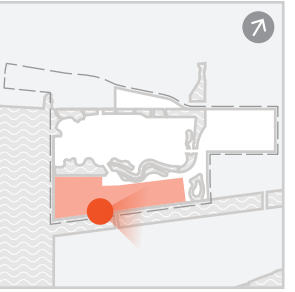


A conceptual view of a future street in McCleary, looking east to McCleary Park, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood would be led by Waterfront Toronto and the City of Toronto.)

Consistent with the Port Lands Planning Framework's direction as a mixed-use area focused on production, interactive, and creative industries, the 14-hectare McCleary District could integrate dense housing with commercial space that complements East Harbour and the Film District, such as new economy companies, startups, micro-enterprises, and creative industries.

Located within short walking or biking distance of the Film District, East Harbour, and the innovation campus on Villiers Island, McCleary could become an ideal residential location for people with jobs in the neighbourhood and nearby. In addition, a new light rail stop located on Commissioners Street would ensure access to major transportation hubs and downtown Toronto.

# Polson Quay



A conceptual view of Polson Quay, looking north to downtown, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood would be led by Waterfront Toronto and the City of Toronto.)

Polson Quay encompasses both the Polson Quay and South River areas identified in the Port Lands Planning Framework. Establishing connections to the rest of the city will be critical to the growth of this 23-hectare neighbourhood, located south of Villiers Island and along the south side of the newly naturalized Don River.

As in Villiers Island, a series of bridges in Polson Quay could form important links to the surrounding city, including space

for a light rail extension with a new stop in the centre of the neighbourhood. With these key investments in place, Polson Quay can take full advantage of its geography and dramatic views of the harbour and city skyline to become a place where production, interactive, and creative uses can coexist in an integrated way with housing, commercial activity, community spaces, and an accessible public realm — achieving a unique live-work-make waterfront neighbourhood.

# Unique public spaces: Pedestrian bridges

The River District could include unique public spaces such as the Keating Channel, featuring a canal with creative programming along

both sides and pedestrian bridges linking neighbourhoods across the water.



# Part 4 Committing to Diversity, Equity, and Inclusion

Designing neighbourhoods that everyone can access means planning for the full spectrum of people’s abilities, whether physical, digital, economic, social, or cultural. Sidewalk Labs aims to create the conditions that bring people together, not pull them apart, and that provide new opportunities for all.

Neighbourhoods would be designed to support the full spectrum of people’s abilities, whether physical, digital, economic, social, or cultural.



Sidewalk Labs has approached its planning for the Sidewalk Toronto project with the following principles in mind:

- **Diversity.** Sidewalk Labs recognizes and honours the vibrant diversity of Toronto, and strives for a place that reflects Toronto’s values around diversity — one where people of all ages, abilities, incomes, and backgrounds can thrive and belong.
- **Accessibility.** Sidewalk Labs prioritizes accessibility of place, transportation, services, and opportunities to ensure the IDEA District is physically, socially, economically, and culturally accessible for all, including residents, workers, and visitors. Sidewalk Labs designs spaces, systems, and services for 100 percent of the population, including people who face multiple barriers.
- **Affordability.** Sidewalk Labs includes options for housing, retail, programming, and amenities that are affordable for people of all income levels, including those who are low income.

- **Equity of opportunity.** Sidewalk Labs works to identify and remove systemic barriers to participation so everyone can exercise the right to fair and respectful access to economic, social, and cultural opportunities, paving the way for equitable outcomes.
- **Inclusion.** Designing neighbourhoods that everyone can access means planning for the full spectrum of people’s circumstances: physical, digital, economic, social, or cultural. The IDEA District would create the conditions that bring people together, not pull them apart. These conditions can help create an inclusive community — a group of people who share a sense of belonging, trust, safety, and collective stewardship in a place where everyone feels welcome and has an opportunity to flourish and thrive.

## Honour strength in diversity


Sidewalk Labs recognizes and honours the range of visible and invisible qualities, experiences, and identities that shape who people are, how they think, and how they engage with and are perceived by the world. These include but are not limited to race, ethnicity, gender, marital and family status, sexual orientation, socio-economic status, age, physical or mental abilities, religious or spiritual beliefs, Indigeneity, immigrant and newcomer status, and political ideologies.

Sidewalk Labs deliberately and thoughtfully strives to develop designs, spaces, services, and programming — in partnership with local institutions — that are welcoming, iterative, responsive, and accessible to a diverse population, including people who face multiple barriers.

## Design accessibility for people of all ages and abilities

Sidewalk Labs' commitment to intergenerational communities involves developing a variety of housing types and sizes, pedestrian-friendly streets, and complete communities where people can easily access shops, social services, and community spaces. This commitment is particularly relevant for populations that tend to stay closer to home, including children and seniors.


Sidewalk Labs also plans to establish a host of physical and digital accessibility initiatives co-designed with members of the disability community, including accessible streets, building entrances, and public washrooms, as well as wayfinding tools for people who are visually impaired.

These initiatives would aim to meet or exceed existing Accessibility for Ontarians with Disabilities Act (AODA) requirements. They are based on 22 general, physical, and digital accessibility principles developed in collaboration with more than 200 members of the accessibility community in Toronto during 70 hours of co-design sessions. 

## Create affordability for people of all incomes

A mix of incomes, lifestyles, and life-stages is essential to generating a neighbourhood's sense of community and energy. Sidewalk Labs' proposed housing program has been designed to set a new standard for inclusive communities.

An ambitious affordability vision would target residents across the income spectrum: overall, 40 percent of units would be below-market. This breakdown includes 20 percent of units devoted to traditional affordable housing (at least a quarter of which would go towards households with “deep” affordability needs) and 20 percent of units for middle-income housing.

In contrast to conventional waterfront revitalization in Toronto, often dominated by market-rate condos, a full 50 percent of housing units would be “purpose-built” rentals, improving long-term affordability for the city. A new set of efficient unit designs would reflect a broader effort to make downtown living affordable and meet the evolving needs of Toronto's diverse households. 


In addition to expanding housing affordability, the IDEA District would strive to improve the “all-in” affordability of living in the neighbourhood. For example, a mobility subscription package would enable households to forgo car ownership, saving more than \$4,000 a year without sacrificing the ability to get around.<sup>47</sup> A new approach to affordable electrification would maintain or reduce overall utility costs for households and businesses while achieving more sustainable outcomes.

## Ensure opportunities for all

Sidewalk Labs believes that a strong plan for economic growth requires an equally strong commitment to inclusion.

Sidewalk Labs plans to take a proactive “community benefits approach,” based on community input, to ensure that equitable economic opportunities are open to a wide range of Torontonians. This effort includes creating training and employment opportunities for members of historically disadvantaged and equity-seeking groups, together with employers, community organizations, training providers, and labour.

Building on the Waterfront Toronto Employment Initiative,<sup>48</sup> Sidewalk Labs plans to work with a range of partners — including Toronto Employment and Social Services, Dixon Hall, Miziwe Biik Aboriginal Employment and Training, and Acces Employment, among others — to provide opportunities in both the construction and tech sectors. The project will set minimum targets, including requiring 10 percent of all construction hours to be worked by members of equity-seeking groups.

While creating meaningful employment in the industries of today is important, so too is helping to cultivate the next wave of local entrepreneurs. Sidewalk Labs envisions a business incubator program developed with a local partner to provide space and support for underrepresented and low-income entrepreneurs, and for small business owners from diverse communities. 

## Foster an inclusive community supported by robust social infrastructure

Social infrastructure fosters health and well-being, ties together communities, and helps people reach their highest potential.

Proactive planning for social infrastructure — including health, civic engagement, lifelong learning, and arts and culture — is critical to achieving an inclusive community. The IDEA District should be a place that creates and sustains good health for all by enabling proactive, coordinated, continuous, and holistic approaches to health, care, and well-being. It should foster a civically engaged community underpinned by deep social ties and a strong sense of pride and belonging. And it should provide the conditions to explore, produce, and experience creative expression of all kinds.

Sidewalk Labs plans to take a proactive approach to health and well-being that recognizes the social determinants of health. This approach would be reflected through a built environment designed to promote active transportation and infuse nature into the streetscape.



See “The Quayside Plan” chapter of Volume 1, on Page 136, for more details on proposed accessibility initiatives.



See the “Buildings and Housing” chapter of Volume 2, on Page 202, for more details on the proposed housing vision.



See the “Economic Development” chapter of Volume 1, on Page 420, for more details on planning for prosperity with equity.

A [Care Collective](#), operated through service-delivery partnerships, [would seek to meet the diverse health needs of people in their local neighbourhood.](#)

The IDEA District will also have a central location for community connection and participation that would be the heart of civic life in Quayside: [the Civic Assembly, a place to connect with neighbours, learn about what is going on in and around the neighbourhood, share ideas, express creativity, engage in cultural activities, and get technical assistance on digital tools.](#) 

## Committing to Indigenous communities

Sidewalk Labs will work to reflect and acknowledge traditional and contemporary Indigenous presence in Quayside, and commits to contributing to prosperity and opportunity for local Indigenous communities.

There is a collective responsibility to share in wise stewardship and peaceful care of the land and its resources.

Quayside sits on the treaty lands of the Mississaugas of the Credit First Nation. Today, there is a significant diverse urban Indigenous community in Toronto. Sidewalk Labs acknowledges the urgent need for, and is committed to furthering the goals of, reconciliation with Canada's Indigenous Peoples.

Quayside is close to a number of Indigenous organizations and districts, including a new Indigenous business district on Dundas Street East, which will include an Indigenous Centre for Innovation and Entrepreneurship, Miziwe Biik Aboriginal

Employment and Training, and Anishnawbe Health Toronto, which is developing a new Indigenous Community Hub in the neighbouring West Don Lands.

Over half of the Indigenous people in Canada now reside in urban centres.<sup>49</sup> This project is an opportunity to model how contemporary city building can contribute to, and support, urban Indigenous prosperity and opportunity. Sidewalk Labs will strive to create opportunity for local Indigenous communities through a number of initiatives. These commitments include:

- [Engagement.](#) Sidewalk Labs will engage Indigenous communities, including the Mississaugas of the Credit First Nation, in ongoing dialogue to build a mutually respectful relationship and explore potential collaborations.
- [Workforce initiatives.](#) Sidewalk Labs will work with Indigenous workforce agencies (such as the Miziwe Biik Aboriginal Employment and Training and the Centre for Indigenous Innovation and Technology) on both skills training and job opportunities in construction and tech, and include Indigenous suppliers in diverse procurement strategies.
- [Design and education.](#) Sidewalk Labs will reflect and acknowledge Indigenous presence on the waterfront. In November, Sidewalk Labs held a design consultation with Indigenous participants, designers, and artists led by Brook McIlroy's Indigenous Design Studio to imagine (among other things) educational opportunities and Quayside's future through the lens of Indigenous design.

For the Sidewalk Toronto project to truly contribute to Indigenous prosperity and opportunity, Indigenous voices must be at the table. Sidewalk Labs is committed to ongoing conversations and collaboration with Indigenous communities in Toronto throughout the development process.

### Mississaugas of the Credit First Nation.

The Mississaugas of the Credit First Nation (MCFN), part of the Ojibwe (Anishinabe) Nation, is one of the largest Aboriginal Nations in North America.

MCFN asserts unextinguished title to all water in its claimed traditional territory including Lake Ontario, and any adjacent lands under water or formerly under water. The land on which Quayside will be built are lands covered by Treaty 13/13A Toronto Purchase (1805) between the Mississaugas and the Crown.<sup>50</sup>

As a company proposing a new vision for these lands, Sidewalk Labs intends to engage with, and include, MCFN in the project.

Sidewalk Labs recognizes the aspirations of the MCFN as articulated in their vision statement: "[MCFN] looks to our Anishinabe roots to guide our vision for the future as a strong, caring, connected community who respects the earth's gifts and protects the environment for future generations. Our identity includes our history, language, culture, beliefs, and traditions which we strive to incorporate into the programs and services offered to our community."<sup>51</sup>

In partnership with Waterfront Toronto, Sidewalk Labs has started an important ongoing dialogue between project staff, MCFN Chief R. Stacey Laforme, and the MCFN Department of Consultation and Accommodation (DOCA). Sidewalk Labs thanks Chief R. Stacey Laforme, MCFN band councillors, and DOCA staff for their generous time during the development of this MIDP, and looks forward to continued meaningful and respectful conversation. It is Sidewalk Labs' hope that this important engagement improves the environmental, social, cultural, and economic well-being of the city and all the project's stakeholders, including MCFN.

**Sidewalk Labs recognizes and honours the vibrant diversity of Toronto, and strives for a place where people of all ages, abilities, incomes, and backgrounds can thrive and belong.**



See "The Quayside Plan" chapter of Volume 1, on Page 214, for more details on social infrastructure.

# Part 5 A New Economic Engine That Drives Outsized Job Growth on an Accelerated Timeline

Sidewalk Labs' approach to economic development can help Toronto realize the full potential of the eastern waterfront on a significantly expedited time frame, resulting in more than 93,000 total jobs (including 44,000 direct jobs) stimulated by the IDEA District by 2040.

The global market value of the urban innovation sector could top **\$2 trillion USD** by 2025.

Any comprehensive approach to urban development requires a strong plan for economic growth with an equally strong commitment to inclusion.

In recent years, all three levels of government in Canada have recognized the importance of inclusive growth. These efforts have included federal investment in public transit and affordable housing, community benefit agreements on provincial projects, and social procurement initiatives at the city level. Waterfront Toronto recognized this priority in its RFP, establishing as one of its primary objectives the need “to deliver key economic and social benefits that enable Toronto to compete effectively with other top-tier global cities for investment, jobs and talent.”

Waterfront Toronto also identified a focus for this growth: an economic cluster centred around urban innovation, a burgeoning sector whose global market value is projected to top \$2 trillion USD by 2025.<sup>52</sup> But despite the vast potential for urban innovation to spark economic growth, no one place has put together a holistic plan to become the global hub of this emerging field.

The Sidewalk Toronto project provides a unique opportunity to help meet and exceed government and Waterfront Toronto goals for inclusive growth by generating a new economic engine — one designed specifically to improve quality of life, affordability, and prosperity for residents, workers, and businesses of all sizes. Sidewalk Labs proposes a two-part approach to economic development with the potential to catalyze significant jobs and growth anchored around urban innovation.

First, Sidewalk Labs plans to help boost general economic growth by accelerating development across the underutilized areas of the IDEA District.

Sidewalk Labs' proposed approach for the IDEA District — including significant investments in advancing an innovation framework and in advanced systems and infrastructure — would help the city and Waterfront Toronto unlock the potential of this underutilized area on an accelerated timeline, creating the conditions for significant new economic growth.

Realizing the full potential of the IDEA District begins with early delivery of the planned Waterfront Light Rail Transit extension, which would not only better connect the area with the rest of the city but also with other planned development nearby, including commercial development at East Harbour and the planned expansion of the Film District.

As a next step, the relocation of Google's Canadian headquarters onto Villiers Island as part of a new innovation campus would spark economic activity and draw businesses and talent from around the world. A thoughtful approach to mixed-use development that integrates new innovations to improve sustainability, affordability, and mobility would further attract workers and residents by creating complete communities filled with homes, jobs, shops, community spaces, and parks.

Finally, new affordable housing and workforce development programs help ensure that this approach to prosperity also comes with equity — creating opportunities for Torontonians of all ages, incomes, and abilities, as well as businesses of all sizes.

To plan for prosperity with equity, Sidewalk Labs commits to a robust inclusion program, anchored by an ambitious housing vision that provides 40 percent of units at below-market rates. Building on that foundation, Sidewalk Labs plans to launch a new workforce development program, implement a construction jobs program for equity-seeking populations, and invest in an Ontario-based mass timber factory capable of supporting approximately 2,500 person-years of full-time employment over 20 years.

Second, Sidewalk Labs plans to help catalyze a cluster focused on urban innovation with the potential to spark a new economic engine.

The city's Official Plan articulates the potential for a cluster-based approach to drive meaningful impact in Toronto:

"Today, the real competitive advantage for urban economies lies in the foundations that support growth in economic clusters that bring new wealth to the region: a well-educated, highly-skilled labour force; research and development leading to innovation; access to financial capital; adequate infrastructure, including advanced information and communications networks; a dynamic business climate; an enviable quality of life; and safe, cohesive, congenial and inclusive neighbourhoods."

Consistent with these objectives, Sidewalk Labs' approach to sparking a new cluster for urban innovation along the waterfront draws inspiration from global examples of successful clusters but is specifically designed to address the challenges to improving life in cities today. This approach can shape the future of

the field, create thousands of jobs, and drive economic opportunity well beyond the waterfront.

First, this cluster would be designed to build on top of Toronto's existing innovation ecosystem, including its world-class academic and research institutions and its support from all levels of government, towards promoting related technology industries.

To build on that foundation, Sidewalk Labs would integrate the unique physical, digital, and policy conditions — found nowhere else at scale throughout the world — necessary to help researchers, entrepreneurs, startups, civic organizations, government agencies, and all third parties tackle difficult urban challenges.

Beyond these unique conditions, Sidewalk Labs plans to further spark this cluster through \$10 million in seed funding for a new Urban Innovation Institute focused on applied research for urban innovation as well as \$10 million towards a new venture fund to support local, early-stage enterprises.

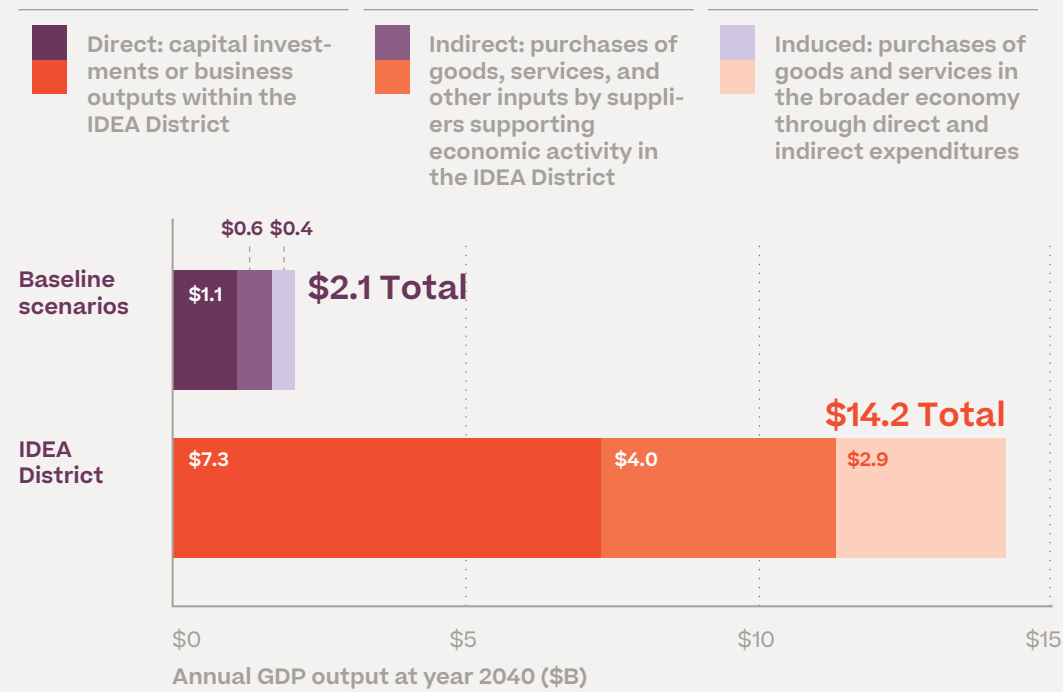
Sidewalk Labs believes the combination of these ingredients would create the conditions for innovation, catalyzing economic activity in Toronto, driving meaningful contributions to the field of urban innovation globally, and drawing innovators from around the world to research, invest, explore, build, and scale ideas that can improve the quality of life in cities.

**The IDEA District  
would help Toronto  
unlock the potential  
of this underutilized  
area on an accelerated  
timeline, creating  
conditions for significant  
economic growth.**

# The IDEA District's significant economic impact on GDP, tax revenue, and jobs by 2040

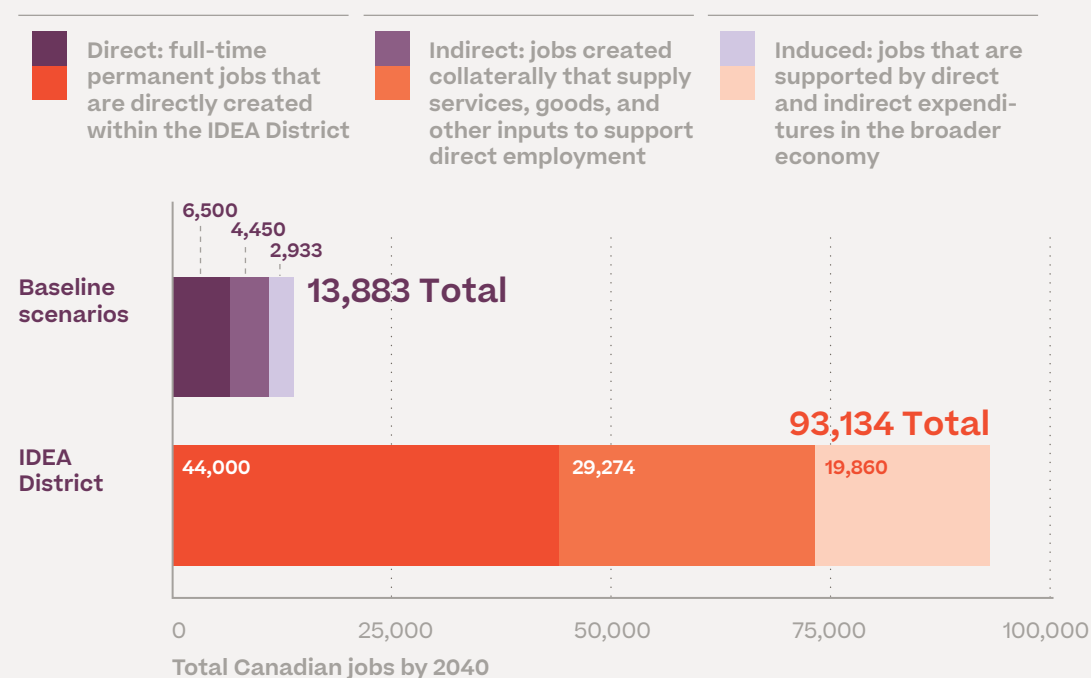
## Nearly seven times the annual GDP contribution by 2040

In its analysis, urbanMetrics estimates that, by 2040, the IDEA District would contribute nearly seven times the value to Canadian GDP annually than would result from existing proposals for the eastern waterfront. Sidewalk Labs recognizes that there are many factors that could contribute to increased value aside from the unique conditions established in the IDEA District, such as a potential increase in commercial and residential density. The baseline scenario assumed the densities as currently considered in existing planning documents.



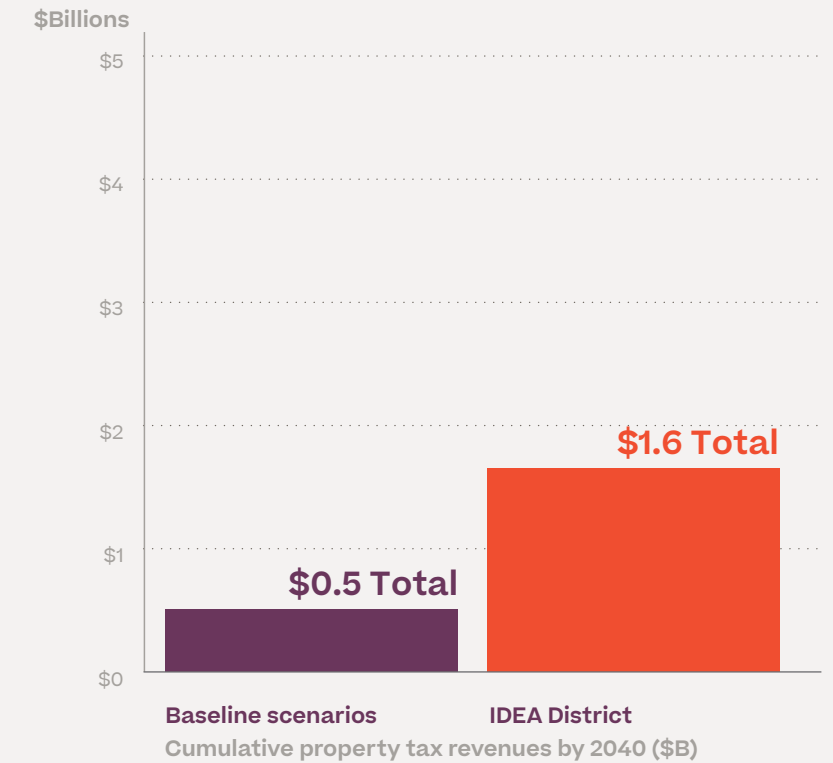
## Nearly seven times as many jobs by 2040

Implementation of Sidewalk Labs' plans for the IDEA District could realize significantly greater permanent employment opportunities, achieved on a faster timeline, than existing proposals. In its analysis, urbanMetrics estimates that, by 2040, the IDEA District would stimulate 93,000 jobs — nearly seven times the number of jobs by 2040 that would be realized under the approach currently envisioned in the Port Lands Planning Framework.



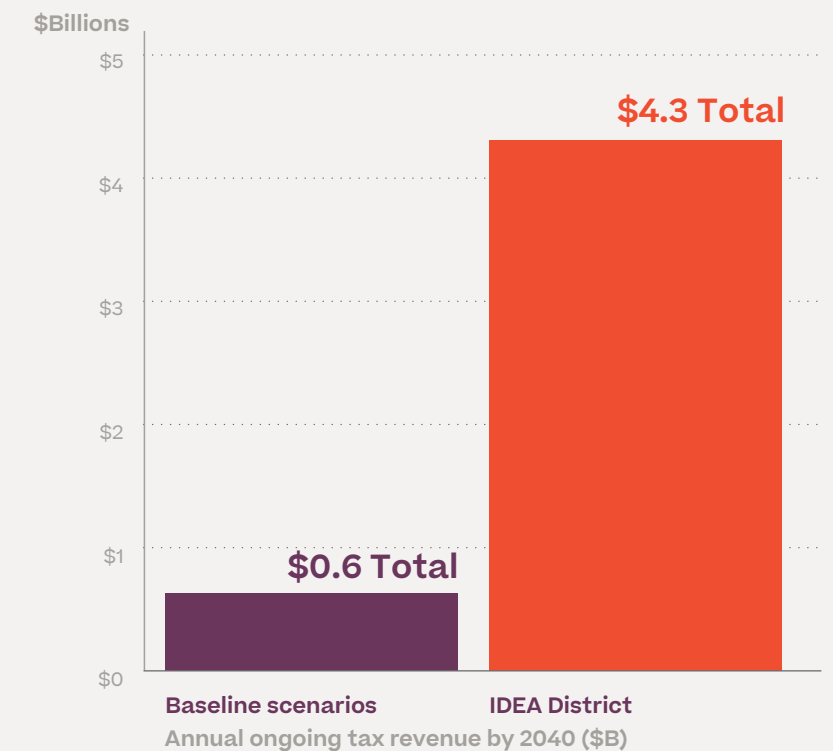
## Three times the cumulative property tax revenue by 2040

Accelerating development of the eastern waterfront would allow for a rapid accumulation of property tax revenues generated upon expedited occupancy. In its analysis, urbanMetrics estimates that, by 2040, full buildout of the IDEA District would accrue more than three times the cumulative property tax revenue of that generated under existing proposals.



## Nearly seven times the annual ongoing tax revenue by 2040

The urbanMetrics analysis also estimates that overall annual tax revenues generated throughout the IDEA District would be realized at a magnitude nearly seven times that of the baseline scenario by 2040. Importantly, a fully developed IDEA District would have the capacity to produce this annual benefit across municipal, provincial, and federal jurisdictions.



All figures in these charts reflect an economic analysis conducted by urbanMetrics, a leading Toronto-based firm with extensive experience on the waterfront.



# Priority Out- comes

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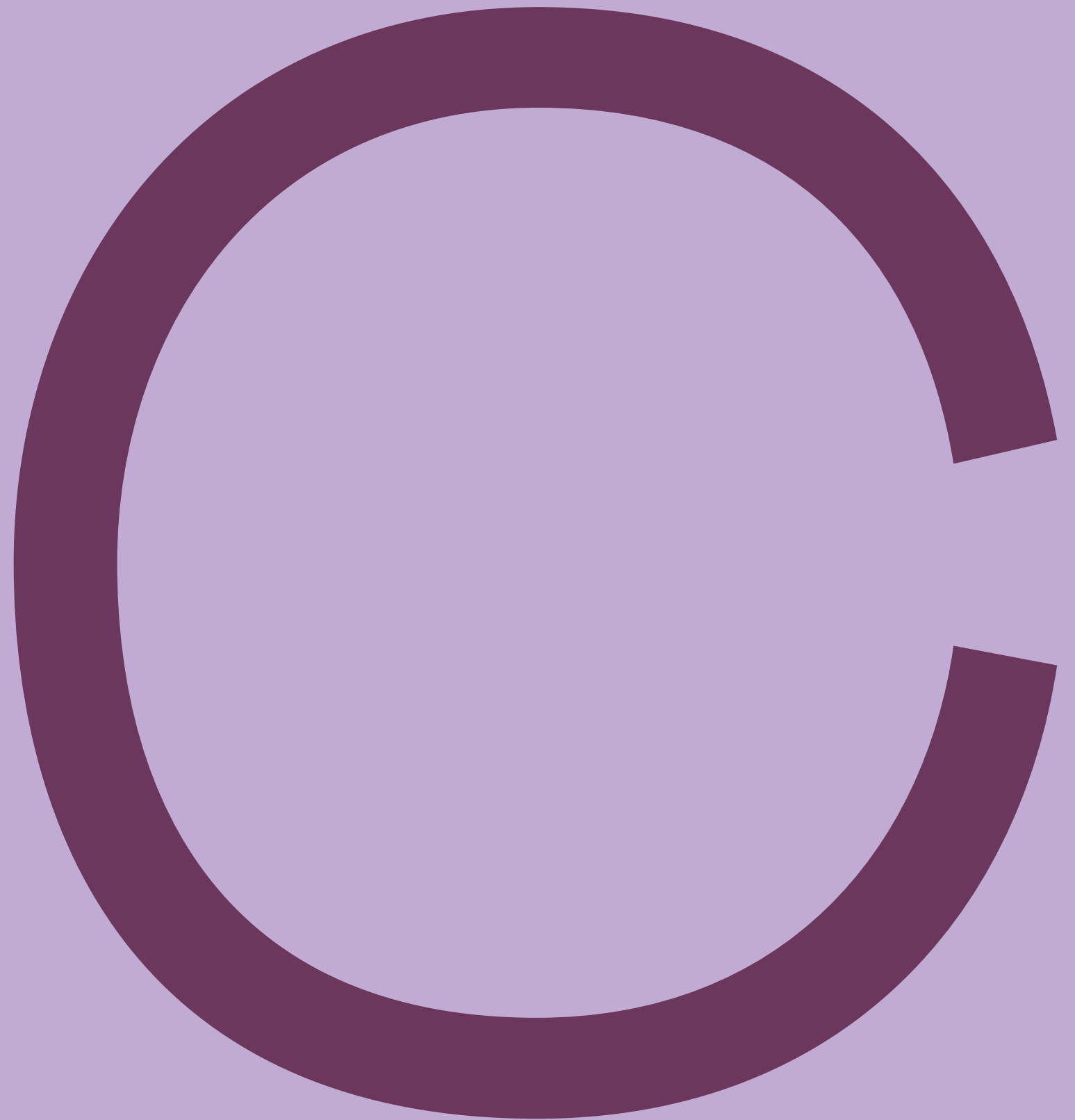
**Part 1**  
Striving to Meet  
Waterfront Toronto's  
Five Priority Outcomes

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**Part 2**  
Impact Summary:  
Achieving the Ambitious  
Priority Outcomes

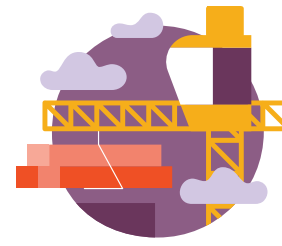
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# Part 1 Striving to Meet Waterfront Toronto's Five Priority Outcomes

Waterfront Toronto has stated that its evaluation of the MIDP will focus on goals and objectives developed through a robust and thoughtful process, identifying five “priority outcomes”: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility (including an emphasis on accessibility), and urban innovation (including robust data privacy and digital governance).

## Waterfront Toronto's five priority outcomes



### Job creation and economic development.

This priority outcome is anchored around the goal of catalyzing economic growth for Toronto, Ontario, and Canada — particularly, in the words of the RFP, by “providing an environment in which an urban innovation cluster can be established and thrive.” This outcome includes bolstering Toronto’s existing innovation ecosystem, providing opportunities for Canadian firms to scale, and expanding training opportunities and jobs across the socio-economic spectrum.



### New mobility.

This priority outcome begins by strengthening connections to the city’s existing public transit network. It also emphasizes the need to rely more heavily on electric vehicles and leverage the future potential benefits of self-driving vehicles. Above all, a successful new mobility plan will reduce the cost and climate impact of transportation options while maintaining or increasing convenience for travellers and goods movement.



### Sustainable and climate-positive development.

This priority outcome emphasizes the creation of neighbourhoods with below-zero annual greenhouse gas emissions. Achieving this goal involves either exporting clean energy outside of a project area or actively reducing Toronto’s current greenhouse gas emissions through carbon offsets.



### Urban innovation.

This priority outcome aims to tackle complex urban problems, from traffic congestion to energy use, using emerging physical and digital tools. Additionally, Waterfront Toronto identified a series of “must do’s,” some of which apply to this area. Specifically, “must do’s” concerning digital innovation include compliance with all applicable laws and regulations while striving for a new global standard in digital governance. Other requirements involve making data open by default to ensure equitable access by third parties, avoiding vendor lock-in to ensure competition, and enhancing data security and privacy.



### Housing affordability.

This priority outcome strives to exceed Waterfront Toronto’s affordable housing requirement (reservation of land sufficient to accommodate 20 percent of new residential units as affordable rental housing) while using minimal reliance on public funding. It also aims to create purpose-built rental housing as well as market ownership units.

# Part 2

## Impact Summary: Achieving the Ambitious Priority Outcomes

The moment is right for a vision of historic sweep: a comprehensive plan for greater affordability, sustainability, inclusion, and economic opportunity that no city government alone could achieve and that no private developer alone would pursue. The MIDP lays the foundation for achieving — and exceeding — Waterfront Toronto’s ambitious priority outcomes.



The IDEA District would create a global model for inclusive communities that set new standards for sustainability, affordability, and economic opportunity.

After 18 months of intensive planning work informed by robust public feedback, Sidewalk Labs believes the MIDP outlines a new development approach that not only meets Waterfront Toronto’s ambitious priority outcomes — but exceeds them.

To do so, the MIDP proposes to transform a small portion of the eastern waterfront — less than one third, to be developed over 20 years — into a 77-hectare IDEA District large enough to point the way forward on a new approach to inclusive growth.

As described in Section B of the Overview, beginning on Page 90, the IDEA District would consist of two phases. The first phase is a five-hectare Quay-side development, which can serve as a demonstration ground for how to integrate urban innovations into the physical environment to achieve significant quality-of-life objectives. The second phase is a larger River District, where those solutions can realize their full impact in a financially sustainable way.

This section provides a high-level overview of how the MIDP would achieve the priority outcomes.

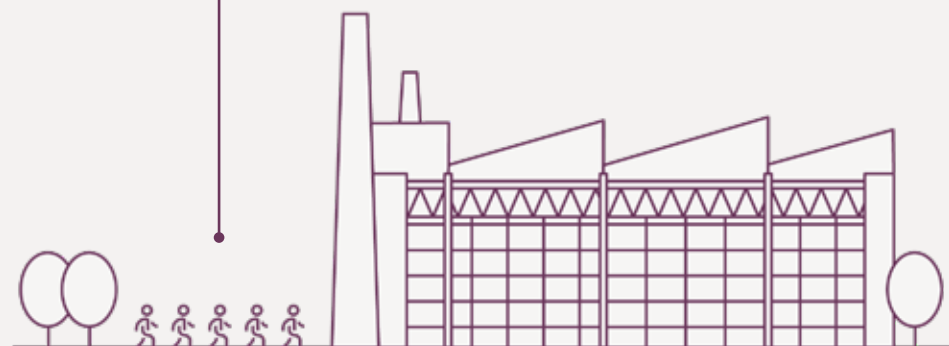
# The IDEA District impact: The new bottom line

**93,000**  
total jobs created

## Economic impact

An economic engine that creates 93,000 total jobs (including 44,000 direct jobs) and generates \$14.2 billion in annual economic impact by 2040

A new Ontario-based factory that catalyzes a Canadian mass timber industry



## Climate impact



**-89%** less CO<sub>2</sub>

A climate-positive neighbourhood that cuts greenhouse gases by 89 percent

## Housing affordability impact



**40%** below-market units

A housing vision with 40 percent of units at below-market rates, supported by more than \$1.4 billion in new private funding sources

## Mobility impact



**77%** of trips using public transit, walking, or cycling

An estimated 77 percent of trips would use public transit or active modes, like walking or cycling

## Urban innovation impact

**10,500**  
urban innovation jobs created

A new innovation campus and economic cluster, with 10,500 jobs (of the 93,000 total) focused specifically on urban innovation

The ability to catalyze digital innovation while protecting privacy and the public good through a new standard of responsible data use





# Priority outcome #1: Job creation and economic development

## Creating 93,000 total jobs and generating \$14.2 billion in economic impact

The IDEA District could help meet and exceed goals for inclusive growth by generating a new economic engine centred around the emerging field of urban innovation. As estimated by the Toronto-based economic firm urban-Metrics, the full scale of the IDEA District would result in 93,000 total jobs (including 44,000 direct jobs) and \$14.2 billion in economic output for Canada each year (GDP), including \$11.8 billion in Toronto — representing a 178 percent increase in value added to the Canadian economy compared to status quo development at completion.<sup>53</sup>

This growth is achieved through a two-part approach to economic development. First, Sidewalk Labs plans to accelerate and unlock new development through upfront investments in critical infrastructure, such as light rail, and relocating Google's Canadian headquarters as part of a new innovation campus. Second, Sidewalk Labs plans to help catalyze a cluster focused on urban innovation and is prepared to provide \$10 million in initial seed funding to create (with local partners) an applied research centre called the Urban Innovation Institute.

Additionally, Sidewalk Labs plans to contribute \$10 million to a new venture fund designed to help Canadian companies scale.

Critically, Sidewalk Labs recognizes that its approach to economic development must benefit everyone. To plan for prosperity with equity, Sidewalk Labs commits to robust measures to ensure affordability, accessibility, and opportunity for all, anchored by an ambitious below-market housing vision (see Priority Outcome #3 for more details), as well as a new workforce development program, commitments to physical and digital accessibility, and opportunities for diverse businesses.

Sidewalk Labs also plans to build on the Waterfront Toronto Employment Initiative to ensure training and opportunities for a wide range of Torontonians in emerging areas of urban innovation.



A new Ontario-based factory for off-site mass timber construction would catalyze a new Canadian industry and support an estimate 2,500 annual full-time jobs.

## Creating 2,500 manufacturing jobs and catalyzing the mass timber industry

At the full proposed scale, the IDEA District would become one of the largest construction projects in the world.<sup>54</sup> Canada is poised to become a global leader in a sustainable new construction industry focused on mass timber — engineered wood that is as strong and fire-resistant as concrete and steel, but far more sustainable and far easier to manufacture.

Sidewalk Labs is prepared to catalyze industry growth with an investment to create a new Ontario-based factory for off-site mass timber construction. The domestic supply of mass timber products produced in such a factory would support

an estimated 2,500 annual full-time jobs over a 20-year period, and by accelerating development across the IDEA District, a factory would catalyze an estimated 5.2 million total work hours for all factory-related trades.<sup>55</sup>

All told, between buildings and infrastructure, the project's construction could add more than \$22 billion in value to the Canadian economy and create over 174,000 years of employment by 2040.

Building on the Waterfront Toronto Employment Initiative, Sidewalk Labs has committed to target at least 10 percent of construction hours for low-income and racialized youths, women, and Indigenous people.



See the "Economic Development" chapter of Volume 1, on Page 420, for more details on the jobs and prosperity plans for the IDEA District.

# Job creation and economic development

The project would catalyze **93,000 total jobs**, **\$14.2 billion in annual economic output (GDP)**, and **\$4.3 billion in annual tax revenue by 2040** — all delivered years faster than existing baseline plans.

## Proposed innovation or initiative

## Impact at IDEA District scale

<p><b>1</b> <b>Proposed economic anchors</b> The proposed economic anchors include a new Google Canadian headquarters and an applied research centre called the Urban Innovation Institute.</p>	<p>→ Together, a new Google Canadian headquarters and the Urban Innovation Institute (seeded with \$10 million by Sidewalk Labs) would form the foundation of a 2.7 million square foot innovation campus on Villiers Island, catalyzing an urban innovation cluster.<sup>56</sup></p>
<p><b>2</b> <b>Venture fund</b> A new venture fund would support early-stage local enterprises working in urban innovation-related fields.</p>	<p>→ Sidewalk Labs' \$10 million initial seed investment (coupled with commitments from other local funding partners) would help startups and small businesses scale and support the region's capacity to retain talent and intellectual property.<sup>57</sup></p>
<p><b>3</b> <b>Sidewalk Works jobs program</b> The Sidewalk Works jobs program would bring employers and educators together to identify real-time needs; partner with educators and trainers on skills development to meet demand; and identify opportunities to further develop a diverse and talented workforce.</p>	<p>→ Realized at a district scale and over time, the Sidewalk Works job program could support the development of an inclusive talent pipeline and foster a culture of inclusion in the workplace.<sup>58</sup></p>
<p><b>4</b> <b>Community benefits commitments</b> Community benefits commitments are designed to ensure more equitable access to employment opportunities.</p>	<p>→ In alignment with the Waterfront Toronto Employment Initiative, 10 percent of construction hours (including professional, administrative, and technical jobs) would be targeted for low-income and racialized youths, women, and Indigenous people.<sup>59</sup></p>
<p><b>5</b> <b>Mass timber construction</b> Mass timber construction in an Ontario-based factory would catalyze a new industry that taps into Canada's vast sustainable forests.</p>	<p>→ The creation of a local factory would support an estimated 2,500 person-years of full-time employment over a 20-year period and catalyze an estimated 5.2 million total work hours for all factory-related trades.<sup>60</sup></p>
<p><b>6</b> <b>Library of building parts</b> A library of building parts created in a mass timber factory would reduce costs related to materials procurement, design, assembly, and shipping efficiency; reduce waste; and reduce regulatory approval timelines for developers.</p>	<p>→ A library of factory-made mass timber building parts would accelerate construction by up to 35 percent and enhance project predictability — savings that could be applied towards below-market housing. It could also help reduce project costs by up to 20 percent.<sup>61</sup></p>

<p><b>7</b> <b>Sidewalk Digital Fabrication</b> A digital coordination system called Sidewalk Digital Fabrication would build on existing building information modelling (BIM) tools to help coordinate every part of the proposed mass timber supply chain, from the off-site factory to on-site assembly.</p>	<p>→ Use of this tool by the entire construction pipeline — developers, architects, contractors, landlords, and others — has the potential to create an unprecedented degree of clarity across the entire development ecosystem, enabling all parties to reduce costs related to uncertainty.<sup>62</sup></p>
<p><b>8</b> <b>“Loft” spaces</b> Adaptable “Loft” spaces are designed with flexible floor plates to accommodate residential, commercial, and light manufacturing uses, enabling a true live-work community.</p>	<p>→ Broad development of “Loft” spaces could accommodate the full range of live-work needs and respond nimbly as those needs change over time, decreasing vacancy periods by 50 percent compared to traditional spaces and attracting the workers and companies necessary for an innovation cluster to thrive.<sup>63</sup></p>
<p><b>9</b> <b>Flexible wall systems</b> Flexible wall systems enable renovations to Loft and residential spaces to occur much faster than normal, reducing vacancies and helping the neighbourhood adapt to market conditions.</p>	<p>→ These systems accelerate renovations through features such as low-voltage digital power (which travel over ethernet cables rather than electrical wires) and mist-based sprinkler systems (which are equally effective as traditional sprinklers but need not be embedded in walls).<sup>64</sup></p>
<p><b>10</b> <b>Outcome-based building code</b> An outcome-based building code system could monitor noise and other nuisances in real time to help a mix of residential and non-residential uses thrive while protecting public safety.</p>	<p>→ Realized throughout the IDEA District, an outcome-based building code system could unlock new local economic opportunities by safely enabling a broader mix of uses at both the building and district scales, including production spaces and small-scale industries.<sup>65</sup></p>
<p><b>11</b> <b>“Stoa” spaces</b> Ground-floor “stoa” spaces are designed to accommodate a wide range of uses beyond traditional retail, ensuring that the community has a lively mix of shops and restaurants, community spaces, maker studios, pop-ups, and small businesses.</p>	<p>→ Sidewalk Labs estimates that the costs associated with renovation, such as moving walls and electrical wiring, would decrease by roughly 50 percent with stoa compared to traditional ground-floor spaces — making it easier for businesses of all sizes to launch or expand.<sup>66</sup></p>
<p><b>12</b> <b>Small business incubator</b> A small business incubator would be designed to help those without access to capital open up shop.</p>	<p>→ Sidewalk Labs plans to work with partners to help launch this program and would reserve a portion of stoa stalls for this incubator, enabling the cohort to test ideas and sharpen business skills in a low-risk environment.<sup>67</sup></p>
<p><b>13</b> <b>Seed Space</b> A digital leasing platform called Seed Space would help small businesses and other retailers book a wide range of stoa sizes for short- or long-term uses, making it easier for small businesses to establish a physical retail presence.</p>	<p>→ Seed Space services would make it possible for landlords to take risks on more dynamic tenants who might not be equipped or willing to sign up for a five- or 10-year contract, and to reduce short-term space vacancies and downtime between leases.<sup>68</sup></p>



## Priority outcome #2: Sustainable and climate-positive development

A climate-positive district that cuts greenhouse gases by 89%

Following Waterfront Toronto's lead in sustainable development, the IDEA District would achieve emissions of 0.72 annual tonnes per capita, or an 89 percent reduction from the city's current average.<sup>69</sup> To get there, Sidewalk Labs proposes a series of energy, green infrastructure, and mobility initiatives that include:

- Reducing overall energy demands through energy-efficient building designs inspired by the global "Passive House" movement
- Eliminating energy waste through digital management tools that help optimize building heating, cooling, and power systems
- Providing heating, cooling, and domestic hot water via a new type of district energy solution called a thermal grid that captures a variety of clean energy sources
- Designing an advanced power grid that uses solar energy, battery storage, and real-time energy pricing to reduce the GHG impact of electricity use
- Improving recycling rates via a smart disposal chain
- Actively managing stormwater via green infrastructure paired with digital management systems
- Prioritizing biking, walking, public transit, and electric vehicles
- Reducing truck deliveries on local streets by coordinating freight through a logistics hub

**The IDEA District would achieve emissions of 0.72 annual tonnes per capita, or an 89 percent reduction from the city's current average.**



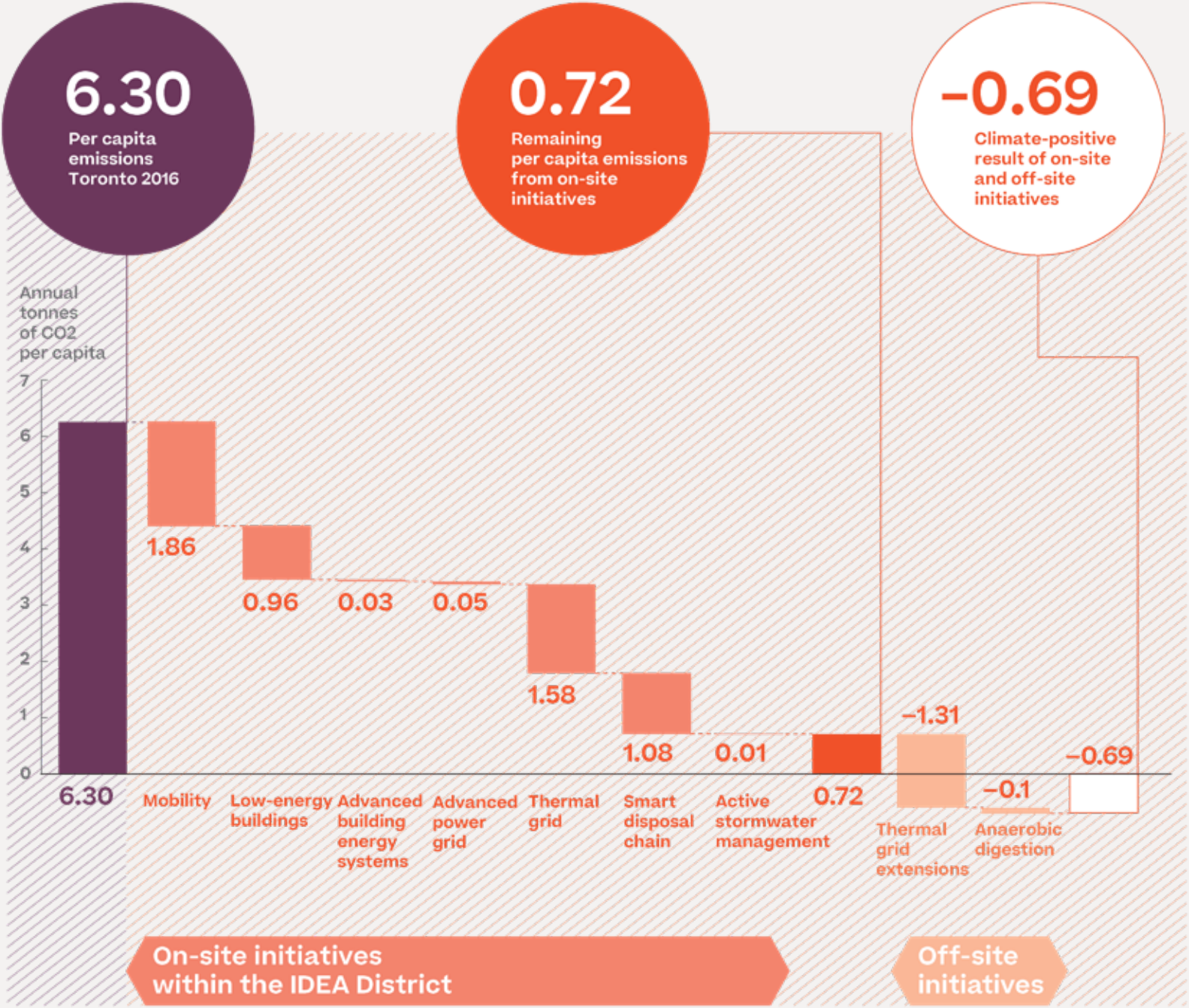
Innovative building designs would reduce energy demands, increase efficiency, and prioritize clean energy sources as part of a broader strategy to achieve a climate-positive district.

At the full scale of the IDEA District, it also becomes feasible to create a surplus of clean energy in the project area that could then be exported to buildings in other parts of the city, fulfilling Waterfront Toronto's climate-positive vision by reducing the city's overall emissions. With public-sector support, the Sidewalk Toronto project could become the largest, densest climate-positive district in North America and the third largest in the world – establishing a credible path forward for cities to follow.

See the "Sustainability" chapter of Volume 2, on Page 296, for more details on the climate-positive vision for the IDEA District.

# The path to achieving a climate-positive district

Sidewalk Labs has proposed a set of on-site and off-site initiatives that, when combined, would produce the largest climate-positive district in North America.



The Sidewalk Toronto project could become the largest, densest climate-positive district in North America.



# Sustainability and climate-positive development

The project’s sustainability vision would enable the IDEA District to become the **largest climate-positive district in North America** and the third largest in the world — contributing **0.69 annual tonnes of clean energy per capita**.<sup>70</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 1 Low-energy buildings**  
Low-energy buildings — inspired by the Passive House movement — would feature highly insulated building envelopes, airtight exteriors, and balanced ventilation systems designed to reduce energy needs while improving interior comfort.

→ Low-energy building designs would reduce GHG emissions by 0.96 annual tonnes per capita (or 15.2 percent) from the city’s current average. They would also achieve Toronto Green Standard Tier 3 rating for energy efficiency and Tier 4 for greenhouse gases.
- 2 Active energy management tools**  
Digital active energy management tools called “Schedulers” would optimize energy systems for residents, businesses, and building operators, ensuring that buildings operate in the most efficient way possible.

→ Schedulers would enable low-energy building designs to achieve their full potential and reduce GHG emissions by 0.03 annual tonnes per capita (or 0.5 percent) from the city’s current average.
- 3 Advanced power grid**  
An advanced power grid would use solar energy, battery storage, and time-based energy pricing to reduce reliance on the main Toronto Hydro grid during periods of peak demand and make an all-electric community affordable.

→ The advanced power grid would reduce GHG emissions 0.05 annual tonnes per capita (or 0.8 percent) from the city’s current average, while maintaining comparable utility costs.
- 4 Thermal grid**  
A district energy system called a “thermal grid” would provide heating, cooling, and domestic hot water by drawing on clean energy sources such as geothermal (underground) energy, building “waste” (or excess) heat, and wastewater heat.

→ The thermal grid would reduce GHG emissions by 1.6 annual tonnes per capita (or 25.1 percent) from the city’s current average.

With support from the city, this advanced infrastructure system could also tap a vast reserve of clean energy from the Ashbridges Bay Wastewater Treatment Plant, removing 70,444 annual tonnes of CO2 per person from areas outside the IDEA District.
- 5 Innovative utility bill**  
An innovative utility bill structure would enable residents and businesses to set monthly budgets for energy costs.

→ When combined with other strategies for affordable electrification, such as Schedulers, innovative bill structures enable customers to have more predictable utility bills with much cleaner energy consumption.

- 6 Smart disposal chain**  
A smart disposal chain would feature real-time feedback to improve waste sorting and “pay-as-you-throw” chutes to reduce household and business waste.

→ The smart disposal chain would reduce GHG emissions by 1.08 annual tonnes per capita (or 17.1 percent) from the city’s current average. It would also result in a landfill diversion rate of 80 percent.
- 7 Pneumatic tube system**  
A pneumatic tube system would separate waste streams underground, reducing contamination and centralizing trash hauling.

→ In addition to helping achieve the greater emissions savings of the smart disposal chain, the pneumatic tube system would remove truck traffic from local streets. Further, it could reduce the need to truck waste to a materials recovery facility for sorting, which currently adds 28 percent to processing costs.
- 8 Anaerobic digestion facility**  
An anaerobic digestion facility can convert organic (food) waste into a clean energy source called biogas.

→ In addition to helping achieve the savings of the smart disposal chain, an anaerobic digestion facility could achieve a carbon offset of 0.1 tonnes per capita through the creation of biogas, helping the district become climate positive.
- 9 Active stormwater management**  
An active stormwater management system relies on green infrastructure to capture water and on digital sensors to empty storage containers in advance of a storm.

→ The active stormwater system would reduce GHG emissions by 0.01 annual tonnes per capita (or 0.2 percent) from the city’s current average. It would also achieve Toronto Green Standard’s Tier 3 for stormwater retention and reduce stormwater moving into municipal systems by 90 percent.
- 10 Electric vehicles**  
A plan to encourage electric vehicles includes a variety of strategies, such as deploying electric ride-hail services, creating charging incentives, and adopting electric self-driving vehicles.

→ When combined with public transit, walking, cycling, and new mobility options, this electric vehicle plan would reduce transportation-related GHG emissions by 1.86 tonnes per capita from the city’s current average.<sup>71</sup>
- 11 Mass timber**  
An emerging building material called mass timber is just as strong and fire-resistant as steel or concrete yet far more sustainable.

→ Mass timber traps 1 tonne of carbon dioxide in every cubic metre of timber, storing carbon that otherwise would have been released back into the air through decomposition. The timber required to build the whole IDEA District would remove the equivalent of roughly 150,000 annual cars from the road.<sup>72</sup>
- 12 Shikkui plaster**  
A sustainable material called Shikkui plaster would provide fire protection equivalent to dry-wall with a fraction of the waste.

→ The Shikkui system would result in a waste stream that can be recycled as plant-beneficial fertilizer, a far more sustainable alternative to the use of drywall, which generates nearly 12 million tonnes of debris every year.<sup>73</sup>



## Priority outcome #3: Housing affordability

### A housing program with 40% of units at below-market rates

The housing vision for the IDEA District is specifically designed to address the housing gridlock facing the city today, providing options and opportunities for more Torontonians on the waterfront.

Meeting the intent of the Central Waterfront Secondary Plan requirement, Sidewalk Labs plans to deliver 20 percent of housing units as affordable housing in Quayside (as defined by the city as being at or below 100 percent Average Market Rent), with at least a quarter of these units going towards households with “deep” affordability needs (defined as households at or below 60 percent of AMR).<sup>74</sup>

Recognizing the challenges in the market for middle-income households, the Quayside housing program goes beyond this requirement to include another 20 percent of units for middle-income households (for example, mid-range rentals at 100 to 150 percent AMR). Together, these units create a 40 percent below-market program to help achieve unprecedented new levels of affordability.

To improve long-term affordability, half of all units in Quayside would be purpose-built rentals important for a healthy housing ecosystem. The other half (far less than in a typical development) would be owned, with 5 percent earmarked for shared equity programs. Finally, the housing program features a variety of housing options, including co-living, family-friendly housing, and efficient units.



See the “Buildings and Housing” chapter of Volume 2, on Page 202, for more details on the housing vision for Quayside and the IDEA District.

**To improve long-term affordability, half of all units in Quayside would be purpose-built rentals important for a healthy housing ecosystem.**



The IDEA District housing vision aspires towards 40 percent of units at below-market rates, including a variety of options designed to support families.

If this vision were applied to the full IDEA District, it could include around 6,800 affordable housing units, representing nearly a third of the current annual citywide target for new affordable rental housing units. With additional government support, that vision could help create more than 13,600 total below-market units.

This approach would also achieve the outcome of increasing private funding support over time by generating over \$1.4 billion for below-market housing through 2048, at the full scale of the IDEA District.<sup>75</sup> These new sources emerge from factory-based construction (which unlocks new land value), efficient housing design (which enables developers to build more units on a given site), and other proposed financial tools (such as a condo resale fee to support mixed-income communities).

# Housing affordability

A 40 percent below-market housing vision — supported by \$1.4 billion in new private funding sources — could generate more than 13,600 below-market units across the IDEA District with additional government support.<sup>76</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 1 Below-market housing**  
An ambitious below-market housing program would feature 20 percent affordable housing units (a quarter of which would go towards “deep” affordability needs) and 20 percent middle-income housing units.

→ In Quayside, Sidewalk Labs commits to achieving this 40 percent below-market vision, which would create roughly 1,000 below-market units. If applied at the full IDEA District with additional government support, this vision has the potential to create 13,600 below-market units by 2048 (including 6,800 affordable housing units).
- 2 “Purpose-built” rentals**  
Half of the total proposed housing vision would consist of “purpose-built” rentals that are critical to improving long-term affordability.

→ In Quayside, Sidewalk Labs commits to purpose-built rentals for half of its housing program, amounting to roughly 1,300 units. If applied at the full IDEA District with additional government support, this program has the potential to create 17,000 purpose-built rentals by 2048, improving long-term affordability.
- 3 “Shared equity” units**  
Middle-income housing options would include “shared equity” units designed to help households build value in their home without the high upfront cost of a traditional mortgage down payment.

→ In Quayside, Sidewalk Labs commits to having 5 percent of all units be shared equity units. If this initiative is extended across the full IDEA District, it could increase adoption of an alternative tenure model that can increase affordability for middle-income households.
- 4 “Affordability by design”**  
An “affordability by design” approach reduces unit footprint while enhancing efficiency, flexibility, and community to enable the creation of more below-market units when compared to traditional development.

→ In Quayside, affordability by design can generate an estimated \$37 million towards below-market housing. If a 40 percent below-market vision is applied at the scale of the IDEA District, it could generate an estimated \$475 million in value towards below-market housing.
- 5 Factory-based construction**  
Factory-based construction can accelerate project timelines and enhance cost certainty, enabling developers to pay more for land, with such premiums directed towards below-market housing.

→ In Quayside, factory-based construction would be tested and refined, but would require an estimated 6 million square feet to drive value. If a 40 percent below-market vision is applied at the scale of the IDEA District, factory-based construction could generate \$639 million in value towards below-market housing.
- 6 Condo resale fee**  
A condo resale fee of 1 percent would enable market ownership units to support rental economics, which creates an additional source of funding for below-market housing.

→ In Quayside, a condo resale fee would be implemented, but would not yet drive value. If a 40 percent below-market vision is applied at the scale of the IDEA District, a condo resale fee could generate \$321 million in value towards below-market housing.

- 7 Waterfront Housing Trust**  
A proposed Waterfront Housing Trust would “lock-box” new private funding sources — including land value from factory-based construction and the condo resale fee — for below-market housing.

→ The Waterfront Housing Trust (not administered by Sidewalk Labs) could assemble and disburse funding from a variety of sources for below-market housing within the IDEA District, increasing the predictability and certainty of funding for developers.
- 8 Efficient unit design**  
Efficient and ultra-efficient units reduce size to enable affordability while remaining livable through thoughtful design features that make the most of their space.

→ Efficient units of all sizes — up to four bedrooms — would create an affordable option for single-person households, families, seniors, and other groups looking for high-quality downtown living with access to community services, public spaces, and neighbourhood amenities.
- 9 Co-living units**  
Co-living units would feature shared building amenities such as communal kitchens to enhance community for a range of residents.

→ Integration of co-living spaces could improve affordability while creating more community-focused housing options for seniors, families, and others seeking a stronger sense of community from downtown living.
- 10 Family-sized units**  
Family-sized units of at least two bedrooms or more would expand housing options for households of all sizes.

→ In Quayside, Sidewalk Labs commits to creating 40 percent of units at family size. If applied at the full IDEA District, this approach could help make downtown living affordable and possible for families that might otherwise leave the city.
- 11 Care Collective**  
A Care Collective would provide community space dedicated to enhancing health and well-being by co-locating the delivery of health care and community services alongside proactive health programming.

→ To support residents and ensure a complete community, the Quayside plan sets aside a central space for the Care Collective, which would be activated by local partners. If these partners choose, the Care Collective could demonstrate a forward-looking model that could extend throughout the IDEA District.<sup>77</sup>
- 12 Civic Assembly**  
A Civic Assembly would provide neighbourhood access to spaces for community programs, civic engagement, and cultural events to bolster community.

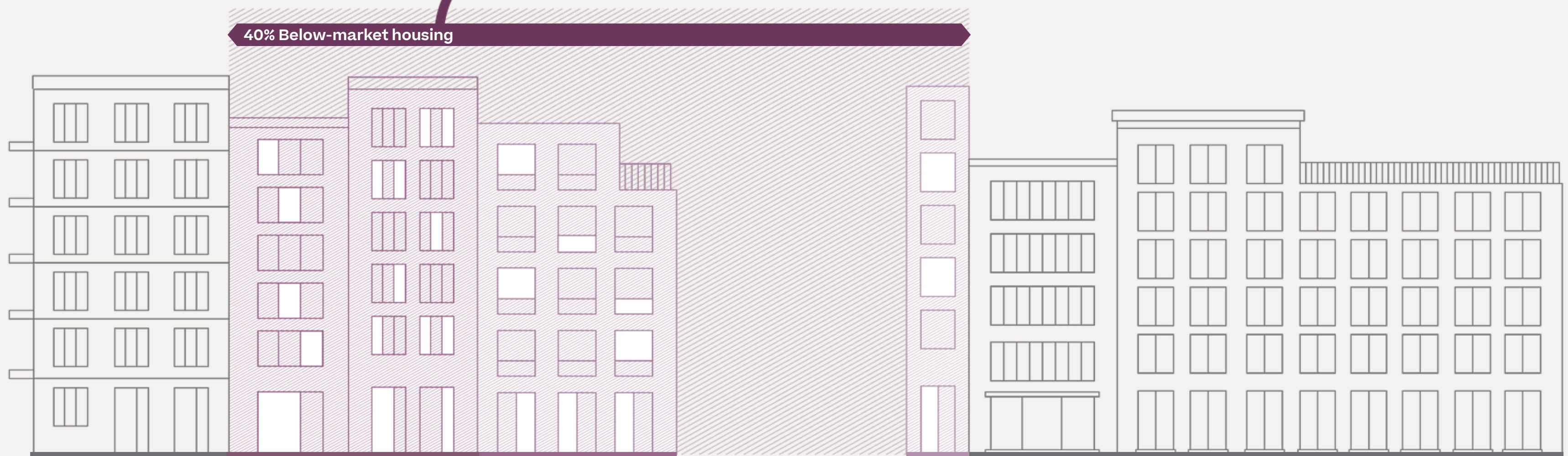
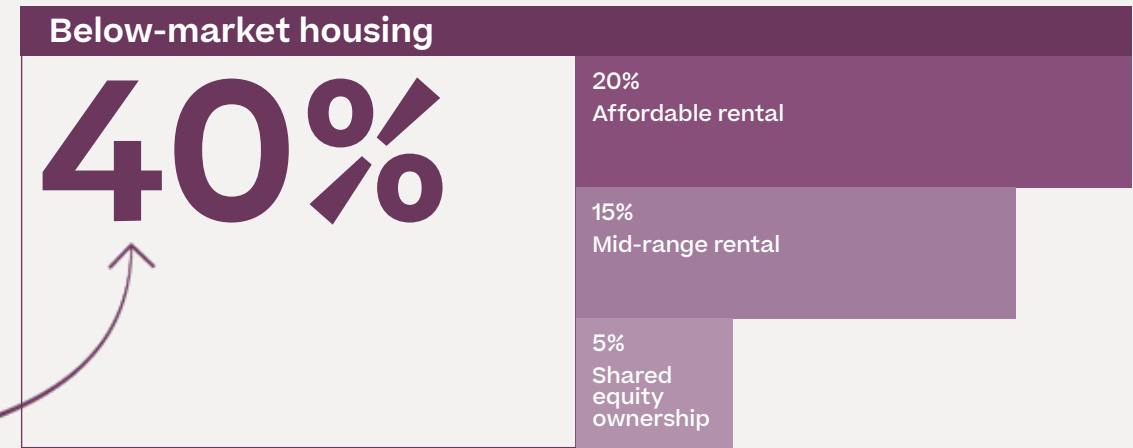
→ To support residents and ensure a complete community, the Quayside plan envisions the Civic Assembly as a place to connect with neighbours, access local services, and participate in community decisions. If extended across the IDEA District, it could further enhance social interaction and community engagement.<sup>78</sup>
- 13 Elementary school and daycare centre**  
Plans for an elementary school and daycare centre would ensure that downtown families have access to basic education and child care needs.

→ To support residents and ensure a complete community, the Quayside plan proposes to work with the Toronto District School Board to plan for an elementary school; a portion of the space could also be allocated for a childcare facility. Beyond Quayside, this approach would demonstrate the viability of planning a neighbourhood with families in mind from the start.<sup>79</sup>
- 14 Library collaboration**  
A proposed collaboration with the Toronto Public Library (TPL) would explore ways to integrate the library’s presence, resulting in potential pop-up lending services or TPL-developed classes on digital literacy.

→ While Sidewalk Labs has not yet proposed such collaborations beyond Quayside, the scale of the IDEA District provides the opportunity to enable new learning experiences for a broader population.<sup>80</sup>

# Achieving a 40% below-market housing program

Sidewalk Labs commits to achieving a 40 percent below-market program in Quayside, which could scale across the IDEA District with government support to help achieve the city's affordability goals.



**Market-rate rental**  
These units would be purpose-built rentals renting at market rates.

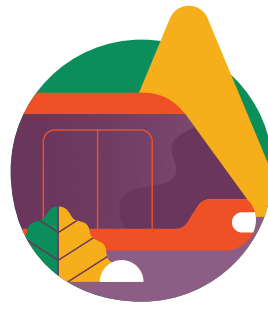
**Affordable rental**  
These units qualify as affordable housing in Toronto (below 100 percent Average Market Rent) and include at least 5 percent deeply affordable units (at 60 percent AMR or below).

**Mid-range rental**  
These units are geared towards middle-income families who do not today qualify for affordable housing (100-150 percent AMR).



**Shared equity ownership**  
These units would offer a new type of affordable homeownership for middle-income families unable to afford full ownership.

**Market-rate ownership**  
These condo ownership units would, as with all other unit types, offer a range of new options, including family units and co-living spaces.



## Priority outcome #4: New mobility

### More than three-quarters of all trips by transit, walking, or cycling

Rapid urban growth is making it harder to get around, but support for transit and innovations in mobility management offer opportunities to help people and goods move more easily.

The plans for the IDEA District would support light rail expansion, provide exceptional bike and pedestrian infrastructure, and encourage on-demand mobility services (such as ride-hail) priced for sharing. An integrated mobility package would bundle all these options, making it possible for households to get around conveniently without the need to own a car and saving two-person households an estimated 40 percent on annual transportation spending, or roughly \$4,000 per year.

A new mobility management system could improve safety using real-time traffic management tools, such as adaptive traffic signals that can prioritize pedestrians or transit vehicles. A new approach to urban freight would consolidate all deliveries into a neighbourhood logistics hub and then distribute them via a below-grade tunnel system, reducing truck traffic on local streets, along with noise and air pollution.

Altogether, Sidewalk Labs projects that these initiatives would lead to more than 77 percent of all trips across the IDEA District being made by public transit or active modes (walking or cycling) — more than 16 percentage points higher than in comparable neighbourhoods.<sup>81</sup>

### A 91% increase in pedestrian space

These expanded mobility options also enable the neighbourhood's streets to reclaim significant amounts of street space for pedestrians, ensuring they are more accessible for more people.

Sidewalk Labs estimates that its street designs could provide at least 91 percent more pedestrian space than a business-as-usual development scenario, thanks to street design features such as “dynamic” curb spots that change between road and public space, the dramatically reduced need for curbside parking that results from shared mobility services, and, in the future, the potential for self-driving vehicles to share a right-of-way with public transit without hindering transit efficiency.<sup>82</sup>

Applied at the full proposed scale of the IDEA District, a balanced mobility vision would enable the vast majority of trips to occur by walking, cycling, riding public transit, or using a ride-hail service — dramatically reducing the need to own a car.



# New mobility

The project would create a safe, affordable, and fully accessible mobility system in which **77 percent of all trips are made by public transit, cycling, or walking; pedestrian street space increases by 91 percent; and households can save up to \$4,000 a year.**<sup>83</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 1 Light rail transit extension**  
A self-financing light rail transit extension would connect residents to job hubs and draw workers and visitors to the waterfront from all over the city.

→ At the full scale of the IDEA District, more than 60 percent of all trips would occur by public transit. The light rail could serve more than 72,900 riders and make 36 percent of jobs accessible across Toronto within 30 minutes — while demonstrating the viability of the self-financing approach.<sup>84</sup>
- 2 Pedestrian and cycling infrastructure**  
A network of pedestrian and cycling infrastructure features wider sidewalks, wider and heated bike lanes, and accessibility elements to encourage walking and cycling and support people using wheelchairs or other assistive devices.

→ At the full scale of the IDEA District, more than 16 percent of all trips would occur by foot, bike, or other low-speed vehicles. Cyclists would be able to reach 100 percent of buildings on a dedicated bike lane or cycling street, compared to roughly 15 percent in a typical downtown Toronto neighbourhood today.<sup>85</sup>
- 3 New mobility services**  
New mobility services such as ride-hail, bike-share, electric vehicle car-share, and e-scooters would provide affordable alternatives to private car trips.

→ With the arrival of self-driving technology, applied at the full scale of the IDEA District and coordinated with the city, roughly 7 percent of all trips would occur by ride-hail options, reducing the need to own a car.<sup>86</sup>
- 4 Mobility subscription package**  
An integrated mobility subscription package would establish a new pricing model that enables residents and workers to see all their trip choices in real time and pay in one place.

→ Adopting this package — which would include access to public transit, bike-share, ride-hail, car-share, and other services — would save two-person households an estimated \$4,000 a year if they choose to go car-free.<sup>87</sup>
- 5 “People-first” street types**  
“People-first” street types are designed for different speeds and primary uses, including Boulevards and Transitways for public transit and vehicle traffic, Accessways for cyclists, and Laneways for pedestrians.

→ These street types would serve as the foundation for the suite of mobility options and innovations proposed by Sidewalk Labs. At the full IDEA District scale, this network would enable people to fulfill all their daily needs within a 15-minute walk while still ensuring that people can get where they need to go.<sup>88</sup>
- 6 Accessibility initiatives**  
A wide set of accessibility initiatives would include curbless street design, wider sidewalks, heated pavement, wayfinding beacons, and accessible ride-hail vehicles.

→ These initiatives would ensure that every street meets or exceeds all the requirements of the 2005 Accessibility for Ontarians with Disabilities Act (AODA), making it easier for everyone to get around.<sup>89</sup>

**7 Freight “logistics hub”**  
A freight “logistics hub” would feature a consolidated shipping centre (housed alongside on-demand storage and a borrowing library) with underground delivery, reducing truck traffic on local streets and improving convenience.

→ In Quayside alone, this system would reduce truck trips into the neighbourhood by 72 percent, along with reducing disruption to local roads and surrounding areas — benefits that would increase considerably at the full IDEA District scale.<sup>90</sup>

**8 Mobility management system**  
A mobility management system would use real-time information to coordinate travel modes, traffic signals, and street infrastructure, and to apply pricing to curb and parking spaces — reducing congestion and encouraging shared trips.

→ Such a system could coordinate the entire street network to help achieve transportation goals established by a public entity, such as prioritizing modes that carry the most people, striving towards Vision Zero safety, reducing curbside traffic, and providing cyclists with “green waves” for faster and safer travel.<sup>91</sup>

**9 District parking management**  
A district parking management system would incorporate high-density on- and off-site parking, on-demand retrieval of vehicles, and electric-vehicle charging.

→ Such a system could dramatically reduce the need for on-site garage or curbside parking, enabling this space to be used for housing, parks, or other uses and encouraging adoption of electric vehicles.

**10 Dynamic curbs**  
Dynamic curbs are flexible street spaces that provide passenger loading zones during rush-hour and public spaces in off-peak times.

→ Dynamic curbs would have the capacity to process six times as many curbside pick-ups and drop-offs as a typical one-hour metered curb, and would greatly expand the diversity of uses that could be supported in the public realm.

**11 Adaptive traffic signals**  
Adaptive traffic signals have the ability to prioritize pedestrians who need more time to cross a street or public transit vehicles running behind schedule.

→ Adaptive traffic signals could optimize their systems across a wider area, enabling the mobility management system to achieve its transportation objectives.

**12 Modular pavement**  
Modular pavement consists of hexagonal pavers that can be replaced or repaired quickly, dramatically reducing the amount of time streets spend closed down for road or utility work and increasing flexibility of street uses.

→ Over a 30-year period, modular pavement coupled with open access channels would be 13 percent less expensive per square metre than the standard waterfront streetscape in Toronto today by reducing maintenance costs and accelerating utility repair.<sup>92</sup>



## Priority outcome #5: Urban innovation

By establishing the physical, digital, and policy conditions for urban innovation, the IDEA District can become a beacon for researchers, entrepreneurs, private companies, civic organizations, government agencies, and innovators from around the globe to create countless new services and products designed to improve urban life.

At the heart of this vision is the ability to create the digital conditions for others to build on. These conditions begin with flexible, affordable digital infrastructure. That includes a powerful ubiquitous connectivity network that leverages new advances to improve speed and security. A standardized mount system would dramatically reduce the cost of deploying innovations and eliminate vendor lock-in.

As with ecosystems such as the World Wide Web, third parties depend on open hardware and software as well as on an agreed-upon set of standards and protocols to successfully deploy their ideas. A set of published standards around open-data architecture, access, and sources would enable third parties to build upon a shared foundation, supported by a common set of security, formatting, and communication standards.

To implement the systems needed to achieve Waterfront Toronto's priority outcomes, Sidewalk Labs plans to purchase third-party technology or partner with third parties to create (or enhance) these systems whenever possible, giving priority to technology that is local to Toronto, Ontario, or Canada. For systems that Sidewalk Labs needs to develop itself because they do not exist in the market, data would be made publicly accessible (with the proper protections, including de-identification), further catalyzing third-party creation.

Above all, Sidewalk Labs understands that realizing the promise of digital innovation in a responsible manner requires an approach to governance that protects privacy and makes the benefits of urban data widely accessible.



The IDEA District would enable innovators from around the world to create new services and products to improve urban life.



For more details on the proposed Urban Data Trust and responsible data use process, see the "Digital Innovation" chapter of Volume 2, on Page 374.

To meaningfully enable responsible data use across the IDEA District, Sidewalk Labs proposes that urban data be controlled by an independent entity called the Urban Data Trust charged with balancing the interests of personal privacy, public interest, and innovation. This independent, government-sanctioned steward would establish a clear process for approving any initiatives that involve the use or collection of urban data for all parties, including those proposed by Sidewalk Labs.

Sidewalk Labs proposes that the Urban Data Trust anchor this process around a publicly auditable [Responsible Data Use \(RDU\) Assessment](#) — an in-depth review that is triggered by any proposal to collect or use urban data — and guided by [RDU Guidelines](#) that incorporate globally recognized Privacy by Design principles.

# Urban innovation

Catalyzing urban innovation requires **open digital conditions** that enable third parties to create new solutions using urban data in a responsible way.<sup>93</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 1 Ubiquitous connectivity**  
A ubiquitous connectivity internet network — powered by a new Super-PON technology that reaches faster speeds with less equipment — could provide households and businesses with a secure personal network across an entire neighbourhood.

→ Deployed across the IDEA District, this advanced connectivity would provide the foundation for countless new services and solutions to emerge within the urban innovation cluster. It would also create momentum to deploy lower-cost Super-PON technology, improving the equitable growth of key digital infrastructure.<sup>94</sup>
- 2 Standardized physical mounts**  
Standardized physical mounts connected to power would reduce the cost of deploying digital innovations, serving as a sort of “urban USB port.”

→ The proposed standardized mount system could cut the amount of time it takes to install a device from 30 hours today to two hours, a 92 percent savings of time and cost, enabling a wide array of third parties to deploy urban innovations and preventing vendor lock-in.
- 3 Open, published standards**  
Open, published standards would make properly protected urban data accessible to the community in real time.

→ At the scale of the IDEA District, open standards enable a broad range of third parties to build new services or competitive alternatives to existing ones, establishing a core condition for the urban innovation cluster to thrive.<sup>95</sup>
- 4 Urban Data Trust**  
A proposed Urban Data Trust would build on existing Canadian privacy laws to oversee the review and approval of all digital innovations that propose to use or collect urban data.

→ Over the longer term, once this publicly accountable entity has benefited from many use cases in Quayside, it could have broader coverage — enabling an urban innovation cluster to grow while protecting inclusion, privacy, and the public good.
- 5 Responsible Data Use**  
Clear Responsible Data Use Guidelines (such as making de-identified or non-personal data publicly accessible by default) and a publicly transparent Responsible Data Use Assessment would help ensure responsible innovation.

→ Established by an independent entity such as the Urban Data Trust, RDU Guidelines and Assessments would help ensure that urban innovation has a beneficial purpose — not falling into the trap of being tech for tech’s sake — and remains publicly accountable.
- 6 Security and resiliency**  
A best-in-class approach to security and resiliency would be designed to prevent disruptions, rapidly detect them, and rapidly restore functionality.

→ This approach would ensure that urban innovations that use urban data or connectivity remain protected from intentional actions, inadvertent disruptions, or environmental events that could disrupt digital services or infrastructure.<sup>96</sup>

Catalyzing urban innovation also requires **flexible physical conditions**. Many flexible physical elements have been described in other priority outcomes tables, including flexible street elements, active energy tools, and adaptable building spaces. Others are included here.

## Proposed innovation or initiative

## Impact at IDEA District scale

- 7 Open access channels**  
Open access channels located under removable pavers would allow for easy utility access and greater flexibility to incorporate new systems as they are developed over time.

→ In addition to facilitating utility access, open access channels would provide communities with greater flexibility to respond to changing needs, enabling infrastructure transformations (such as installing a new community garden) or new utility systems (such as a new communications network with higher performance capabilities) to be implemented faster and at a lower cost.<sup>97</sup>
- 8 Shared programming infrastructure**  
Shared programming infrastructure, such as projectors and lighting options, would enable communities to program open spaces themselves.

→ In Quayside and across the greater geography of the IDEA District, shared public realm infrastructure would empower the community to program public spaces, democratizing placemaking.<sup>98</sup>
- 9 Outdoor-comfort system**  
A proposed outdoor-comfort system (featuring Raincoats to shelter sidewalks; Fanshells to cover open spaces; and Lanterns to block wind) could dramatically increase the amount of time it is comfortable outside.

→ In Quayside, this system would help to increase comfortable hours by 35 percent. Applied throughout the IDEA District, this weather-mitigation system has the potential to double the number of hours it is comfortable to be outdoors each year across key spaces, drawing more people outdoors, together.<sup>99</sup>
- 10 Public realm assets map**  
A real-time map of public realm assets — including park benches and landscaped gardens — would enable proactive maintenance and keep spaces in good condition.

→ This map would serve as a single repository for information about open spaces and related infrastructure, enabling open-space managers to run operations software on top of it, improving maintenance, issue response, and proactive repairs. For instance, a water pipe sensing system paired with this map could ultimately save up to \$200,000 a year in preventing quotidian water leaks.<sup>100</sup>
- 11 Generative design**  
A digital planning tool called “generative design” could help planners identify opportunities to achieve development objectives, such as increased daylight, open space access, or density.

→ Such a tool could help ensure that the wide array of developers, architects, and designers who would be responsible for building out the IDEA District over time would maintain flexibility and creativity in developing new ideas, while at the same time ensuring that their proposals achieve key public interest objectives.<sup>101</sup>



# The Partnership

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**Part 1**  
A New Type of  
Partnership to Catalyze  
Inclusive Growth in  
the Digital Age

p196

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**Part 3**  
Summary of the  
Financial Terms

p212

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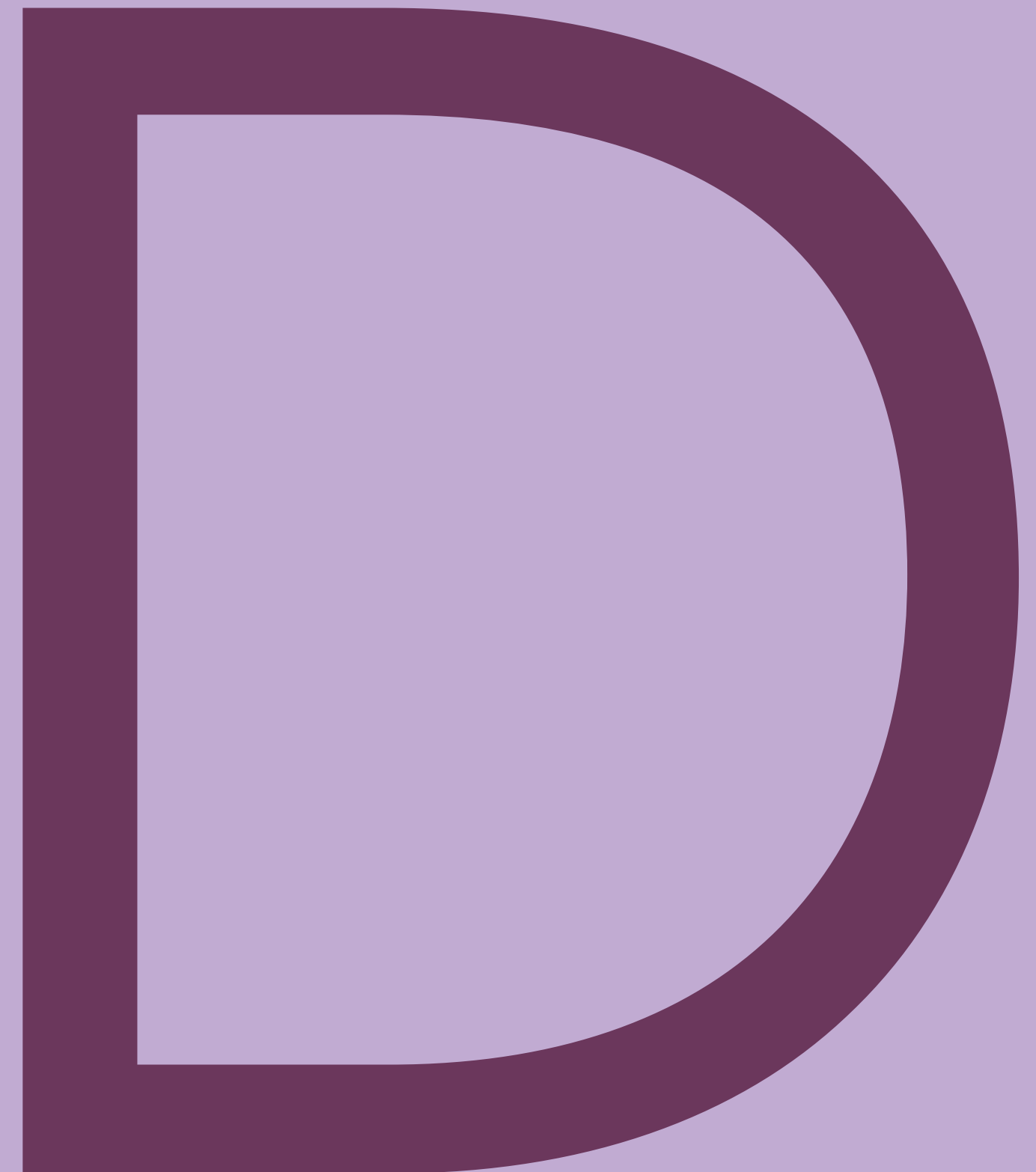
**Part 2**  
Summary of the  
Proposed Innovation and  
Funding Partnership

p202

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**Part 4**  
How the Proposal  
Reflects the  
Transaction Principles

p222



# Part 1

## A New Type of Partnership to Catalyze Inclusive Growth in the Digital Age

Guided by a core set of transaction principles, the MIDP outlines a groundbreaking public-private partnership, in which the public sector leverages outside expertise, technology, and resources to spur economic growth and deliver extraordinary benefits for the people of Toronto.

**“Waterfront Toronto is seeking a world-leading urban innovation and funding partner to help create and fund a globally significant community that will showcase advanced technologies, building materials, sustainable practices and innovative business models.”**

Waterfront Toronto, RFP No. 2017-13

Waterfront Toronto’s RFP was an unusual and ambitious approach to the matter most immediately at hand: the development of a five-hectare piece of land at the foot of Parliament Slip, called Quayside. But it was a natural extension of the agency’s work, over two decades, thinking about what Toronto needs — and finding innovative ways to deliver.

With Quayside situated at the doorway to one of the largest underdeveloped areas of urban land in North America, Waterfront Toronto saw an opportunity to achieve a global model for inclusive growth.

This goal simply would not occur if Waterfront Toronto had used the traditional approach of auctioning off parcels of land, one by one, for development. Instead, the RFP recognized that transformational change would require the delivery of an integrated vision capable of addressing urban challenges through new innovations.

The RFP also recognized the potential need for scale to fully realize key objectives, noting that “it may be beneficial to advance the solutions, processes and partnerships proven successful through the Project to subsequent developments on the eastern waterfront.”

At its formation, Sidewalk Labs was charged with the pursuit of a large-scale demonstration project to show, in significant ways, the combined power of cutting-edge technology and forward-thinking planning and design to create better urban communities. For this pilot, Alphabet provided Sidewalk Labs the flexibility to balance the pursuit of substantive policy outcomes and near-term financial results, in order to make an innovative partnership with government work.

It was this mandate that led Sidewalk Labs to respond to Waterfront Toronto’s RFP.<sup>102</sup> The company was honoured to be selected as Innovation and Funding Partner six months later, a role that involved spending \$50 million USD of private capital on an intensive planning process informed by robust public consultation, with no guarantees that what came out of it would be implemented.

# Seven principles guiding the proposed partnership

From the start, there was an unusual — and, for some, almost hard to imagine — alignment between the subsidiary of an American tech giant and an innovative revitalization agency in Toronto. Both shared an aspiration to deliver a project that served multiple bottom lines: measured not just in dollars but in the vibrancy and inclusivity of the community it would create, in the solutions it would pursue to address pressing urban challenges, and in the path forward it would illuminate for Toronto and cities around the world.

The MIDP is the result of 18 months of planning to deliver that potentially unprecedented project. It is a detailed and executable plan to create a new community on the eastern waterfront that realizes every one of Waterfront Toronto's priority outcomes and puts forth a vision for what the future of city-building might look like.

But the RFP recognized that realizing these goals would require more than an innovative development plan — it would require “new and innovative partnerships, funding and investment models” that enable the private sector to help support and achieve public-sector priorities. 



For more details on the proposed partnership, see Volume 3.

**The RFP recognized that realizing ambitious quality-of-life goals would require “new and innovative partnerships, funding and investment models.”**

Sidewalk Labs considered its own objectives and capabilities, and reflected deeply on the objectives detailed in Waterfront Toronto's RFP, and the feedback it received from the public. Sidewalk Labs distilled this 18-month engagement process into a series of seven transaction principles that seek to harmonize the priorities of Sidewalk Labs with those of Waterfront Toronto and the public at-large:

# 1

**Devise a transaction that would achieve Waterfront Toronto's priority outcomes.**

Any proposal must first achieve Waterfront Toronto's priority outcomes through an innovation approach to both development and partnership: (1) job creation and economic development; (2) sustainability and climate-positive development; (3) housing affordability; (4) new mobility; and (5) urban innovation (including robust data privacy and digital governance).

# 2

**Scale the project to achieve the desired outcomes.**

Understanding that making progress on its project objectives could require a scale broader than Quayside, Waterfront Toronto invited proposals at a district scale. Waterfront Toronto recognized that certain promising approaches can only be supported financially or deliver a material public benefit when applied to a broader geography. Ultimately, the project should be scaled such that the public policy outcomes are met and the project can be commercially viable.

# 3

**Phase development to manage risk.**

The ability to extend new approaches to innovation beyond Quayside should depend on Sidewalk Labs first hitting milestones that demonstrate it is likely to succeed in future phases.

# 4

## **Establish strong public-sector oversight.**

No urban project of sufficient scope or complexity can succeed without meaningful public oversight and an administrator capable of moving it forward. This is especially true for projects bringing new ideas and approaches to bear.

# 5

## **Structure the role of Sidewalk Labs to leverage its strengths.**

The role for Sidewalk Labs should capitalize on its unique combination of strengths, including a multidisciplinary team that spans urban planning, finance, design, and technology; its access to capital and technological resources, including from its parent company, Alphabet; and its willingness to take calculated risks to advance its mission. The flipside is also true: Sidewalk Labs should not take on roles where it does not add special value.

# 6

## **Use proven approaches where possible.**

Deal terms, financing mechanisms, and implementation agreements should rely on existing local precedents whenever possible, to simplify and de-risk the transaction.

# 7

## **Align financial interests.**

As with any company seeking to invest in Toronto, it is appropriate that Sidewalk Labs seeks to earn a return on its investment. But the transaction structure must ensure that Sidewalk Labs is financially successful only when the public sector is financially successful and also achieves its objectives.

**The transaction structure must ensure that Sidewalk Labs is financially successful only when the public sector is financially successful and also achieves its objectives.**

# Part 2

## Summary of the Proposed Innovation and Funding Partnership

Sidewalk Labs proposes a set of roles as Innovation and Funding Partner designed to support the public sector and create the conditions for others to thrive.

Guided by the core set of principles, Sidewalk Labs proposes a transaction to accelerate the development of the eastern waterfront, accomplish Waterfront Toronto's priority outcomes, and spur economic growth. This proposal strives for a forward-looking public-private partnership, in which the public sector leverages outside expertise, technology, and resources to spur economic growth and deliver extraordinary benefits for the people of Toronto.

As described earlier, the MIDP proposes to realize Waterfront Toronto's priority outcomes on an area of the eastern waterfront that includes Quayside, and a portion of the Port Lands north of the ship channel. The project geography, as a whole, would be known as an Innovative Development and Economic Acceleration (IDEA) District. Sidewalk Labs proposes that government designate a public entity to serve — or in the case of Waterfront Toronto, continue to serve — as revitalization lead for the IDEA District.

Working with local partners, Sidewalk Labs would lead real estate development in Quayside and the Villiers West neighbourhood, on the western part of Villiers Island, where a new Google Canadian headquarters would be located; real estate development across the rest of the IDEA District would be handled by other developers. Sidewalk Labs also proposes to lead the development of a set of advanced systems in Quayside and Villiers West, including sustainability and mobility infrastructure (see sidebar on Page 204).

As Innovation and Funding Partner throughout the rest of the IDEA District, Sidewalk Labs would serve as a catalyst for innovative urban development, bringing expertise, financial resources, economic development assets, and a willingness to invest in a forward-looking, integrated, progressive, and sustainable model for improving urban life. In this supporting role, Sidewalk Labs would provide a variety of services — including advisory services, limited technology deployment, and optional infrastructure financing — to ensure the innovative approaches contemplated in the MIDP are properly implemented.

The project would be carefully phased, starting with the limited geography of Quayside, and requiring the achievement of milestones at each step along the way towards its full implementation. In aggregate, Sidewalk Labs and its partners would invest over \$900 million, in addition to reinvesting over \$2 billion of proceeds received as the project progresses — generating multiples of that in tax revenues for the three orders of government and in economic activity more broadly.<sup>103</sup>

Sidewalk Labs would make money from the real estate development it does, charges on any financing it provides, and, if all goes well, a performance payment considered at a time when the project's success against agreed-upon metrics can be judged. The project's finances and transactional framework are designed to ensure that all project participants, public and private, are treated fairly, and that the public interest is protected.



## Spotlight

### Proposal explainer

## Key partnership terms

#### Public administrator.

Sidewalk Labs proposes that government designate a public entity to serve — or in the case of Waterfront Toronto, continue to serve — as revitalization lead for the IDEA District.

#### Lead developer.

The party responsible for delivering horizontal or vertical development to agreed upon specifications and performance standards. To carry out this responsibility, the lead developer would engage third-party development partners, contractors, and operators.

Sidewalk Labs proposes to be lead developer (with local partners) on two parcels: in Quayside, to prove out the innovation approach, and in Villiers West, to further prove out the innovations and to catalyze economic development through a new urban innovation cluster. In total, these areas represent just 16 percent of the IDEA District and 7 percent of the eastern waterfront.

#### Advanced systems.

These nine urban solutions described in the MIDP are needed to deliver on Waterfront Toronto's priority outcomes. Sidewalk Labs proposes to lead these systems in Quayside and Villiers West. They include:

→ **Advanced power grid:** An advance on typical Toronto Hydro electric service that, among other elements, incorporates rooftop photovoltaic generation, battery storage, and dynamic demand management.

→ **Advanced stormwater management system:** District-scale stormwater management using continuously monitored green infrastructure and active controls to reduce infrastructure needs and enhance public realm.

→ **Digital communications network:** A fibre-optic internet network using Super-PON technology to support ubiquitous internet connectivity.

→ **District parking management system:** A system incorporating space-efficient on- and off-site parking, high-density parking equipment, attendant-based vehicle retrieval, and electric-vehicle charging.

→ **Dynamic streets:** Innovative hexagonal paving that incorporates dynamic lighting and signage, heating to melt snow, and digital infrastructure for traffic management.

→ **Freight management system:** A system allowing most deliveries to arrive at a single freight consolidation centre and sent on to recipients through tunnels using self-driving delivery dollies.

→ **Mobility subscription package:** A specialized, app-enabled mobility service bundle spanning public transit, ride-hail, parking, shared services, and micro-mobility options.

→ **Pneumatic waste system:** A pneumatic waste collection system with a pay-as-you-throw rate structure, a user interface at the chute, and downstream monitoring of contamination to help improve recycling practices.

→ **Thermal grid:** A thermal energy grid that could incorporate geothermal heat exchange, building heat recovery, sewage heat recovery, and other clean energy sources.

#### Horizontal development/infrastructure.

This term refers to the construction and stabilization of infrastructure, improvements, and services that affect and support multiple real-estate parcels in a given area. These include municipal infrastructure, such as sewers and parks; transit infrastructure, such as a light rail extension; and the advanced systems.

#### Vertical development.

This term refers to the construction and operation of private residential, commercial, and mixed-use buildings on individual real-estate parcels.

## Sidewalk Labs commitments

As Innovation and Funding Partner, Sidewalk Labs makes the following commitments:

#### Advance a bold innovation agenda.

Sidewalk Labs would apply a range of new solutions to pressing urban challenges.

A full list of proposed initiatives can be found beginning on Page 164, but several bear repeating here.

The project would pioneer affordable and sustainable building techniques that can also significantly speed up construction times and reduce construction costs, including factory-built mass timber construction of up to roughly 30 storeys.

New weather-mitigation strategies would make it comfortable to be outside for twice as much time each year in some areas.

Mobility would be profoundly improved, including a subscription package that provides convenient and affordable options for every trip and saves households thousands of dollars a year.

Dynamic streets could reduce traffic congestion, improve comfort and safety for cyclists and pedestrians, and dramatically expand public space.

Cutting-edge energy infrastructure — including through a thermal grid system that uses clean energy to heat and cool buildings, and an actively controlled green infrastructure solution to stormwater management — would result in remarkable levels of sustainability, with the potential to establish the largest climate-positive district in North America.

#### Develop Quayside as a complete and inclusive community.

In Quayside, Sidewalk Labs would deliver 2.65 million square feet of developed space, with a strong commitment to working with local partners. This would include delivering roughly 2,600 units of housing, half of which would be purpose-built rentals.

More than 40 percent of units would have two or more bedrooms, responding to the acute need for family-size housing.

And the project would set a new high-water mark for affordability, with below-market housing accounting for 40 percent of residential units.

Non-residential uses, such as commercial, office, retail, and community activities, would account for 33 percent of floor space (870,000 square feet), with space for 3,900 full-time jobs. From the outset, Quayside would be designed to be a complete community.

#### Deliver a major economic development project.

By successfully advancing the plan for Quayside, Sidewalk Labs would earn the right to lead development of the Villiers West urban innovation campus, with a similarly strong commitment to working with local partners.

Alphabet commits to establishing a new Canadian headquarters for Google on the western edge of Villiers Island, as part of an agreed-upon transaction within the IDEA District. Alphabet would target up to 500,000 square feet, which would be sufficient to accommodate as many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring would depend on market conditions and business requirements).

This new headquarters would be the centre and catalyst for a new innovation campus, amplifying the area's economic potential. Based on experience in a variety of other cities, it is expected that the Google tenancy would attract an array of other companies in the Toronto tech ecosystem to locate at the innovation campus.

To further spur the creation of a new innovation campus, Sidewalk Labs would provide \$10 million in initial seed funding for an Urban Innovation Institute, a new applied research institution modelled on the success of Cornell Tech in New York — but focused on developing urban innovations — working in partnership with local post-secondary institutions. This institute would be designed to bring together academia, industry, entrepreneurs, advocates, and public agencies to collaborate on tackling urban challenges.

Sidewalk Labs would also commit \$10 million to a new venture fund (side-by-side with other institutional funding partners, including one or more local venture firms) that would invest in local startups focused on urban innovation.

#### **Serve as lead developer of advanced systems.**

In both Quayside and Villiers West, Sidewalk Labs would serve as lead developer of a range of advanced systems. Among other responsibilities, this role would include identifying and overseeing sophisticated third-party operators and partners.

These systems are essential to achieving Waterfront Toronto's priority outcomes, especially sustainability and new mobility;

to delivering the innovative development model proposed in the MIDP; and to proving the practical and financial viability of these advanced systems in the broader marketplace.

#### **Serve as a technical partner and advisor.**

From the outset, Sidewalk Labs would provide a suite of technical advisory and management services to expand sustainable economic growth and use innovative strategies to address urban challenges in the eastern waterfront.

This role would include preparing the technical specifications and performance requirements to guide innovative development; integrating new solutions and strategies for achieving public objectives at the project planning stage; and, if the project extends to later phases, assisting in procuring partners and operators for advanced systems, such as an advanced power grid, a new stormwater management system, and dynamic streets.

This role would start in Quayside and expand to the broader geography upon accomplishing a series of project milestones.

#### **Deliver essential technology.**

To achieve core project objectives, Sidewalk Labs proposes to identify key technology products on the market for use in the project. Sidewalk Labs would foster an urban innovation ecosystem open to entrepreneurs and inventors from across Canada and around the world, and work with the governments to design a structure to support Canada's capacity to build and retain intellectual property locally.

Sidewalk Labs would also develop a limited number of services or products that do not exist in the current market but are needed to advance Waterfront Toronto priorities and improve digital infrastructure — identified by Waterfront Toronto in its RFP as “purposeful solutions.” These would be provided by Sidewalk Labs at cost.

For certain technologies that Sidewalk Labs develops and deploys at scale in connection with the project, Sidewalk Labs also proposes to share 10 percent of the profits with the public sector.

#### **Provide optional financing for critical infrastructure.**

Adequate provision of public transit is key to the IDEA District's economic success. If needed, Sidewalk Labs is prepared to explore various options with government to facilitate the financing of the light rail to ensure this critical project can move ahead in the near term.

Sidewalk Labs would also offer optional financing support for municipal infrastructure (such as parks and sewers) needed for the development of the IDEA District.

Finally, to achieve Waterfront Toronto's objectives beyond Quayside and Villiers West, Sidewalk Labs could help to facilitate the financing of advanced systems through Sidewalk Infrastructure Partners (SIP), a company it formed for the purpose of investing in next-generation infrastructure systems.

#### **Catalyze \$29 billion in third-party investments.**

In total, Sidewalk Labs would catalyze up to \$3.9 billion in real estate investments in Quayside and Villiers West.<sup>104</sup>

Optional financing for municipal infrastructure, transit, and advanced systems would total up to \$1.6 billion, from Sidewalk Labs and third parties. A series of targeted investments would spur economic growth, including a tall timber factory and a venture fund targeting Canadian startups. This capital would come from various sources, including outside investors and asset-level debt for both real estate and infrastructure. It would include an estimated \$900 million investment from Sidewalk Labs and its local development partners; an additional \$400 million of financing that Sidewalk Labs would offer to the public sector as an option to expand the LRT and deliver municipal infrastructure; and additional capital (equity and debt) that Sidewalk Labs expects to enable for the delivery of advanced systems.

These investments would enable more than \$29 billion in additional third-party real estate investments and catalyze a project that, when fully implemented across the IDEA District, would substantially exceed Waterfront Toronto's priority outcomes, realizing 93,000 total jobs (including 44,000 permanent jobs); up to 34,000 units of housing (including 13,600 units of below-market housing, if the Quayside housing vision is extended to full IDEA District with additional government support); and an 89 percent reduction in GHG emissions that provides a new model for climate-positive development.

**Key Term**  
**Sidewalk Infrastructure Partners (SIP)**  
is a new company created by Sidewalk Labs to finance next-generation infrastructure systems that can help unlock sustainable development. See Volume 3 for more details.

## Proposed public-sector commitments

To enable these commitments, Sidewalk Labs seeks the following public-sector commitments:

### **Governance: Designate a district administrator.**

A project of this scope, complexity, and duration requires strong public oversight and a regulatory framework predisposed to new approaches. Building on Canada's success with targeted geographic governance strategies, the proposal calls for government to designate a public entity to serve — or in the case of Waterfront Toronto, continue to serve — as revitalization lead for the IDEA District with certain additional powers.

A carefully targeted package of regulatory reforms and development standards would apply in the IDEA District. Under this approach, this public administrator would be empowered to hold Sidewalk Labs and others working in the district accountable for performance, steer innovation strategy, and oversee the governance structures needed to manage new district systems.

### **Financial: Align on fair terms.**

The proposal incorporates several key financial terms. First, Sidewalk Labs expects to purchase (or long-term lease) the land in Quayside and Villiers West from Waterfront Toronto at a price such that the innovation risk and cost would be borne by Sidewalk Labs, but that also fairly accounts for the heightened public policy outcomes required, such as levels of sustainability and affordability unprecedented in any commercial development.

Second, Sidewalk Labs expects to be reimbursed, over time, for its advisory and implementation services and repaid for optional financing or credit support for transit and municipal infrastructure. The financing would be repaid at a fixed annual rate of return at market rates, to be negotiated — with a commitment from Sidewalk Labs to work with government, pension funds, and other institutional investors to develop transaction structures to reduce the rate as low as possible while still attracting the necessary financing. With funds expected from several sources, Waterfront Toronto would repay financing fronted by Sidewalk Labs and other partners; cover Waterfront Toronto's ongoing operations; and reimburse expenses Sidewalk Labs incurs to deliver technical and advisory services.

Finally, Sidewalk Labs is seeking performance payments for serving as a catalyst to accelerate development across the eastern waterfront and deliver on Waterfront Toronto's priority outcomes. The amount of this fee would be negotiated in closing the transaction, and earned if (and only if) Sidewalk Labs reaches a series of performance and growth targets directly tied to Waterfront Toronto's priority outcomes.

The proposed financial structure is designed to align the interests of Waterfront Toronto, Sidewalk Labs, and the public; to compensate Sidewalk Labs for serving as a catalyst for a new approach to urban development; and to account for the special challenges underlying the project, such as an extended repayment timeline and complexities associated with integrating next-generation systems that are new to Canada or the market.

This structure includes a proposal to pay the public sector a share of the upside value if Quayside and Villiers West prove more profitable than expected; an approach where Sidewalk Labs only begins to earn performance payments after Waterfront Toronto and the public sector reach their objectives; and a profit-sharing proposal, through which the public sector would receive a share of the profits generated by certain technologies first tested and deployed in the IDEA District.

## A public administrator would be empowered to hold Sidewalk Labs and others working in the IDEA District accountable.

### Collaboration spotlight

## Sidewalk Labs' approach to partnering with local firms

Sidewalk Labs recognizes the value of local partners in delivering on the vision of the MIDP and achieving Waterfront Toronto's priority outcomes. Toronto has a vibrant local development community, including developers eager not only to build projects on the waterfront, but to embrace new, sustainable ways of building and to advance innovative approaches to design.

Sidewalk Labs proposes to lead the development of real estate and advanced systems of a portion of the eastern waterfront, initially at Quayside and potentially expanding to Villiers West with the achievement of project milestones. This constitutes the extent of Sidewalk Labs' vertical development, representing 16 percent of the IDEA District and 7 percent of the eastern waterfront overall; if Sidewalk Labs is successful, its role in the IDEA District would then shift to serving solely as a catalyst for sustainable development by others. Just as importantly, Sidewalk Labs is committed to seeking capable local partners to participate in the vertical development of Quayside and Villiers West, the development of horizontal infrastructure, including traditional and advanced systems, and other project areas. By adding local knowledge, knowhow, and relationships, these local businesses would supplement Sidewalk Labs' skillset and lead to a better overall project. This extends to Canada's sophisticated base of investors, including pension funds, that could invest capital for real estate, infrastructure, and other project elements. Whether specifically stated or not, Sidewalk Labs is committed to identifying appropriate partners to deliver many of the elements described in the MIDP.

Concurrent with the negotiation of the transaction and seeking public approvals, Sidewalk Labs therefore intends to identify appropriate local partners to participate in various aspects of project delivery. The actual business arrangements could take various forms, including but not limited to partnerships, joint ventures, and licence arrangements.





Spotlight

## Public and private commitments of the proposed Innovation and Funding Partnership

The proposal involves a set of mutual commitments for an incremental, multi-phase project to establish the eastern waterfront as a global leader in using cutting-edge technology and design to achieve significant progress in tackling urban problems.

### Commitments from Sidewalk Labs

- Vertical development of Quayside to deliver a new model for using cutting-edge design and technologies to improve urban life.
- Vertical development of the Villiers West Urban Innovation Campus to further prove out the innovations initiated in Quayside, spur economic development, and cultivate an urban innovation cluster.
- Horizontal development of the advanced systems for Quayside and Villiers West needed to deliver on Waterfront Toronto's objectives.
- Deployment of Sidewalk Labs' technologies (e.g., "purposeful solutions"), along with sharing the profits associated with certain technologies with the public sector.
- Optional financing at a fixed interest rate for enabling infrastructure, including credit support for Waterfront East LRT extension; financing for municipal infrastructure; and funding "supplemental innovation investments" to make the advanced systems financially viable in the early phases.
- Major economic development investments, including a new Canadian Google headquarters on Villiers West, a tall timber factory, seed funding for an Urban Innovation Institute (\$10 million), and a venture fund (\$10 million) focused on Canadian startups.
- Payment to Waterfront Toronto of a share of upside value, above an agreed-upon threshold, from the Quayside and Villiers West proceeds.
- 15-year agreement to provide ongoing technical, advisory, and management services for planning, design, and implementation in the IDEA District, including for advanced systems and certain other horizontal infrastructure.

### Public-sector commitments

- Partnering with Sidewalk Labs to implement a comprehensive innovation and development strategy, with corresponding fees.
- Establishment of the IDEA District with a public administrator, including regulatory adjustments to enable critical infrastructure and innovative strategies.
- Disposition of land for Quayside and Villiers West at price that accounts for additional Waterfront Toronto requirements.
- Source a limited number of Sidewalk Labs' products (at cost) to enable prototyping and deployment at scale, with corresponding IP sharing provisions.
- Payment of performance payments upon Sidewalk Labs achieving a series of negotiated growth and performance targets.

# In total, Sidewalk Labs would catalyze up to \$3.9 billion in real estate investments in Quayside and Villiers West.

# Part 3

## Summary of the Financial Terms

In aggregate, Sidewalk Labs and its partners propose to invest over \$900 million, in addition to reinvesting over \$2 billion of proceeds as the project progresses. Sidewalk Labs believes the financial terms of the proposal demonstrate the viability of the approach, the inherent creation of value, and alignment of interests — and commits to making the terms of any eventual transaction entirely transparent.

Overall, the transaction seeks to reflect Sidewalk Labs' final transaction principle: to align the interests of Sidewalk Labs, Waterfront Toronto, its stakeholders, and the public. The proposed transaction meets that goal, delivering substantial economic value to the public sector while enabling Sidewalk Labs to earn a reasonable and justified return for its multiple roles, and providing flexibility to government in how the project is implemented — particularly related to infrastructure financing.

The transaction and the economic activity it would generate would deliver enormous value to the City of Toronto, the Province of Ontario, and the people of Canada at a scale far greater and a pace far faster than the baseline scenario, as shown through analyses commissioned by Sidewalk Labs and conducted by urbanMetrics, a Toronto-based economic impact consultancy.<sup>105</sup>

In its entirety, the proposal contemplates leveraging private-sector resources to deliver over 30 percent more square feet of development on a timeline at least 10 years faster than the current plan. Under an optimistic baseline scenario, the IDEA District geography would see 24.4 million square feet of development by 2050.

**The proposal would deliver over 30 percent more square feet of development on a timeline at least 10 years faster than the current plan.**

By contrast, implementing the MIDP would produce 32.8 million square feet of development a full decade ahead of schedule, by 2040.<sup>106</sup> This accelerated development would include a significantly (almost two times) larger commercial component — catalyzed and made economically viable by the relocation of Google's Canadian headquarters to an innovation campus on Villiers Island — that employs more people, generates greater tax revenue, and adds more to the Canadian GDP than would a more single-use, residential neighbourhood.

According to the analysis by urbanMetrics, in total, the project would generate approximately \$4.3 billion in annual municipal, provincial, and federal tax revenues; \$14.2 billion annually in Canadian GDP; and 93,000 total jobs (including 44,000 permanent jobs) by 2040. These benefits are summarized in the top table on Page 214.

This impact represents \$2.8 billion more in annual tax revenues, a \$9 billion increase in GDP, and over 27,000 more permanent jobs than the baseline scenario at completion, which assumes development proceeds based on the current set of government-created planning documents for the project geography (including zoning where it exists, precinct plans, and the Port Lands Planning Framework).

## Estimated economic impact of the IDEA District over baseline in 2050

	Baseline scenario	IDEA District	Improvement over baseline
<b>Tax revenues (annual)*</b>	\$1.5 billion	\$4.3 billion	+\$2.8 billion (+187% increase)
<b>GDP (annual)</b>	\$5.1 billion	\$14.2 billion	+\$9.0 billion (+178% increase)
<b>Direct job growth</b>	17,000	44,000	+27,000 (159% increase)

Note: The above figures are from an economic analysis and report provided by urbanMetrics to Sidewalk Labs, which presented tax and GDP figures in 2019 dollars. This analysis from urbanMetrics includes Keating East in the total tax revenue calculations, while Sidewalk Labs' property tax analysis excludes Keating East, for which incremental property tax revenues have already been pledged to other projects.

\* Annual tax revenues include personal tax, corporate tax, property tax, and other taxes. Other taxes include: Federal Trading Profits, Federal Gas Tax, Federal Excise Tax, Federal Duty Tax, Federal Environmental Tax, Federal Air Transportation Tax, Federal Sales Tax, Import Duties, Federal Taxes on Production, Provincial Environment Tax, Provincial Gallon Tax, Provincial Trading Profits, Provincial Gas Tax, Provincial Amusement Tax, Other Provincial Consumption Taxes, Provincial Sales Tax, Provincial harmonized Sales Tax, Provincial Taxes on Production, Municipal Amusement Tax, Municipal Sales Tax and Municipal Taxes on Production.

## Municipal revenue streams over baseline by 2050

	Baseline scenario	IDEA District	Improvement over baseline
<b>City property taxes (cumulative)</b>	\$1.6 billion	\$2.8 billion	+\$1.2 billion (+75%)
<b>Development charges (cumulative)</b>	\$2.1 billion	\$3.8 billion	+\$1.7 billion (+81%)
<b>Total proceeds from the sale of public land</b>	\$0.9 billion	\$2.4 billion	+\$1.5 billion (+167%)
<b>Total</b>	<b>\$4.6 billion</b>	<b>\$9.0 billion</b>	<b>+\$4.4 billion (+96%)</b>

Note: The above figures are adjusted for inflation.

Beyond these broader benefits, Sidewalk Labs' analysis suggests that the project would increase and accelerate the receipt of three major municipal revenue streams: property taxes, city fees and development charges, and land proceeds from the sale of public land within the project area (see the bottom table on Page 214).

The value created for the public sector on this accelerated timeline results from a series of upfront investments in innovation from Sidewalk Labs (described further on Page 218), and the implementation of the robust public-private partnership described earlier.

In aggregate, Sidewalk Labs and its partners would make an estimated \$900 million investment, in addition to reinvesting over \$2 billion of proceeds received as the project progresses. This total does not include an additional \$400 million of potential financing that Sidewalk Labs

would offer as an option to the public sector as part of the broader transaction for the LRT expansion and municipal infrastructure delivery, nor the almost \$1.2 billion in total capital (equity and debt) that Sidewalk Labs expects to enable for the delivery of advanced systems. It also does not include construction financing that Sidewalk Labs would secure as part of its proposed real estate development at Quayside and Villiers West.

The table on Page 216 summarizes the sources and uses of funds for the entire \$39 billion project, identifies where Sidewalk Labs is providing funding or financing (including optional financing offered to the public sector), and shows the estimated third-party real estate investment expected to follow — over \$29 billion, which Sidewalk Labs projects will be the total amount of money invested by others to develop the entirety of the IDEA District beyond Quayside and Villiers West.

**The project would increase and accelerate the receipt of three major municipal revenue streams, including property taxes.**

# Sources and uses for the Sidewalk Toronto proposal

Uses (Preliminary Analysis for Indicative Purposes)	Uses (\$M)	Sources (Preliminary Analysis for Indicative Purposes)	Sources (\$M)	Sidewalk Labs (and Partners) Funding & Financing Support (\$M)
<b>Real Estate (Quayside + Villiers West ONLY)</b>				
Hard Costs <sup>A</sup>	2,840	Sidewalk Labs (and Partners) Equity Investment <sup>B</sup>	595	595
Soft Costs (incl. design, contingency, G&A, land payment, taxes, interest, and fees) <sup>C</sup>	1,090	Sidewalk Labs (and Partners) Equity Investment in Below Market Housing <sup>B</sup>	110	110
		Construction Financing	735	
		Reinvested Proceeds (Reinvested Equity)	2,405	
		Government Affordable Housing Grants <sup>D</sup>	85	
<b>Total Real Estate Uses</b>	<b>3,930</b>	<b>Total Real Estate Sources</b>	<b>3,930</b>	<b>705</b>
<b>LRT</b>				
Total Capital Costs <sup>E</sup>	430	Debt Financing (backed via value capture mechanism) <sup>F</sup>	430	
		Traditional Government Funding <sup>G</sup>		
<b>Total LRT Uses</b>	<b>430</b>	<b>Total LRT Sources</b>	<b>430</b>	
		Optional Sidewalk Labs Credit Support to Fill Timing Gap in Funding <sup>H</sup>		100
<b>Municipal Infrastructure (IDEA District)</b>				
Total Capital Costs	2,340	Traditional Government Funding <sup>G,I</sup>	150	
		Municipal Infrastructure Contribution - Muni (excludes Roads) <sup>J</sup>	1,860	
		Additional Public Sources	330	
<b>Total Municipal Infrastructure Uses</b>	<b>2,340</b>	<b>Total Municipal Infrastructure Sources</b>	<b>2,340</b>	
		Optional Sidewalk Labs Credit Facility to Front-End Infrastructure <sup>H</sup>		300

Note: The above figures are adjusted for inflation.

A Inclusive of above-standard costs incurred by Sidewalk Labs as part of the innovation agenda.

B "Sidewalk Labs (and Partners) Equity" refers to equity from Sidewalk Labs and potential local development/capital partners.

C Additional density, which would increase all costs related to the project, could also enable a larger land payment.

D Reflects existing government affordable housing programs.

E Total capital cost for LRT includes the portions of Segments 2 and 4 within the IDEA District, as well as Segments 5 through 7, as defined in Chapter 2 of Volume 3.

F Third-party debt (or government bonds) could be repaid by incremental property taxes or other source identified by the public sector.

G Use of traditional government funding could decrease or eliminate reliance on value capture mechanisms.

H Credit support to be provided in exchange for a fixed market-rate return, to be negotiated.

I Includes sitework and shoreline for Quayside and Villiers West.

J Municipal infrastructure contributions are paid by vertical developers to fund the project's municipal infrastructure, in an amount up to the credit received against city fees and development charges; if municipal infrastructure contributions are not sufficient to fund the entirety of the required infrastructure, additional sources such as land proceeds or traditional government funding would need to be utilized; excludes municipal infrastructure contribution to roads.

Uses (Preliminary Analysis for Indicative Purposes)	Uses (\$M)	Sources (Preliminary Analysis for Indicative Purposes)	Sources (\$M)	Sidewalk Labs (and Partners) Funding & Financing Support (\$M)
<b>Advanced Infrastructure (IDEA District)</b>				
Total Capital Costs	2,670	Third-party Financing, incl. Equity + Debt (potentially SIP)	1,165	
		Local Infrastructure Contribution - BAU Horizontal Costs	330	
		Local Infrastructure Contribution - BAU Vertical Costs	645	
		Municipal Infrastructure Contribution - Roads	485	
		Sidewalk Labs Equity (Supplemental Innovation Investment) <sup>K</sup>	45	45
<b>Total Advanced Infrastructure Uses</b>	<b>2,670</b>	<b>Total Advanced Infrastructure Sources</b>	<b>2,670</b>	<b>45</b>
<b>Additional Investments</b>				
Tall Timber Factory	80	Sidewalk Labs (and Partners) Equity <sup>B</sup>	90	90
Venture Fund	10			
<b>Total Additional Investments Uses</b>	<b>90</b>	<b>Total Additional Investments Sources</b>	<b>90</b>	<b>90</b>
<b>Additional Investments without Direct Return</b>				
MIDP Investment	65 <sup>L</sup>	Sidewalk Labs Equity	75	75
Urban Innovation Institute	10			
<b>Total Additional Investments without Direct Return Uses</b>	<b>75</b>	<b>Total Additional Investments without Direct Return Sources</b>	<b>75</b>	<b>75</b>
<b>Total Uses</b>	<b>9,535</b>	<b>Total Sources</b>	<b>9,535</b>	<b>915 (1,315 with optional financing)</b>
<b>Third-Party Real Estate (IDEA District, excluding Quayside and Villiers West)</b>				
Real Estate Uses <sup>M</sup>	29,130	Third-Party (Non-Sidewalk Labs) Equity + Debt	29,130	
<b>Total Third-Party Real Estate Uses</b>	<b>29,130</b>	<b>Total Third-Party Real Estate Sources</b>	<b>29,130</b>	
<b>Total Uses with Third-Party Real Estate</b>	<b>38,665</b>	<b>Total Sources with Third-Party Real Estate</b>	<b>38,665</b>	

K Size of innovation investment reflects current equity injection necessary at Quayside and Villiers West to achieve business as usual user utility rates.

L MIDP Investment reflected in CAD; equivalent to stated commitment of USD \$50M.

M Third-party real estate costs reflect Sidewalk Labs' internal projection of the third-party real estate catalyzed in the broader IDEA District by the project; at this geography, Sidewalk Labs will not have development rights or control over vertical development.

Core to achieving the project's objectives is the delivery of two early-phase real estate development projects in Quayside and Villiers West at an estimated combined total cost of \$3.9 billion. These two projects, totalling approximately 5.4 million square feet (or 16 percent of the IDEA District's proposed 33 million square feet), would be the proving ground, where Sidewalk Labs would over-invest to demonstrate the impact and prove the financial viability of its innovations.

The first substantial investment Sidewalk Labs would make if the MIDP is approved would be in the acquisition of Quayside. Sidewalk Labs proposes to pay a purchase price that accounts for existing requirements (such as Waterfront Toronto's requirement of setting aside sufficient land to accommodate 20 percent affordable housing) and MIDP proposals (such as the use of less than the maximum allowable density, enabling the use of sustainable mass timber).

That purchase price would not account for an estimated \$115 million investment, realized through foregone profit, that Sidewalk Labs would make in Quayside to pilot the innovation agenda, creating an anticipation of subpar returns for that initial phase. Specifically, Sidewalk Labs projects that approximately half of the \$115 million would be used to fund the additional 20 percent below-market housing units, with the other half funding a series of other innovations, such as the flexible ground-floor stoa that enable more community uses and retail diversity.

The purchase of the land and the additional \$115 million would be part of a \$2 billion (total capital, including equity and debt) real estate project in Quayside that would be undertaken by Sidewalk Labs

and local development partners. Sidewalk Labs anticipates that its investment in innovation in Quayside would result in subpar returns for this first phase of real estate development, but that the economics of a second phase in Villiers West would result in a blended real estate return in line with market expectations for real estate development.

As with Quayside, Sidewalk Labs believes that the acquisition or lease price for land at Villiers West should reflect the basic requirements that would be attached to it, as well as value that is created by Google locating its new Canadian headquarters there. That price would be part of a roughly \$1.8 billion (total capital, including equity and debt) investment in the development of Villiers West.

There are other, less central roles that Sidewalk Labs proposes to play, all of which are intended to advance the innovation agenda laid out in the MIDP. These roles and revenue sources are summarized in the table on Page 220.

These include as contractor for the delivery of infrastructure systems on a fee-for-service basis; developer of technology that would be deployed at-cost in the project area, and which would be eligible for profit sharing arrangements with Waterfront Toronto; seeder, with no associated revenue, of an Urban Innovation Institute; investor in the aforementioned Canada-focused venture fund and Ontario-based mass timber factory, which would be self-contained investments generating returns if successful; and, at the option of Waterfront Toronto and government, investor in a waterfront light rail, municipal infrastructure, and advanced infrastructure systems, all of which would be similarly self-contained.

**The project's impact would represent \$2.8 billion more in annual tax revenues, a \$9 billion increase in GDP, and over 27,000 more permanent jobs than the baseline scenario at completion.**

# Summary of Sidewalk Labs' potential sources of revenue

To provide clarity and transparency regarding Sidewalk Labs' business model in Toronto, the following table identifies each potential revenue stream related to the project.

	Role / Revenue Opportunity	Description
1	<b>Real estate</b>	In delivering Quayside and Villiers West, Sidewalk Labs expects to receive revenue from the sources traditionally associated with real estate projects: rental revenue, income from the sale of condominiums, and income from the sale of individual buildings.
2	<b>Technology deployment</b>	The limited number of its own technology products that Sidewalk Labs deploys in the project would be provided at cost.  For technologies that Sidewalk Labs develops and deploys at scale in Toronto that meet the testbed criteria, Sidewalk Labs proposes to share 10 percent of the profits with the public sector when that product is sold in other cities.
3	<b>Advisory services</b>	Advisory services provided to Waterfront Toronto by Sidewalk Labs in its role as Innovation and Funding Partner are proposed to be paid back, at cost, to Sidewalk Labs.
4	<b>Implementation services (municipal infrastructure)</b>	Third-party operators would compensate Sidewalk Labs directly for its role as lead developer of advanced systems in Quayside and Villiers West. This includes reimbursement for the costs to prepare the preliminary designs, plans, and specifications issued with the procurement documents for certain systems, as needed.  In Quayside and Villiers West, third-party operators would also pay Sidewalk Labs an advanced system development fee applied as a percentage of project costs specified upfront in the procurement documents. This fee would vary based on the degree of Sidewalk Labs participation required.
5	<b>Implementation services (advanced systems)</b>	For work managed by the public administrator in Quayside and Villiers West, and thereafter, Sidewalk Labs would receive a lower percentage (2 percent) of related soft costs for supporting the public administrator in integrating municipal infrastructure with advanced systems infrastructure.
6	<b>Venture fund seed funding</b>	This investment, likely to be undertaken with partners, would have stand-alone economics and the same potential upside and risks as typical venture investing.
7	<b>Mass timber factory</b>	This investment, likely to be undertaken with partners, would have stand-alone economics and the same potential upside and risks as other investments in manufacturing.
8	<b>Optional LRT financing</b>	In the event government elects to utilize Sidewalk Labs' optional LRT financing, Sidewalk Labs would receive revenue that reflects a market return for the magnitude and risk associated with the agreed-upon financing structure.

	Role / Revenue Opportunity	Description
9	<b>Optional municipal infrastructure financing</b>	In the event government elects to utilize Sidewalk Labs' optional municipal infrastructure financing, Sidewalk Labs would receive revenue that reflects a market return for the magnitude and risk associated with the agreed-upon financing structure.
10	<b>Optional advanced systems financing</b>	In the event a SIP financing package was utilized to implement an advanced infrastructure system, SIP would receive revenues related to the operation of that system, to provide SIP an opportunity to achieve a standard market return associated with the financing of a project of such magnitude and risk.
11	<b>Performance payment</b>	In the event of final stage-gate achievement and delivery of success for the overall project, as defined through a series of metrics agreed upon in the Implementation Agreements, Sidewalk Labs expects to receive revenue in the form of a performance payment.  This payment would compensate Sidewalk Labs for catalyzing the acceleration of development within the IDEA District, and its achievement of performance targets tied to Waterfront Toronto's priority outcomes.

**For certain technologies, Sidewalk Labs proposes to share 10 percent of the profits with the public sector when that product is sold in other cities.**

# Part 4

## How the Proposal Reflects the Transaction Principles

The transaction proposed here will be subject to consultation, negotiation, and revision before approval by the boards of Waterfront Toronto and Sidewalk Labs, and, where applicable, the three orders of government. What follows is a brief discussion of why Sidewalk Labs believes that the MIDP, even in its draft form, reflects the transaction principles — and thus presents a new type of partnership that can help catalyze inclusive growth in the digital age.

## The MIDP delivers on Waterfront Toronto's priority outcomes

### Transaction Principle 1: Devise a transaction that would achieve Waterfront Toronto's priority outcomes

In December 2018, building on objectives outlined in the RFP, Waterfront Toronto introduced a set of priority outcomes for the MIDP: job creation and economic development, sustainability and climate-positive development, affordability and inclusivity, new mobility, and urban innovation (including robust data privacy and digital governance).

The MIDP outlines detailed plans to achieve significant gains in each of these areas:

→ **Job creation and economic development:** An estimated 93,000 total jobs and \$14.2 billion of annual GDP impact to the Canadian economy by 2040 — nearly seven times Toronto's current projections for a baseline development scenario during this same time period — as well as roughly 174,000 short-term construction jobs.

→ **Sustainability and climate-positive development:** A climate-positive community that would generate 89 percent fewer greenhouse gas emissions per capita than downtown Toronto, contributing 0.69 annual tonnes of clean energy per capita back to the city.

→ **Housing affordability:** A vision for a 40 percent below-market housing program, with the potential to create more than 13,600 below-market units, supported by \$1.4 billion in new private funding sources along with additional government support.

→ **New mobility:** Roughly 77 percent of trips would use public transit or active modes (cycling and walking), and "drive alone" trips would be reduced by more than 16 percentage points compared with what would happen in a standard development.

→ **Urban innovation:** The project would give rise to an Urban Innovation Institute, a venture capital fund focused on Canadian entrepreneurs, digital infrastructure and open standards to create highly hospitable conditions for startups, and an independent Urban Data Trust to ensure privacy and the protection of the public interest.

# Geographic scale is necessary to achieve priority outcomes, but Sidewalk Labs' role is limited

## Transaction Principle 2: Scale the project to achieve the desired outcomes

The MIDP's nuanced approach to the issue of geographic scale balances the pursuit of Waterfront Toronto's priority outcomes with the protection of existing plans and industries and the importance of ensuring that the IDEA District consists of neighbourhoods built by many.

First, the proposed approach recognizes that the scale of Quayside alone is not sufficient, in and of itself, to achieve the RFP's objectives and Waterfront Toronto's subsequently articulated priority outcomes, and that the deployment of innovations at broader scale may be necessary to achieve those goals. This was expressly anticipated, repeatedly, by the RFP and in the subsequent City of Toronto staff report about it, and has become apparent in myriad ways during the planning process.

For example, in pursuit of climate positivity, the development of Quayside alone cannot justify the cost of the infrastructure systems and other approaches essential for dramatically reducing GHG emissions, such as an advanced power grid and a thermal energy grid. This

costly infrastructure becomes affordable across a larger area as a result of the cumulative benefits of smarter energy management; new and increased sources of clean energy; economies of scale in infrastructure development and maintenance; and a larger customer base across which to spread the costs of setting up and administering a business.

To meet Waterfront Toronto's specific call to deliver housing for middle-income residents, above and beyond traditional affordable housing requirements, the MIDP proposes several new private sources of value, including factory-built timber construction and a condo resale fee, that can help deliver on the aggressive affordable and below-market housing targets called for in the MIDP. But Quayside cannot support the estimated 6 million square feet of buildable area needed to catalyze the wood construction supply chain. A condo resale fee would likewise require time and unit resales to generate value to redeploy towards the below-market housing program.

Following through on the RFP's mobility objectives, the MIDP proposes a set of convenient options for every trip that reduces or eliminates the need for households to own a car. But while Quayside's four blocks can serve as an effective

demonstration project, the solutions offered in the plan only begin to meaningfully affect mobility patterns when linked to a larger street and transit network. Additionally, Quayside alone is not large enough to support the financing of the proposed LRT extension, a major, new public work; the density across a larger area is needed to cover the projected cost. As part of an integrated mobility package at the scale of the IDEA District, the new mobility options could reduce solo car trips by more than 16 percentage points and save a two-person household that goes car-free roughly \$4,000 a year.

The RFP called for the development of an urban innovation cluster, which would seek to use Quayside as a focal point for technology firms, academic institutions, and nonprofits dedicated to improving urban life and advancing sustainable technology. The MIDP would deliver jobs at all skill levels, including through the establishment of the Sidewalk Works program, which would build an inclusive talent pipeline and support on-site employers in filling real-time needs; broadening the construction workforce by targeting at least 10 percent of construction hours for racialized youth, women, and Indigenous people; and catalyzing a mass timber factory, which would support an estimated 2,500 person-years of full-time employment over a 20-year period. But delivering on this promise and creating new jobs requires a critical mass of space, resources, and investment, and a holistic approach to economic development that extends into broader geography.

This need for scale is achieved by applying the ideas and innovations in the MIDP to an area that extends beyond Quayside to Villiers Island, Keating Channel, McCleary, and Polson Quay: the IDEA District. This geography has been defined with particular sensitivity to existing plans and important industries in certain parts of the Port Lands. For that reason, the IDEA District — which represents the project area at its fullest scale, amounts to less than a third of the eastern waterfront — leaving undisturbed the Film and Media Studio District, East Port, and all areas south of the Ship Channel.

At the same time, the MIDP recognizes that Sidewalk Labs' role need not remain constant over the lifespan of the project and entirety of the geography, and that it is in no one's interest for Sidewalk Labs to shoulder development responsibilities across the IDEA District. In other words, the question of how much geographic area is necessary to achieve Waterfront Toronto's priority outcomes can be treated separately from the question of how much geographic area is necessary for Sidewalk Labs to develop.

The company's deepest involvement, including in real estate development, is most critical in the project's initial phases in order to prove out concepts, which in many cases will require an over-investment. Sidewalk Labs would be responsible for real estate development only on Quayside and the western part of Villiers Island, the first part of the River District that would be developed. Villiers West would be home to a new Canadian headquarters for Google, which the company is willing to locate there as a catalyst for



**Key Term**

**Innovation Design Standards and Guidelines (IDSG)**

A series of enhanced requirements for new developments in the IDEA District arising out of Waterfront Toronto's priority outcomes.

economic development on the eastern waterfront as part of an agreed-on transaction within the IDEA District. Sidewalk Labs' real estate development would constitute 16 percent of the IDEA District and just 7 percent of the broader eastern waterfront, and would itself be built in conjunction with one or more local partners that would contribute both expertise and capital.

Beyond Quayside and Villiers West, Sidewalk Labs' role would be more limited, with solutions proven out in Quayside applied to new development across the IDEA District with the project's Innovation Design Standards and Guidelines. That approach ensures that the IDEA District would, indeed, be a place built by many.

Both the contours of the IDEA District and the tiered involvement of Sidewalk Labs at different geographies are depicted in the map on the opposite page.

## Sidewalk Labs' more limited role beyond Quayside and Villiers West ensures that the IDEA District would, indeed, be a place built by many.



Map  
**Sidewalk Labs' role across phases of the IDEA District**

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- ▨ Optional Participation in Phase 2
- 🏢 Sidewalk Labs develops real estate and advanced systems

# Evidence-based milestones must be met before each phase of the project may advance

## Transaction Principle 3: Phase development to manage risk

While scale is critical to achieve Waterfront Toronto's objectives, the three orders of government — along with Torontonians involved in the MIDP consultation process — expressed reservations about committing to the project substantial lands beyond Quayside from the get-go, before the solutions proposed in the MIDP have even begun to be tested. There is an openness to the incremental expansion of the project over time, but only on the basis of evidence of success at each step along the way.

These two imperatives — the need for scale beyond Quayside, and the importance of incremental, evidence-based decision-making about questions of scale — have led Sidewalk Labs to propose a “stage-gated” approach, in which each phase of the project would proceed only after Sidewalk Labs has met its obligations and strategies have been proven viable in the prior phase.

This phased approach protects the public interest and provides for course correction and off-ramps should the project begin to fall short, while at the same time creating a straightforward path to its expansion across a broader geography, as Waterfront Toronto contemplated, should it prove successful.

Specifically, the MIDP proposes that Sidewalk Labs must satisfy milestones before moving from planning development of Quayside (Stage 1) to construction of Quayside (Stage 2), to planning development of Villiers West (Stage 3), to construction of Villiers West (Stage 4), and, later, before Innovation Design Standards and Guidelines jointly developed by Sidewalk Labs and the public administrator are applied to the broader IDEA District (Stage 5).

If and only if the broader IDEA District meets agreed-upon performance targets, Sidewalk Labs would receive performance payments in Stage 6 — returns on investment above and beyond revenues tied to specific components of the project (such as real estate development on Quayside and Villiers West).

# The MIDP puts government in the driver's seat

## Transaction Principle 4: Establish strong public sector oversight

The MIDP contemplates innovative, fundamentally different approaches to the development and operations of a new part of the city. In addition, the MIDP explores new policies that may be imposed, and old policies that may be waived, within the IDEA District, in order to accelerate innovation and deliver on Waterfront Toronto's priority outcomes. Rather self-evidently, this different approach to development calls for a different approach to governance — one tailored to implement the project vision in the project area, specifically.

At the same time, real concern was voiced throughout the public consultation process that while an innovative public-private partnership and the establishment of new and different governance structures might help achieve Waterfront Toronto's priority outcomes, government should not and must not give up its responsibility for protecting the public interest and driving a project of this size and significance.

As a result, under the MIDP's proposals related to governance and partnership, the IDEA District would be led by a public administrator (which could be Waterfront Toronto or another government entity, extant or new). This public administrator would oversee various management and operational entities, and lead land disposition and planning efforts as well as the delivery of traditional, or “municipal,” infrastructure.

Sidewalk Labs' role as Innovation and Funding Partner would be established by contract with Waterfront Toronto and/or the public administrator, to whom Sidewalk Labs would be accountable. The table on Page 232 details all the proposed roles and responsibilities for public and private sectors.

# Sidewalk Labs would provide innovation, funding, and implementation support

## Transaction Principle 5: Structure the role of Sidewalk Labs to leverage its strengths

With government leading development and oversight of the IDEA District, the MIDP proposes a role for Sidewalk Labs that capitalizes on its own unique combination of strengths, including a team that spans urban planning, technology, policy, architecture, engineering, development, and finance and its exceptional technological resources; its access to patient capital that is able to take a long-term view of investing, where warranted; and its ability to serve as an economic catalyst.

In any of its proposed roles, Sidewalk Labs would in no way hold an interest in — or any encumbrance on — any lands beyond Quayside and Villiers West.

Sidewalk Labs would support and advise the public administrator on achieving innovation objectives, providing advisory, technical, and management services to implement the MIDP’s innovation strategy.

Its role as lead real estate developer in Quayside and Villiers West (with local partners) would serve to prove out concepts for broader application by others across the IDEA District.

Sidewalk Labs would serve as lead developer of advanced infrastructure systems, assuming responsibility for identifying operators and partners to implement the advanced power grid, thermal grid, and the other systems identified as vital to the success of Quayside and the Villiers West urban innovation campus, and to achieving the priority outcomes identified by Waterfront Toronto.

Finally, Sidewalk Labs would identify or develop critical urban technology solutions, including a small number identified as “purposeful solutions.” Building off Sidewalk Labs’ technological expertise and assets, the resulting products would incorporate enhanced privacy protections and use published standards to avoid technology “lock-in.”

In the execution of these roles, the MIDP proposes that Sidewalk Labs shoulder a disproportionate share of the cost of upfront innovation — and receive its compensation in later stages.

While Sidewalk Labs proposes to focus on the roles where it can add the greatest value, the converse is equally important: others should lead areas where they can uniquely contribute.

For example, Sidewalk Labs proposes to provide optional financing support to advance the Waterfront East LRT extension but would not construct, own, or operate it. This approach holds true across all aspects of the project, including technology and other horizontal

infrastructure. It is especially evident with real estate development, where Sidewalk Labs only proposes to lead vertical development in Quayside and Villiers West, to prove to the private market that its innovation approach is commercially viable and that its inclusive economic development plan can thrive. The expectation is that other developers would lead all other vertical development.

**The MIDP proposes that Sidewalk Labs shoulder a disproportionate share of the cost of upfront innovation — and receive its compensation in later stages.**



## Proposed roles and responsibilities within the IDEA District

This page summarizes the MDP's proposal for roles and responsibilities of the public administrator, Sidewalk Labs, the three orders of government, real estate developers, and other third parties.

	Role	Waterfront Toronto or Public Administrator	City, Province, and Government of Canada	Sidewalk Labs	Real Estate Developers	Third-Party Vendors (i.e. technology, construction, and consultants)
1	<b>IDEA District Oversight and Administration</b>	Public administrator of the IDEA District with oversight for district management entities.	Enabled by government. Relevant city agencies would be core stakeholders of management entities.	Not applicable	Not applicable	Not applicable
2	<b>Land Use and Development Planning</b> (Precinct Plans, Infrastructure and Transportation Master Plans, Precinct-Level Infrastructure Plans, Bylaw and OPA)	Lead Planning Entity	Traditional roles - IDEA District planning documents would require standard set of approvals.	Contracted to provide technical expertise and implementation services related to planning and advanced systems, including the IDSG.	No change from current (except for application of IDSG to public parcels sold for private development).	Not applicable
3	<b>Infrastructure Financing</b>	Contribute to municipal infrastructure funding, including through land proceeds in structure laid out in the 2006 MOU.	Enable city fee and development charge credits, municipal infrastructure contributions, and local infrastructure contributions; enable LRT financing through TIF or identify alternate funding source.	Provide optional financing for municipal infrastructure (as front-end agreements).  Provide optional credit support for LRT.  Enable optional financing for advanced systems through newly formed company.	Pay (1) reduced DCs; (2) additional municipal infrastructure contributions (combined with (1), that roughly equal standard city fee and development charge obligations); and (3) local infrastructure contributions, equal to the cost of avoided systems (like traditional gas).	Participate in normal course of business.

	Role	Waterfront Toronto or Public Administrator	City, Province, and Government of Canada	Sidewalk Labs	Real Estate Developers	Third-Party Vendors (i.e. technology, construction, and consultants)
4	<b>Infrastructure Delivery</b>	Manage construction of municipal infrastructure.  Co-lead LRT delivery, in coordination with TTC.	Co-lead LRT delivery, in coordination with Waterfront Toronto.	Partner with public administrator to play various roles. At Quayside and Villiers West, this would include serving as lead developer of a range of advanced systems and leading the design of certain municipal infrastructure.  No role in the design, delivery, or operation of the LRT.	Shoulder a reduced infrastructure burden for vertical development due to public administrator's comprehensive infrastructure program.	Contractors would compete to construct municipal infrastructure.  Operators would compete to deliver advanced systems.
5	<b>Real Estate Development</b>	Lead RFP process for publicly-owned parcels, subject to IDSG.	Traditional roles — IDEA District would require standard set of approvals and permissions.	Lead vertical development of Quayside (for R&D purposes) and Villiers West (for economic development purposes), working alongside local partners.  Prepare the IDSG.	Partner with Sidewalk Labs in delivery of vertical development at Quayside and Villiers West.  Bid on, or proceed with, development of the 83.6 percent of IDEA District not vertically developed by Sidewalk Labs.	Contractors would compete to deliver vertical real estate.  Other vendors would compete to deliver products and components.
6	<b>Technology Deployment</b>	Establish Innovation Framework.	Traditional roles (where applicable).	Identify technical solutions for use in connection with the project.  Develop and deploy a limited number of solutions that do not yet exist in the market.	Conduct business as usual. No obligation to purchase or use Sidewalk Labs' products.	Third-party technology firms would compete to deliver the vast majority of technology products used in the project area.

# The MIDP builds on proven approaches to waterfront development and financing

## Transaction Principle 6: Use proven approaches where possible

Over the past 18 months, Sidewalk Labs was encouraged to apply strategies, tools, and practices that have already proven successful in Canada and beyond. Rather than reinvent the wheel, the MIDP seeks to build on what has worked. This principle informed the proposal for an IDEA District, which builds on Waterfront Toronto's existing authorities and Canada's success with geographically-targeted development strategies, and guided the MIDP's proposals to use self-financing mechanisms to achieve project goals.

Governments at the federal, provincial, and city level have long recognized that the Toronto waterfront is an area of uncommon scope and promise that calls for a comprehensive, geographically-specific strategy. Years ago, this recognition inspired the creation of Waterfront Toronto "to oversee all aspects of revitalization of Toronto's waterfront."

But Waterfront Toronto is just one example of Canada's remarkable success with innovative strategies to spur the revitalization of struggling or underdeveloped urban areas. Other examples include the pioneering use of Business Improvement Areas, Canada Mortgage and Housing Corporation's turnaround of Granville Island in Vancouver, Toronto's experimentation with a new approach

to zoning and economic development in Two Kings, and Toronto's novel use of a Community Improvement Plan to revitalize Yonge-Dundas Square.

What these strategies have in common is the recognition that a smart, targeted approach to development in a particular geographic area — in which certain restrictions are adjusted and, in return, developers and others are expected to achieve priority outcomes — can jumpstart development, ensure that social needs are met, and pay other dividends. That is what this project, generally, and the proposed IDEA District specifically, seeks to accomplish, setting out a comprehensive vision and a specific set of rules and incentives for spurring innovation and development across a defined but limited geography within the eastern waterfront.

This interest in proven approaches extends to the MIDP's proposals to finance the roads, transit, and other municipal infrastructure that the project requires through existing Canadian project financing strategies. These include using development and other developer-paid charges for infrastructure; reinvesting the proceeds from the sale of public lands in the area; and other self-financing mechanisms.

Together, these strategies aim to deliver a project that is largely self-contained and self-financed:

## 1

### City fee and development charge credits, municipal infrastructure contributions, and local infrastructure contributions.

In Toronto, city fees, development charges, and for certain projects, other developer contributions are typically assessed to pay for the municipal infrastructure required to support the infrastructure needs associated with new development. For example, Waterfront Toronto has used such fees — including a local area improvement charge specified in the East Bayfront Zoning Bylaw — to fund local infrastructure in East Bayfront.

The MIDP proposes that such charges and fees be directed to finance critical infrastructure in the IDEA District (along with proceeds from the sale of public lands). Because these charges are slow to materialize, the MIDP proposes that Sidewalk Labs finance certain pieces of infrastructure in anticipation of those charges through the use of a "front-ending agreement," a common mechanism to address this timing gap.

## 2

### Land proceeds reinvestment.

By selling public land incrementally over time and investing the proceeds in local area development, a city can use the growth potential of land to fund development. Waterfront Toronto has used this approach since 2006, relying, in part, on the authorities contained in its memorandum of understanding (MOU) with the City of Toronto.

In concert with Infrastructure Ontario, Waterfront Toronto used this strategy to develop the West Don Lands, leveraging provincial lands to fund the costs of the new infrastructure, remediation, and land-use approvals necessary to enable development. Reinvesting land proceeds also represented another part of Waterfront Toronto's approach to funding East Bayfront. And the Harbourfront Corporation used this strategy to enable development of approximately 36 hectares along Toronto's central waterfront; the corporation obtained land-use approvals, delivered enabling infrastructure, and later sold the lands to repay an initial federal investment.

The MIDP proposes joining proceeds from the sale of public lands with the aforementioned fees and charges to fund infrastructure necessary to support development of the IDEA District. The MIDP envisions that the public administrator would have control over the disposition of public lands within the IDEA District (akin to the authorities the City of Toronto has already granted to Waterfront Toronto in their 2006 MOU) and the authority to apply the proceeds to finance the overall development and innovation strategy.

# 3

## Incremental property tax.

Tax increment financing (TIF), known elsewhere in Canada as a Community Revitalization Levy (CRL), directs a share of the increase in property tax revenue within a project area to fund major infrastructure, like transit.

For example, Calgary, Alberta has used a CRL financing strategy to advance the Rivers District Community Revitalization Plan. Since 2007, this approach has enabled \$396 million in infrastructure funding, attracting nearly \$3 billion in planned private development to downtown Calgary. As a result, residential property assessments reportedly increased from \$328 million to about \$1.2 billion and non-residential assessments jumped from \$647 million to \$1.8 billion.<sup>107</sup>

In another example from Alberta, Edmonton will use a 20-year CRL financing strategy to fund several projects in the Capital City Downtown CRL Plan.<sup>108</sup> TIF and similar strategies are commonplace for funding major projects across the United States, including Hudson Yards (New York, New York), Mesa del Sol Development (Albuquerque, New Mexico), and Lincoln Yards (Chicago, Illinois).

Toronto's Official Plan has acknowledged the value of TIF, specifically commending the strategy as a way to “invest without direct cost to the municipal taxpayer.”<sup>109</sup>

Consistent with this, the MIDP observes that the funding challenges associated with the construction of a waterfront LRT might be addressed through the use of TIF, and that it should be available in Ontario and, more specifically, to the public administrator of the IDEA District.

# Public and private sectors would share in the value they jointly create

## Transaction Principle 7: Align financial interests

The overall deal structure requires Sidewalk Labs to meet evidence-based milestones at each phase of the project in order to advance to the next phase and the potential for financial upside that comes with it. On an overall basis, this aligns Sidewalk Labs' interests with the substantive and financial interests of the public sector.

In addition, the MIDP proposes two specific mechanisms by which public and private sectors would share in value created by the project, in order to protect the public interest, properly incentivize private investment, and to align the interests of Sidewalk Labs and its public partners around shared goals.

First, Sidewalk Labs has carefully considered the question of how the public sector might share in profits realized later from technologies that were made possible because of this project. The MIDP proposes a two-pronged test to distinguish technologies used in the project that would be developed by Sidewalk Labs in the normal course, even were the project not to proceed, from those that arise because of the conditions created by Sidewalk Labs' public partners. For a product that passes that test, the MIDP proposes that the public sector receive 10 percent of profits over a 10-year period following the sale of the product to a second customer.

In the process of considering this proposal, Sidewalk Labs was unable to find any precedent for this kind of profit-sharing arrangement with government. In and of itself, it would represent an innovative approach to the public and private sectors partnering not only to create technology, but to jointly reap the proceeds from success.

Second, the MIDP proposes that Sidewalk Labs be eligible for a performance payment that would fairly compensate the company for its role in accelerating development on the eastern waterfront aligned with Waterfront Toronto's priority outcomes, generating billions of economic activity for the city, province, and country, and producing substantial revenue for the governments that would otherwise go unrealized.

This payment would recognize the overall risk and resulting upfront costs assumed by Sidewalk Labs, and would be conditional on Sidewalk Labs' achievement of its final stage gate and the success of the overall project, as defined through a series of metrics to be agreed upon in the Implementation Agreements.

**Key Term**  
**Implementation Agreements** would be developed following approval of the MIDP. These contracts, which would involve Sidewalk Labs, Waterfront Toronto, and, in certain cases, government, would govern all aspects of the transaction.

The concept of a performance payment is logical for this project not only because of its uncertain outcome but because Sidewalk Labs has structured the business model, in response to feedback from a range of stakeholders, in ways that limit its opportunity for upside elsewhere — by forgoing revenue streams that might be less directly connected to the public interest or sought by more conventional companies.

Sidewalk Labs limits the amount of real estate the company would develop to two small pieces of the overall project; seeks no real estate interest in the remainder of the IDEA District; puts urban data under the control of an independent entity; makes a number of constraining unilateral commitments with regard to the commercialization of data; and does not seek special tax subsidies.

It also reflects the unusual nature of certain early investments Sidewalk Labs will have made with no direct opportunity for a return, including its spending to develop this plan (acting as seed funding for the project), to subsidize advance infrastructure systems at the Quayside and Villers West scale in order to prove their viability while maintaining reasonable user rates, and offer advisory services at cost.

In short, this financial structure is designed to align the interests of Waterfront Toronto, Sidewalk Labs, and the public; to compensate Sidewalk Labs for serving as a catalyst for a new approach to urban development; and to account for the special challenges underlying the project, such as an extended repayment timeline and complexities associated with integrating next-generation systems that are new to Canada or the market.

The amount of this fee would be negotiated in closing the transaction, and earned if (and only if) Sidewalk Labs reaches a series of agreed-upon performance and growth targets directly tied to Waterfront Toronto's priority outcomes. The exact terms, magnitude, and source of this fee would be determined in future negotiations with Waterfront Toronto and its government stakeholders in advance of the execution of Implementation Agreements and approval of the project.

**In short, this financial structure is designed to align the interests of Waterfront Toronto, Sidewalk Labs, and the public.**

# A Vision of the Waterfront in 2050: A Global Model for Inclusive Growth

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The planning vision outlined in this MIDP has the potential to generate more than 93,000 total jobs, catalyze more than \$14.2 billion in economic activity by 2040, create more than 13,600 below-market homes, and set a replicable new standard for climate-positive communities. It would make the waterfront a global hub for urban innovation — and help Toronto live up to its ideals for diversity and opportunity.

When all these things come together — a people-first approach to planning and economic development; new digital, physical, and policy innovations addressing big urban challenges; and a new partnership model that blends public objectives with private resources — the results can be transformative. Deployed at the full scale of the proposed IDEA District, this plan has the potential to achieve the ambitious quality-of-life objectives that Waterfront Toronto, and the City of Toronto, have aspired towards for years.

This planning work was paid for by Sidewalk Labs with no promises of approval, because as a company, Sidewalk Labs believes there is no better opportunity in the world to show the way forward for the future of cities.

If together we can shorten commutes for hard-working households and give people back time to spend with their friends, family, and community ...

If we can point the way towards relieving the affordability crisis and make life downtown possible for everyone ...

If we can create a new standard of sustainability that shows the path to a healthier planet ...

If we can convince all the strivers that their best chance to build the next great global innovation sits right on the shores of Lake Ontario ...

If we can demonstrate that cities need not choose between their commitments to inclusion and their hopes for economic growth in the digital age ...

— then the world will take notice of this new model created in Toronto.

But even if and when a version of this plan is approved by Waterfront Toronto and all levels of government, the MIDP is just the beginning.

In the end, it is the City of Toronto — its people, its civic leaders, its academic and cultural institutions, its tech ecosystem, its business and real estate communities, and its public agencies — that will make this project a success.





## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full IDEA District scale are inclusive of the entire proposed geography, including Quayside and all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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35. See the "Quayside Plan" chapter of Volume 1, on Page 70, for more details on the residential and non-residential development plan.
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37. See the "How It Works: Mobility" section of the "Quayside Plan" chapter in Volume 1, on Page 102, for a thorough examination of the proposed transportation network and mobility systems in Quayside.
38. See the "How It Works: Public Realm" section of the "Quayside Plan" chapter in Volume 1, on Page 146, for more information on public realm improvements and innovations proposed for Quayside.
39. See the "How It Works: Buildings and Housing" section of the "Quayside Plan" chapter in Volume 1, on Page 168, for details on building construction, housing types, and affordability programs planned for Quayside.
40. To learn more on the sustainability initiatives proposed for Quayside, turn to the "How It Works: Sustainability" section of the "Quayside Plan" chapter in Volume 1, on Page 198.
41. Consult the "How It Works: Social Infrastructure" section of the "Quayside Plan" chapter in Volume 1, on Page 214, for more information on social infrastructure in Quayside.
42. See the "How It Works: Digital Innovation" section of the "Quayside Plan" chapter in Volume 1, on Page 230, for more information on digital innovation proposals for Quayside.
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61. For more on the accelerated timelines resulting from factory construction, see the "Buildings and Housing" chapter in Volume 2, Page 208. For more on the library of parts, see the "Quayside Plan" chapter in Volume 1, Page 181, as well as the Buildings section of the MIDP Technical Appendix.
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63. For more details on the Loft space concept, see the "Buildings and Housing" chapter in Volume 2, Page 238.
64. For more on flexible wall systems, see the "Buildings and Housing" chapter in Volume 2, Page 246.
65. For more on the proposed outcome-based building code system, see the "Buildings and Housing" chapter in Volume 2, Page 251.
66. For more on the flexibility of stoa space, see the "Buildings and Housing" chapter in Volume 2, Page 242.
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69. Additional details on emission reductions in the IDEA District can be found in the "Sustainability" chapter in Volume 2, Page 296, as well as the "Sidewalk Toronto Greenhouse Gas Model - Path to Climate Positive" section of the MIDP Technical Appendix.
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77. For more on the proposed Care Collective, see the "Quayside Plan" chapter in Volume 1, Page 220.
78. For details on the proposed Civic Assembly, see the "Quayside Plan" chapter in Volume 1, Page 224.
79. For more on the Quayside elementary school, see the "Quayside Plan" chapter in Volume 1, Page 228.
80. For more on the proposed collaboration with the Toronto Public Library, see the "Quayside Plan" chapter in Volume 1, Page 228.
81. For projections regarding modes of travel in the IDEA District, see the "Modelling and Transportation Analysis" section of the MIDP Technical Appendix.
82. For more information on pedestrian space in Quayside and the IDEA District, turn to the "Public Realm" chapter in Volume 2, Page 126, as well as the "Streets for People" section of the MIDP Technical Appendix.
83. Each of the initiatives in this table are further detailed in the "Mobility" chapter of Volume 2, beginning on Page 24. Where endnoted in this table, additional information is also available in other chapters or in the MIDP Technical Appendix.
84. For more information on light-rail ridership and its employment accessibility benefits, consult "Enabling Rapid Transit" section of the MIDP Technical Appendix.
85. Consult the "Active Transportation" and "Modelling and Transportation Analysis" sections of the MIDP Technical Appendix for details on active modes of transportation.
86. To understand projections regarding the use of ride-hailing services and their associated cost savings, consult the "New Mobility" section of the MIDP Technical Appendix.
87. Consult the "New Mobility" section of the MIDP Technical Index for pricing and savings information regarding mobility as a service.
88. Consult the "Streets for People" section of the MIDP Technical Appendix for more details on street types.
89. More information on accessibility initiatives are available in the "Quayside Plan" chapter of Volume 1, Page 136.
90. Consult the "Freight" section of the MIDP Technical Appendix for more details on the logistics hub.
91. Consult the "Mobility Management" section of the MIDP Technical Appendix for more details on active traffic management.
92. Consult the "Public Realm" chapter of Volume 2, Page 136, as well as the "Cost Comparison of Modular Pavement vs. Typical Waterfront Streetscape" section of the MIDP Technical Appendix, for more details on modular pavement.
93. Each of the initiatives in this table are further detailed in the "Digital Innovation" chapter of Volume 2, beginning on Page 374. Where endnoted in this table, additional information is also available in other chapters or in the MIDP Technical Appendix.
94. Consult the "Building the Backbone of Connectivity" section of the MIDP Technical Appendix for additional details on super-PON technology and ubiquitous connectivity.

## Endnotes

- 95.** See also the “Catalyzing Digital Services” section of the MIDP Technical Appendix for more on open standards for data.
- 96.** See the “How Quayside Will Make Data Work for Toronto - And Protect It” section of the MIDP Technical Appendix for more on open data resiliency and security.
- 97.** See the “Public Realm” chapter in Volume 2, Page 137, for more on open access channels.
- 98.** See the “Public Realm” chapter in Volume 2, Page 182, for more on shared public infrastructure.
- 99.** Turn to the “Public Realm” chapter in Volume 2, Page 167, as well as the “Outdoor Comfort Development Standard” section of the MIDP Technical Appendix, for more on weather-mitigation systems.
- 100.** Consult the “Public Realm” chapter in Volume 2, Page 186, for more on real-time maps.
- 101.** See the “Public Realm” chapter in Volume 2, Page 140, for more on generative design.
- 102.** The Vision sections of Sidewalk Labs’ original RFP submission are available online at the Sidewalk Toronto website, [sidewalktoronto.ca/documents/](http://sidewalktoronto.ca/documents/).
- 103.** For more detail on this and other financial investments and commitments by Sidewalk Labs, consult the “Development Appendix” section of the MIDP Technical Appendix.
- 104.** Consult Volume 3 for more information on real estate and infrastructure investments.
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# MIDP

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# Toronto Tomorrow

A new approach for  
inclusive growth

SIDE WALK LABS



**The Plans**

# Land Acknowledgement

Sidewalk Labs recognizes that this land we now call Toronto has been the site of human activity for over 15,000 years; we are within the Treaty Lands and claimed Territory of the Mississaugas of the Credit. Toronto is now home to many diverse First Nations, Inuit, and Métis peoples. It is the responsibility of all people to share in wise stewardship and peaceful care of the land and its resources. We are mindful of a history of broken treaties, and of the urgent need to work continuously towards reconciliation, and we are grateful for the opportunity to live and work on this land.

# The Plans Contents

---

## Introduction

p16

---

## Chapter 1 The Quayside Plan

p24



---

## Chapter 2 The River District

p254



---

## Chapter 3 Economic Development

p420



---

## MIDP Acknowledgements

p518

# The Plans

## Contents

---

### Introduction

p16

---

## Chapter 1

### The Quayside Plan

Introduction	p26
Part 1: Development Plan	p48
Part 2: How It Works	p96
Public Engagement	p244
Endnotes	p250

---

## Chapter 2

### The River District

Introduction	p256
Part 1: Neighbourhood Planning Concepts	p292
Part 2: Scaling Urban Innovations	p348
The Future Can Start Now	p408
Endnotes	p416

---

## Chapter 3

### Economic Development

Introduction	p422
Part 1: Accelerating Development	p428
Part 2: Sparking a Cluster in Urban Innovation	p460
Part 3: Measuring Impact	p494
Part 4: Exploring Economic Impact Further into the Future	p504
Endnotes	p516

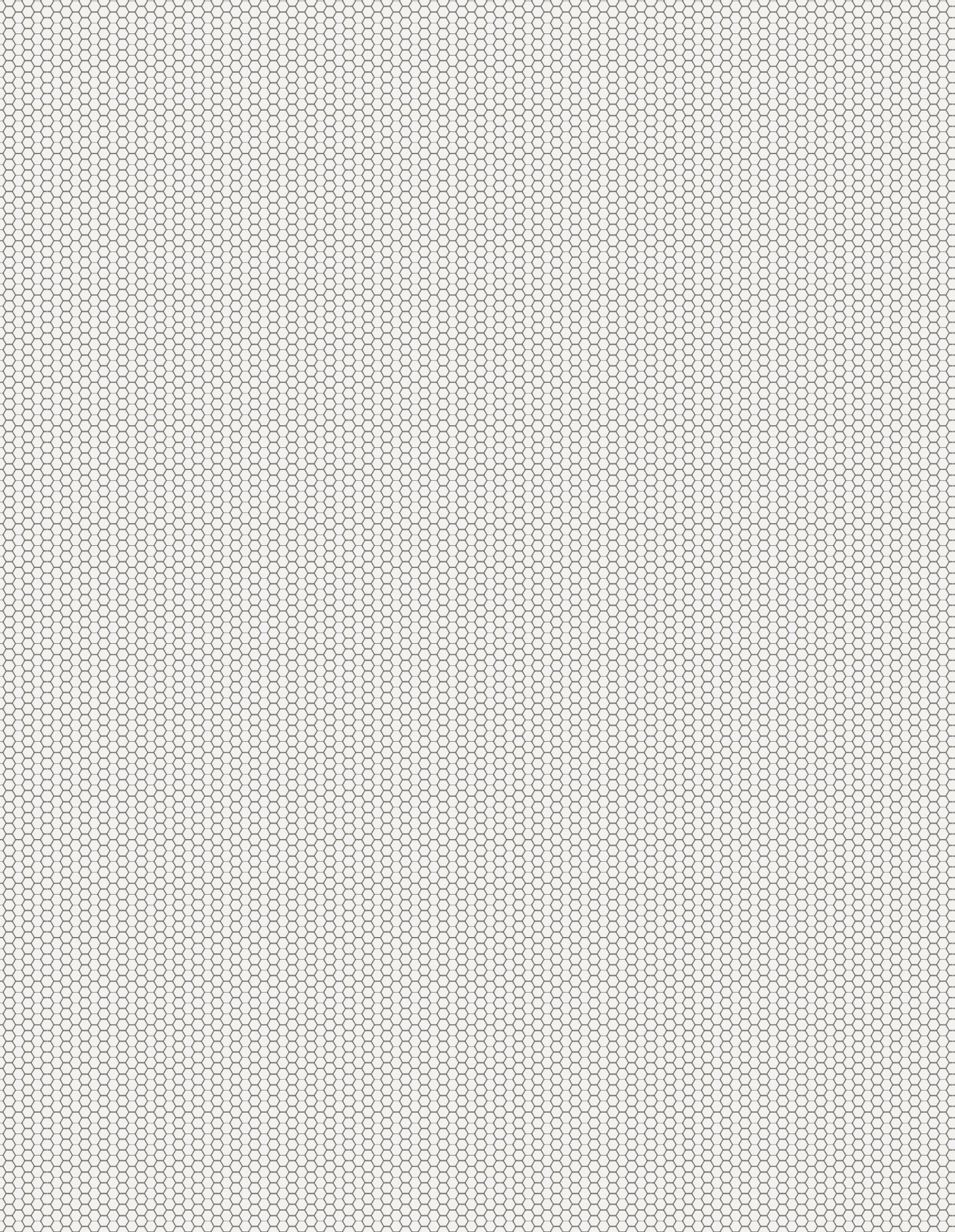
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## MIDP Acknowledgements

p518


Volume 1

# Intro -duction



# A Vision for Unlocking the Eastern Waterfront

Sidewalk Labs proposes a vision — beginning with Quayside — designed to realize and maximize ambitious quality-of-life goals by integrating innovations into the physical development.

The Master Innovation and Development Plan (MIDP) is a comprehensive proposal for inclusive growth along Toronto’s eastern waterfront, informed by more than 18 months of public consultation, following the selection of Sidewalk Labs as Innovation and Funding Partner in October 2017 by Waterfront Toronto, the public corporation formed to unlock the social and economic potential of the waterfront. 

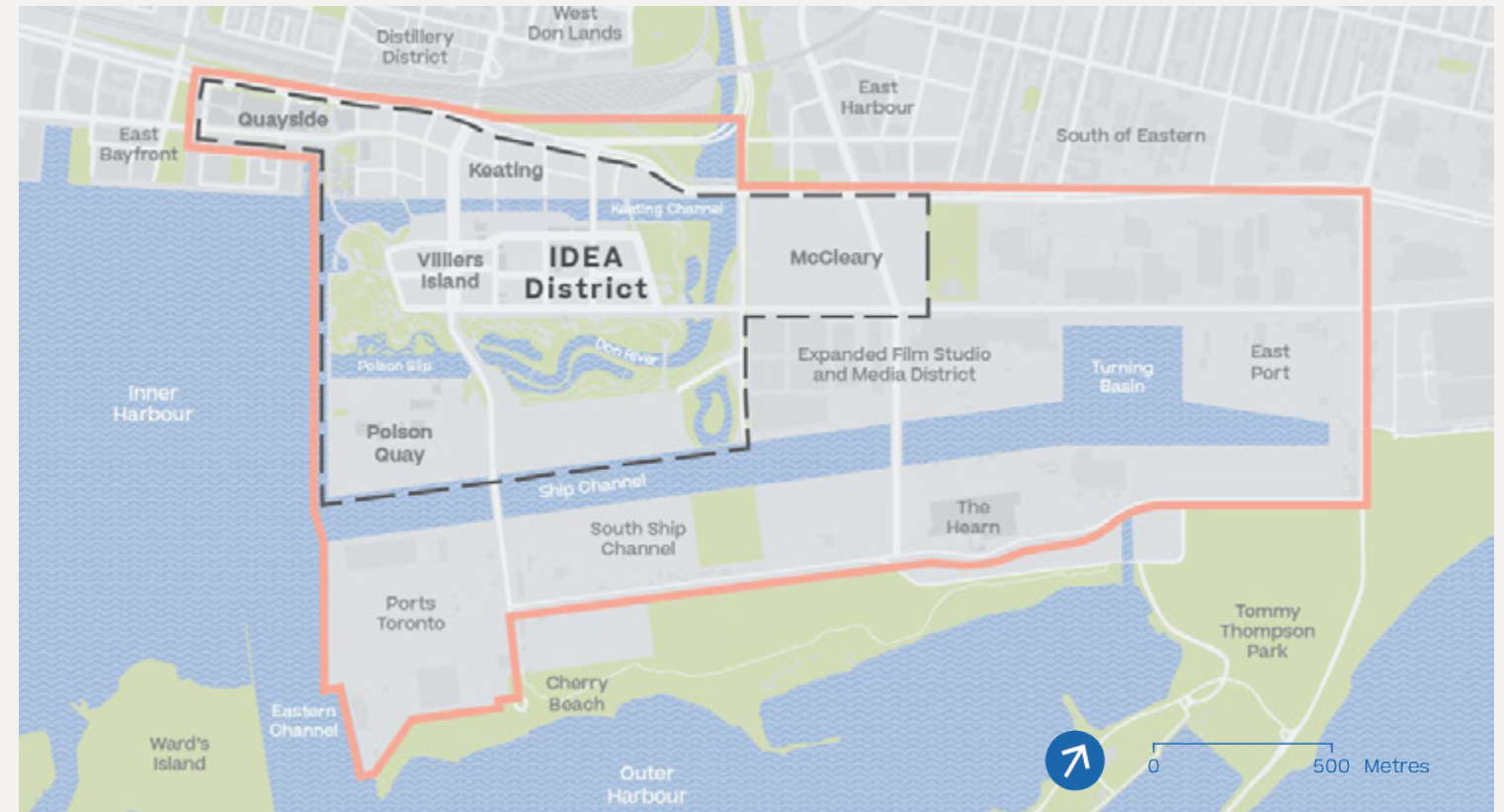
In creating the MIDP, Sidewalk Labs has tried to respond directly to Waterfront Toronto’s priority outcomes: job creation and economic development, sustainability and climate-positive development,

housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

Throughout its planning process, Sidewalk Labs has also tried to respond to Toronto’s Official Plan, which embraces the use of “innovative implementation solutions” to help address tough urban challenges and describes the future city as one where “the private sector marshals its resources to help implement public objectives.” Specifically, the Official Plan calls for leaders in the private sector “with the courage to take risks, develop proactive solutions and then follow through.”





For more details on the project background, see the Overview volume.



Map  
**The proposed IDEA District geography**

The proposed 77-hectare IDEA District provides sufficient scale to achieve ambitious quality-of-life outcomes.

-  Eastern waterfront
-  IDEA District

Consistent with these priorities and values, the plans and ideas described in Volume 1 put forward innovative implementation solutions, aim to leverage private resources to realize public objectives, and advocate for sustainable communities along the eastern waterfront.

### Creating an IDEA District within the eastern waterfront.

The eastern waterfront is located just east of downtown Toronto, extending around the inner harbour and encompassing the industrial areas surrounding Parliament Slip, the mouth of the Don River, the Ship Channel, and the Turning Basin. As defined by Waterfront Toronto’s 2017 Request for Proposals (RFP), the eastern waterfront is made up of the areas of Quayside, the Keating Channel precinct

plan, and the Port Lands Planning Framework. Some of the area has recently been developed, some is under construction, some supports active industry today, and other lands are underutilized. The total area is over 300 hectares.

To achieve its goals, the MIDP proposes to transform a small portion of the eastern waterfront — less than one-third, to be developed over 20 years — into an Innovative Design and Economic Acceleration (IDEA) District that represents an innovative new development model for how the private sector can support the public sector in tackling the toughest growth challenges.

# Exploring phases and roles to maximize impact

From the 2017 RFP to the Sidewalk Toronto Plan Development Agreement, Waterfront Toronto has sought to maximize the impact of its objectives.

The RFP recognized the potential constraint of Quayside, at just five hectares, including a requirement to “describe your team’s ability and readiness to take the concepts and solutions deployed on Quayside to scale in future phases of waterfront revitalization.” The Plan Development Agreement describes the MIDP as including both plans for the Quayside parcel and “plans at scale.”

Consistent with these calls, [Sidewalk Labs believes in a phased approach for testing, refining, and demonstrating the impact of core innovations, beginning with a smaller setting and working up to larger areas along the eastern waterfront as project objectives are achieved.](#) Certain solutions cannot reach their full impact at the size of a small neighbourhood like Quayside while others do not become financially feasible at this smaller scale.

For these reasons, Sidewalk Labs has proposed a geography for the IDEA District that can meet or exceed the ambitious priority outcomes outlined by Waterfront Toronto, and do so in a way that is both financially achievable and replicable in other parts of Canada and around the world.

The IDEA District proposal is broken into two phases.

## Phase 1: Quayside.

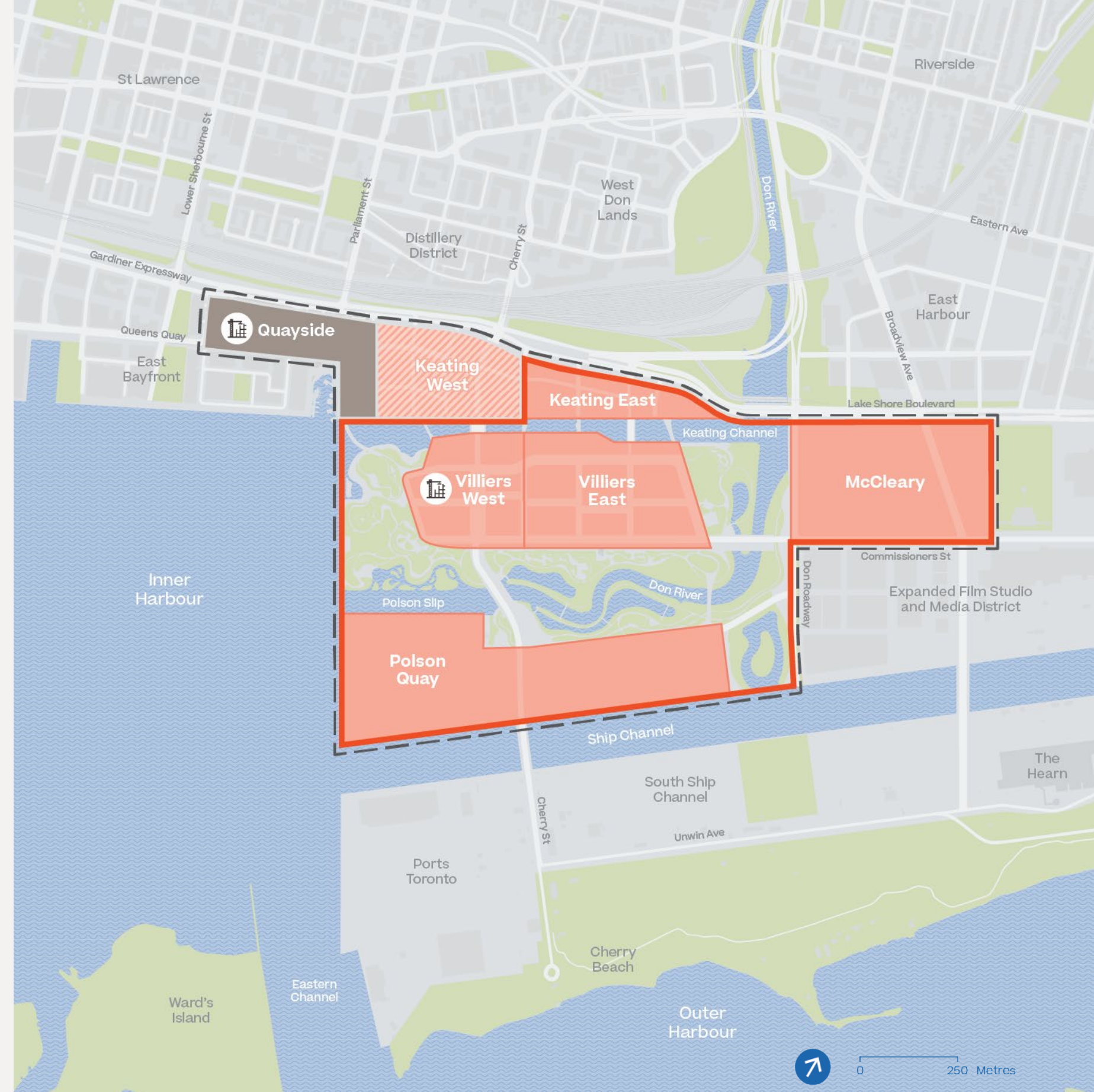
The first phase of the IDEA District would be Quayside, a five-hectare neighbourhood that sits at the crucial transition point to the broader eastern waterfront. The Quayside development plan provides the opportunity to lay out the foundations for achieving the priority outcomes, forming the basis for identifying the required innovations and the critical and advanced infrastructure to make it all happen.

Sidewalk Labs proposes to lead this development, working with local partners, and take the risk of proving the market viability of a proposed development model that incorporates urban innovations to achieve ambitious quality-of-life objectives.

The Quayside phase is explored in the greatest amount of planning detail throughout the MIDP. [The “Quayside Plan” chapter begins on Page 24.](#)

## Phase 2: River District.

The second phase would be the River District, a 62-hectare area made up of five neighbourhoods surrounding the renaturalized Don River: Keating East, Villiers West, Villiers East, Polson Quay, and McCleary. Extending Quayside’s innovations into the River District would unlock opportunities for Waterfront Toronto and the city to fully realize priority outcomes.



Map  
**Proposed IDEA District neighbourhoods and roles**

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- Optional participation in Phase 2
- 🏠 Sidewalk Labs develops real estate and advanced systems



# The IDEA District can exceed Waterfront Toronto’s ambitious priority outcomes — and do so in a way that is both financially achievable and replicable in other parts of Canada.

(A Keating West parcel of roughly eight hectares that sits between Quayside and Keating East already has approved plans; the private landowners there can choose to participate in the IDEA District if they want.)

The “River District” chapter includes considerable planning details for Villiers West, a parcel of nearly eight hectares, where Sidewalk Labs proposes to be lead developer, working with local partners. Villiers West would serve as a catalyst for a new economic cluster focused on urban innovation, anchored by a new Google

Canadian headquarters and a new Urban Innovation Institute, and it could further prove out the innovations necessary to achieve Waterfront Toronto’s priority outcomes.

**In total, Sidewalk Labs proposes leading development (with local partners) on less than 7 percent of the eastern waterfront.**

The “River District” chapter includes only concepts for the other proposed neighbourhoods. It also describes how each core innovation creates greater benefits or becomes economically viable at scale. **This chapter begins on Page 254.**

## Proposed project roles beyond Quayside and Villiers West

Planning and development for the River District would be led by Waterfront Toronto and the City of Toronto, working with various development partners. It is Waterfront Toronto’s mandate to lead the urban planning, design, infrastructure delivery, and real estate development associated with broader geographies along the eastern waterfront.

Sidewalk Labs proposes that government designate a public entity to serve — or in the case of Waterfront Toronto, continue to serve — as revitalization lead for the IDEA District.

Beyond Quayside and Villiers West, Sidewalk Labs proposes to play a different role across the IDEA District, focusing on three supportive areas:

### → **Planning, design, and implementation.**

In this role, Sidewalk Labs proposes to support Waterfront Toronto’s ability to provide cutting-edge infrastructure and development that meets agreed-upon guidelines and standards for innovation, with the goal of realizing key quality-of-life objectives around economic opportunity, affordability, mobility, and sustainability.


Building on the Quayside innovations, Sidewalk Labs proposes to work with Waterfront Toronto to prepare a set of “Innovative Design Guidelines and Standards” that can be used to ensure that all developments in the IDEA District achieve the desired

outcomes. Waterfront Toronto would be responsible for working with government to approve them and then ensure their implementation as development proceeds.

→ **Technology support.** In this role, Sidewalk Labs proposes to deploy a limited set of technologies required to achieve key project objectives — defined in Waterfront Toronto’s original RFP as “purposeful solutions” — including a dynamic curb that can adjust throughout the day to accommodate vehicle traffic or pedestrian uses, and a standardized mount system that can help catalyze digital innovation by third parties.

### → **Optional infrastructure financing.**

In this role, Sidewalk Labs proposes to provide optional support financing critical infrastructure, such as upfront debt service, to help ensure that the city and waterfront can invest holistically in systems that unlock the potential for future development.

These supportive roles reflect Sidewalk Labs’ belief that the greatest cities are built from the community up, and that the proposed innovation strategies for achieving public policy goals can only be successful if widely adopted by Toronto’s broader development and innovation communities. 

Applying this innovative planning approach across the full proposed IDEA District could spark a global hub for urban innovation along the eastern waterfront. **Details on these economic benefits can be found in the “Economic Development” chapter on Page 420.**



See Volume 3 for more details on Sidewalk Labs’ proposed roles for the IDEA District.

# A planning approach that integrates innovations into the physical environment

The development of the IDEA District provides a rare opportunity to achieve — and exceed — the priority outcomes established by Waterfront Toronto for the MIDP.

These objectives have proven largely elusive for a variety of reasons. They speak to problems that cannot be solved in a single development and require a scale of coordination that is difficult, if not unprecedented. In some cases, the solutions are contrary to market forces. For many of these challenges, the technology simply did not exist to successfully address the issues.

That has the potential to change today. The scale of the IDEA District offers the opportunity to create a truly transformative experience — at the moment when technology has finally advanced enough to make genuine breakthroughs, if applied with the right level of thought and care. But realizing this opportunity for the betterment of people's lives and urban economies requires a new approach to urban planning and a strong focus on quality-of-life objectives.

## An innovation vision across key areas.

Sidewalk Labs' approach to planning centres around providing the physical, digital, and policy conditions for innovation on which an array of third parties can build and explore new solutions to urban challenges, with the goal of achieving long-term quality-of-life goals.

To catalyze this approach, Sidewalk Labs identified the building blocks of a neighbourhood — [mobility, public realm, buildings and housing, and sustainability](#) — and explored how urban innovations within these areas could support a new kind of community and infuse flexibility into the built environment.

Many of these advances, from mobility management systems guiding the streets to building systems optimizing energy use, are made possible by [connectivity and digital innovation](#). Sidewalk Labs aims to establish the open foundation for a wide array of third parties to address urban challenges using urban data. To ensure that digital innovation aligns with the public interest, all digital proposals — including those by Sidewalk Labs — would be subject to approval from an [independent entity tasked with overseeing a transparent process for responsible data use](#), which would apply in addition to existing Canadian privacy laws.

No community is complete without a cross-cutting layer of [social infrastructure](#) that could provide residents with programs to support health and well-being, education and work opportunities, civic life, and arts and culture. Sidewalk Labs' approach would integrate physical spaces, trusted delivery partners, and digital complements to enable a healthy and engaged community where everyone can grow, thrive, and belong.

Within each of these areas, the planning team incorporated innovations into the development designs with an eye towards achieving Waterfront Toronto's priority outcomes and improving quality of life for all. This goal is reflected in the vision statements for each of the urban innovation areas:

## Mobility.

A transportation system that reduces the need to own a car by providing safe, convenient, connected, and affordable options for every trip.

## Public Realm.

A system of streets, parks, plazas, and open spaces that encourages people to spend more time outdoors, together.

## Buildings.

Sustainable buildings that can be constructed and adapted far more quickly and support a lively mix of uses.

## Housing.

A program with 40 percent below-market units to improve affordability and expand options for all households.


## Sustainability.

A new standard of sustainability that creates a blueprint for truly climate-positive communities.

## Social Infrastructure.

Health, civic life, learning, and workforce initiatives and facilities that enable people to thrive.

## Digital Innovation.

Catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data in cities. 



For more details on the urban innovations proposed by Sidewalk Labs, see Volume 2.

# The Quay-side Plan

**Introduction**

p26

**Part 1**

**Development Plan**

p48

**Part 2**

**How It Works**

p96

**Public Engagement**

p244



# Quayside History: A Working Waterfront

While Quayside was once a bustling manufacturing area, and before that a waterway entry point to a vibrant node of commerce and trade for the Northeastern Indigenous Peoples, the rise of the Gardiner and the fall of industry have left the site underutilized — creating a new opportunity to reimagine it for inclusive growth.<sup>1</sup>

Sitting on the Treaty Lands and Territory of the Mississaugas of the Credit and the traditional territory of the Haudenosaunee and Wendat,<sup>2</sup> along Toronto's waterfront, the site known today as Quayside consists of two portions of land, roughly equal in size, that form an L-shape around the waters of Parliament Slip when viewed from above.<sup>3</sup>

Quayside emerged during a century of lakefill that began in the 1850s.<sup>4</sup> Prior to that point, the original lakefront ended at Front Street.<sup>5</sup> The expansion of the dockwall shifted the water's edge farther and farther from the city centre — and fundamentally changed the conditions of the waterfront.

For most of the 20th century, Quayside had all the hallmarks of a working waterfront. It was the site of a fish processing plant, as well as an enormous soybean storage and processing plant thrumming with production. Vessels pulled up

to Parliament Slip to be filled with products bound for the St. Lawrence Seaway across Lake Ontario — and to distant seas and harbours beyond.<sup>6</sup>

As times changed, so did Quayside. The rising hulk of the Gardiner Expressway, begun in 1955, stranded the land from the rest of the city.<sup>7</sup> The fish processing plant closed. By the 1990s, most of the soybean processing facility had been torn down, leaving only one set of grain elevators, which still stand in silent testimony to the area's past: the Victory Soya Mills Silos adjacent to Quayside.<sup>8</sup>

In recent years, cities around the world have realized that this type of industrial waterfront site is valuable public space. Toronto has been a leader of this trend, including the very creation of Waterfront Toronto in 2001, which has since applied strong people-first planning to much of the central waterfront.<sup>9</sup> But Quayside and areas to the east have not yet undergone this transformation, and despite Quayside's spectacular views and close proximity to downtown, the site's potential remains untapped.

**Despite Quayside's spectacular views and close proximity to downtown, the site's potential remains untapped.**

This historic view of Quayside shows construction beginning on the Victory Soya Mills Silos, in August 1944. Credit: Arthur Beales

BYLE No. 12083



# Quayside Today: Untapped Potential

Waterfront Toronto recognized that revitalizing Quayside requires a bold development plan that is both evolutionary, in terms of building on existing waterfront initiatives, and revolutionary, in terms of applying new innovations.

Today, Quayside remains a post-industrial piece of land used mostly for parking. It has a few scattered buildings, with no parks, plazas, or public gathering places — and no restaurants, stores, or homes. The only occupied structure is a low, cinderblock former fish-processing plant that Sidewalk Labs has renovated into “307,” its main Toronto office and innovation workshop.<sup>10</sup>

For all Quayside’s promise, its revitalization faces some imposing physical barriers.

The site is bisected by Queens Quay East, which turns into Parliament Street as it heads beneath the Gardiner — with four lanes of car traffic and few pedestrian crossings. The eastern end of Quayside sits at the edge of Parliament Slip but is difficult to access and set outside the city’s current existing block structure. Much of the lakefill terrain has been contaminated as a result of the area’s industrial history, and making the site safe for development and public space would require expensive measures to cap or remove this soil. Any development requires deep building foundations that drill down into rock, because the soft fill cannot support structures of any significant scale. Basic infrastructure like water pipes, sewers, and power grids would need to be relocated or upgraded to support any new development.

There are psychological obstacles, too. Although Quayside is tantalizingly close to Downtown Toronto, the Gardiner Expressway and the railroad tracks beside it serve to cut off the waterfront from the rest of the city.<sup>11</sup> And while Lake Shore Boulevard, Queens Quay, and Parliament Street all meet on the site, the streetcar veers off half a mile away, creating a sense that the site is out past the end of the line.

To be sure, city and waterfront developments are advancing eastward. The East Bayfront Precinct Plan — one of the first precinct plans to be prepared by Waterfront Toronto at its inception<sup>12</sup> — is being realized, and a series of residential and commercial buildings is taking form and being connected by new public spaces, streetscapes, and a water’s edge promenade. The vision is that vibrant ground-floor uses would begin to extend along Queens Quay and the Martin Goodman Trail, and that a new Queens Quay light rail would connect the Central Waterfront through East Bayfront and into the Port Lands.

Quayside completes the vision of the East Bayfront plan while forming a new entry point and beginning for areas further east. The eastern half of Quayside is governed by the Keating Channel Precinct Plan, which sets out Waterfront Toronto’s visions for great public spaces, a vibrant water’s edge, mixed-use buildings, and extension of the light rail.

As waterfront revitalization approached Quayside, Waterfront Toronto’s 2017 Request for Proposals (RFP) envisioned Quayside as something more than the next step in waterfront progress, calling it a “globally significant transformation opportunity that showcases innovative and sustainable approaches to development.” Instead of Quayside serving as the final step to the success of the Central Waterfront, it can become a beginning — the entrance to a reimagined eastern waterfront with innovation at its core that achieves new levels of affordability, sustainability, economic opportunity, and inclusion.

Located just southeast of downtown Toronto, Quayside is a post-industrial area awaiting revitalization.  
Credit: DroneBoy



# Quayside Tomorrow: Connecting the City to the Eastern Waterfront

Located at the nexus of many key corridors, Quayside can become an essential new link that draws on the energy of surrounding neighbourhoods and makes the eastern waterfront more accessible to Torontonians.

Quayside sits at the intersection of key corridors that span some of the country's densest, most diverse neighbourhoods to the north and east, new communities rising along Toronto's revitalized Central Waterfront to the west, and the future promise of the Port Lands to the south.

#### **Parliament Street and the East End: Diverse, historic neighbourhoods.**

Parliament Street is home to the revitalized Distillery District and a diverse network of historic neighbourhoods. The corridor continues north through Regent Park and Cabbagetown and ultimately arrives at St. James Town up at Bloor — the most densely populated neighbourhood in the country, where over 60 percent of the residents were born outside Canada.<sup>13</sup>

The St. Lawrence neighbourhood and ongoing revitalization initiatives in Regent Park and West Don Lands are strong Toronto models for mixed-income neighbourhoods and the integration of social infrastructure that Quayside seeks to build upon.

A number of Indigenous organizations, including Miziwe Biik Aboriginal Employment and Training and Anishnawbe Health Toronto, are leading the development of a new Indigenous Community Hub in the neighbouring West Don Lands. Further to the north, a new Indigenous business district on Dundas Street East is being planned.<sup>14</sup>

Across the Don River, a number of East End mixed residential neighbourhoods — including Riverdale, Riverside, and Leslieville — connect to Quayside through existing light rail lines and will soon gain an additional link from the future SmartTrack line.

Quayside can extend the mixed-income character of the communities found in neighbourhoods to the north and east, provide the additional social infrastructure the area needs, and establish new public spaces along the waterfront that connect people with the lake.

#### **Queens Quay: New waterfront communities.**

The improved Queens Quay runs through neighbourhoods along the city's revitalized Central Waterfront and many important projects Waterfront Toronto has undertaken, including significant residential development, extension of the light rail along the renovated Queens Quay corridor, and major new public parks such as Sugar Beach and Sherbourne Common.

Sidewalk Labs plans to build on Waterfront Toronto's work to extend the pedestrian, cycling, light rail, and public realm enhancements through Quayside, creating a vibrant connection to future waterfront development to the east.

#### **Cherry Street: Future waterfront parks and development.**

Cherry Street and a series of pedestrian bridges would provide a connection across Keating Channel to the extraordinary new parks that will encircle Villiers Island as part of Waterfront Toronto's renaturalization of the Don River and link to future neighbourhoods like Polson Quay.

In short, Quayside can serve as a connection point for city and waterfront, lake and land, past and present. It can emerge as a starting point to address the broader challenges of city life and become a model for how urban communities can meet the needs of new generations.



# Quayside and surrounding neighbourhoods



0 500 Metres

# What Makes Quayside Different: Applying Innovations to the Plan

Applying Sidewalk Labs' planning approach and proposed innovations to Quayside would result in a new type of neighbourhood that enables more affordability, more sustainability, and more opportunity for more people than conventional developments — with exploration built into its bones.

The following pages provide a high-level overview of the various physical, digital, design, and policy innovations proposed as part of the Quayside plan. These innovations have been organized around [mobility, public realm, buildings and housing, sustainability, social infrastructure, and digital innovation](#).

Readers wishing for additional details on how these innovations would be applied in Quayside should turn to the technical plan sections of this chapter, on Page 96. Readers wishing for even greater detail on the innovation concepts, including their potential impact on quality of life at various scales of development, should turn to Volume 2 of the MIDP.



# Mobility

A transportation system that reduces the need to own a car by providing safe, convenient, connected, and affordable options for every trip.



# Public Realm

A system of streets, parks, plazas, and open spaces that encourages people to spend more time outdoors, together.

- A self-financing light rail extension would connect residents to employment hubs and draw workers and visitors to the waterfront from all over the city.
- A vast network of pedestrian and cycling infrastructure featuring wider sidewalks, wider and heated bike lanes, and accessibility elements would encourage walking and cycling and support people using wheelchairs or other assistive devices.
- New mobility services such as ride-hail, bike-share, electric vehicle car-share, and e-scooters would provide affordable alternatives to private car trips.
- An integrated mobility subscription would enable residents and workers to see all their trip choices in real time and pay in one place — a concept often called “mobility as a service.”
- A neighbourhood freight “logistics hub” connected to an underground package delivery system would dramatically reduce truck traffic on streets and improve convenience.
- To reduce congestion and encourage shared trips, a proposed mobility management system would coordinate all travel modes, traffic signals, and street infrastructure, and apply demand-based pricing to curb and parking spaces.
- Flexible street spaces called “dynamic” curbs would provide passenger loading zones during rush hour that could be used as public spaces in off-peak times.
- Adaptive traffic signals would prioritize pedestrians who need more time to cross a street or transit vehicles running behind schedule.
- A set of “people-first” street types would be designed for different speeds and primary uses: Boulevards and Transitways for public transit and vehicle traffic, Accessways designed for cycling speeds, and Laneways designed for pedestrian speeds.

- People-first street designs would eliminate curbside parking, widen sidewalks, and increase tree plantings to improve safety and activate street life.
- Modular pavement — hexagonal pavers that can be replaced or repaired in mere hours by a single person with a handheld machine — would dramatically reduce the amount of time streets spend closed down for road or utility work and increase flexibility of street uses.
- A proposed outdoor-comfort system could dramatically increase the amount of time it is comfortable outside, including Raincoats to block rain, wind, and sun along sidewalks; Fanshells to provide cover in open spaces; and Lanterns to block wind between buildings.
- Flexible ground-floor “stoa” spaces designed to accommodate a wide range of uses beyond traditional retail would ensure that the community has a lively mix of shops, restaurants, cafés, art installations, community gatherings, and maker studios.
- A leasing platform called Seed Space would help small businesses and other retailers book a wide range of stoa sizes, from anchor-tenant spaces to micro-stalls, for short- or long-term uses.
- Quayside’s three primary open spaces would be infused with flexibility to encourage year-round use, including a dynamic water feature and performance space at Parliament Plaza, barges on Parliament Slip, and multi-sport fields in Silo Park.
- A proposed entity called the Open Space Alliance would coordinate programming, operations, and maintenance across Quayside’s parks, plazas, streets, and water spaces for a more responsive public realm.
- Shared programming infrastructure, such as projectors and lighting options, would enable the community to program open spaces themselves.
- A real-time map of public realm assets — from park benches to drinking fountains to landscaped gardens — would enable proactive maintenance and keep spaces in good condition.



# Buildings

Sustainable buildings that can be constructed and adapted far more quickly and support a lively mix of uses.

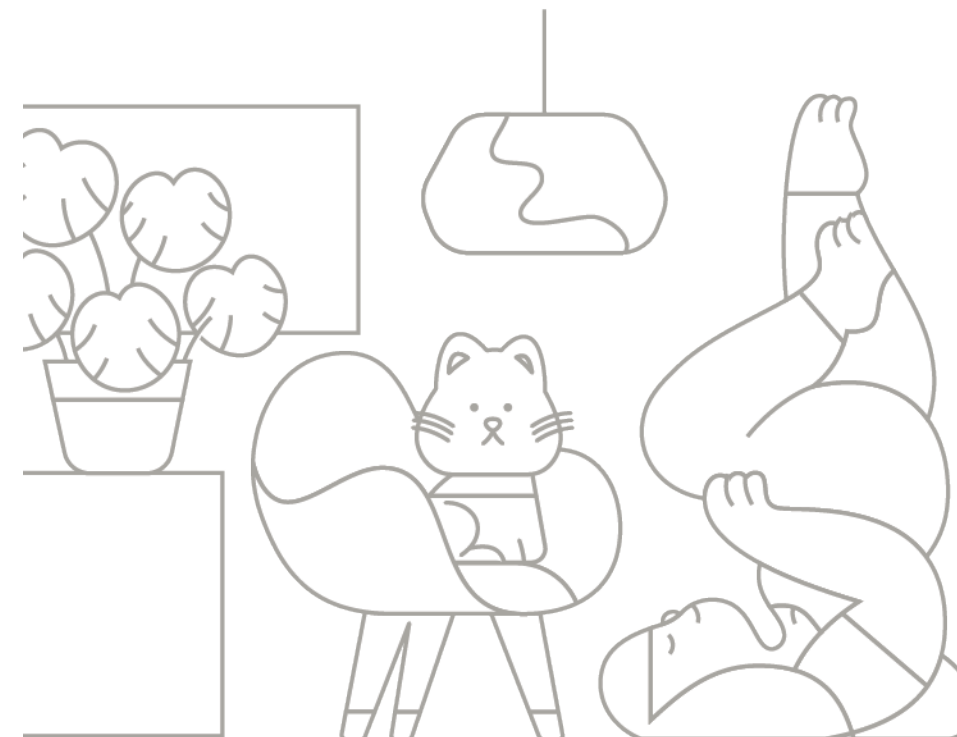
- Quayside would be the first neighbourhood built entirely of “mass timber” — an emerging material every bit as strong and fire-resistant as concrete or steel but far more sustainable — including record-setting buildings of around 30 storeys.
- An Ontario-based factory would produce mass timber building parts for fast assembly in Quayside, catalyzing a new industry that taps into Canada’s vast sustainable forests.
- A digital coordination system called Sidewalk Digital Fabrication would help to coordinate every part of the proposed mass timber supply chain, from the off-site factory to on-site assembly.
- Buildings in Quayside would feature adaptable “Loft” spaces designed with flexible floor plates to accommodate residential, commercial, and light manufacturing uses, enabling a true live-work community.
- A system of flexible wall panels would enable renovations to Loft and residential spaces to occur much faster than normal, reducing vacancies and helping the neighbourhood adapt to market conditions.
- Low-voltage digital power connections — designed to travel over ethernet cables rather than via electrical wires embedded in walls — would dramatically reduce fire risks and facilitate quicker renovations.
- Mist-based sprinklers would provide the same protection as traditional sprinkler systems but use a fraction of the water and facilitate quicker renovations by travelling through narrow tubes instead of being embedded in walls.
- A sustainable material called Shikkui plaster would provide fire protection equivalent to drywall with a fraction of the waste.
- A proposed “outcome-based” building code system would monitor noise, nuisances, and structural integrity in real time to help a mix of residential and non-residential uses thrive without sacrificing public safety or comfort.



# Housing

A program with 40% below-market units to improve affordability and expand options for all households.

- Quayside’s proposed mixed-income housing program would feature 20 percent of units as affordable housing (a quarter of which would go towards “deep” affordability needs) and 20 percent of units as middle-income housing.
- Middle-income housing options would include “shared equity” units designed to help households build value in their home without the high up-front cost of a traditional mortgage down payment.
- Half of the total proposed housing program would consist of “purpose-built” rentals that are critical to improving long-term affordability.
- Quayside would feature a set of efficient and ultra-efficient units that reduce size to enable affordability while remaining livable through thoughtful design features, such as space-saving furniture, shared building amenities, and access to off-site storage space with on-demand delivery.
- This approach of “affordability by design” would enable the creation of 87 more units in Quayside than would otherwise exist in a conventional development, creating \$37 million of value that could be applied towards below-market housing.
- A set of co-living units would feature shared building amenities, such as communal kitchens, to enhance community for a range of residents, including single-person households, multi-generational families, and seniors.
- In Quayside, 40 percent of housing would consist of family-sized units at two bedrooms or more.





# Sustainability

A new standard of sustainability that creates a blueprint for truly climate-positive communities.

- **Low-energy building designs** — inspired by the Passive House movement — would achieve Toronto Green Standard Tier 3 rating for energy efficiency and Tier 4 for greenhouse gas intensity.
- **A proposed suite of energy “Schedulers”** would optimize energy systems for residents, businesses, and building operators, ensuring that buildings operate in the most efficient way possible.
- **A district energy system called a “thermal grid”** would provide heating, cooling, and domestic hot water without relying on fossil fuels.
- **An advanced power grid** would use solar energy, battery storage, and time-based energy pricing to reduce reliance on the main Toronto Hydro grid during periods of peak demand and make an all-electric community affordable.
- **An innovative bill structure** would enable residents and businesses to set monthly budgets for energy costs, similar to the way people pay for mobile phone plans today.
- **A smart disposal chain** would feature real-time feedback to improve waste sorting and “pay-as-you-throw” chutes to reduce household and business waste.
- **An underground pneumatic tube system** would keep these waste streams separated until they reach a collection facility, reducing contamination and centralizing trash hauling.
- **An active stormwater system** would rely on green infrastructure to capture and retain stormwater and on digital sensors to empty storage containers in advance of a storm.



# Social Infrastructure

Health, civic life, learning, and workforce initiatives and facilities that enable people to thrive.

- **A Care Collective** would provide community space dedicated to enhancing health and well-being by co-locating the delivery of health care and community services alongside proactive health programming.
- **A Civic Assembly**, adjacent to the Care Collective, would provide neighbourhood access to spaces for community programs, civic engagement, and cultural events.
- **An elementary school, co-located with a childcare centre**, would ensure that downtown families have access to basic education needs.
- **A proposed collaboration with the Toronto Public Library (TPL)** would explore ways to integrate the library’s presence throughout the neighbourhood, resulting in potential pop-up lending services or TPL-developed classes on digital literacy.
- **An online resource called Collab** could allow community members to decide on public space programming, giving them a nuanced understanding of trade-offs and community impact.
- **The Sidewalk Works jobs program** would bring employers and educators into conversation, prepare workers to acquire in-demand skills, and connect employers with a diverse and talented workforce.

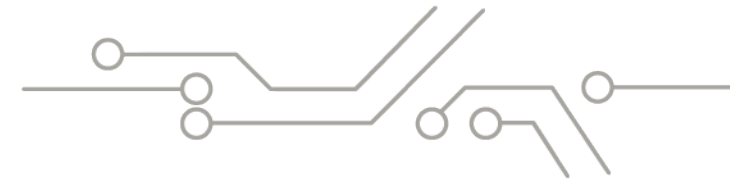
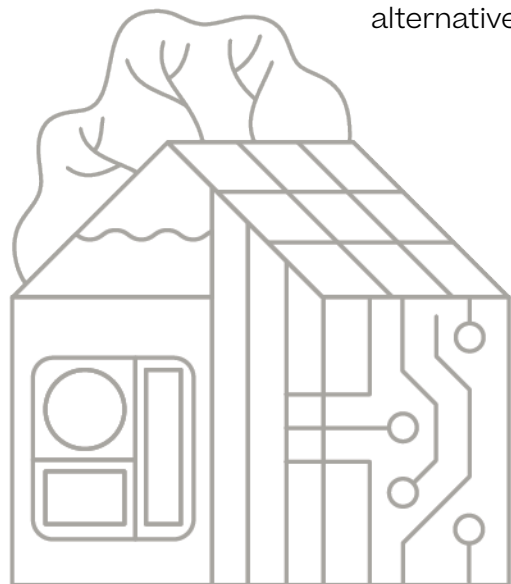




# Digital Innovation

Catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data in cities.

- A ubiquitous connectivity network — powered by a new Super-PON technology that reaches faster speeds with less equipment — can provide households and businesses with a secure personal network across the entire neighbourhood, indoors and outdoors.
- Standardized physical mounts connected to power would dramatically reduce the cost of deploying digital innovations, serving as a sort of “urban USB port.”
- Open, published standards would make properly protected urban data accessible to the community in real time, and make it easy for third parties to build new services or competitive alternatives to existing ones.
- A best-in-class approach to security and resiliency would be designed to prevent disruptions, rapidly detect them, and rapidly restore functionality.
- Building on existing privacy laws, a proposed independent Urban Data Trust would oversee the review and approval of all digital innovations that propose to use or collect urban data in Quayside — whether developed by Sidewalk Labs or third parties.
- The proposed Urban Data Trust would be tasked with establishing clear Responsible Data Use Guidelines that safeguard the public good while enabling innovation, including by making de-identified or non-personal data publicly accessible by default.
- A publicly transparent Responsible Data Use Assessment would ensure that companies or community members wishing to use urban data do so in a way that has a beneficial purpose and protects privacy.

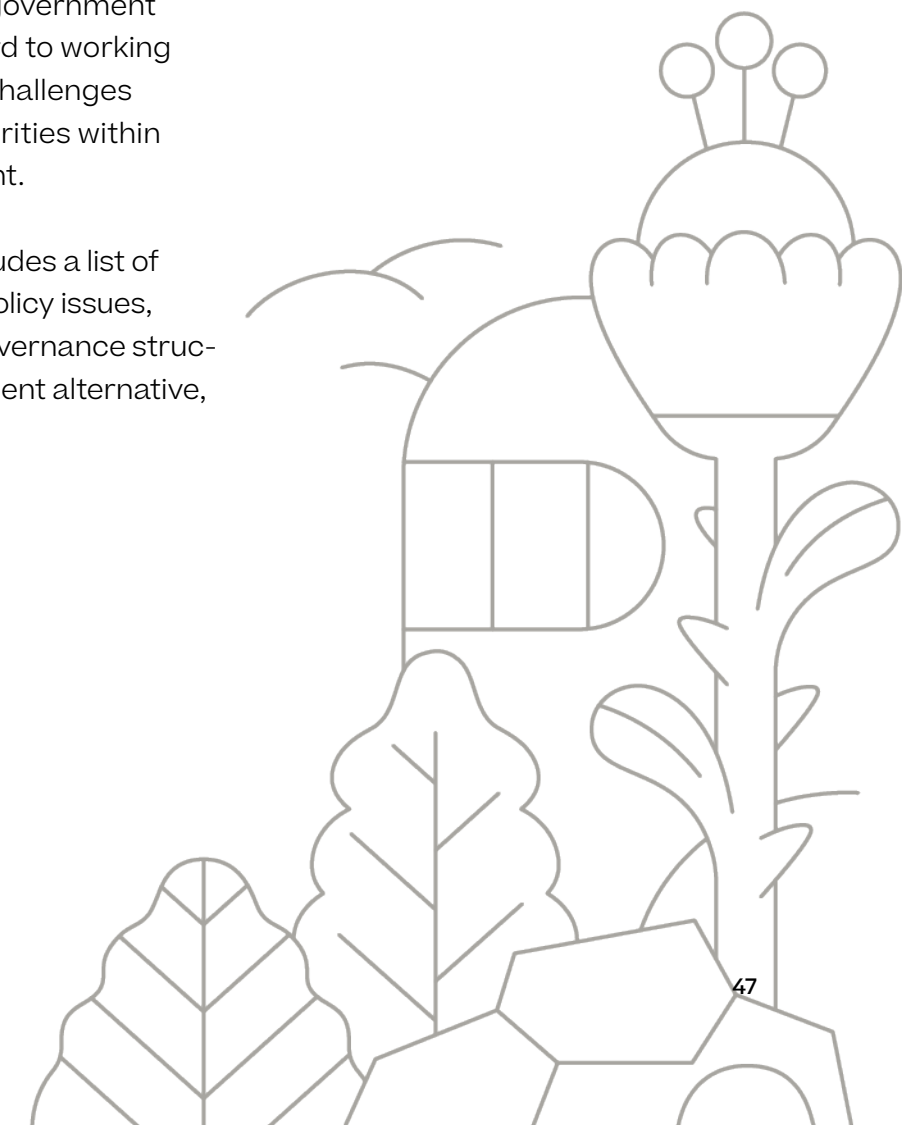


## The path to implementing these innovations

Sidewalk Labs recognizes that some of these proposed innovations would require regulatory or policy changes in order to be implemented. Sidewalk Labs also recognizes that these types of changes require significant review and analysis by public agencies at multiple levels and understands how challenging this process can be.

In preparing this proposal, Sidewalk Labs has begun discussions with Waterfront Toronto and government officials and looks forward to working through these complex challenges with the applicable authorities within each order of government.

Volume 3 of the MIDP includes a list of specific regulatory and policy issues, along with a proposed governance structure with which to implement alternative, innovative approaches.



# Develop- ment Plan

The Quayside development plan strives to achieve transformative quality of life improvements by combining forward-thinking planning approaches with new physical and digital innovations.

The following pages show the site plan and some illustrative renderings of the neighbourhood, as well as a breakdown of the development program into its core components.

These components include residential uses and a wide range of non-residential uses — including retail, office, production, and community spaces — to create a diverse live-work community.

# The Quayside Site Plan

This plan view of the site illustrates the extensive pedestrian pathways in Quayside, as well as a new grand public space at Parliament Plaza.

By creating a new “cove” at Parliament Slip, an exciting new public space oriented around the water, this plan would help connect all Torontonians to the waterfront.

This connection to the water is a major theme of the Quayside plan: residents, workers, and visitors can interact directly with the water through barges, kayaks, and new floating boardwalks.





Lower Sherbourne Street

Bonnycastle Street

Parliament Street

Gardiner Expressway / Lake Shore Boulevard

Silo Street

Martin Goodman Trail

Sherbourne Common

Parliament Plaza

Queens Quay

Small Street

Parliament Cove

Silo Park

Merchants' Wharf

Parliament Slip

Inner Harbour

To Villiers Island

Keating Channel

# The Quayside neighbourhood

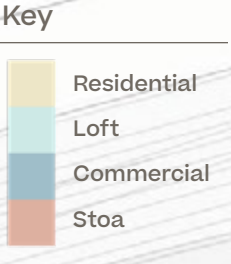
This view of the Quayside site plan looks northeast towards the Gardiner Expressway. The plan incorporates a series of innovations around transportation, social infrastructure, housing affordability, digital tools, sustainable infrastructure, building construction, and public space

— with the goal of improving quality of life for Torontonians. It reflects 18 months of public engagement needed to refine these planning ideas and start to achieve Waterfront Toronto's ambitious priority outcomes.



# Quayside's five sites

The site consists of 2.65 million square feet of developable space, 10 buildings across five sites that mix residential and commercial uses, and four hectares of public realm. At full build, Quayside could house roughly 4,500 residents in a range of housing options affordable to people of all incomes, as well as host roughly 3,900 jobs.<sup>15</sup>



**Site 1: Building 1**  
 30 Floors (107 m)  
 Stoa: 60,000 sq ft  
 Loft: 100,000 sq ft  
 Residential: 240,000 sq ft

**Site 1: Building 2**  
 13 Floors (56 m)  
 Stoa: 65,000 sq ft  
 Loft: 165,000 sq ft

**Site 2: Building 2**  
 12 Floors (45 m)  
 Stoa: 35,000 sq ft  
 Commercial: 10,000 sq ft  
 Residential: 200,000 sq ft

**Site 2: Building 1**  
 28 & 21 Floors (101 & 78 m)  
 Stoa: 100,000 sq ft  
 Commercial: 150,000 sq ft  
 Residential: 345,000 sq ft

**Site 3: Building 1**  
 30 Floors (107 m)  
 Stoa: 45,000 sq ft  
 Commercial: 100,000 sq ft  
 Residential: 255,000 sq ft

**Site 3: Building 2**  
 10 Floors (44 m)  
 Stoa: 10,000 sq ft  
 Loft: 70,000 sq ft  
 Commercial: 10,000 sq ft

**Site 4: Building 1**  
 30 Floors (107 m)  
 Stoa: 55,000 sq ft  
 Commercial: 70,000 sq ft  
 Residential: 265,000 sq ft

**Site 5: Building 1**  
 9 Floors (32 m)  
 Stoa: 10,000 sq ft  
 Residential: 70,000 sq ft

**Site 5: Building 2**  
 15 Floors (54 m)  
 Stoa: 15,000 sq ft  
 School: 60,000 sq ft  
 Residential: 125,000 sq ft

**Site 5: Building 3**  
 4 Floors (18 m)  
 Stoa: 5,000 sq ft  
 Loft: 15,000 sq ft

# Pedestrian walkway: Intimate public spaces

A network of pedestrian-only pathways would be lined with a variety of retail, community, and cultural ground-floor stoa spaces, with housing and offices on upper floors to create a true live-work neighbourhood.

As the world's first all-mass timber neighbourhood, Quayside would become a global model for showcasing this sustainable, beautiful building material.



# Queens Quay: People-first streets

A redesigned Queens Quay would create expanded pedestrian spaces that benefit from animated ground floors, curbsless streets, lush plantings, and outdoor-comfort strategies that make it possible for people to spend more time outside together.

A new modular pavement system with embedded lights and heating would facilitate safe, welcoming spaces that can adapt to changing conditions.



# Parliament Plaza: Connecting land and water

A series of water-based play spaces would anchor a grand central plaza designed to draw people down to the water's edge and host a wide range of activities, from concerts to markets to art installations.

The plaza would be surrounded by two-story ground-floor stoa spaces that host diverse programming and blur the line between indoors and outdoors.



# Parliament Slip: Active in all seasons

Framed by lower-scale, intimate buildings, Parliament Slip would offer direct access to the water for activities like kayaking, educational programs, art installations, and relaxation. A new pedestrian bridge would connect the slip with the stunning new parks of Villiers Island.



Outdoor-comfort strategies, such as building Raincoats that extend over the sidewalk and temporary enclosed structures, would support ongoing programming to ensure that the waterfront remains lively and safe year-round.





# The Quayside Development Program

Applying these principles and innovations to Quayside would result in a physical development program that is fundamentally more affordable, vibrant, connected, and inclusive than conventional urban developments.

**Evolutionary:**

- Greater mixed-use
- Expanded social infrastructure
- Ambitious sustainability plan

**Revolutionary:**

- All-wood construction
- 40% below-market housing
- Accelerated light rail expansion

Development in Quayside is governed by zoning bylaws that, if followed exactly, would have a limited impact on some of Toronto's biggest challenges around affordability and economic opportunity.

In its aspirations to push beyond these bylaws, Waterfront Toronto developed precinct plans and zoning bylaws for Quayside (endorsed by the city) that represent an important departure from typical developments in Toronto, with increased requirements for mixed-use and affordable housing, a focus on creating a top-quality public realm, and an emphasis on sustainability.

Sidewalk Labs embraces this vision and proposes to push these priorities even further, exceeding the targets established in the precinct plans and the zoning bylaws, and creating a new type of development model to achieve the goals established by Waterfront Toronto.

Several aspects of Sidewalk Labs' vision for Quayside are **evolutionary** in nature, building on progress by Waterfront Toronto and the city.

Quayside's plans support a significant mix of residential and non-residential space, exceeding the minimum requirements for retail and commercial activity in order to generate street life and drive economic expansion — an approach enabled by flexible building types designed to accommodate a variety of uses and accelerate renovations. Quayside's plans build in space for community purposes up front, ensuring that residents have

access to schools, health facilities, civic spaces, and arts and cultural programs. And Quayside will advance Waterfront Toronto's sustainability ambitions through a series of design and technology initiatives that, altogether, would reduce greenhouse gas emissions by 85 percent from the city's average.

In addition to these efforts, Sidewalk Labs proposes some initiatives that are more **revolutionary** in terms of their ability to push city and waterfront objectives forward in new ways.

Sidewalk Labs proposes to cap heights at around 30 storeys to create a livable neighbourhood, with all-wood construction to create healthy and sustainable buildings. Instead of providing the minimum amount of affordable housing, Sidewalk Labs proposes to increase the range of housing opportunities, including 40 percent of units at below-market rates. Instead of building a neighbourhood and waiting for public transit to arrive, Sidewalk Labs is prepared to assist with the financing for the extension of the light rail in tandem with building Quayside, which would accelerate development opportunities and make the site dramatically more attractive for commercial activity.

These approaches to the development program run counter to current market trends and forces but are fully consistent with the goals for Quayside, as established by Waterfront Toronto, for an affordable, mixed-use community.

# A development program defined by a vibrant mix of uses

A cornerstone of Sidewalk Labs' proposed development program for Quayside is that it calls for roughly 33 percent of the site's allowable floor area to be devoted to non-residential uses,<sup>16</sup> encouraging a mix of office space for companies and startups, ground-floor commercial space for retailers and makers, and social space for schools and community groups, in addition to homes.

For Quayside's residential spaces, Sidewalk Labs proposes an unprecedented commitment to mixed-income housing. Sidewalk Labs plans to meet and even exceed Waterfront Toronto's 20 percent requirement for traditional affordable housing<sup>17</sup> (a quarter of which Sidewalk Labs would dedicate to "deep" affordability needs) and add 20 percent more below-market housing for middle-income households.

The benefits of this type of complete live-work community include decreased commute times, greater "all-in" affordability because of lower housing costs and travel options that do not require owning a car, and a heightened sense of social cohesion. Sidewalk Labs estimates that this approach would also result in major economic development, with more than 3,900 jobs eventually located in Quayside (and more than 9,000 new jobs in Ontario overall).

Each aspect of the proposed Quayside development program responds to a challenge facing Toronto today. To help show how this plan would address these challenges while building on existing city and waterfront development trends,

the tables on the following pages compare Quayside's proposed development program to the zoning bylaws for residential, commercial, ground-floor, community, and public spaces, as well as for parking.

(Additional information on how Sidewalk Labs' proposed plan meets or exceeds existing precinct plans and zoning bylaws is available in the "Planning Policy Justification Report" section of the MIDP Technical Appendix.)

In total, the proposed Quayside development plan consists of five sites, 10 buildings, and 2.65 million square feet of developable space.<sup>18</sup> For several reasons, Sidewalk Labs has decided not to build up to the maximum square footage allotted by the zoning bylaws.

First, Sidewalk Labs believes Quayside can become the world's first neighbourhood designed entirely out of sustainable mass timber, demonstrating the vast potential of this important technology. Achieving this goal would catalyze a new Canadian industry around mass timber building components, anchored by the launch of a new Ontario-based factory. An all-wood Quayside would also have significant benefits to the environment, removing the equivalent of 20,000 cars from the road annually.<sup>19</sup>

Currently, the practical limit of mass timber is around 30 storeys; beyond that height, structural beams become so large that they interfere with usable interior space.<sup>20</sup> As a result, the Quayside development proposes buildings around 30 storeys.

Quayside could be home to more than **3,900** jobs.

# Total development program

	Quayside Approximate square feet	Quayside Program percentages	Zoning bylaws <sup>21</sup>
<b>Total developable space</b>	<b>2.65 million sq ft</b>	<b>100%</b>	<b>3.17 million sq ft</b>
<b>Residential space</b>	<b>1.78 million sq ft</b>	<b>67% of total program</b>	<b>95% of total program</b>
Condo	800,000	45% of residential	
Market rental	270,000	15% of residential	
Below market	710,000	40% of residential	
<b>Non-residential space</b>	<b>870,000 sq ft</b>	<b>33% of total program</b>	<b>5% of total program</b>
Traditional commercial space	340,000	39% of non-residential	
Loft commercial space 3rd to 12th floors	70,000	8% of non-residential	
Stoa commercial space 1st or 2nd floor	140,000	16% of non-residential	
Stoa retail, food, and beverage 1st or 2nd floor	210,000	24% of non-residential	
Stoa production 1st or 2nd floor	20,000	2% of non-residential	
Stoa social infrastructure 1st or 2nd floor	30,000	3% of non-residential	
Elementary school	60,000	7% of non-residential	

Note: Numbers may not add up due to rounding. All numbers are subject to change based on further consultations and refinement of the plan.

Second, the Quayside plan aims to prototype more flexible interior spaces, both with stoa on the lower two floors, which can accommodate a range of retail, production, and community spaces, and with Loft spaces at the mid-rise sections of buildings, which can accommodate commercial and live-work spaces in what would normally be residential-only buildings. To provide these flexible spaces, floor-to-ceiling heights would be taller than in a typical development, resulting in fewer overall floors within the same general heights.

Third, Sidewalk Labs aims to create a neighbourhood filled with more open and publicly accessible space than it might otherwise have, often with an intimate feel. The Quayside plan would convert Parliament Street into a new concept for a public plaza, Parliament Plaza, and devote more open space to this area than previous plans to create a significant public destination at this location. Additionally, while the East Bayside precinct plan identified a passageway through Sites 1 and 2, the proposed Quayside plan creates a more generous space that extends through Site 3 to connect directly to Parliament Plaza.

Together, these spaces advance the goals of creating more active street life for residents, visitors, and workers, as well as creating new opportunities for small retailers and other ground-floor uses that benefit from foot traffic. Sidewalk Labs believes these benefits are worth the tradeoff in land area for development.

Another example of building less than bylaws allow occurs on Site 5. Instead of pursuing a single larger structure of approximately 12 storeys, Sidewalk Labs proposes a group of smaller buildings for the site. This approach enables pedestrian passageways and courtyards to bisect the site, extending the public realm from Silo Park to the waterfront. It also allows buildings to descend in height as development moves towards the water, ranging from 15 storeys down to 9 and then only 4 storeys at the water's edge, consistent with priorities of the city and Waterfront Toronto and creating a more human-scaled experience.

### Residential uses: More options for all incomes

While the zoning bylaws for Quayside would allow for a development that is 95 percent residential, Waterfront Toronto's precinct plans for Quayside recognize that an inclusive community should provide options for households of all incomes while also leaving room for non-residential uses. For that reason, the precinct plans call for 75 percent of developable area to be designated as residential space — with 20 percent of units as affordable housing and 5 percent of units as low-end-of-market housing.<sup>22</sup>

Sidewalk Labs agrees that the city's greatest strength is its diversity and that the most successful neighbourhoods welcome a wide range of people and activities. To push the concepts of the precinct plans further, Sidewalk Labs plans to allocate 67 percent of space in

## Residential program

	Quayside Approximate square feet	Quayside Program percentages	Zoning bylaws
<b>Residential space</b>	<b>1.78 million sq ft</b>	<b>67% of total program</b>	<b>95% of total program</b>
Condo	800,000	45% of residential	
Market rental	270,000	15% of residential	
Below market	710,000	40% of residential	

Quayside to housing and ensure that it is accessible to a greater diversity of residents, creating a neighbourhood that reflects a mix of non-residential uses alongside residential ones.

To realize the goal of a mixed-income community, Sidewalk Labs plans for 40 percent of housing units in Quayside to be below-market. Half of these units would be dedicated to traditional affordable housing for households at or below 100 percent Average Market Rent (AMR), as defined by the city.<sup>23</sup> The other half would provide housing options — both rental and shared equity — for middle-income households (defined as 100–150 percent AMR), who currently cannot qualify for affordable housing but also cannot afford to pay market prices.

A key part of this program is that it consists of 50 percent purpose-built rentals, or units created specifically to be rented, which are almost non-existent in new Toronto developments. These rentals — which include units at both market and below-market rates — can provide more

flexibility and easier entry into the market for residents, as well as long-term affordability for the city.<sup>24</sup>

Quayside's proposed housing program also includes new types of flexible, efficient residential units of all sizes that can appeal to single-person households, seniors, and growing families, as well as co-living options, where residents trade some individual unit space for more generous and social community areas within a building.

But affordable homes are just one aspect of an affordable community. To reduce the cost of living, neighbourhoods should also put jobs and essential daily services in close proximity to homes. For that reason, the plans for Quayside devote 33 percent of developable space to a mix of non-residential uses, including offices, ground-floor retail, production spaces, and social infrastructure.

In total, the Quayside plan calls for roughly 2,600 residential units, including roughly 1,000 below-market units.

Housing plan:

**50%**

“purpose-built” rentals to improve affordability.

## Non-residential uses: A lively mix of flexible spaces

To advance the shared goal of creating a truly complete community where people can walk to work and enjoy a lively mix of people and activities, Sidewalk Labs' development plan proposes over six times the amount of non-residential space required in Quayside through the zoning bylaws.

Bolstering the neighbourhood's commercial presence would position Toronto to capitalize on the rapid growth of a wide

range of new economy businesses seeking to locate in dynamic urban centres that provide inspiration and convenience in equal measure. As just one major driver of this new economy, Toronto's tech sector alone is poised to provide thousands of new, high-paying jobs — if the city can supply the right spaces.

An office park will not attract this new generation of companies, nor will traditional downtown office towers. Quayside's proposed commercial program includes 550,000 square feet of office space, integrated within mixed-use buildings

rather than isolated in office towers that are only occupied during weekday work hours. Employees would have daily access to the creative activity that is the hallmark of thriving, diverse cities.

### New types of commercial space.

Nearly 40 percent of Quayside's commercial office space would consist of adaptable Loft or stoa spaces. These spaces are designed with flexible floor plates and interior wall systems to enable rapid and low-cost renovations in response to changing economic conditions, as well as to accommodate a range of uses.

### Stoa: More vibrant lower floors.

Street life is what gives cities their energy and vibrancy, offering pedestrians lively storefronts and cafes, neighbourhood essentials like schools and healthcare centres, and access to everything from art galleries to maker spaces to community rooms. This eclectic mix fuels the character of a neighbourhood.

Unfortunately, today these spaces are at risk. Rising rents and high overhead costs are squeezing out all but the most established businesses, which can afford the capital expense, time, and risks associated with opening a ground-floor space.

## Non-residential program

	Quayside Approximate square feet	Quayside Program percentages	Zoning bylaws
<b>Non-residential space</b>	<b>870,000 sq ft</b>	<b>33% of total program</b>	<b>5% of total program</b>
Traditional commercial space	340,000	39% of non-residential	
Loft commercial space 3rd to 12th floors	70,000	8% of non-residential	
Stoa commercial space 1st or 2nd floor	140,000	16% of non-residential	
Stoa retail, food, and beverage 1st or 2nd floor	210,000	24% of non-residential	
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Stoa social infrastructure 1st or 2nd floor	30,000	3% of non-residential	
Elementary school	60,000	7%	

### Key Term

## Loft spaces

(found on upper floors) are designed with flexible floor plates to accommodate a range of residential and non-residential uses.

Loft spaces would be located on floors 3 through 12 in buildings and could potentially be used for residential purposes, in addition to non-residential uses. (Sidewalk Labs plans to implement minimum targets on its Loft spaces for commercial usage, so they always include a mix of residential and non-residential space.)

### Key Term

## Stoa spaces

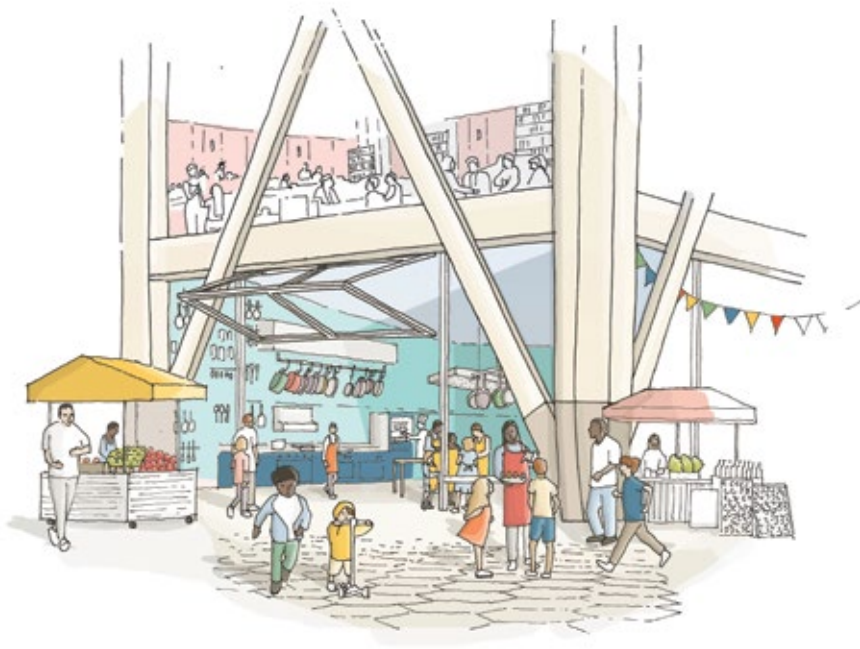
(found on the lower two floors) are designed to accommodate a wide range of uses beyond traditional retail, helping to activate the street.

Stoa spaces would be located on the ground and second floors of buildings to support retail, commercial, production, and community uses that activate the adjacent public spaces and streets.

The other 60 percent of commercial office space with traditional floor plans would also differ from the norm. In keeping with the preferences of new economy companies, these spaces would provide large horizontal footprints similar to the kind often found in old industrial buildings, which promote interaction and collaboration among employees, rather than the small footprints often found in towers, which separate workers across multiple floors and divorce them from neighbourhood street life.

In recognition of these challenges, the precinct plans developed by Waterfront Toronto devote 5 percent of total building area to retail and community uses intended to activate key street and park spaces. Sidewalk Labs proposes to push this concept further, devoting 15 percent of the development to retail and other active uses — both on the ground floor and extending into the second floor of buildings — to encourage activation of public spaces and support community needs.

Sidewalk Labs calls its proposed ground-floor space stoa in a nod to the Ancient Greek structures that hosted a broad range of civic functions such as markets and teaching spaces.<sup>25</sup> These modern stoa spaces are designed to foster a diverse urban ecosystem of stores, galleries, public markets, restaurants and cafes, light manufacturing or production, and community gathering spaces and services.



Stoa's flexible nature enables it to accommodate a diverse range of uses, including retail, production, commercial, and social infrastructure.

## Stoa program

	Quayside Approximate square feet
<b>Stoa space</b> Lower two floors	<b>400,000 sq ft</b>
Commercial space	140,000
Retail, food, and beverage	210,000
Production	20,000
Social infrastructure	30,000

The inherent flexibility of stoa space enables it to be quickly and inexpensively converted into different uses. Stoa spaces would come in varying sizes and involve leases of varying length, supported by a digital leasing platform that enables straightforward applications and fast approvals. The combined impact of these strategies would create new opportunities for small businesses and reassert the streetscape as the centre of civic life.

This flexible design also encourages the programmatic makeup of stoa in Quayside to shift over time in response to market trends. At any given time, retail might make up 40 to 80 percent of stoa, commercial spaces 15 to 45 percent, social infrastructure 5 to 10 percent, and production 1 to 5 percent.

### Stoa: retail, food, and beverage.

The variety of retail offered in a typical community can be limited by economic factors such as high rents, competition from online merchants, and a desire for long-term leases — often leading to retail spaces being dominated by multi-national chains rather than local businesses. The loss to neighbourhood life is significant. Sidewalk Labs plans to dedicate half of Quayside's ground-floor space to retail and take steps to ensure a diverse mix of stores of all sizes and ambitions by reducing fit-out costs and designing flexible floor plates into its stoa spaces.

Retail uses in stoa could include traditional retail shops, food and beverage service, marketplaces or bazaars, and essential neighbourhood services. The flexible nature of stoa enables production spaces to coexist alongside sales. For example, a major clothing brand could open a retail space next to an incubator workshop, where local clothing makers could create and sell their own independent labels.

Flexible walls help reduce renovation costs by

**50%**  
in stoa spaces.

Stoa's flexible walls also enable the rapid creation of retail spaces of different sizes, making rental and fit-outs easy and affordable for small merchants. Sidewalk Labs estimates that the costs associated with structural elements of renovation, such as moving walls and electrical wiring, would decline by 50 percent in stoa spaces, compared with traditional spaces. So if it would typically cost a landlord \$40 per square foot to make these structural changes, it would instead only cost \$20 per square foot in stoa.<sup>26</sup> Tenants who choose to take full advantage of Sidewalk Labs' prefabricated components and finishings could reap additional cost savings.

Thanks to these low costs, pop-ups should also become a hallmark of stoa retail, with some 20,000 square feet of space devoted to them across both retail and food and beverage.

### Stoa: production.

A typical development is not designed in such a way to include light manufacturing, and zoning and building codes often prohibit production spaces within mixed-use projects. But production-oriented businesses are once again becoming a key part of urban economic growth.

Whether it is a small business that needs fabrication space, or an e-commerce craft-maker that needs studio space in a lively neighbourhood, this type of production work need not be located in a remote warehouse in a far-flung industrial district. Artisans and small businesses embedded within Quayside can create unique products and services that reflect and inform the surrounding community, reinforcing the neighbourhood's culture of exploration.



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the "Digital Innovation" chapter of Volume 2.

Stoa space allows for production to occur throughout, with no specific designations. All stoa space is designed to support light manufacturing, such as fabrication or 3D printing spaces, general maker spaces, and other creative endeavours by providing the wide-open floor plates that production facilities tend to need, as well as proximity to the street so large materials can be easily transported.

For retailers, these spaces might be used for on-site assembly, personalized goods, or commissary kitchens. Production is also very much necessary in today's commercial offices, as can be seen with any prototyping lab or design studio.

Sidewalk Labs anticipates that approximately 4 percent of Quayside's ground-floor space would be used by production-related organizations or businesses. While certain production uses are not currently permitted under zoning for a development like Quayside, Sidewalk Labs proposes to use a digital innovation capable of monitoring noise, air quality, and other use-related nuisances in real time, with the goal of enabling a vibrant mix of residential and non-residential spaces to coexist safely. As a result, a wide range of new creative and production activities normally relegated to industrial zones could thrive within an urban centre.

Sidewalk Labs plans to work closely with the city to develop this proposed system, which would be operated, managed, and enforced by the City of Toronto, in full accordance with the standards established by the city.

## Social infrastructure program

	Quayside Approximate square feet
<b>Social infrastructure</b>	<b>90,000 sq ft</b>
Elementary school	60,000
Stoa social infrastructure	30,000

### Social infrastructure: Integrated into neighbourhood planning

Social infrastructure encompasses a wide range of vital services and support for all members of a community. In Quayside, the proposed development program would include approximately 60,000 square feet of building space for an elementary school co-located with a childcare facility.

The program would allocate another approximately 30,000 square feet of its ground-floor space to evolving community use. The plan allocates community space for health care and community service delivery alongside proactive health programming, as well as for participation in civic life and cultural activities and the development of digital skills. The Quayside plan would also provide space for ongoing educational programs, such as pop-up libraries and community mentorships.

Such support systems and neighbourhood resources are necessary to ensure the level of access and opportunity that Sidewalk Labs sees as fundamental to any thriving, inclusive community.

### Public realm: A wide variety of spaces for all

Public space is an essential component of any urban environment, and one that helps to define the community. Well-designed and active public parks and other gathering places provide opportunities for social interaction, recreation, and many other forms of civic engagement vital to a neighbourhood's success.

To ensure that the public realm plays a central role in Quayside, Sidewalk Labs plans to provide more than 40,000 square metres of open space and include an extraordinary range of spaces (see Page 79) that can appeal to different groups — from traditional parks, to reclaimed street space made possible by expanded trip options, to new opportunities for engaging with Toronto's lakefront.<sup>27</sup>

The Quayside plan would increase comfortable outdoor hours by **35%**

The centrepiece of the public realm plan is the creation of a grand new public space called Parliament Plaza that unlocks new ways to access Lake Ontario at Parliament Slip. To create this space, the Quayside plan proposes to close off a block of Parliament Street to cars, with limited expected impact on network connectivity for drivers. (See Page 143 for more details on street network connectivity and the proposed design for Parliament Plaza.) This design is aligned with Sidewalk Labs' approach to planning, which prioritizes transit, biking, walking, and cycling and assumes an increasing shift away from private car trips.

Creating a wide variety of spaces is a key strategy towards achieving Sidewalk Labs' goal of encouraging people to spend more time outdoors, together.

It is also critical in a cold-weather city like Toronto that these spaces remain available and activated as much as possible. A proposed set of outdoor comfort strategies and weather-mitigation structures would increase the number of hours it is comfortable to be outdoors by an estimated 35 percent, as compared to traditional public spaces.

Four major locations would become the anchors of this public realm program:

→ **Parliament Plaza.** This 6,000-square-metre gathering place at the heart of Quayside would be surrounded by stoa space and include dynamic water features and an overhead canopy for weather protection in all seasons.

→ **Parliament Slip.** At this 6,000-square-metre space, residents, workers, and visitors could connect directly with the water via a new "cove" feature (Parliament Cove), as well as a stretch of dedicated parkland running along the slip's eastern edge.

→ **Queens Quay.** This 7,500-square-metre stretch of public space along the street would represent a major expansion of typical sidewalk space, made possible by narrowing the width of vehicle lanes and creating dynamic curbs that can become public spaces during off-peak times.

→ **Silo Park.** This 5,000-square-metre park across from the Victory Soya Mills silos would serve as the green and recreational heart of the community.

## Public realm program

	Quayside Approximate square metres
<b>Public space</b>	<b>40,700 sq m</b>
Parliament Plaza	6,000
Parliament Slip	6,000
Queens Quay	7,500
Silo Park	5,000
Other Sidewalks, buffers, courtyards, and promenades	16,200

## Parking: Dramatically reduced

One component of Quayside’s plan is notable for its near absence on-site: parking. Adhering to zoning bylaws, a traditional development would create on-site parking lots and likely build expensive underground garages to serve approximately 2,400 spaces.<sup>28</sup>

In Quayside, no parking would be provided above ground and only 500 spaces would exist in a below-ground lot for visitors. Residents and workers who choose to arrive in the neighbourhood by car could pick up or drop off their vehicle at an underground interchange facility in Quayside, with storage at a 750-space off-site parking facility in the Port Lands or a nearby location.

This reduction in on-site parking is possible because Sidewalk Labs’ mobility plan is designed to provide convenient and affordable alternatives for virtually every trip by expanding public transit, bike networks, pedestrian infrastructure, and ride-hail options. Sidewalk Labs also predicts that, within the next 15 years, shared access to self-driving vehicles would fill any remaining needs that private cars serve today.

By unbundling the parking requirement from the site itself, Quayside’s plan can use neighbourhood space that would normally go towards parking for buildings or the public realm — without reducing mobility.

Eliminating parking lots would improve the quality of the pedestrian experience on the sites by freeing up potential space for plazas, sidewalks, and other public uses. And eliminating the cost of parking garages enables developers to create more shared spaces in buildings. They can also pursue higher-quality architectural designs, with curves or other interesting shapes, since the layout of a parking garage often determines the structural columns of the building above it. In other words, removing the need for on-site parking enables structures that can respond to the needs of people rather than the requirements of car storage.

## Parking program

	Quayside Number of spaces	Zoning bylaws
Total parking	1,250 spaces	2,400 spaces
On-site above grade	0	2,400
On-site below grade	500	
Off-site	750	0

**Expanded public transit, bike networks, pedestrian walkways, and ride-hail options would dramatically reduce the need for on-site parking — freeing up space for a bigger, more vibrant public realm.**

### Program spotlight

## Parking: Available, but not too convenient

Quayside’s expanded set of mobility options means residents and workers are expected to travel mostly by public transit, walking, biking, or shared rides — driving only infrequently.

For example, modelling suggests that only 8 percent of people who work in Quayside would drive into work; it also suggests that just 30 percent of Quayside households would own cars,<sup>29</sup> compared with the 48 percent of downtown households today.<sup>30</sup>

Infrequently used vehicles are best accommodated by off-site attended parking. Residents or workers could store vehicles off-site at reasonable monthly rates and hail them through apps. Because few Quayside residents are expected to drive to work, most use of the lot would occur during off-peak hours, minimizing the impact on peak traffic.

Underdeveloped sites near Quayside could host these secure parking facilities, which would be equipped with electric vehicle charging facilities and managed by the proposed Waterfront Transportation Management Association. Residents or workers could of course choose to pay higher rates for the on-site parking garage.

(See the “Mobility” chapter of Volume 2 for more details on the Waterfront Transportation Management Association.)

Together, these parking facilities are meant to provide an option for those wishing to drive while encouraging residents and workers to consider alternatives to driving — consistent with the climate-positive and affordability objectives for Quayside.

# Committing to Diversity, Equity, and Inclusion

Designing neighbourhoods that everyone can access means planning for the full spectrum of people’s abilities, whether physical, digital, economic, social, or cultural. Sidewalk Labs aims to create the conditions that bring people together, not pull them apart, and that provide new opportunities for all.

Sidewalk Labs has approached its planning for the Sidewalk Toronto project with the following principles in mind:

## Diversity.

Sidewalk Labs recognizes and honours the vibrant diversity of Toronto, and strives for a place that reflects Toronto’s values around diversity — one where people of all ages, abilities, incomes, and backgrounds can thrive and belong.

## Accessibility.

Sidewalk Labs prioritizes accessibility of place, transportation, services, and opportunities to ensure Quayside is physically, socially, economically, and culturally accessible for all, including residents, workers, and visitors. Sidewalk Labs designs spaces, systems, and services for 100 percent of the population, including people who face multiple barriers.

## Affordability.

Sidewalk Labs includes options for housing, retail, programming, and amenities

that are affordable for people of all income levels, including those who are low income.

## Equity of opportunity.

Sidewalk Labs works to identify and remove systemic barriers to participation so everyone can exercise the right to fair and respectful access to economic, social, and cultural opportunities, paving the way for equitable outcomes.

## Inclusion.

Designing neighbourhoods that everyone can access means planning for the full spectrum of people’s circumstances: physical, digital, economic, social, or cultural. Quayside would create the conditions that bring people together, not pull them apart. These conditions can help create an inclusive community — a group of people who share a sense of belonging, trust, safety, and collective stewardship in a place where everyone feels welcome and has an opportunity to flourish and thrive.

Sidewalk Labs aims to create the conditions that bring people together.







See the “Buildings and Housing” chapter of Volume 2, for more details on the proposed housing vision.

**Affordability by the numbers:**

- 40 percent below-market housing program
- \$4,000 annual savings through mobility subscription package
- Affordable electrification that maintains or reduces utility costs

## Honour strength in diversity

Sidewalk Labs recognizes and honours the range of visible and invisible qualities, experiences, and identities that shape who people are, how they think, and how they engage with and are perceived by the world. These include but are not limited to race, ethnicity, gender, marital and family status, sexual orientation, socio-economic status, age, physical or mental abilities, religious or spiritual beliefs, Indigeneity, immigrant and newcomer status, and political ideologies.

Sidewalk Labs deliberately and thoughtfully strives to develop designs, spaces, services, and programming — in partnership with local institutions — that are welcoming, iterative, responsive, and accessible to a diverse population, including people who face multiple barriers.

## Design accessibility for people of all ages and abilities

Sidewalk Labs’ commitment to intergenerational communities involves developing a variety of housing types and sizes, pedestrian-friendly streets, and complete communities where people can easily access shops, social services, and community spaces. This commitment is particularly relevant for populations that tend to stay closer to home, including children and seniors.

Sidewalk Labs also plans to establish a host of physical and digital accessibility initiatives co-designed with members of the disability community, including accessible streets, building entrances, and public washrooms, as well as way-finding tools for people who are visually impaired. These initiatives would aim to meet or exceed existing Accessibility for

Ontarians with Disabilities Act (AODA) requirements. They are based on 22 general, physical, and digital accessibility principles developed in collaboration with more than 200 members of the accessibility community in Toronto during 70 hours of co-design sessions.

## Create affordability for people of all incomes

A mix of incomes, lifestyles, and life-stages is essential to generating a neighbourhood’s sense of community and energy. Sidewalk Labs’ proposed housing program has been designed to set a new standard for inclusive communities.

An ambitious affordability vision would target residents across the income spectrum: overall, 40 percent of units would be below-market. This breakdown includes 20 percent of units devoted to traditional affordable housing (at least a quarter of which would go towards households with “deep” affordability needs) and 20 percent of units for middle-income housing.

In contrast to conventional waterfront revitalization in Toronto, often dominated by market-rate condos, a full 50 percent of housing units would be “purpose-built” rentals, improving long-term affordability for the city. A new set of efficient unit designs would reflect a broader effort to make downtown living affordable and meet the evolving needs of Toronto’s diverse households.

In addition to expanding housing affordability, Quayside would strive to improve the “all-in” affordability of living in the neighbourhood. For example, a mobility subscription package would enable households to forgo car ownership, saving more than \$4,000 a year without

sacrificing the ability to get around. A new approach to affordable electrification would maintain or reduce overall utility costs for households and businesses while achieving more sustainable outcomes. ☑

## Ensure opportunities for all

Sidewalk Labs believes that a strong plan for economic growth requires an equally strong commitment to inclusion.

Sidewalk Labs plans to take a proactive “community benefits approach,” based on community input, to ensure that equitable economic opportunities are open to a wide range of Torontonians. This effort includes creating training and employment opportunities for members of historically disadvantaged and equity-seeking groups, together with employers, community organizations, training providers, and labour.

Building on the Waterfront Toronto Employment Initiative, Sidewalk Labs plans to work with a range of partners — including Toronto Employment and Social Services, Dixon Hall, Miziwe Biik Aboriginal Employment and Training, and Acces Employment, among others — to provide opportunities in both the construction and tech sectors. The project will set minimum targets, including requiring 10 percent of all construction hours to be worked by members of equity-seeking groups.

While creating meaningful employment in the industries of today is important, so too is helping to cultivate the next wave of local entrepreneurs. Sidewalk Labs envisions a business incubator program developed with a local partner to provide space and support for underrepresented and for low-income entrepreneurs, and small business owners from diverse communities. ☑

### Planning spotlight

## Planning for resiliency to ensure a safe future

Resilience is critical for successful neighbourhoods and has been a core priority for Waterfront Toronto, as demonstrated in part by its Resilience and Innovation Framework. Sidewalk Labs’ resiliency planning addresses climate-related shocks and other stressors designated as critical to Toronto by ResilientTO, such as housing, congestion, and robust social networks. The below list includes examples of how Sidewalk Labs plans to approach resiliency by being proactive, responsive, and informative.

**Proactive.** Stormwater management systems would be designed to mitigate flooding risk, including robust green infrastructure to capture water, and environmental sensors that free up water storage space in advance of storms. Connected utility infrastructure would enable predictive maintenance to stop major failures before they occur. Redundant physical infrastructure would ensure reliable accessibility before, during, and after a weather event.

Additionally, open-source software would allow Sidewalk Labs to learn about potential problems from the data security community before they happen, and proactive threat-modelling will improve response readiness. Finally, designing to encourage strong social infrastructure and community cohesion would ensure that social networks could be quickly activated in the event of emergencies.

**Responsive.** Buildings would have backup generators and draw power from Toronto’s main electricity grid, which has 99.99 percent reliability, reducing the likelihood of a power outage. In the event such an outage does occur, high-performance building envelopes would enable thermal resiliency without the use of any backup mechanical heating system.

**Informative.** Sidewalk Labs would help amplify the city’s emergency preparedness plans and emergency messaging prior to, during, and after any event through additional physical and digital communication methods such as apps and signage.



See the “Economic Development” chapter of Volume 1, on Page 420, for more details on planning for prosperity with equity.

## Supporting robust social infrastructure

Social infrastructure fosters health and well-being, ties together communities, and helps people reach their highest potential.

Proactive planning for social infrastructure — including health, civic engagement, lifelong learning, and arts and culture — is critical to achieving an inclusive community. Quayside should be a place that creates and sustains good health for all by enabling proactive, coordinated, continuous, and holistic approaches to health, care, and well-being. It should foster a civically engaged community underpinned by deep social ties and a strong sense of pride and belonging. And it should provide the conditions to explore, produce, and experience creative expression of all kinds.

Sidewalk Labs plans to take a proactive approach to health and well-being that recognizes the social determinants of health. This approach would be reflected through a built environment designed to promote active transportation and infuse nature into the streetscape. A Care Collective, operated through service-delivery partnerships, would seek to meet the diverse health needs of people in their local neighbourhood.

Quayside would also have a central location for community connection and participation that would be the heart of civic life: the Civic Assembly, a place to connect with neighbours, learn about what is going on in and around the neighbourhood, share ideas, express creativity, engage in cultural activities, and get technical assistance on digital tools.

## Committing to Indigenous Communities

Sidewalk Labs will work to reflect and acknowledge traditional and contemporary Indigenous presence in Quayside, and commits to contributing to prosperity and opportunity for local Indigenous communities.

There is a collective responsibility to share in wise stewardship and peaceful care of the land and its resources.

Quayside sits on the treaty lands of the Mississaugas of the Credit First Nation. Today, there is a significant diverse urban Indigenous community in Toronto. Sidewalk Labs acknowledges the urgent need for, and is committed to furthering the goals of, reconciliation with Canada's Indigenous Peoples.

Quayside is close to a number of Indigenous organizations and districts, including a new Indigenous business district on Dundas Street East, which will include an Indigenous Centre for Innovation and Entrepreneurship, Miziwe Biik Aboriginal Employment and Training, and Anishnawbe Health Toronto, which is developing a new Indigenous Community Hub in the neighbouring West Don Lands.

Over half of the Indigenous people in Canada now reside in urban centres. This project is an opportunity to model how contemporary city building can contribute to, and support, urban Indigenous prosperity and opportunity. Sidewalk Labs will strive to create opportunity for local Indigenous communities through a number of initiatives.

### These commitments include:

- Engagement. Sidewalk Labs will engage Indigenous communities, including the Mississaugas of the Credit First Nation, in ongoing dialogue to build a mutually respectful relationship and explore potential collaborations.
- Workforce initiatives. Sidewalk Labs will work with Indigenous workforce agencies (such as the Miziwe Biik Aboriginal Employment and Training and the Centre for Indigenous Innovation and Technology) on both skills training and job opportunities in construction and tech, and include Indigenous suppliers in diverse procurement strategies.
- Design and education. Sidewalk Labs will reflect and acknowledge Indigenous presence on the waterfront. In November, Sidewalk Labs held a design consultation with Indigenous participants, designers, and artists led by Brook McIlroy's Indigenous Design Studio to imagine (among other things) educational opportunities and Quayside's future through the lens of Indigenous design.

For the Sidewalk Toronto project to truly contribute to Indigenous prosperity and opportunity, Indigenous voices must be at the table. Sidewalk Labs is committed to ongoing conversations and collaboration with Indigenous communities in Toronto throughout the development process.

### Mississaugas of the Credit First Nation.

The Mississaugas of the Credit First Nation (MCFN), part of the Ojibwe (Anishnabe) Nation, is one of the largest Aboriginal Nations in North America.

MCFN asserts unextinguished title to all water in its claimed traditional territory including Lake Ontario, and any adjacent lands under water or formerly under water. The land on which Quayside will be built are lands covered by Treaty 13/13A Toronto Purchase (1805) between the Mississaugas and the Crown.

As a company proposing a new vision for these lands, Sidewalk Labs intends to engage with, and include, MCFN in the project.

Sidewalk Labs recognizes the aspirations of the MCFN as articulated in their vision statement: “[MCFN] looks to our Anishnabe roots to guide our vision for the future as a strong, caring, connected community who respects the earth's gifts and protects the environment for future generations. Our identity includes our history, language, culture, beliefs and traditions which we strive to incorporate into the programs and services offered to our community.”

In partnership with Waterfront Toronto, Sidewalk Labs has started an important ongoing dialogue between project staff, MCFN Chief R. Stacey Laforme, and the MCFN Department of Consultation and Accommodation (DOCA). Sidewalk Labs thanks Chief R. Stacey Laforme, MCFN band councillors, and DOCA staff for their generous time during the development of this MIDP, and looks forward to continued meaningful and respectful conversation. It is Sidewalk Labs' hope that this important engagement improves the environmental, social, cultural, and economic well-being of the city and all the project's stakeholders, including MCFN.

# Quayside Impact: The New Bottom Line

The Quayside development plan lays the foundation for achieving Waterfront Toronto's priority outcomes: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

## Economic impact: Creating 11,000 construction jobs and catalyzing a new mass timber industry

### Job creation and economic development



**11,000** construction jobs

**3,900** permanent jobs

Development on the waterfront should support Toronto's need for continued economic success and growth in employment. The Quayside development plan would catalyze economic growth in the short term and the long term — creating an estimated 11,000 construction jobs in Ontario and hosting nearly 3,900 new permanent jobs in a true live-work community.<sup>31</sup>

The advanced designs and technologies proposed as part of the plan would help grow new Canadian industries, including tall-timber design and construction, modular supply, and new mobility technology.

The plan also incorporates flexible ground-floor spaces called stoa that support small-scale businesses throughout the neighbourhood and mix more non-residential space into buildings. The adaptable ground floor is designed to merge with sidewalks and the public realm, forming civic arcades filled with community space, local pop-ups, light manufacturing, small businesses, or micro-enterprises. Rather than requiring long-term leases that are only possible for select global retailers, this flexible stoa space, combined with new digital tools, would lower the barriers for new businesses to get started.

# Climate impact: A nearly carbon-neutral neighbourhood that cuts GHGs by 85%

## Sustainable and climate-positive development



-85% less CO2

Following Waterfront Toronto's lead in sustainable development, Quayside would produce seven times less CO2 than other Toronto neighbourhoods.<sup>32</sup> Sidewalk Labs proposes a series of innovations and planning initiatives that would drastically reduce greenhouse gas emissions below the levels in comparable projects:

→ **Prioritizing** biking, walking, public transit, and electric vehicles

→ **Reducing** truck deliveries on local streets by coordinating freight through a logistics hub

→ **Relying** on clean energy, including from building heat recovery systems, geothermal wells, solar capacity, and battery storage

→ **Managing** energy consumption more actively and efficiently using digital technology

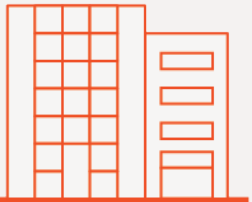
→ **Designing** buildings to reduce energy use by meeting the Toronto Green Standard Tier 3

→ **Managing** waste and stormwater more effectively and holistically through a smart waste management system and active stormwater management

Through these initiatives, Quayside would set a new standard of sustainability that builds upon the vision of Waterfront Toronto and all three levels of government, taking the first steps towards a climate-positive community on the waterfront.

# Affordability impact: 40% below-market program

## Housing affordability



+40% units below-market

The housing program in Quayside is specifically designed to address the housing gridlock facing the city today, providing options and opportunities for more Torontonians on the waterfront.

Meeting the intent of the Central Waterfront Secondary Plan requirement, Sidewalk Labs plans to deliver 20 percent of housing units as affordable housing in Quayside (as defined by the city as being at or below 100 percent Average Market Rent), with at least a quarter of these units going towards households with “deep” affordability needs (as defined as households at 60 percent of AMR).

Recognizing the challenges in the market for middle-income households, the Quayside housing program goes beyond this requirement to include another 20 percent of units for middle-income households (for example,

mid-range rental at 100-150 percent AMR). Together, these units create a 40 percent below-market program to help achieve unprecedented new levels of affordability.

In addition to housing, the Quayside plans would improve all-in affordability by providing an extensive range of transportation options that make it possible for households to get around conveniently without the need to own a car — saving two-person households an estimated 40 percent on annual transportation spending, or roughly \$4,000 per year.<sup>33</sup>

Quayside would also provide the proximity to everyday essentials that defines a complete community for people of all ages and abilities, featuring an expanded public realm and access to essential social infrastructure, including spaces dedicated to health, education, civic life, the arts, and culture.

# Mobility impact: 73% of trips using transit or active modes, with 91% more pedestrian space

## New mobility



73% of trips using public transit, walking, or cycling

Rapid urban growth is making it harder to get around, but support for transit and innovations in mobility management offer opportunities to help people and goods move more easily.

The plans for Quayside would support light rail expansion, provide exceptional bike and pedestrian infrastructure, and encourage on-demand mobility services priced for sharing. Streets would be made safer with digital technologies, including responsive traffic signals that can prioritize pedestrians. Quayside would also pilot a new neighbourhood delivery system that collects all packages in one logistics hub and then distributes them via a below-grade tunnel system, reducing truck traffic on local streets, along with noise and air pollution.

Sidewalk Labs estimates that, taken together, these mobility initiatives would reduce the percentage of trips made by

private automobiles in Quayside from the 27 percent made in comparable neighbourhoods to just 13 percent by 2025.<sup>34</sup>

Quayside's expanded mobility options enable the neighbourhood's streets to reclaim significant amounts of street space for pedestrians. While designed for safe operation today, the streets in Quayside would also be the first in the world designed specifically to anticipate the potential benefits of self-driving technology. Sidewalk Labs estimates that its street designs could provide 91 percent more pedestrian space than a business-as-usual development scenario, thanks to features such as narrower lanes and the potential for self-driving vehicles to share a right-of-way with public transit without hindering transit efficiency.

And when all dynamic curb spaces are open to pedestrians, during very low pick-up and drop-off periods, there would be a 118 percent increase in pedestrian space.

# Urban innovation impact: Catalyzing digital innovation while protecting privacy

At the heart of the vision for urban innovation in Quayside is the ability to create the digital conditions for others to build on. These conditions begin with flexible, affordable digital infrastructure that includes a powerful and affordable ubiquitous connectivity network that leverages new advances to improve speed and security, as well as a standardized mount system that reduces the cost of deploying innovations and eliminates vendor lock-in.

## Key Term Urban data

Information gathered in the city's physical environment, including the public realm, publicly accessible spaces, and even some private buildings.

As with ecosystems such as the World Wide Web, third parties depend on open hardware and software as well as on an agreed-upon set of standards and protocols to successfully deploy their ideas. A set of published standards around open-data architecture, access, and sources would enable third parties to build upon a shared foundation, supported by a common set of security, formatting, and communication standards.

To implement the systems needed to achieve quality-of-life objectives, Sidewalk Labs plans to purchase third-party technology or partner with third parties to create (or enhance) it whenever possible, giving priority to technology that is local to Toronto, Ontario, or Canada. For systems that Sidewalk Labs needs to develop itself, because they do not exist in the market, data would be made

publicly accessible (with the proper protections, including de-identification), further catalyzing third-party creation.

Above all, Sidewalk Labs understands realizing the promise of digital innovation in a responsible manner requires an approach to governance that protects privacy and makes the benefits of urban data widely accessible.

To meaningfully enable responsible data use in Quayside, Sidewalk Labs proposes that urban data be controlled by an independent entity called the Urban Data Trust, charged with balancing the interests of personal privacy, public interest, and innovation. This public steward would establish a clear process for approving any initiative that involved the use or collection or urban data for all parties, including those proposed by Sidewalk Labs.

Sidewalk Labs proposes that the Urban Data Trust anchor this process around a publicly auditable Responsible Data Use (RDU) Assessment — an in-depth review that is triggered by any proposal to collect or use urban data — and guided by a set of RDU Guidelines that incorporates globally recognized Privacy by Design principles.




For more details on the proposed Urban Data Trust and responsible data use process, see the "Digital Innovation" chapter of Volume 2.

# Exploring larger scales to realize and maximize the impact achieved in Quayside

Quayside can take meaningful steps towards realizing Waterfront Toronto's priority outcomes and a new model for urban development. But some of the elements of the Quayside plan are only economically viable or programmatically effective when deployed across a sufficient geographic scale. More importantly, the opportunity to achieve Waterfront Toronto's priority outcomes need comprehensive planning and scale.

The RFP recognized the potential constraint of Quayside, at just five hectares, including a requirement to “describe your team’s ability and readiness to take the concepts and solutions deployed on Quayside to scale in future phases of waterfront revitalization.” The PDA describes the MIDP as including both plans for the Quayside parcel and “plans at scale.”

Consistent with these calls, Sidewalk Labs believes in a phased approach for testing, refining, and demonstrating the impact of core innovations, beginning with a smaller setting and working up to larger areas along the eastern waterfront as project objectives are achieved. Certain solutions cannot reach their full impact at the size of a small neighbourhood like Quayside, while others do not become financially feasible at this smaller scale.

For such reasons, Sidewalk Labs has proposed a concept plan for a wider River District geography, enabling the IDEA District to meet or exceed the ambitious quality-of-life objectives in a way that is both financially achievable and replicable in other parts of Canada and around the world. 



See the “River District” chapter on Page 254 for more details on why scale is necessary to achieve Waterfront Toronto’s priority outcomes.

**Waterfront Toronto’s RFP recognized the potential need to “take the concepts and solutions deployed on Quayside to scale in future phases of waterfront revitalization.”**

Three specific examples of the need for scale include:

# 1

## Climate-positive infrastructure.

This robust infrastructure reduces greenhouse gas emissions by 85 percent in Quayside compared to the status quo. But designing, implementing, and operating the advanced infrastructure systems necessary to achieve climate positivity — which requires exporting clean energy outside a project area — requires a large enough customer base to be effective and financially feasible.

Specifically, to keep Quayside resident energy bills in line with Toronto averages, the advanced power and thermal grids would require a \$19 million supplemental innovation investment based on the current plan, due to factors including the high cost of geothermal exchange and initial electric grid connections, in addition to the poor economies of scale for operating costs.

# 2

## The light rail expansion.

If public funding is not available, an innovative self-financing mechanism could finance this expansion, based on existing city plans, estimated to cost \$1.2 billion.

The idea behind self-financing is to impose a future charge on real-estate value, and borrow in the present against that stream of future funds to pay for part of the cost of construction of the transit system. But Quayside’s proposed development of 10 buildings (roughly 2.65 million square feet) is not large enough to sustainably support the financing of the waterfront light rail.

# 3

## Mass timber production.

As the world’s first entirely mass-timber neighbourhood, Quayside can help demonstrate the feasibility and benefits of this new sustainable building material. But Sidewalk Labs estimates that a larger development area — roughly 6 million square feet — is needed to justify an investment in the factory-based production of mass timber.

This larger area is also necessary for such a factory to hit peak efficiency in producing sustainable building components on a predictable timeline that developers can trust, leading to new value that can be captured for below-market housing.

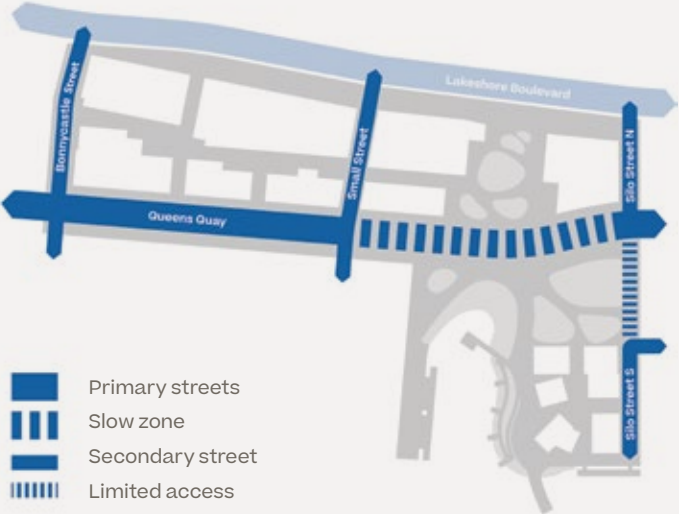
# How It Works

The Quayside plan incorporates innovations into its development approach to achieve project goals.

The following section delves into the technical workings of the plan's proposed innovations around six key areas: mobility, public realm, buildings and housing, sustainability, social infrastructure, and digital innovation.

These initiatives are designed to work together to support a comprehensive vision of a neighbourhood that can adapt to the ever-changing needs of its residents and create a more affordable, sustainable, and prosperous community.

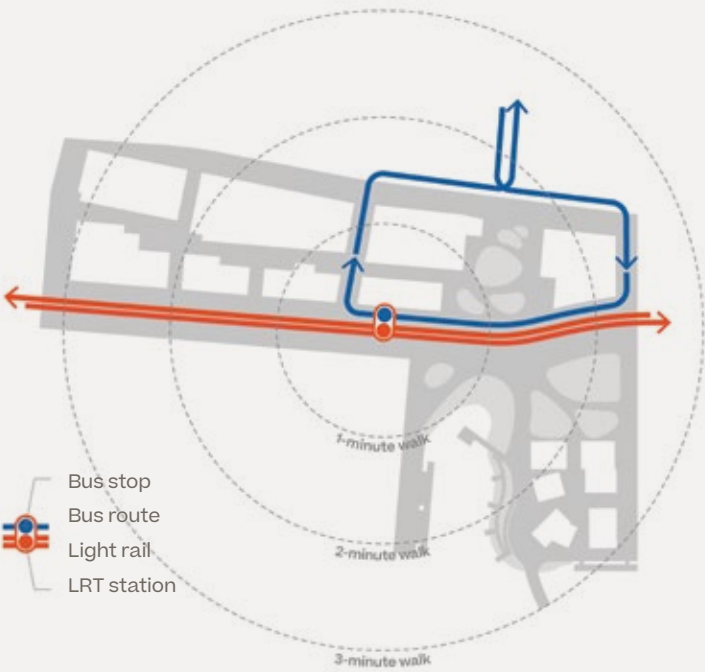
# The Quayside technical systems



- Primary streets
- Slow zone
- Secondary street
- Limited access

## Streets

4 curbless streets



- Bus stop
- Bus route
- Light rail
- LRT station

## Transit

2 new transit stops (light rail and bus) on Queens Quay



- Pedestrian network

## Walking

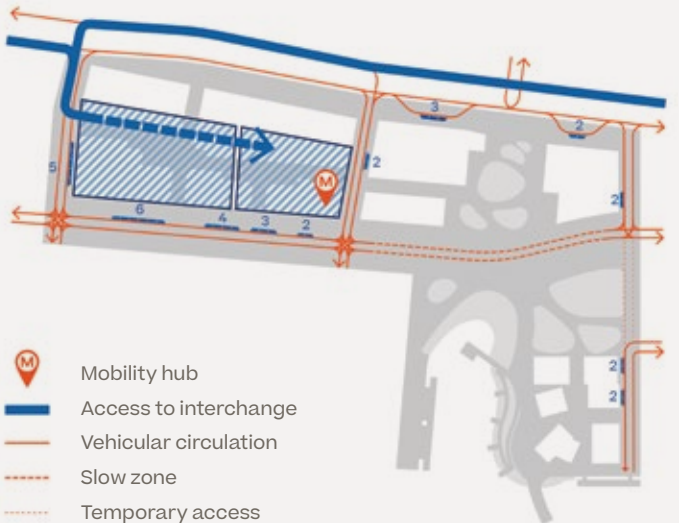
31,000+ square metres of pedestrian-accessible space



- Illuminated trees
- Illuminated street elements
- Street lights and features
- Building spill
- Cove lighting
- Plaza illumination
- Illuminated soffits

## Lighting

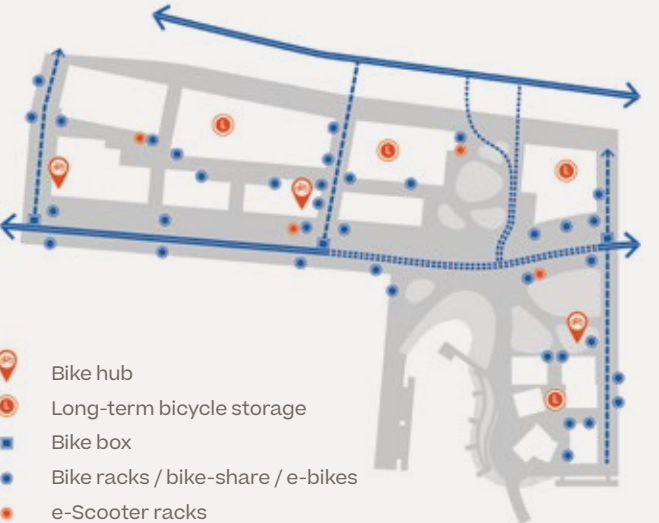
100% responsive lighting



- Mobility hub
- Access to interchange
- Vehicular circulation
- Slow zone
- Temporary access
- Parking garage and interchange
- Dynamic curb spaces

## Vehicles

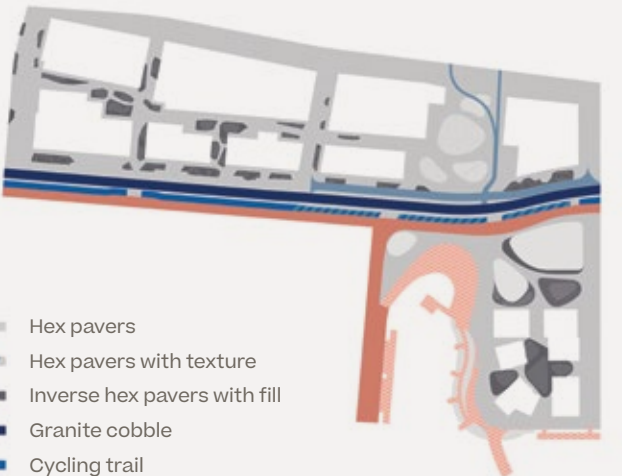
33 dynamic curb spaces and a vehicular interchange



- Bike hub
- Long-term bicycle storage
- Bike box
- Bike racks / bike-share / e-bikes
- e-Scooter racks
- Cycling route – separated
- Cycling route – slow zone
- Cycling route – not separated

## Cycling

4,000+ bicycle parking spaces



- Hex pavers
- Hex pavers with texture
- Inverse hex pavers with fill
- Granite cobble
- Cycling trail
- Slow cycling trail
- LRT concrete
- Timber decking

## Paving

50% modular streetscape

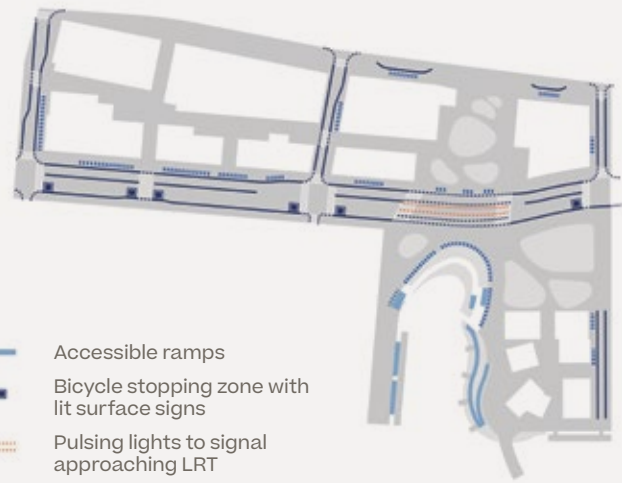


- Forest model
- Queens Quay street trees
- Lakeshore Greenway
- Turf

## Planting

430+ new trees

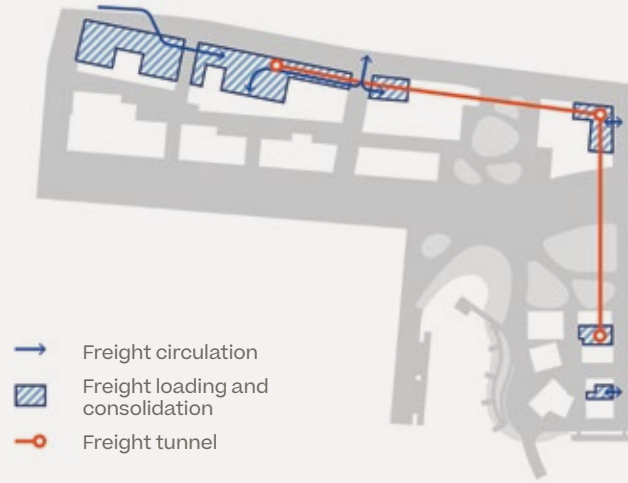




- Accessible ramps
- Bicycle stopping zone with lit surface signs
- Pulsing lights to signal approaching LRT
- Detectable edge
- Seating, planters, and buffers
- Crossings

## Accessibility

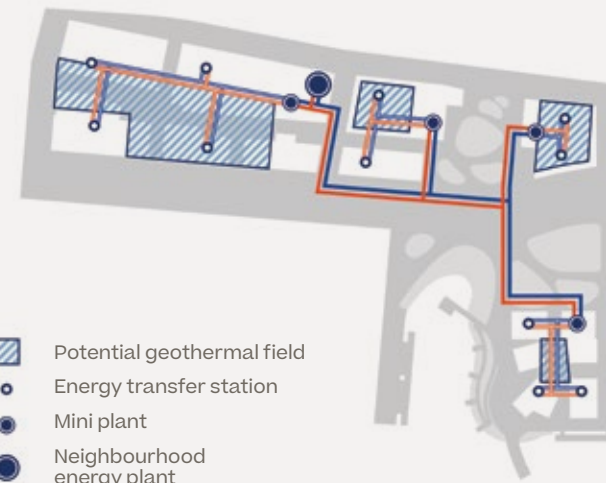
Wayfinding beacons throughout the site



- Freight circulation
- Freight loading and consolidation
- Freight tunnel

## Freight

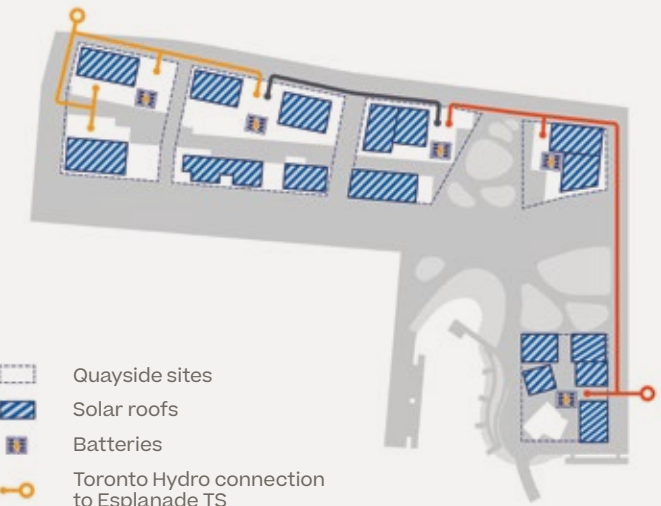
78% on-site truck trip reduction



- Potential geothermal field
- Energy transfer station
- Mini plant
- Neighbourhood energy plant
- Hot / chilled piping
- Ambient piping

## Thermal grid

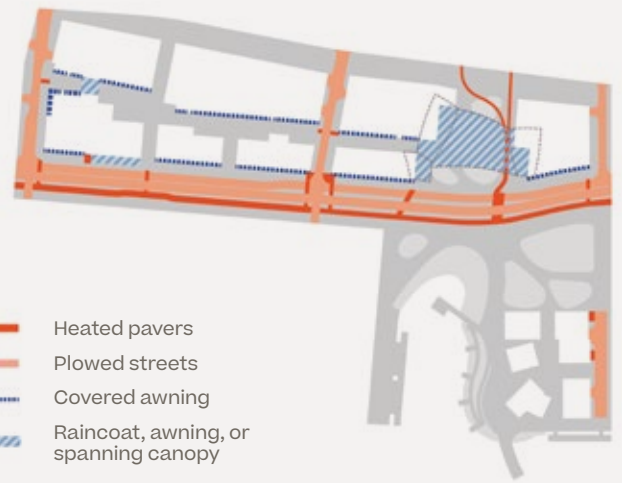
100% clean energy heating and cooling



- Quayside sites
- Solar roofs
- Batteries
- Toronto Hydro connection to Esplanade TS
- Toronto Hydro connection to Basin TS
- Backup connection

## Advanced power grid

Battery capacity equal to 66% of peak demand



- Heated pavers
- Plowed streets
- Covered awning
- Raincoat, awning, or spanning canopy

## Outdoor comfort

35% increase in comfortable outdoor hours



- Stormwater detention tank
- Storm sewer - forcemain
- Storm sewer - gravity
- Mean high water level
- Bio-retention ponds
- Green roof
- Blue roof
- Opportunity for below-grade infiltration

## Stormwater

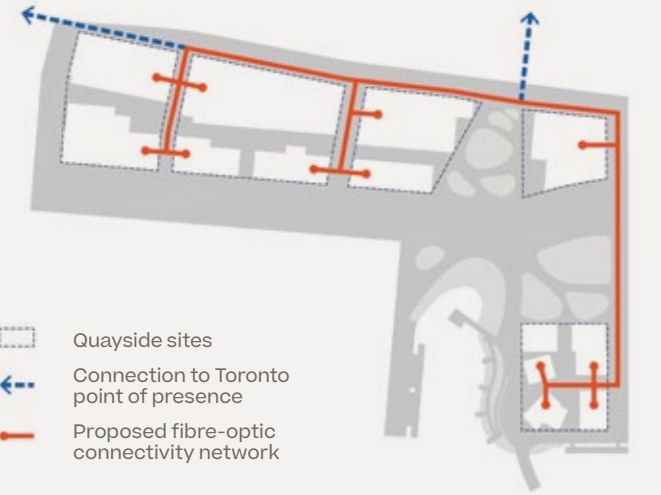
90% on-site stormwater absorption



- Quayside sites
- Waste collection Terminal Station
- Pneumatic waste tubes
- Pneumatic waste public realm inlet
- Freight tunnel for transporting special waste

## Waste

80% landfill diversion

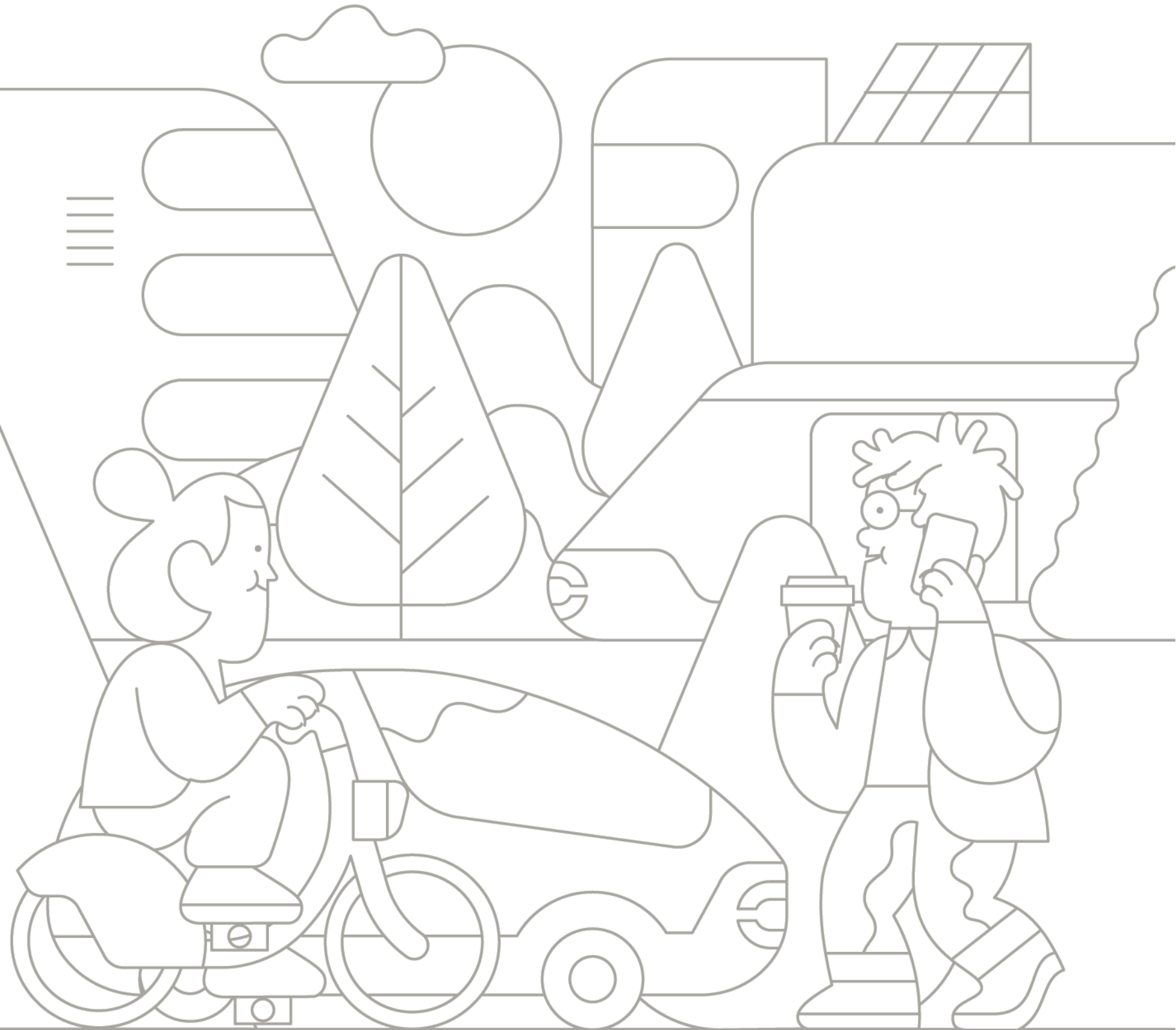


- Quayside sites
- Connection to Toronto point of presence
- Proposed fibre-optic connectivity network

## Fibre-optic network

Super-fast connectivity network

# Mobility



A transportation system that **reduces the need to own a car** by providing **safe, convenient, connected, and affordable options** for every trip.



See the “Mobility” chapter of Volume 2 for more details on the urban innovations described in this section.

# Creating a balanced transportation network that provides convenient, affordable options

The Quayside plan takes an integrated mobility approach designed to offer more choices, lower costs, and better service; to incorporate changing technologies over time; and to provide extensive, easy connections to the surrounding city.

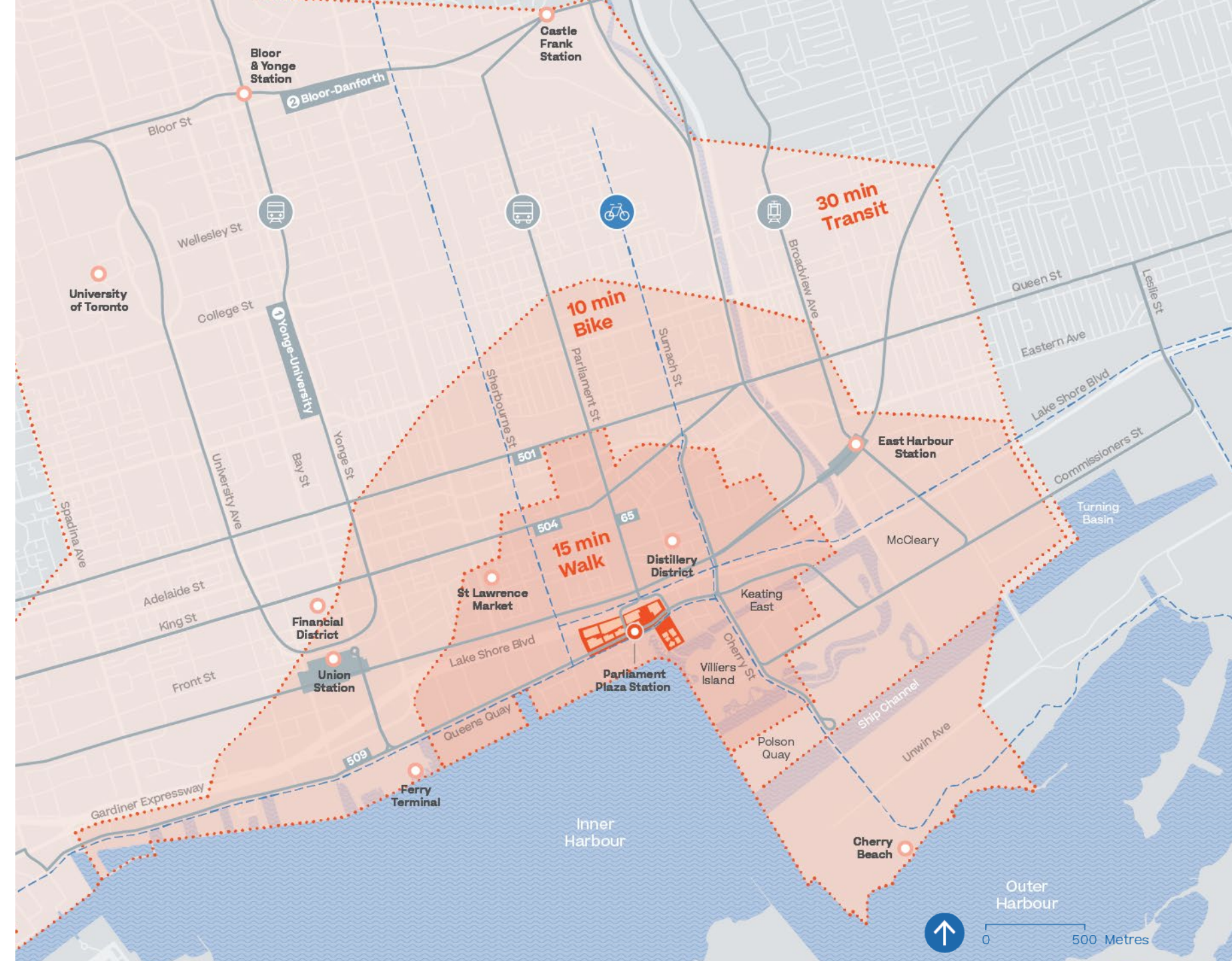
The more growth that Toronto experiences, the harder it can be for the transportation network to fulfill its core mission of helping people get around safely, efficiently, and at a price that everyone can afford.

Traffic congestion costs the greater Toronto area more than \$11 billion a year in lost productivity. Toronto area residents who commute by public transit spend nearly 100 minutes travelling each day.<sup>35</sup> Torontonians who live downtown with a car spend, on average, over \$10,000 a year in car-ownership.<sup>36</sup> Bike lanes are frequently unprotected and pedestrian walkways are sometimes dangerous.

Toronto's waterfront has already started to address these challenges, with a redesigned Queens Quay West that includes

a protected cycle path, walkways, and public transit access.<sup>37</sup> The Quayside plan would accelerate these improvements by integrating safe street design, innovative policy and financing tools, and cutting-edge technology to create a balanced transportation system that meets the needs of all travellers and can adapt over time.

By providing affordable and safe choices for every trip, Quayside's transportation network would reduce the need to own a car and set a more sustainable course for urban mobility along the eastern waterfront.



Map  
**Connecting Quayside to the city: Future pedestrian, bike, and transit travel times**

- City transit
- Primary bike routes
- Quayside
- Travel times from Parliament Plaza Station (a new light rail station located near the centre of the neighbourhood)

Source data:  
 Transit area data from Sidewalk Labs G4ST model  
 Walk and bike area data from Sidewalk Labs

The Quayside plan expands choices through five main strategies that include physical, digital, and operational innovations.

## Physical and digital innovations

### Providing robust, multi-modal connections to the surrounding city.

The plan would create new or improved links between Quayside, downtown, and the wider city by extending light rail lines, adding a new bus stop, and enhancing cycling and pedestrian connections. Designated pick-up and drop-off zones within Quayside would help manage curbside traffic congestion and facilitate the use of shared new mobility services. In addition to these options, the Quayside plan features a vehicle interchange with a limited amount of parking for visitors, residents, and workers to ensure vehicle access to the neighbourhood.

### Enabling residents to fulfill daily needs within a short walk.

The Quayside plan is designed to enhance walkability by providing a mix of homes, shops, offices, parks, and community spaces — a true live-work neighbourhood. Some of the planning components that enable this walkable urban form include adaptable spaces within buildings and on the lower floors that are designed to accommodate a variety of residential and non-residential uses, high-quality connections to light rail and bus stops, access to schools and health facilities, and an extensive pedestrian network that features wider sidewalks, heated pavement, and lush landscaping.

### Designing flexible streets that can adapt to new mobility options.

As transportation technologies evolve to include the increased use of self-driving vehicles or new forms of electric micro-transit, Quayside's flexible streetscape should be able to adapt and rebalance accordingly. To enable future changes to be made with ease, Quayside's streets are designed with removable pavers and extensive digital infrastructure, such as adaptive traffic signals capable of coordinating all travel modes, and dynamic lanes capable of being converted into pedestrian areas.

More detail on these innovations can be found in the How It Works: Mobility pages that follow.

## Operational innovations

### Helping people make smarter, more cost-effective travel choices.

Quayside residents and employees would have access to a unified mobility package that includes a Toronto Transit Commission (TTC) pass, an unlimited Bike Share Toronto membership, access to e-scooters and other low-speed vehicles, credits for rides with ride-hail or car-share providers, and parking options. This package could be provided through a new mobility app created specifically for the waterfront that features all mobility choices in one place. In addition, open data integrations would allow existing third-party mobility apps to understand real-time prices for each service and provide personalized transportation options to users.

### Managing the system holistically.

Sidewalk Labs proposes that a non-profit management entity called the Waterfront Transportation Management Association be responsible for operating all aspects of mobility in Quayside, from establishing safety and traffic congestion goals to offering the mobility subscription package. This entity would operate collaboratively with Quayside residents.

For more details on these operational innovations, see the “Mobility” chapter of Volume 2.

## Sidewalk Labs analysis

# Using modelling to develop Quayside's mobility plan

To help design its transportation network, Sidewalk Labs used a model called the Greater Toronto Area Model 4.0 for Sidewalk Toronto, or G4ST, in addition to more traditional analysis tools. This model builds on the official GTA Model 4.0 developed by the University of Toronto, which is used as the official model of the city to understand how new developments can impact the transportation system.<sup>38</sup>

**How it works.** G4ST uses a representative sample of travel behaviour to simulate the travel patterns of residents, workers, and visitors coming and going from Quayside, including trip modes (such as car, transit, cycling, and walking), routes, and origins and destinations.

**What is new.** On top of these basics, G4ST incorporates some new elements specific to the Sidewalk Toronto project, such as the potential performance of transit service patterns, costs of self-driving fleets, and the effectiveness of parking and curbside pricing.

**Its limitations.** All models are simplifications; for example, no one can predict the impact of new regulations on travel behaviour or the emergence of new technology with full accuracy. The G4ST model is an attempt to represent travel demand and decisions, but Sidewalk Labs recognizes that modelled mode shares and results are best seen as indicators of outcomes rather than perfect projections.

**How it helps.** G4ST has helped inform planning decisions for some essential features of Quayside's mobility network, such as the number of curbside spaces, vehicle lanes, bike lanes, bike-share stations, and bike-parking spaces, as well as the layout of roads.

**What it shows.** Based on all these inputs, G4ST shows that private car usage would be 13 percent in Quayside, down 16 percentage points from what would be expected from standard development, enabling the neighbourhood to devote more space to housing, public uses, cycling, and walking.

# Expanding transit connections between Quayside and the city

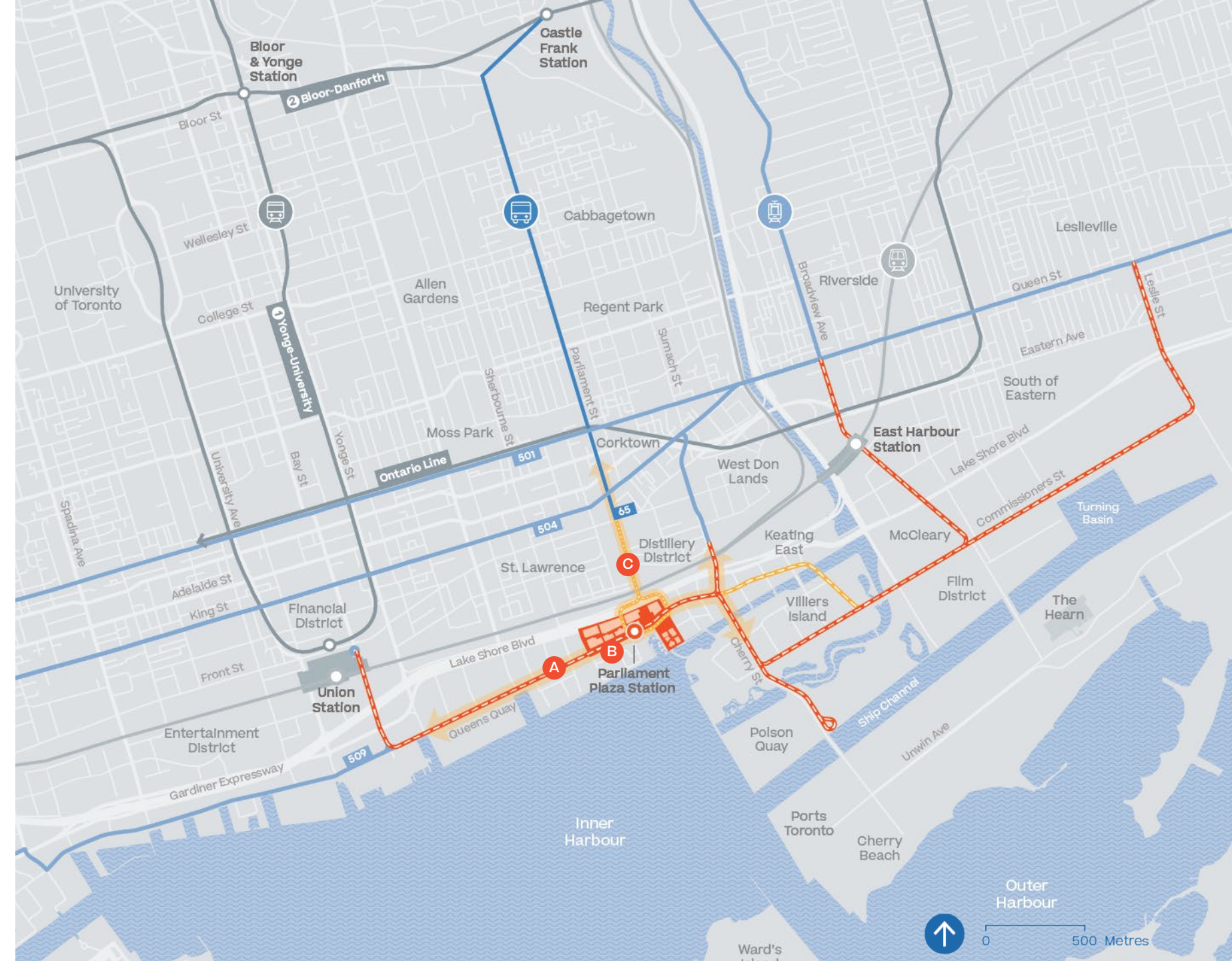
Extending Toronto's existing public transportation system would establish Quayside as an integral downtown neighbourhood whose jobs and waterfront spaces are accessible to all.

Public transit is the most efficient way of travelling through dense urban neighbourhoods: it serves the most people, at the most affordable cost, with the least environmental damage. For more than a decade, Toronto has planned for a light rail extension to support development along Queens Quay East, but the project remains unfunded.<sup>39</sup>

Sidewalk Labs' plan to address this challenge begins by advocating the construction of 6.5 kilometres of light rail transit proposed in the Waterfront Transit Network Plan, including a new Quayside-Parliament Plaza stop. Beyond the approved plan, Sidewalk Labs further proposes an optional second phase of construction to add light rail infrastructure to the area north of the Keating Channel to serve future development. These expanded plans can be pursued at a total estimated cost of approximately \$1.2 billion (roughly \$1.3 billion if the optional Sidewalk Labs link were included).

This proposal advocates that Toronto use the innovative funding mechanism of self-financing, sometimes referred to as "value capture," to finance this plan. The idea behind self-financing is to impose a future charge on real estate development and borrow in the present against that stream of funds to pay for part of the cost of construction of the transit system. Sidewalk Labs is prepared to assist with the financing of this project. The light rail would remain owned and operated by the TTC.

To provide a high-quality rider experience, Sidewalk Labs also seeks to work with the TTC to test and implement a broad range of light rail enhancements, such as wider platforms with seating bars, weather protection, and electronic information displays.



## Map Quayside light rail and bus connections

- GO Transit / SmartTrack
- Subway (existing and planned)
- Existing Light rail
- Approved extension Light rail
- Optional Light rail
- Existing Bus
- Proposed by Sidewalk Labs Bus
- Quayside
- Parliament Plaza Station

**A Expanding light rail transit.** The city's high-capacity light rail system would be extended into Quayside via the 509 (Harbourfront) line and the 504 (King Street) line, operated by the TTC. These extensions into Quayside are part of existing city plans but would be accelerated through Sidewalk Labs' proposed self-financing approach. The Quayside extension would be the first leg of new transit lines to be extended further south and east into the Port Lands, following approved plans by the city and new plans proposed by Sidewalk Labs.

**B New light rail stop.** A new Quayside-Parliament Plaza stop would connect the neighbourhood to major areas like downtown, the exhibition area, and Union Station, as well as to the Bloor-Danforth (Line 2) subway line, the future East Harbour SmartTrack station, and the Sumach Street station on the proposed Ontario Line.<sup>40</sup>

**C Local bus.** A new bus stop for the 65 bus route would be located on Queens Quay at Parliament Plaza, adjacent to the light rail stop, and could be used by the 72 bus until the Light Rail Transit extension is complete.

# Prioritizing pedestrians to create a walkable community





Quayside's extensive pedestrian network is designed to put daily essentials and many jobs within a six-minute walk of every building and provide safe, comfortable connections to surrounding neighbourhoods.

Quayside is within walking distance of many important destinations, but people's willingness to walk is driven more by experience than by distance: if walking is pleasant and safe, people will walk. Especially in the winter, harsh weather can add an additional barrier to walking outside. The Quayside plan integrates design, policy, and technology advances to make walking easier, safer, and more enjoyable year-round.

In the plan, weather-protected walkways — enlivened by shops, plazas, parks, cafés, and community spaces — would make every part of the site accessible and link to adjacent neighbourhoods. A new grand public space, Parliament Plaza, would prioritize pedestrians and feature a “slow zone” through which the light rail, cars, and bikes move closer to pedestrian speeds. Pedestrians and cyclists would be given priority at traffic crossings by responsive traffic signals. Adaptable buildings designed to accommodate offices, homes, shops, community spaces, schools, and health facilities would ensure that everyone in Quayside could fulfill daily needs within a short walk.

Drawing people outside in these ways would not only improve the pedestrian experience but enliven the streets, fill shops, and create the unexpected encounters that fuel great cities.

## Map Quayside pedestrian network

-  Pedestrian access
-  Quayside pedestrian crossings
-  Quayside points of interest
-  1-minute walk radii from Parliament Station

### A Walking from Yonge Street.

The network of pedestrian paths running parallel to Queens Quay from Yonge Street would be extended through Sites 1 to 3 in Quayside, becoming a pedestrian-only courtyard filled with shops and community spaces that culminates in Parliament Plaza.

### B Creating a linear plaza.

When Quayside opens, Queens Quay's north sidewalk would be more than 7 metres wide — almost twice the size of present precinct plans. In the future, when self-driving vehicles share the road with light rail transit and car lanes can be reclaimed as sidewalk space (see Page 356), this area would grow to become a linear promenade more than 14 metres wide.<sup>41</sup>

### C Pedways and courtyards.

Bustling, car-free pedestrian walkways and courtyards connect all areas of Quayside, breaking down large block footprints and creating a greater sense of intimacy.

### D Improving underpass connections.

Currently, to reach Quayside from the north, visitors must travel through dark, narrow, noisy railway underpasses and cross the wide intersection of Lake Shore Boulevard. Sidewalk Labs plans to renovate the underpasses into bright, active corridors to create a more inviting connection.

### E Queens Quay slow zone.

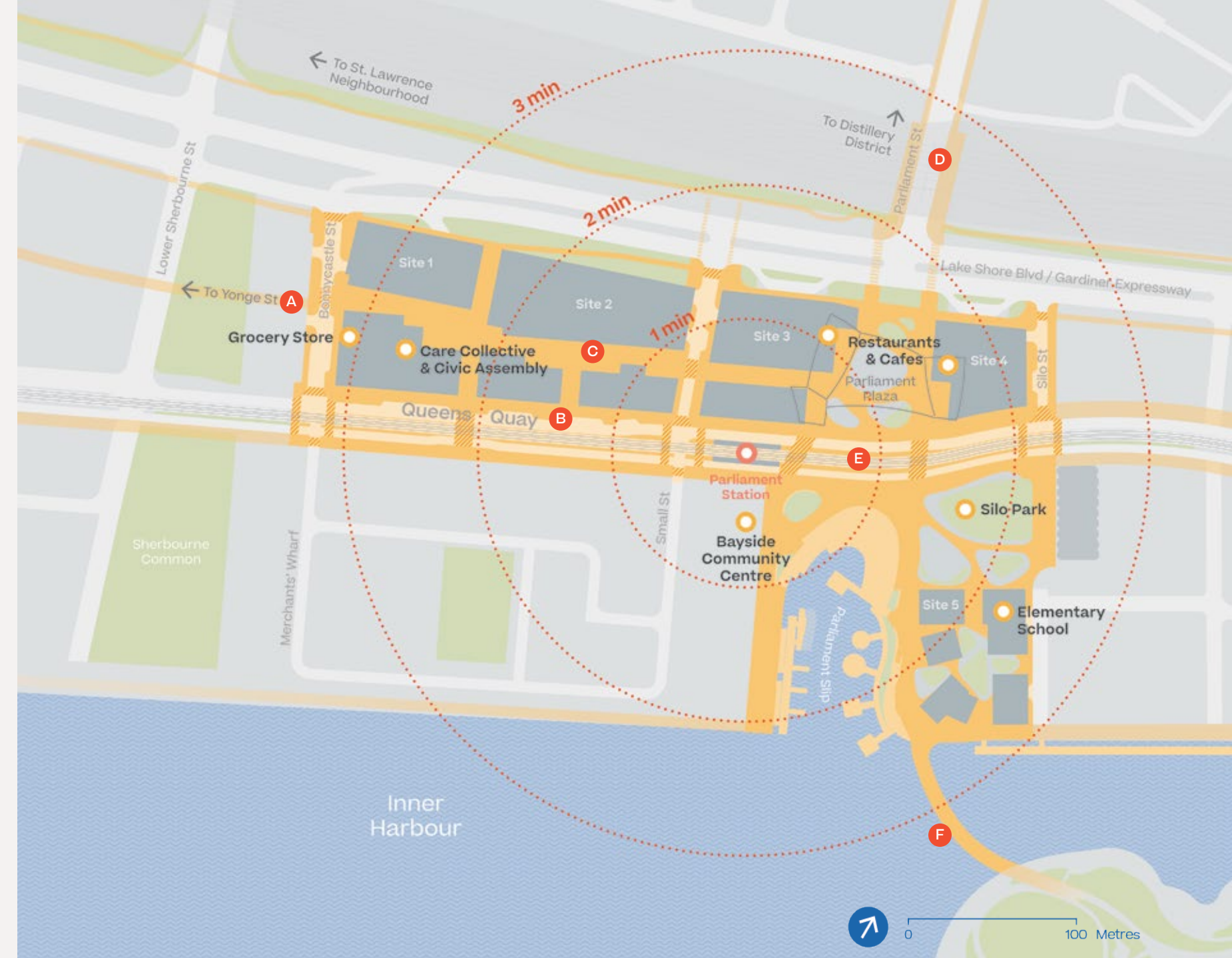
Queens Quay between Small and Silo streets, crossing through Parliament Plaza, would be designated as a slow zone. The light rail, vehicles, and bicycles would cross through the wide, open plaza travelling no faster than 10 km/h — closer to the walking speed of pedestrians. In this zone, vehicle and bike lanes would narrow and varied paving colours, patterns, and textures, as well as dynamic lighting, would alert drivers and cyclists to slow down. Two clearly defined crossing areas at the west and east edges of the plaza would provide primary areas for pedestrian passage and be marked for accessibility.

### F Connecting to Villiers Island.

Pathways would lead to a new pedestrian bridge that connects Quayside to the stunning new parks of Villiers Island.

### 3 Minutes.

A household in Quayside should be able to reach many daily needs within a three-minute walk from the neighbourhood centre, such as the elementary school, a grocery store, and almost 3,900 jobs.













# Creating a safer, connected cycling network

Quayside's proposed cycling network connects seamlessly to surrounding neighbourhoods while piloting new designs and technologies to make cycling smoother, safer, and more convenient across all seasons.

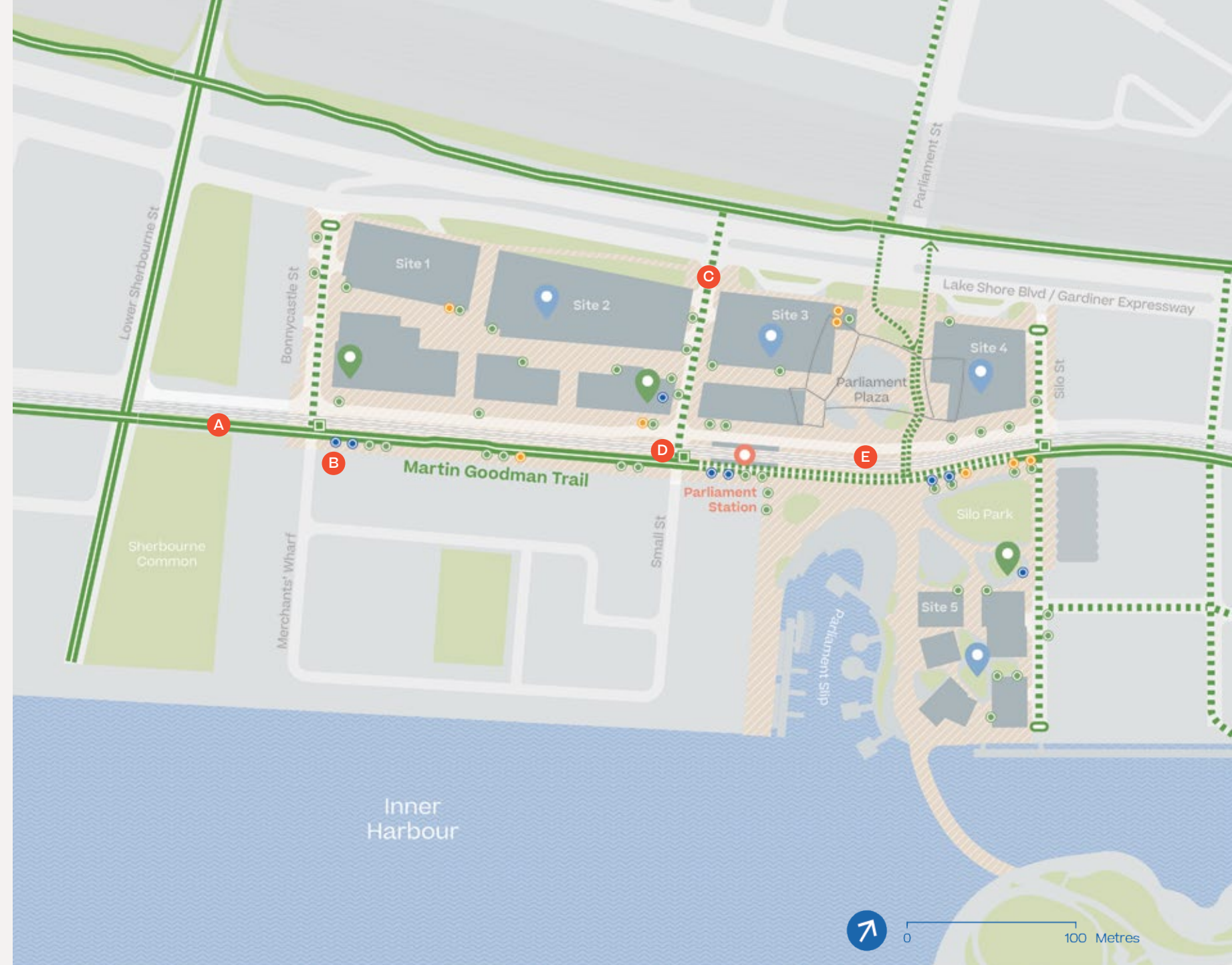
Pedestrians and cyclists along the waterfront face steep challenges in the form of connectivity, safety, and comfort — from unprotected lanes to freezing, snowy days. Waterfront Toronto has started to tackle this challenge along Queens Quay West, with new protected bike lanes that attract more than 6,000 riders a day.<sup>42</sup> The Quayside plan builds on this progress by piloting a series of innovations to protect cyclists and create safe and convenient connections with the rest of Toronto.

The plan's heated bike lanes would make cycling comfortable and safer for more of the year. Wide, physically separated lanes would protect cyclists from traffic. "Green wave" lighting would help cyclists avoid hitting red lights and guide them safely through crossings. Responsive traffic signals would give cyclists and pedestrians priority over cars at intersections. And extensive bike infrastructure — including bike-share stations, bike parking, and e-bike options — would support riders and ensure seamless transfers to other travel modes.

## Map Quayside bicycle network and facilities




- |                                                                                     |                                              |                                |
|-------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------|
|  | Primary / Separated                          | } <b>Bike routes</b>           |
|  | Slow zone                                    |                                |
|  | Secondary / Shared                           |                                |
|  | Pedestrian / Dismount zone                   | } <b>Bike parking (spaces)</b> |
|  | Bike box                                     |                                |
|  | Bike hub (500)                               | } <b>Other parking</b>         |
|  | Basement storage (2700)                      |                                |
|  | Bike racks (600)                             |                                |
|  | Bike-share (190)                             |                                |
|  | Electric vehicles Bikes (60) / Scooter (190) |                                |

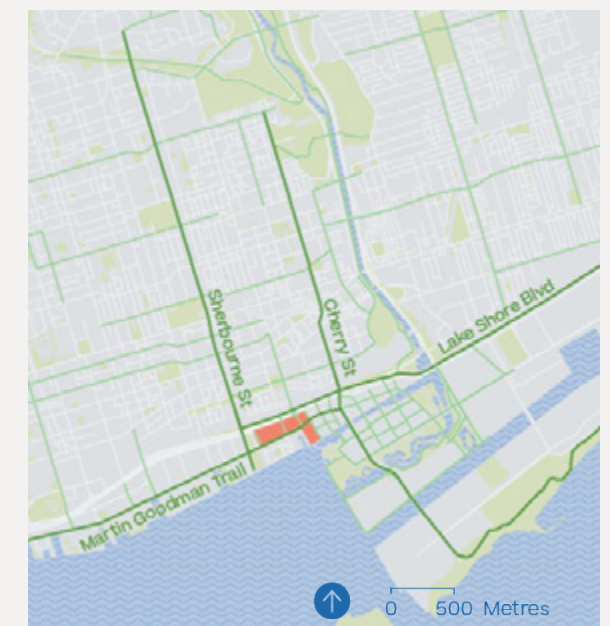
- A Martin Goodman Trail.** For the trail's four blocks through Quayside, cyclists would notice that their trips become more comfortable thanks to a series of pilots, such as doubling capacity on the trail to allow riders to pass each other safely, green waves that enable continuous biking, and heated pavers to melt snow and ice.
- B Bike parking.** To encourage cycling as a primary form of transit, the Quayside plan provides more than 800 short-term and almost 3,000 long-term bike parking spaces on site (more than one per residential unit).<sup>43</sup> This amount meets Toronto Green Standard Tier 1 for long-term residential bike storage and represents almost 70 percent more short-term bike parking spaces than required by city standards and almost 20 percent more spaces overall.<sup>44</sup>
- C Low-speed streets.** Cyclists can travel through Quayside's north-south side streets alongside pedestrians and cars travelling at reduced speeds.
- D Protected turns for cyclists.** Cyclists travelling north along Bonnycastle or Small Streets would be protected by bike boxes at the Queens Quay-Martin Goodman Trail intersections, separating cyclists from vehicle turning paths.



- E Queens Quay slow zone.** As described on Page 111, all modes would share space in the slow zone along Queens Quay, through Parliament Plaza, at a reduced speed of 10 km/h. For cyclists, a new north-south trail through the plaza would connect to the Martin Goodman Trail and be marked with coloured pavers and dynamic lighting. Bike parking and bike-share stations around the edge of the plaza would enable cyclists to easily pick up and drop off bicycles.

**Bike network.** Sherbourne and Cherry streets, as well as a path through the new Parliament Plaza, connect cyclists to the Martin Goodman Trail, which runs through the heart of Quayside parallel to Queens Quay.

-  Bike network
-  Primary routes
-  Quayside



# Ensuring vehicle access to Quayside

Quayside’s proposed vehicular facilities and street network would create connections along the waterfront for drivers while protecting pedestrian and cycling spaces and minimizing the need for privately owned cars.

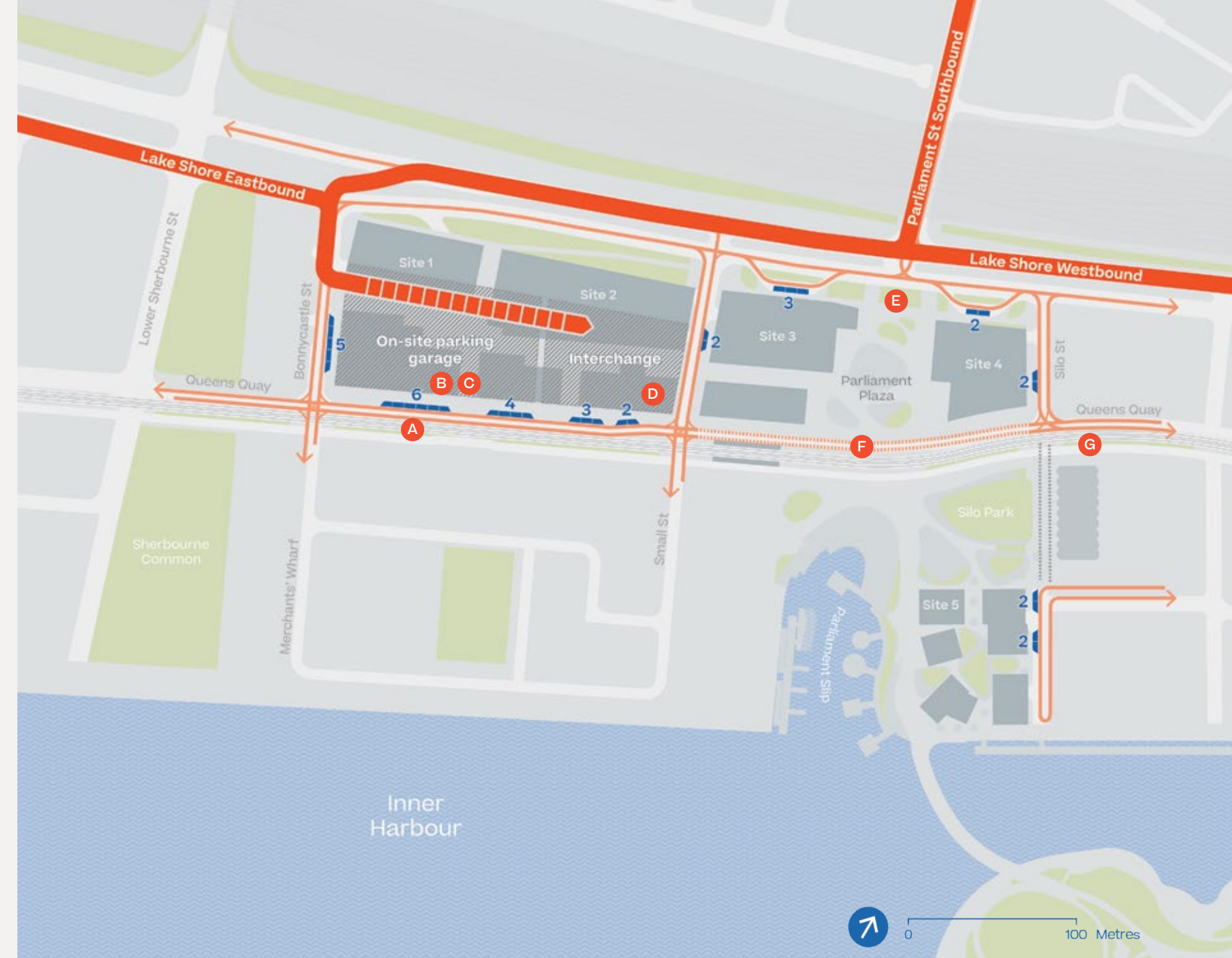
Quayside’s transportation network is designed to prioritize public transit, cycling, and walking. But Sidewalk Labs recognizes that traditional cars — and, in the future, self-driving vehicles — play a part in any comprehensive mobility system.

That means providing network connections to downtown and across the eastern waterfront; offering facilities that prioritize new mobility options, such as ride-hail and car-share services; and facilitating connections to bikes, scooters, and walking paths for travellers leaving from or arriving into the neighbourhood.

The resulting system would provide easy circulation throughout the city and access to vehicles for trips that require them — like transporting an elderly parent to the hospital or travelling to the airport with lots of luggage — while minimizing the need for private car-ownership.

## Map Quayside vehicular network and facilities

- Primary / Interchange access
- Vehicular circulation
- Slow zone
- Temporary access
- Dynamic drop off and pick up (number of spaces)



**A On-street pick-up and drop-off.** Pick-up and drop-off spaces would be available on Queens Quay, with additional sites at Lake Shore Boulevard, Bonnycastle Street, and Small Street. Availability would be monitored, priced, and communicated in real-time to travellers via apps, as well as to new mobility services.

**B Electric vehicle facilities.** To support climate-positive goals, all parking sites would offer extensive electric vehicle charging facilities — enough to meet Toronto Green Standard Tier 2 (25 percent of spaces enabled and all spaces capable of connection). At the on-site garage, Level 3 chargers (which require 1 hour to charge) and Level 2 chargers (which require 3.5 hours to charge) would be available for car-share vehicles, taxis, shuttles, electric buses, and electric mini-buses. To encourage car-sharing and meet environmental goals, almost 100 car-share vehicles would be available at the on-site parking facility and would be all electric. At the off-site facility, Level 1 chargers (which take 10 to 12 hours to charge) would be available. Discounts for these parking facilities would be provided to Quayside residents and employees who own electric vehicles.

**C Hourly (on-site) parking.** An underground parking garage with some 400 spaces would be accessible via Bonnycastle Street; intended mainly for visitors, this garage would charge hourly rates and offer monthly spaces for accessible parking or other exceptions.<sup>45</sup>

**D Off-site parking access.** Residents and employees requiring monthly parking for personal vehicles could access their cars at the proposed “interchange” (see Page 117), where an attendant (scheduled in advance via app) would convey the vehicles to and from off-site parking spaces (750 total) located in the Port Lands or nearby.

**E Parliament Street closure.** To support a safer, livelier transit, bike, and pedestrian experience and create a grand neighbourhood public space at Parliament Plaza, the Quayside plan proposes a closure of Parliament Street with traffic diverted to Small and Silo streets

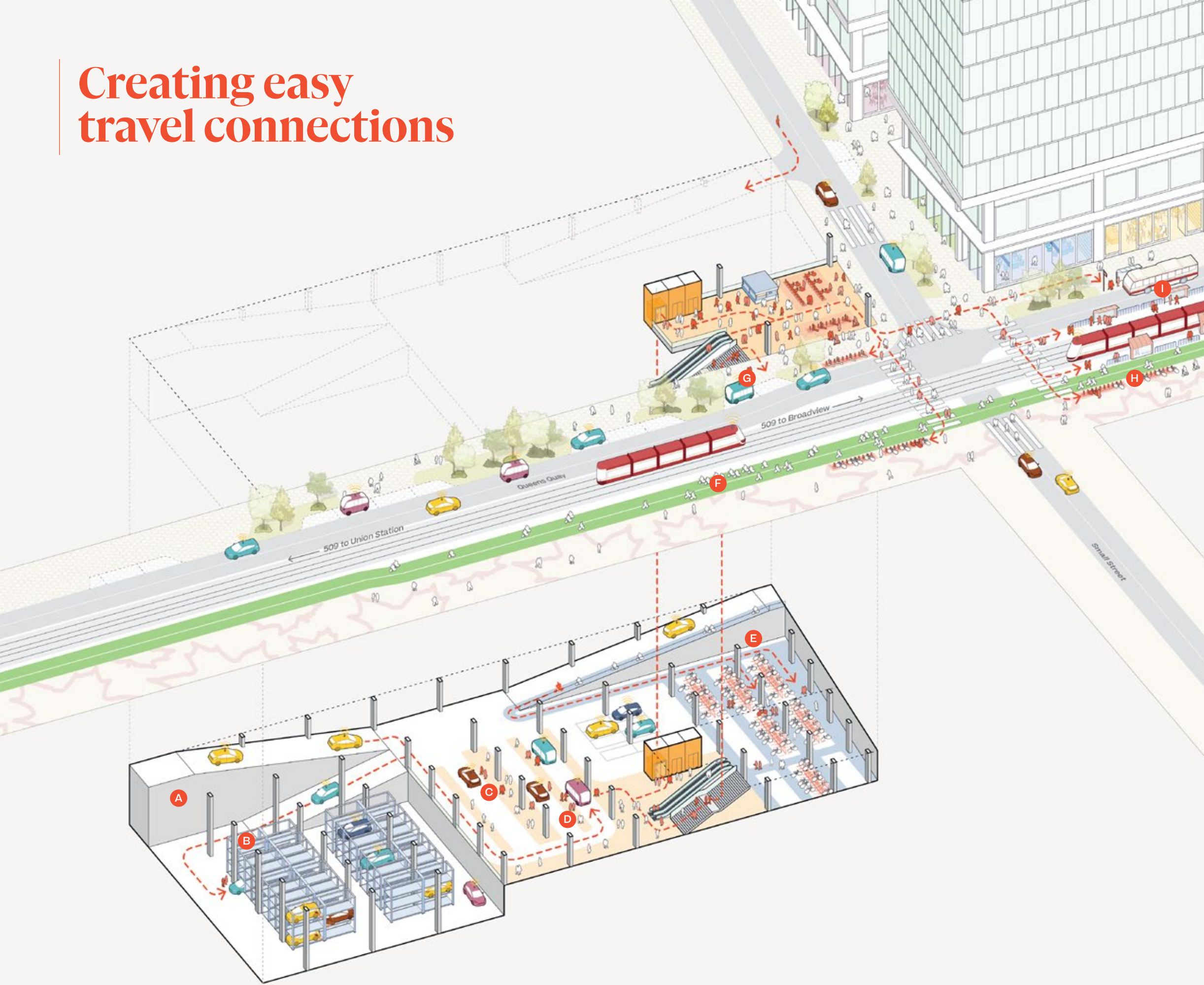
in a loop, via traffic signal management able to respond in real-time to changing conditions. (See Page 143 for details.)

**F Queens Quay slow zone.** Traffic lights at the intersections of Queens Quay and Small and Silo streets would operate to allow limited numbers of cars into the proposed slow zone running through Parliament Plaza (see Page 143). To ensure safety, pedestrians would be given priority in this zone and vehicles would move along the street at reduced speeds of 10 km/h.

**G Queens Quay adaptation.** Queens Quay would be designed to adapt in the future. When self-driving cars become the norm — based on successful pilots and approved operation design — Sidewalk Labs anticipates that these vehicles could share the roadway with light rail. At that time, Queens Quay’s vehicular lanes would be repurposed as a linear pedestrian plaza. (See Page 123 for details.)



# Creating easy travel connections



Quayside's multi-modal mobility hub



In the heart of Quayside, a nexus of bike-share stations, pedestrian paths, light rail and bus stops, a parking garage, and ride-hail pick-up and drop-off points would enable easy transfers across every travel mode.

The Quayside plan anchors the transportation system around a mobility hub for drop-offs, pick-ups, and transfers located in the bustling centre of the neighbourhood.

Travellers who arrive to Quayside by car or public transit can rent bikes or scooters to complete the last leg of their trip, or choose to walk through the expanded and improved pedestrian network.

Alternatively, residents can use bikes and scooters to arrive at the mobility hub, where they could board a light rail vehicle or bus — or access personal, shared, or hailed vehicles — to reach destinations across the Greater Toronto Area.

**A Parking garage.**

An hourly-rate parking garage, complete with electric vehicle charging, could accommodate some 400 cars. This on-site garage would be designed with stacked parking, requiring vehicles to be dropped off with and picked up from parking attendants.

**B Car-sharing.**

To facilitate access to car-sharing services, nearly 100 car-share spaces would be included in the garage.

**C Vehicle interchange.**

The interchange, a below-grade drop-off and pick-up area, would be co-located with the visitor parking garage and have a peak capacity of 500 vehicles per hour.<sup>46</sup> The underground location keeps cars off the road and frees up space for the public realm and building ground floors.

**D Ride-hailing.**

To facilitate access to ride-hailing services, taxis and shuttles would have designated interchange spaces located conveniently near the entrance / exit.

**E Bike hub.**

The bicycle hub includes bike parking, bike-shares, e-bikes, and e-scooter racks.

**F Martin Goodman Trail.**

Protected five-metre bicycle lanes would double the capacity of traditional bike paths.

**G Pick-up and drop-off zones.**

More than 30 pick-up or drop-off spaces would be located around Quayside.

**H Electric bikes and e-scooters.**

Some 250 spaces for these new mobility devices would be provided across Quayside.

**I Transit connections.**

A new Queens Quay light rail station and city bus stop would be located at the mobility hub.

**→ Multi-modal connections.**

Connections to every type of mobility option are available in the hub area.

# Establishing a people-first street network

Quayside's balanced street network integrates digital and design innovations to create a welcoming, safe public realm while facilitating movement for all modes of travel.

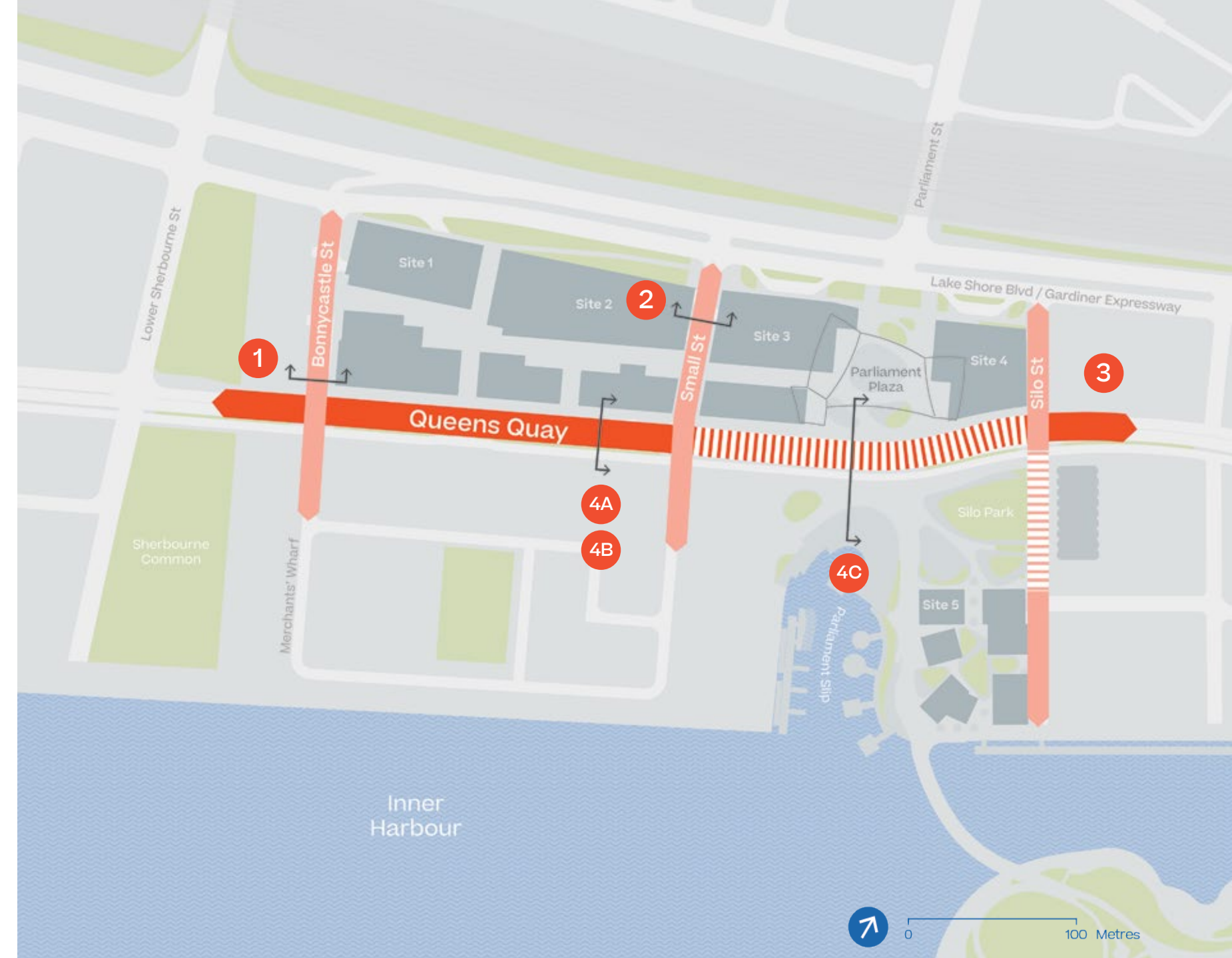
Most streets have a single, static design, yet they are expected to serve an ever-shifting group of users, whose needs change and conflict over the course of a day. In the morning rush hour, the number of transit and private vehicles on the streets is much higher. During the afternoon, there are likely to be more pedestrians using the sidewalk for errands and strolls. Whether exploring or commuting, cyclists should be protected at all times.

Typical street designs cannot respond to these varied demands. Instead, they tend to feature wide, permanent car lanes to accommodate peak traffic needs at the expense of public space.

Quayside's people-first approach creates a balanced street network designed to incorporate the needs of all users and adapt as conditions evolve. Dynamic curbs can provide flexibility to make





the most of limited street space, enabling quick conversions between transportation and public realm purposes like plazas or special events like pop-up markets. By planning streets around public transit use and shared mobility fleets, not private car-ownership, Quayside can reclaim street space for wide sidewalks and safe cycling routes.







This approach is designed to operate safely and effectively in existing cities with traditional vehicles, however, it reaches its peak potential in a world of self-driving vehicles that can be programmed to follow traffic rules, be routed by a mobility management system, and defer to pedestrians.



## Map Quayside's street plan

Quayside's proposed street network consists of one grand boulevard that runs east-west (Queens Quay) and three north-south streets that provide convenient building access.

-  Queens Quay  
30m wide, 40km/hr
-  Slow zone
-  North / South streets  
16-20m wide, 20km/hr
-  Temporary roadway  
during construction of sites to east

-  **1** Bonnycastle Street
-  **2** Small Street
-  **3** Silo Street
-  **4A** Queens Quay 2025
-  **4B** Queens Quay 2035
-  **4C** Queens Quay slow zone 2025

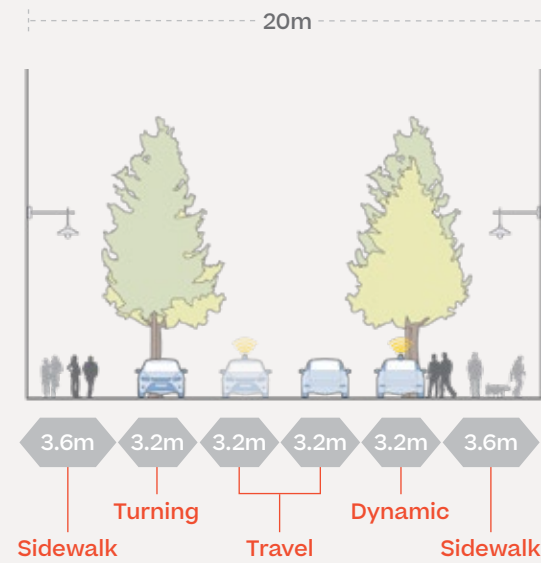
See street sections on the following page

# Designing Quayside's four streets

1

## Bonnycastle Street.

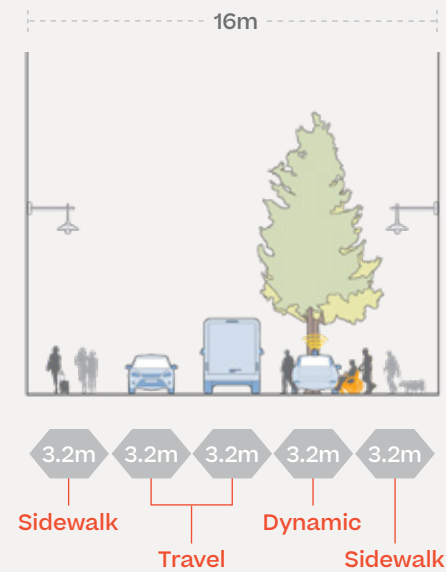
Bonnycastle would have north- and south-bound vehicle lanes and multiple dynamic curb spaces.



2 3

## Small and Silo streets.

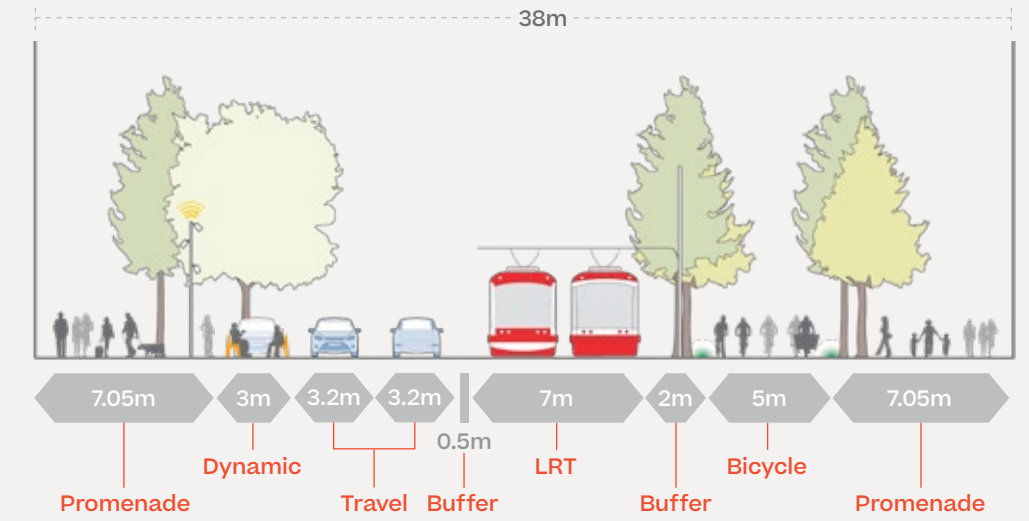
Quayside's two smallest streets would share space among pedestrians, cyclists, and cars, with slower vehicle speeds. Trucks exiting from the neighbourhood logistics hub (see Page 134) would pass along Small Street.



4A

## Queens Quay 2025.

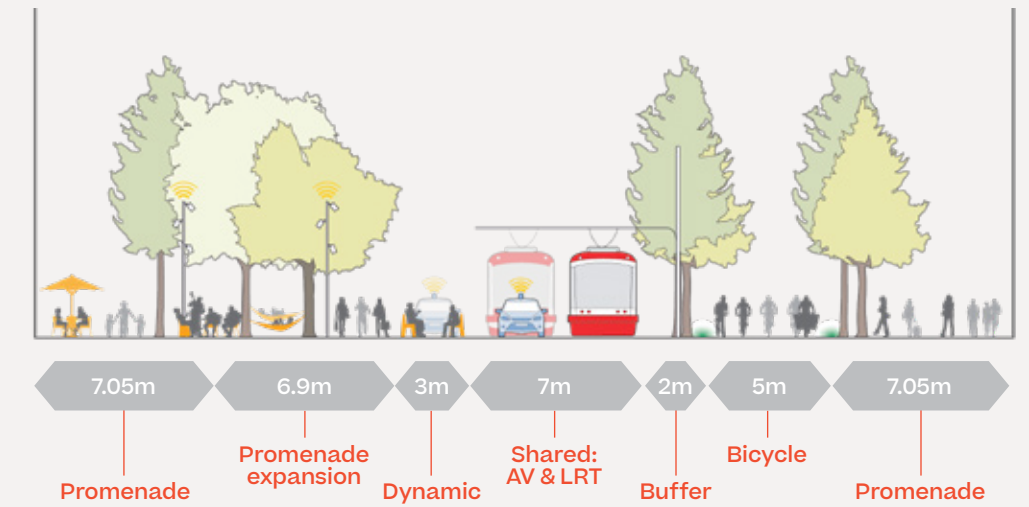
The initial plans for Queens Quay feature wide sidewalks and bike lanes, as well as plentiful dynamic curb spaces along the north side of the street.



4B

## Queens Quay 2035.

In the future, when self-driving vehicles are able to replace traditional cars and share space with the light rail transit lanes without impeding operations, the two traffic lanes would be converted to pedestrian space.

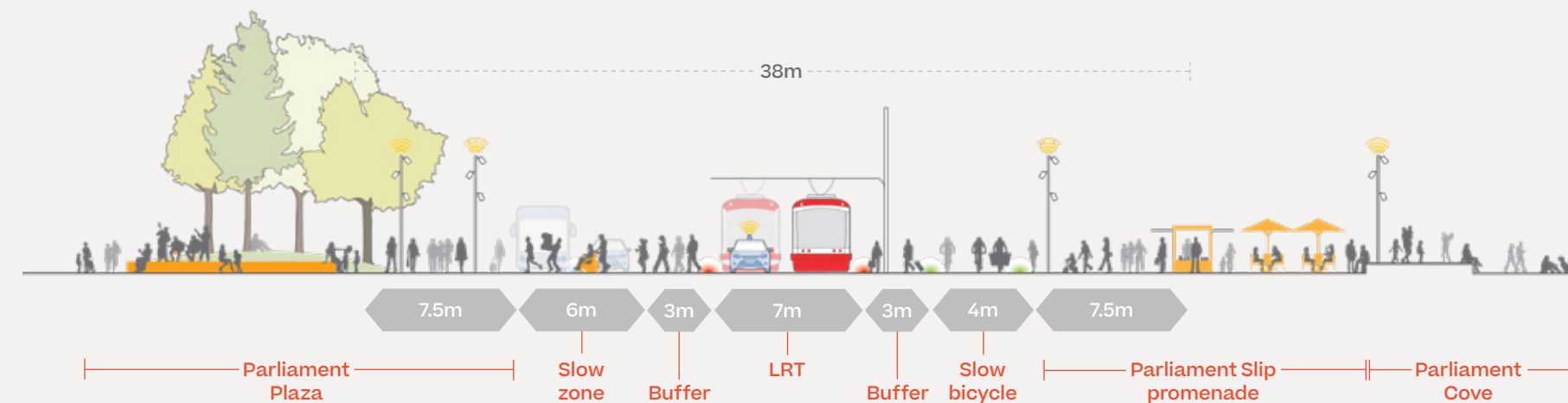


4C

## Queens Quay slow zone 2025.

As described on Page 123, light rail, vehicles, and bicycles would cross through Parliament Plaza along the Queens Quay slow zone, sharing the space with pedestrians at a

reduced speed of 10 km/h. Buffer zones between travel lanes would act as additional safety features for pedestrian crossing areas, and "red waves" would alert pedestrians to the light rail's arrival.



# Reimagining Queens Quay for 2025 and 2035

Quayside's plans accelerate improvements already underway to transform Queens Quay into a vibrant boulevard that welcomes pedestrians, bikes, and public transportation and provides a grand entrance to the eastern waterfront.

Queens Quay is the major boulevard connecting public spaces and neighbourhoods along the waterfront. Farther west, the street has seen major improvements over the last 10 years, resulting in safer conditions, enhanced public transit service, and better cycling conditions.

The Quayside plan builds on these improvements to create an inspiring entrance to the eastern waterfront, a street purposely designed to evolve over time and capture the opportunities provided by a future with self-driving vehicles. On opening day, travellers could enjoy the newly extended streetcar line,

superior cycling and pedestrian experiences, and access to new ride-hail services. An expanded public realm would blur the line between sidewalks and building ground floors, which can host a range of micro-shops, major retailers, cafés, community spaces, and art and cultural installations.

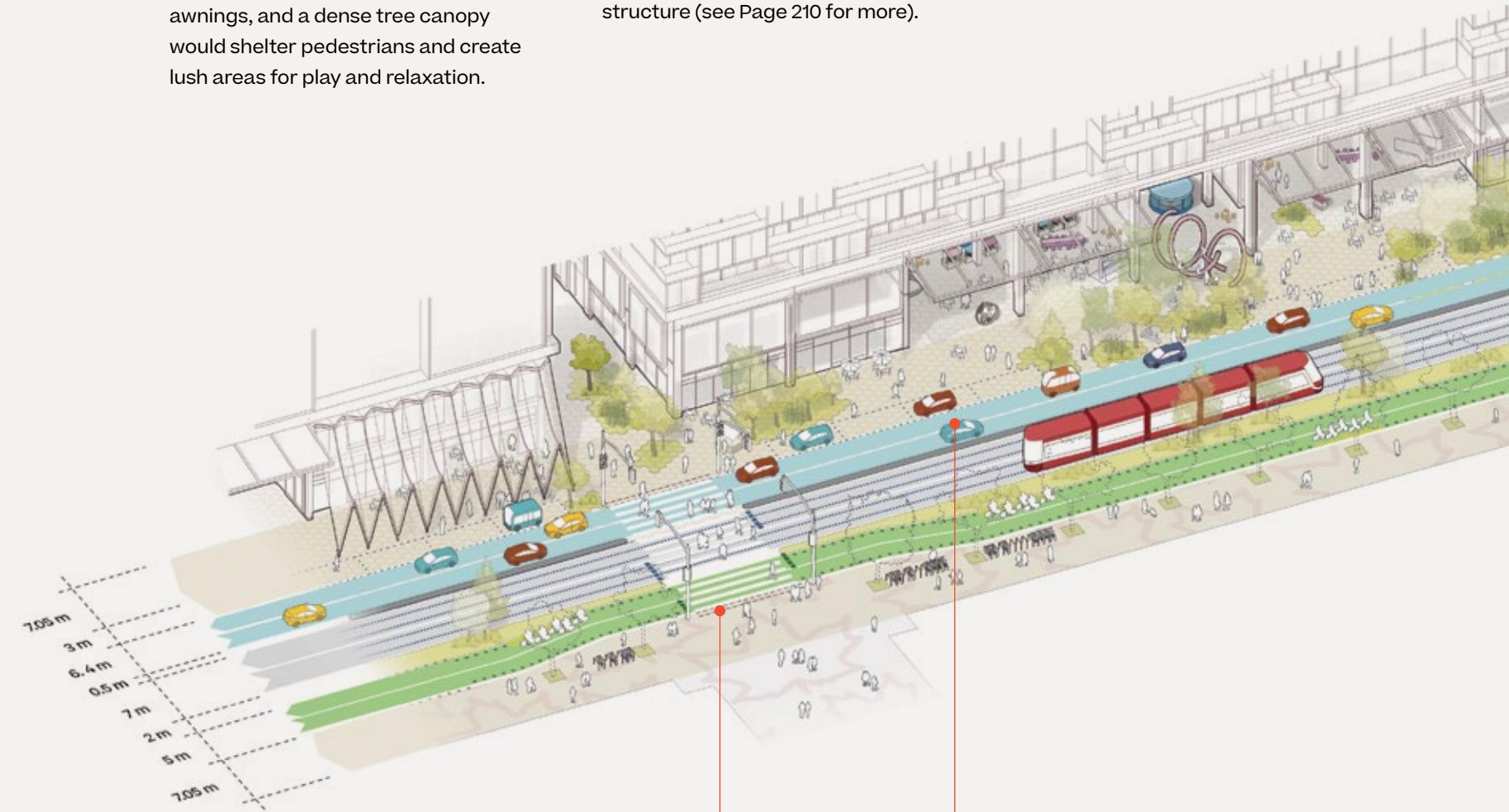
Over time, as new transportation options and self-driving vehicles emerge, the street could recapture car lanes to create a bigger, more varied public realm.

# 2025

## Queens Quay on Day One

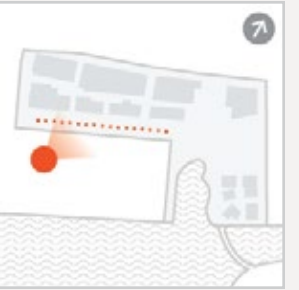
Upon opening, Queens Quay would retain two east-west vehicle lanes to ensure connectivity across the waterfront. Building Raincoats, movable awnings, and a dense tree canopy would shelter pedestrians and create lush areas for play and relaxation.

During slower midday and weekend times, the numerous dynamic pick-up and drop-off zones could be repurposed for programming like outdoor cafés or pop-up shops. Expansive landscaping would also form the foundation of Quayside's green stormwater infrastructure (see Page 210 for more).



Drivers could be guided to curb space managed by pricing and signage.

This design would double the cycling capacity of the Martin Goodman Trail.



The reclaimed road space would be repurposed for the public realm, creating a lively, linear park, with the potential to carve out spaces for playgrounds, markets, and public events.

Self-driving vehicles would improve street safety and require fewer traffic lights.

Self-driving vehicles and the light rail could share a lane without impeding transit operations.

Self-driving vehicles could be assigned to spaces and navigate directly there.

## Queens Quay 2035

The wide adoption of self-driving vehicles could enable a dramatic transformation to the street. Because self-driving vehicles can be programmed to travel in predictable lanes at predictable speeds, it is expected they would be able to share the light rail without slowing down transit service, eliminating the need for separate vehicle lanes. (Sidewalk Labs plans to thoroughly test and pilot the compatibility of self-driving vehicle operations in light rail lanes prior to implementation.)

# 2035

# Designing a welcoming, lively boulevard in 2035

As travellers move along Queens Quay, they would experience a grand boulevard full of intimate moments and a series of digital and design innovations that make the street inviting to pedestrians and cyclists no matter the season.

## Tree clusters and cover.

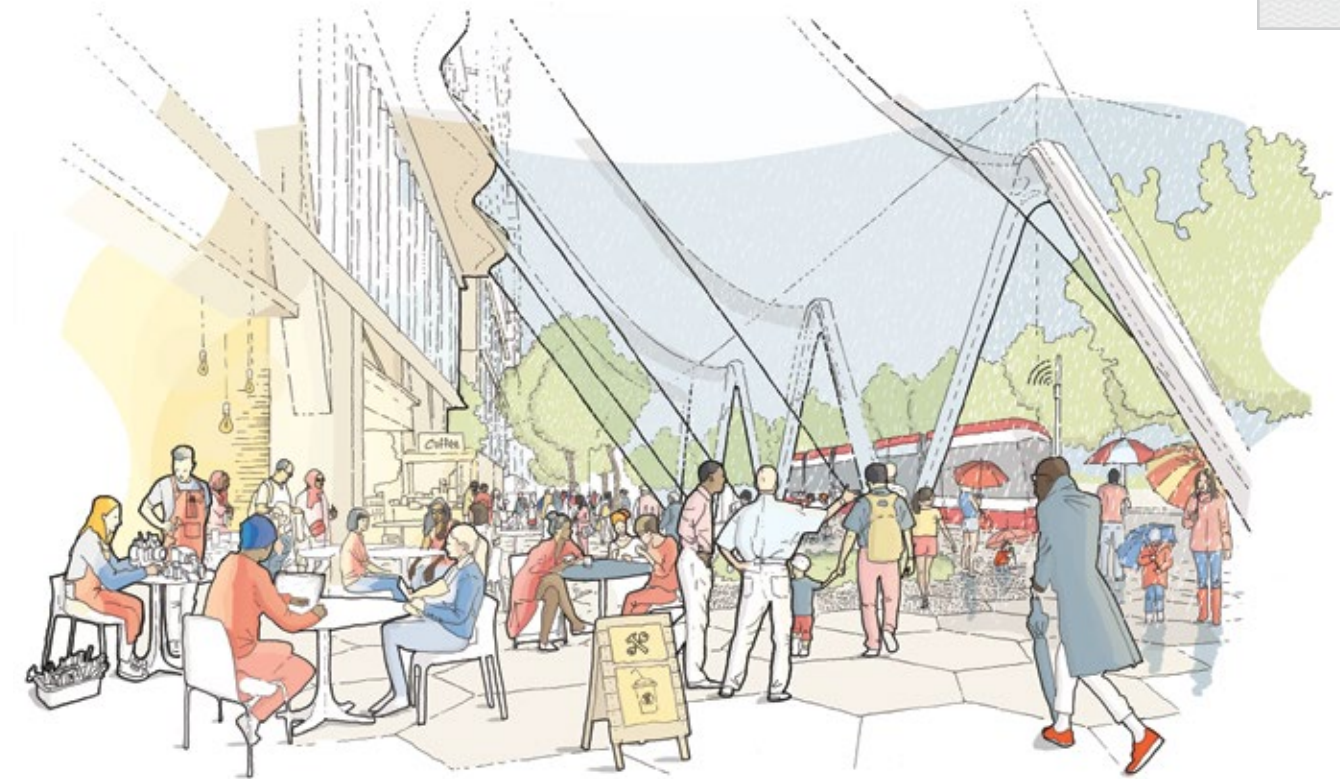
The rich tree canopy clustered at each end of Queens Quay would provide protection from winds sweeping in from the west and southwest, creating opportunities for pockets of playful, green space. All of these trees would have the 30-cubic-metre soil volume set out

in the Toronto Green Standard.<sup>47</sup> In addition to these ecological benefits, on Queens Quay East in 2025, it would be possible to plant trees at a concentration of 59 trees per hectare, a 20 percent increase over the concentration of 49 trees per hectare achieved on Queens Quay West today.<sup>48</sup>



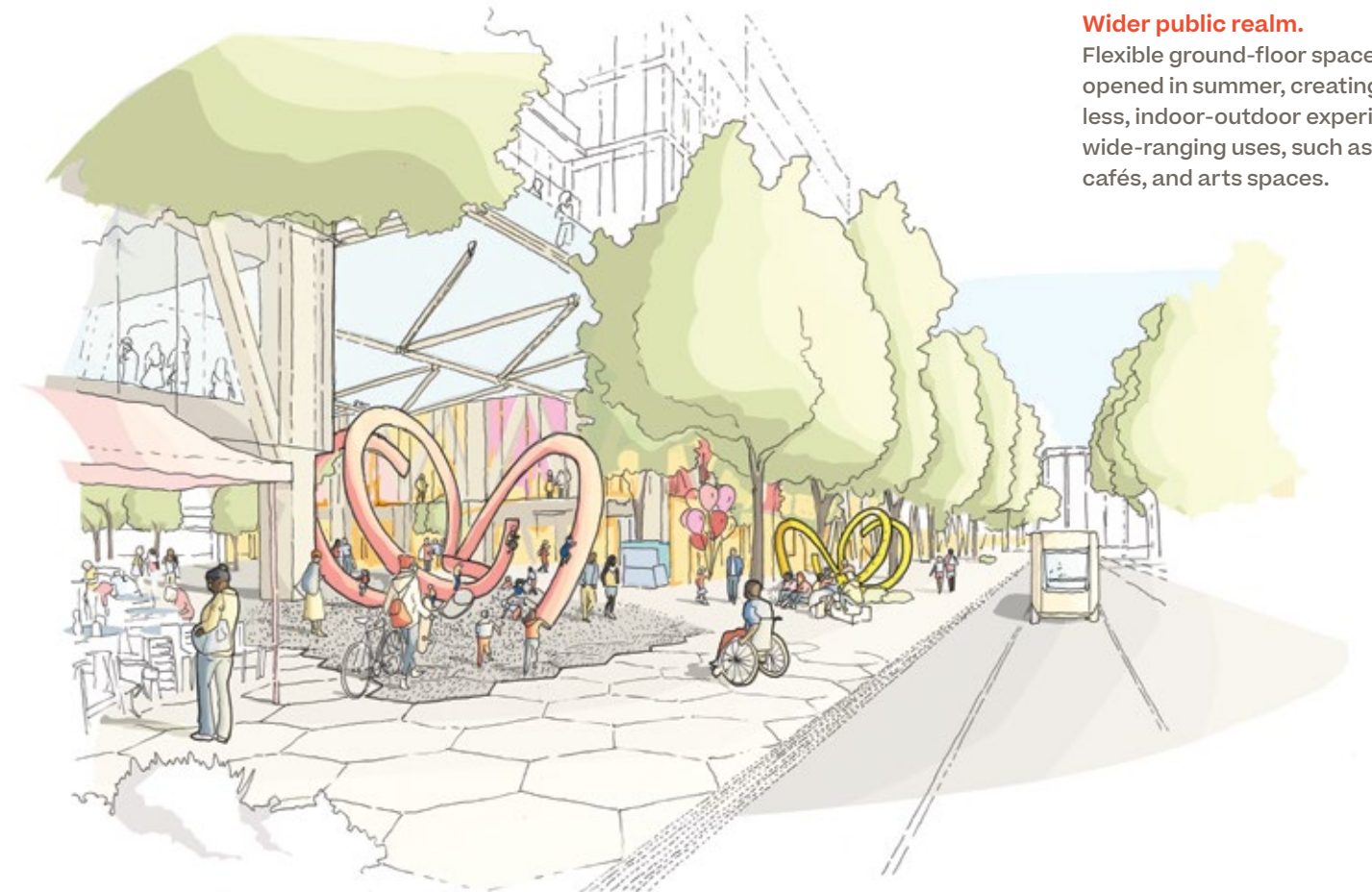
## Building Raincoats.

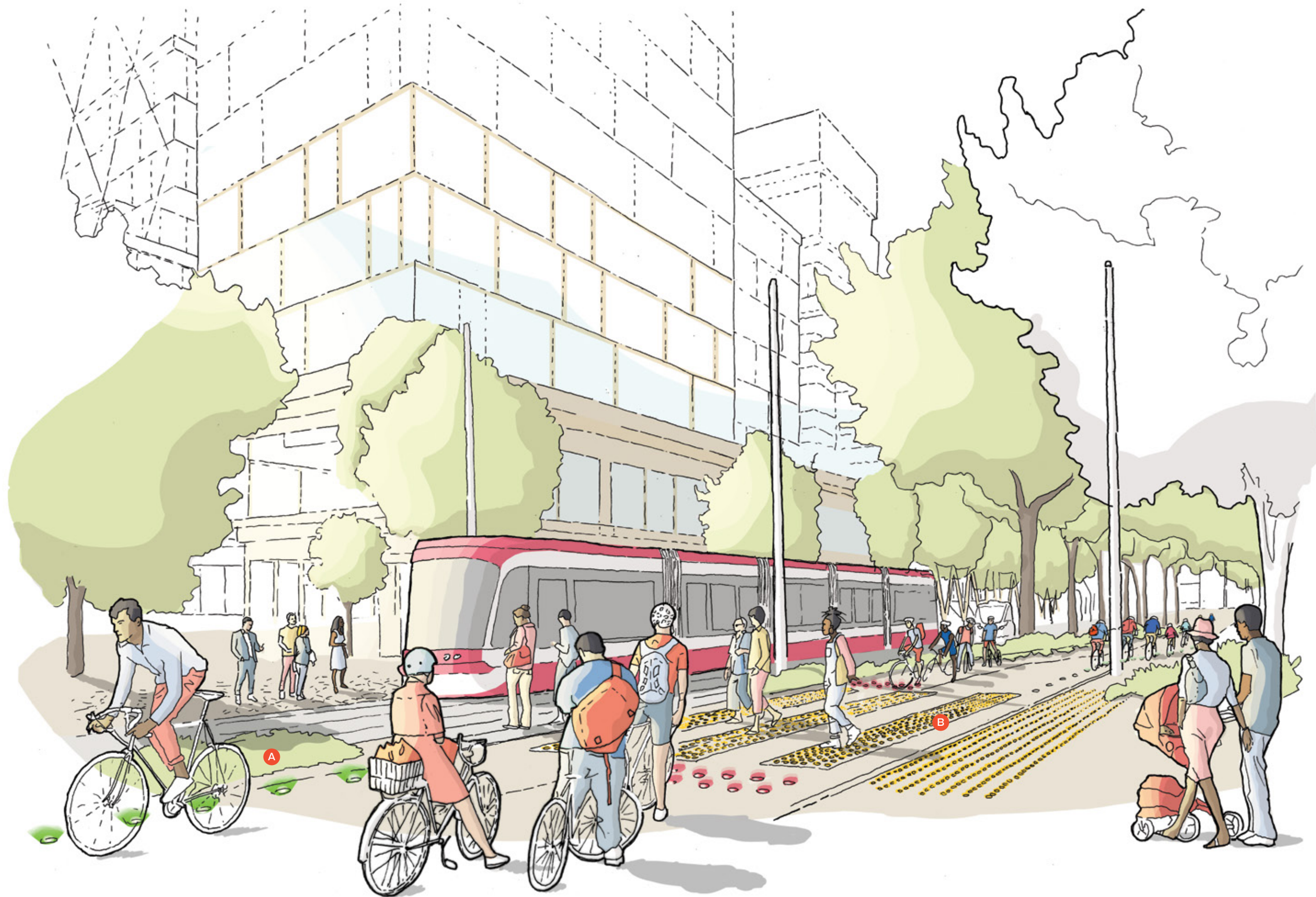
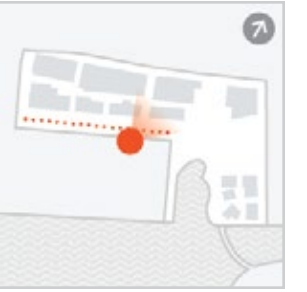
These covered, versatile spaces can protect pedestrians and shelter outdoor pop-ups or patio areas from rain and wind.



## Wider public realm.

Flexible ground-floor spaces can be opened in summer, creating a seamless, indoor-outdoor experience for wide-ranging uses, such as markets, cafés, and arts spaces.





**A Green wave.**  
LED lights embedded in the Martin Goodman Trail can turn green, signalling a green wave that allows cyclists to travel as fast as 22 km/h without stopping at intersections. Green waves encourage cyclists to ride in packs, increasing safety as they receive protected green lights at intersections.<sup>49</sup>

**B Real-time crosswalks.**  
In a traditional design, wide boulevards require traffic lights to allocate a long time for pedestrians to cross the entire street, potentially delaying the light rail. On Queens Quay, lighting embedded in crosswalk pavers at key intersections would create a two-stage crossing, guiding pedestrians safely to a central median and holding them if the streetcar is approaching.

# Creating a more balanced, responsive streetscape

All streets in Quayside — even the smaller ones, such as Bonnycastle Street, shown here — would feature a range of innovations that balance the needs of all users and make adjustments in real time, facilitating easier, safer, more enjoyable trips.

Streets are used in dramatically different ways across the course of a day, a week, and even the seasons. But their designs are generally unable to adjust

to changing needs. For instance, pick-up and drop-off spaces might be packed during commuting rush hours but empty in the afternoon. Individual needs also vary: a healthy young adult typically needs less time to cross the street than a family with a toddler.

Quayside's street designs can support a range of needs at different times. A coordinated mobility management system would provide vehicles with

real-time information on available passenger loading zones. Adaptive traffic signals can balance safety and convenience for all users. Adjustable lighting, protection from bad weather, and more public space would make for a more inviting streetscape.

## A Street lighting.

In contrast to conventional street lights, which have only one brightness level, Quayside's street lights would adjust to real-time conditions, helping to maintain a consistently safe, beautiful, and sustainable streetscape across all times of day and seasons.

## B Adaptive traffic signals.

Adaptive signals can make real-time adjustments to balance the needs of different groups, whether that means helping a slower pedestrian safely finish crossing or giving priority to a streetcar that is running late.

## C Traffic coordination.

A proposed mobility management system would monitor space availability in underground parking areas and pick-up and drop-off zones throughout the neighbourhood, direct drivers (and, in the future, self-driving vehicles) to open spaces, and adjust the pricing in real time to encourage shared rides or alternative trip options.

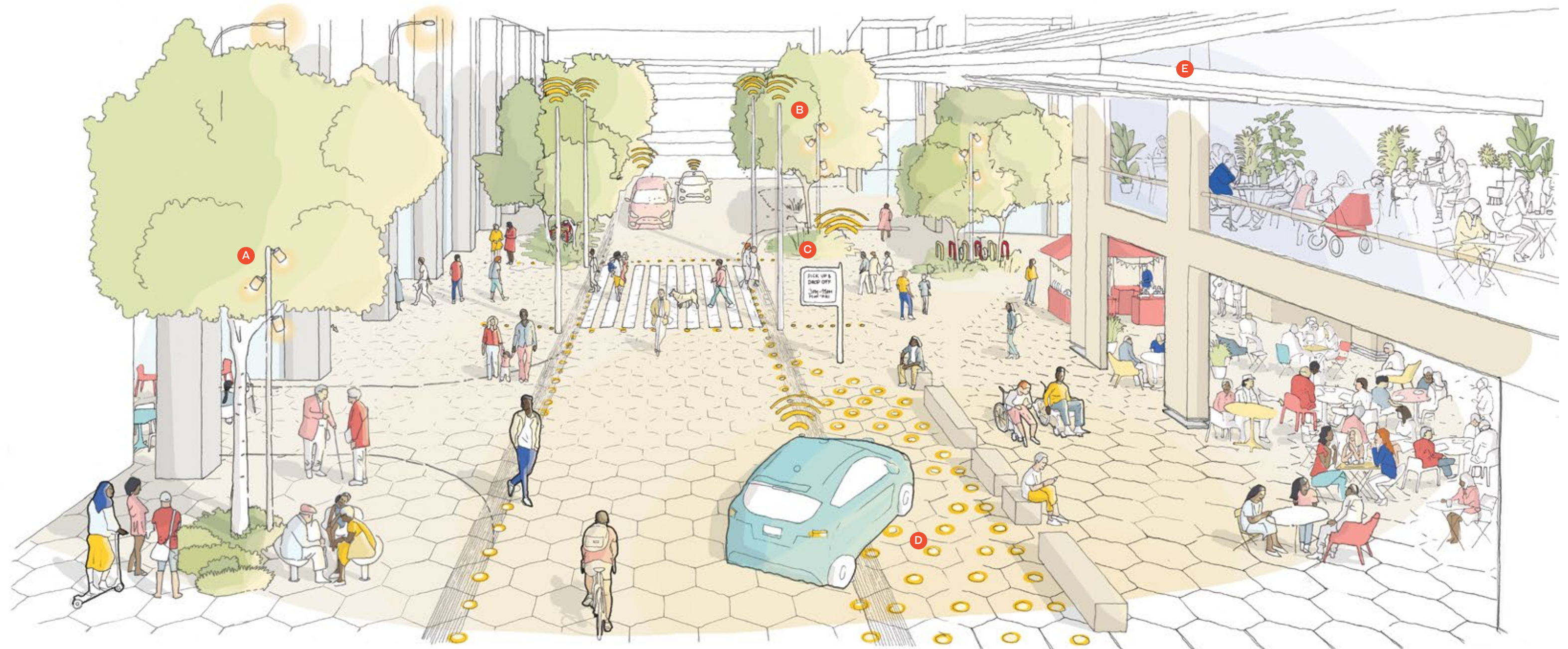
## D Dynamic curb.

Pick-up and drop-off spaces would expand or shrink based on demand. During weekday rush hours, the maximum dynamic curb space would be reserved for cars. At off-peak hours, excess spaces could be repurposed for programming like outdoor cafés or pop-up markets. These changes would be fully compliant with the Accessibility for Ontarians

with Disabilities Act (AODA), using a combination of tactile markings in pavers, movable street furniture, lighting, and digital signage.

## E Retractable facades.

Facades that fold up similar to a simple garage door — one of several outdoor comfort tools in Quayside — would open during the summer months but close during rain and snow storms.



Bonnycastle Street



# Using modular pavers to build a more durable and flexible street

Quayside's proposed modular pavement system would incorporate technology to make the streetscape more responsive and green, reducing the time and disruption required for utility work.

Traditional paving systems lead to rigid streets that cannot adapt when problems arise, technology evolves, or community needs change. Cracks are common — Toronto fixed 214,253 potholes in 2017 alone<sup>50</sup> — as are street cuts for utility work, leading to full crews working with noisy equipment for days. The result is a network of pockmarked pavement that is difficult and costly to replace. Opening up the street is a cost-intensive endeavour that discourages rapid innovation and

investment in new infrastructure, such as fibre-optic cables that have become a basic need for homes and businesses.

To address these challenges, Sidewalk Labs plans to deploy a modular pavement solution in Quayside. Sidewalk Labs has prototyped a pre-cast concrete, one-metre hexagonal road-grade paver that can be used from building-front to building-front and plans to work with local universities and regulators to refine the prototype and develop a pavement that would work in a Toronto context.

While modular pavement can cost the same to deploy as Toronto's current waterfront streetscape, it can be more cost-efficient over the long term due to a greater ability to resist wear and tear and to savings associated with the ease of utility access. The pavers can also host other technologies, and Sidewalk Labs plans to include features like heating to melt snow, lighting to animate street use, and permeability to allow for rain-water infiltration — making streets more safe, inviting, and sustainable.

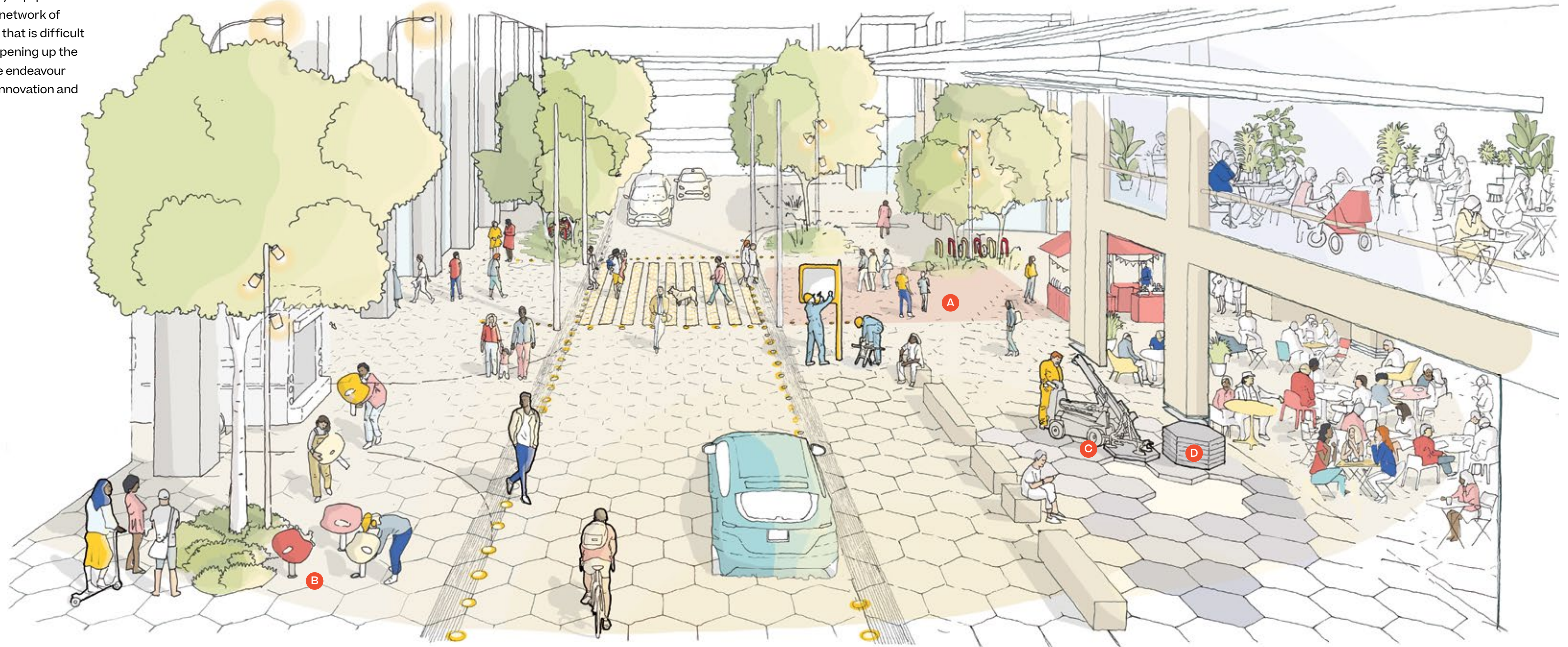
**A Heating.**  
A number of modular pavers in Quayside will pilot heating capabilities to clear snow and ice, improving safety and eliminating the need for salting.

**B Streetscape installations.**  
Pavers would be designed to enable easy installation and removal of street infrastructure, such as signs, traffic lights, and equipment for special events.

**C Paver maintenance.**  
Minor repairs can be completed in a single afternoon — down from Toronto's current average of several days — with a hand-held tool, reducing cost and neighbourhood disruption from jackhammers and large trucks.

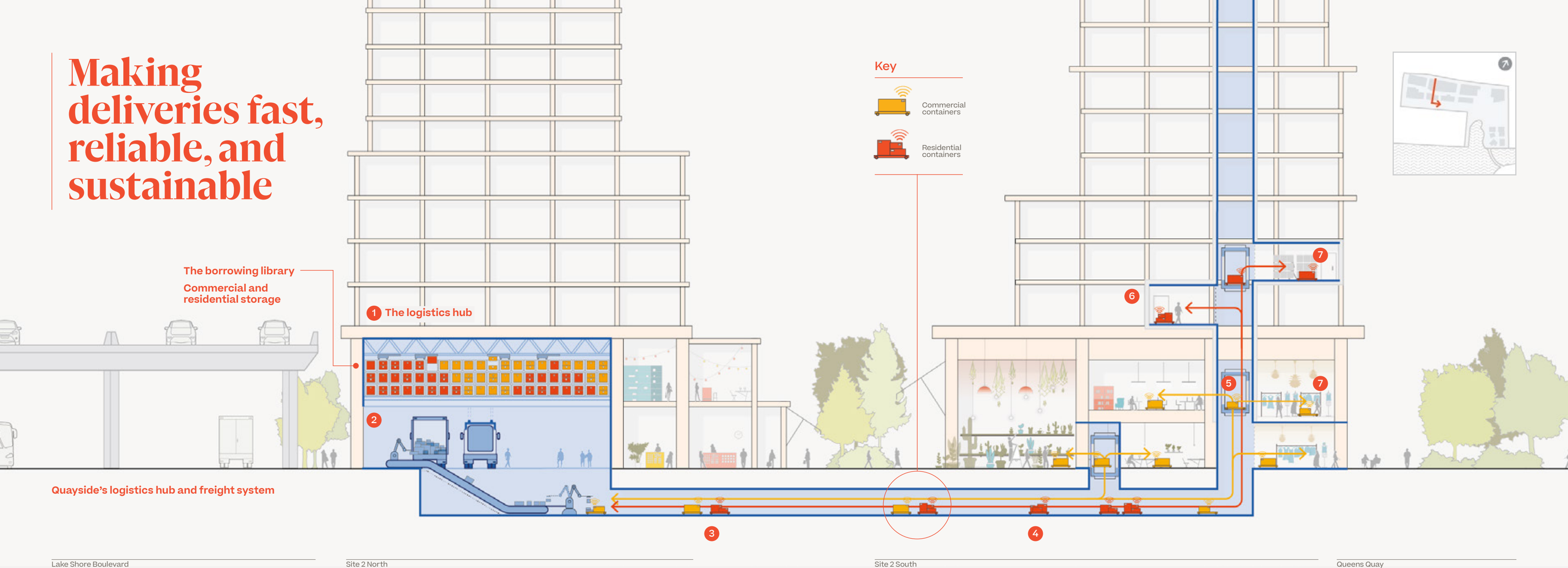
**D Hexagonal design.**  
Each paver's 120-degree angles distribute vehicle weight more evenly than traditional rectangles, helping to minimize cracks and potholes.

**Open access channel.**  
Site utilities (such as fibre-optic cables, pneumatic waste tubes, and electric utilities) would be located in an open access channel running under removable pavers, speeding up maintenance and lowering the installation cost for new utilities by almost 90 percent,<sup>51</sup> helping the neighbourhood keep up with future infrastructure innovations.



Bonnycastle Street

# Making deliveries fast, reliable, and sustainable



Quayside's innovative last-mile delivery system would use underground freight tunnels to deliver packages directly to buildings, significantly reducing truck traffic from local streets.

Quick and reliable deliveries are essential to urban living, especially for residents who do not own cars. But the economic and environmental costs of such service is high: trucks clog the streets and contribute disproportionately to air and noise pollution in part of what is known as the "last-mile" delivery problem.

In Quayside, Sidewalk Labs proposes an innovative approach that would consolidate deliveries at a logistics hub, transferring them into "smart containers" that can be packed onto self-driving delivery dollies, which would reach residents and businesses through a system of underground tunnels. This system would reduce the number of on-site truck trips at Quayside by as much as 72 percent compared to business as usual.<sup>52</sup>

The logistics hub would be a centralized mailroom and storage facility accepting deliveries from existing carriers, such as Canada Post or private couriers.

**1 Logistics hub.** Sites 1 and 2 in Quayside are being planned with the potential to house a logistics hub that would include a centre for mail and parcel delivery, resident and commercial storage space, a borrowing library for items too bulky to keep in apartments (such as ladders), and a waste transfer facility.

The proposed logistics hub could handle 95 percent of Quayside's freight (projected at more than 18,000 daily parcels), significantly reducing truck traffic on internal streets.

**2 Freight transfer.** Freight would be transferred into secure, stackable smart containers loaded onto self-driving delivery dollies.

**3 Smart containers.** New smart containers are designed to know their destination, be tracked by app, and be accessed only by a unique passcode.

**4 Robot tunnel delivery.** Self-driving delivery dollies carrying smart containers would travel through two bi-directional tunnels — each about two metres wide — connecting into the basements of Quayside's buildings.

**5 Drop-off and pick-up.** Self-driving delivery dollies could take a building's freight elevator to a mailroom to drop off packages. They could return with new cargo, such as outbound cardboard, reducing empty runs.

**6 Door delivery service.** Door delivery service would be available for bulkier packages, storage, or borrowed items, or for residents with special needs.

**7 Resident and commercial storage.** Smart containers can be used for short-term storage in a resident's building and long-term storage (such as for seasonal items) at the logistics hub. Commercial storage would also be available at the logistics hub, enabling retail stores to act more like showrooms and helping small local businesses compete with more established enterprises. Users can track their deliveries, unlock containers, and save an inventory of stored goods through an app.



# Planning for accessibility from the start

A series of workshops — conducted in collaboration with the accessible community in Toronto — led to 22 accessibility principles to guide planning in Quayside. These pages help bring some of these principles to life and outline some core accessibility commitments.

In 1945, some of the first curb cuts were introduced in Kalamazoo, Michigan. The idea was to make it easier for people using wheelchairs and other mobility devices to cross the street.<sup>53</sup>

It took 50 more years and the tireless efforts of disability rights groups before the first legislation was passed requiring curb cuts on all street corners in the U.S.<sup>54</sup> But as cities began installing curb cuts, they noticed that the majority of people using them were not people using wheelchairs. They were parents pushing strollers, travellers wheeling roller bags, bicyclists crossing streets, even pedestrians who simply preferred a gradual slope. A simple technology designed and advocated for by people with lived experience of disability ended up benefitting a much wider group.

As the curb cut example shows, everyone benefits when neighbourhoods are designed with homes, transportation systems, and city services that can adapt to

all types of different abilities. In Quayside, Sidewalk Labs has a unique opportunity to design more inclusive environments from the start, with a chance to put into place accessible systems that can improve the lives of everyone and become a model for the world to follow.

To guide this planning process, Sidewalk Labs engaged extensively with the accessible community in Toronto, including professional designers, advocates, and especially people who self-identified as having lived experience of disability. Together, this group co-created 22 accessibility principles that Sidewalk Labs commits to following for the Sidewalk Toronto project.

Building on top of the legal standards set forth in the Accessibility for Ontarians with Disabilities Act, these principles served as a planning guide for both the accessibility of the physical elements of the neighbourhood and the digital services proposed for Quayside.



## The 22 accessibility principles guiding planning in Quayside

### General accessibility principles

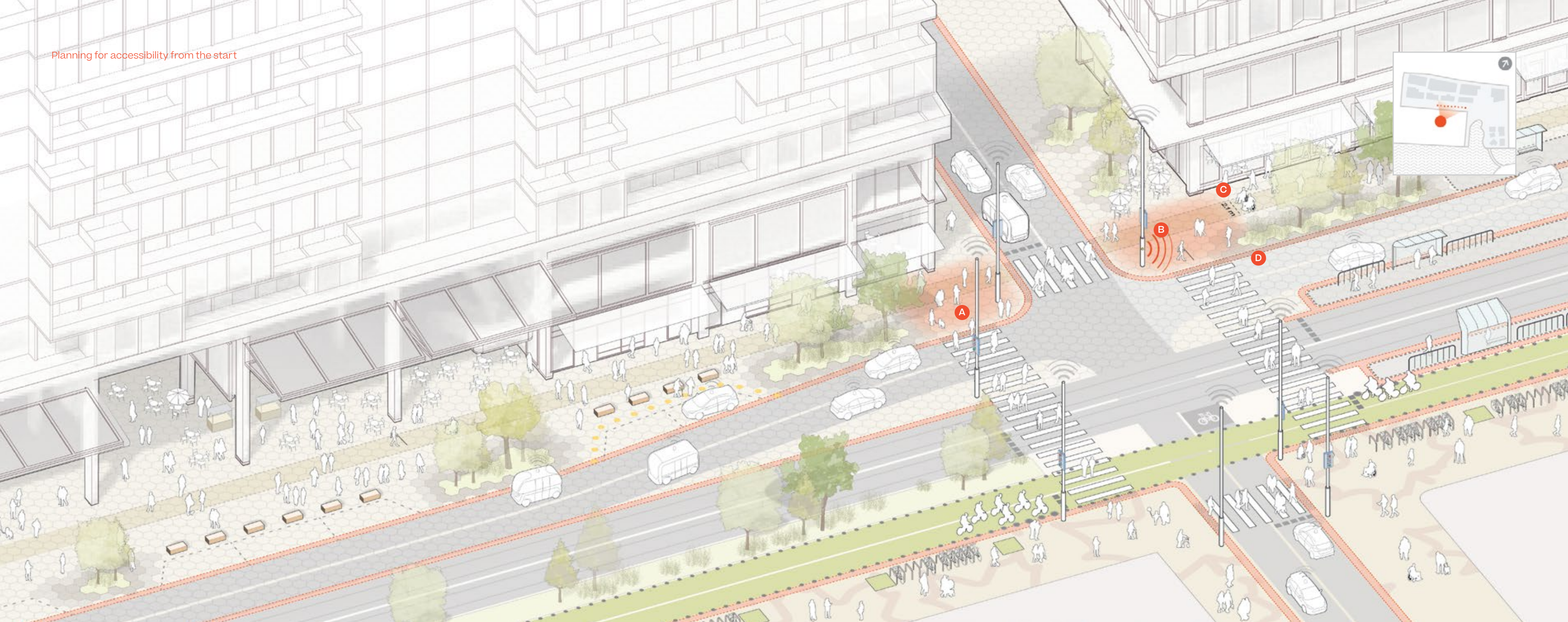
- 1 Enable experiences that were not possible before
- 2 Do “nothing about us without us”
- 3 Make infrastructure simple, durable, and reliable
- 4 Design predictable, intuitive experiences
- 5 Futureproof by default
- 6 Make the accessible path the most convenient, delightful path
- 7 Prioritize end-to-end accessibility
- 8 Prioritize autonomy first

### Physical accessibility principles

- 9 Build for wheels
- 10 Enable wayfinding in multiple formats
- 11 Eliminate barriers and friction
- 12 Promote relaxation and recovery
- 13 Enable personal assistive technology, with a focus on easy to access, low-cost technologies
- 14 Go beyond legal requirements
- 15 Enable flexibility and customization

### Digital accessibility principles

- 16 Provide information in multiple, easily accessible formats and languages
- 17 Support multiple input modalities to all digital experiences
- 18 Preserve privacy and support fairness in machine learning
- 19 Allow an easy way to give feedback on digital tools
- 20 Use common standards for messages in audio wayfinding features
- 21 Provide a recommended, free option that is also open to third-party alternatives wherever technology is necessary to interact with a key service
- 22 Use the best digital accessibility standards available and set new, higher standards wherever possible



## Dynamic, accessible streets

One of the cornerstones of an accessible city is the ability to travel independently and safely at street level. Sidewalk Labs proposes streets that are for pedestrians first — including pedestrians using mobility devices, travelling with service animals, and with varying levels of sensory perception and attention.

This proposal illustrates the following principles:

- **Build** for wheels
- **Enable** visual, auditory, and tactile wayfinding
- **Eliminate** barriers and friction

### A Modular heated pavement.

Sidewalk and road maintenance can be a common impediment to accessibility. The Quayside plan features modular pavers that can be individually and quickly replaced if one cracks or breaks. Pavers at key street crossings and intersections would also include heating elements that can prevent buildup of snow and ice on pedestrian thoroughways. Heated pavers, coupled with building awnings that protect from rain and snow, would create pathways along Queens Quay and the pedestrian passage between Sites 1, 2, and 3, making streets more passable to people using wheeled mobility devices and more comfortable for service animals year-round.

### B Wayfinding beacons.

Beacons are small objects, about the size of Post-it Notes, that emit signals that can be picked up by smartphones or other Bluetooth-enabled devices. Beacons can broadcast navigational information about the environment that is especially useful to people who are blind or partially sighted — for example, that an accessible ramp is located to the right of the steps. In Quayside, beacons would enable the use of BlindSquare and other wayfinding apps as part of the default street-level experience.

### C Sidewalk width.

All thoroughfares in Quayside are planned to have at least enough room for two people using mobility devices (wheelchairs, scooters, white canes) to ride or travel side by side in each direction or for two people to sign while walking. Even more room would be provided wherever possible.

### D Curbless streets.

In Quayside, instead of a vertical step separating the vehicle right-of-way from pedestrian paths, tactile indicators would indicate the line between pedestrian-only areas and spaces shared between pedestrians, bikes, and low-speed vehicles.

## Accessible self-driving rides

One of the key experiences that participants in co-design sessions were most excited about was an accessible fleet of self-driving vehicles to help people get around the neighbourhood safely and independently.

Ideas included the ability to hail a self-driving vehicle using a voice assistant or soft-touch button according to personal preference, as well as visual or audio cues that could guide people to their vehicles (imagine an augmented-reality thick green line on the ground to follow, paired with a unique audio identifier for a vehicle).

The potential for self-driving vehicles to expand mobility and become part of a personal support network speaks to the essence of what accessibility is all about: making people feel at home in their city.

Sidewalk Labs commits to working with self-driving vehicle fleets to make calling, riding, and getting picked up and

dropped off easy and accessible. All streets — even pedestrian laneways — would be designed to allow accessible self-driving vehicles.

This proposal illustrates the following principles:

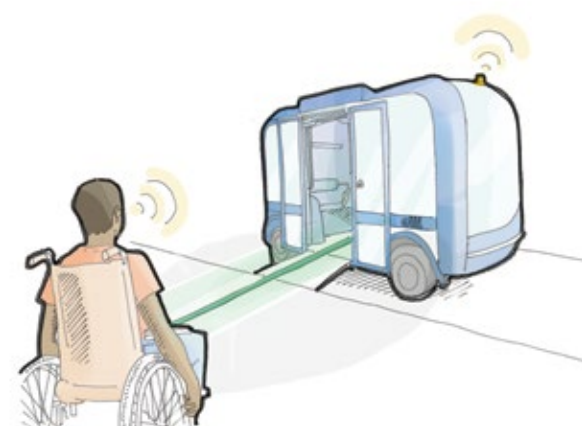
→ **Enable** experiences that were not possible before

→ **Prioritize** autonomy first

## Seamless building thresholds

Getting through a door with an armful of packages can be difficult for anyone — and harder still for people who are using a wheelchair, partially sighted, or experiencing reduced dexterity. A session co-hosted with the Inclusive Design Research Centre focused on improving these “threshold” moments: transitioning through a door into a home, between floors in an office building, or past a badged access point.

The difficulty of these threshold moments can be eased or eliminated by applying simple technologies, like automatic doors. Where access control is necessary, doors can have a contactless scanner for a card, fob, or phone. Participants in the co-design session highlighted these as useful innovations, particularly when they are all knit together, such that a single access device can open doors, call elevators, negotiate access controls, and request street crossings.



Visual, audio, and digital cues can help guide passengers to their self-driving vehicles.

Sidewalk Labs commits to a design principle that “fewer doors are better.” When doors are necessary, designs should preference sliding automatic doors over button-controlled doors.

This proposal illustrates the following principles:

→ **Eliminate** barriers and friction

→ **Design** predictable, intuitive experiences

## Infrastructure that reports back

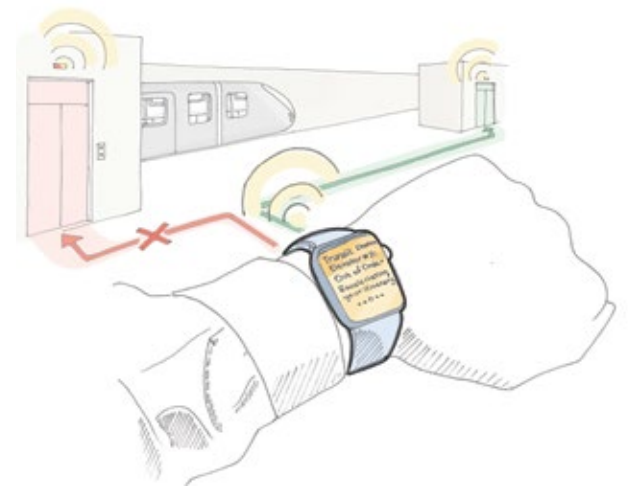
What causes a frustrating delay for some commuters can create an arduous ordeal for others — the wheelchair user faced with a broken elevator at her transit station; the youth with cognitive disabilities whose bus route unexpectedly changes; the visually impaired senior whose daily walk is interrupted by road work.

But imagine if people could be alerted immediately when station infrastructure breaks down, when transit service gets delayed or detoured, or when street maintenance occurs — and be instantly re-routed via a smartphone or wearable device. Participants at a Sidewalk Labs accessibility hackathon prototyped just such a technology, which would allow visually impaired pedestrians using the BlindSquare app to be safely guided around construction sites.

Sidewalk Labs commits to developing infrastructure capable of reporting itself as broken and to working with existing navigation tools to ensure every journey in Quayside is accessible, safe, and convenient for all.



Digital technology can provide safe and secure building entry without push buttons or fob keys.



Wearable tech can provide wayfinding instructions and alert people to obstacles or delays.

This proposal illustrates the following principles:

→ **Make** infrastructure simple, durable, and reliable

→ **Enable** personal assistive tech

## Engaging the accessibility community in Toronto

Sidewalk Labs co-developed 22 initial principles with more than 200 members of the accessibility community in Toronto and around the world. Throughout 2018, Sidewalk Labs hosted 14 events focused on accessibility, including more than 70 hours of co-design sessions.<sup>55</sup> After each event, Sidewalk Labs compiled attendee thoughts, ideas, and feedback; added it to the principles list; and presented the latest version at the next event for further feedback.

Sidewalk Labs sees these principles as a living document to be updated as new insights emerge through prototyping or user testing. Sidewalk Labs hopes to work with government agencies to harmonize these principles with existing legislation and codes and incorporate them into development plans at a more granular level. Sidewalk Labs will continue to listen, engage, and connect with organizations, advocacy groups, and individuals focused on accessibility and inclusive design in Toronto. And Sidewalk Labs will continue to be open to great new ideas for creating an accessible, flexible, and empowering neighbourhood.

**Sidewalk Labs will continue its work with the local accessibility community to integrate accessible systems that can improve the lives of everyone and become a global model.**

# Exploring alternative designs for Quayside's street network

**Sidewalk Labs has explored multiple alternative designs to ensure sufficient road network connectivity while at the same time creating a significant new public space at Parliament Plaza.**

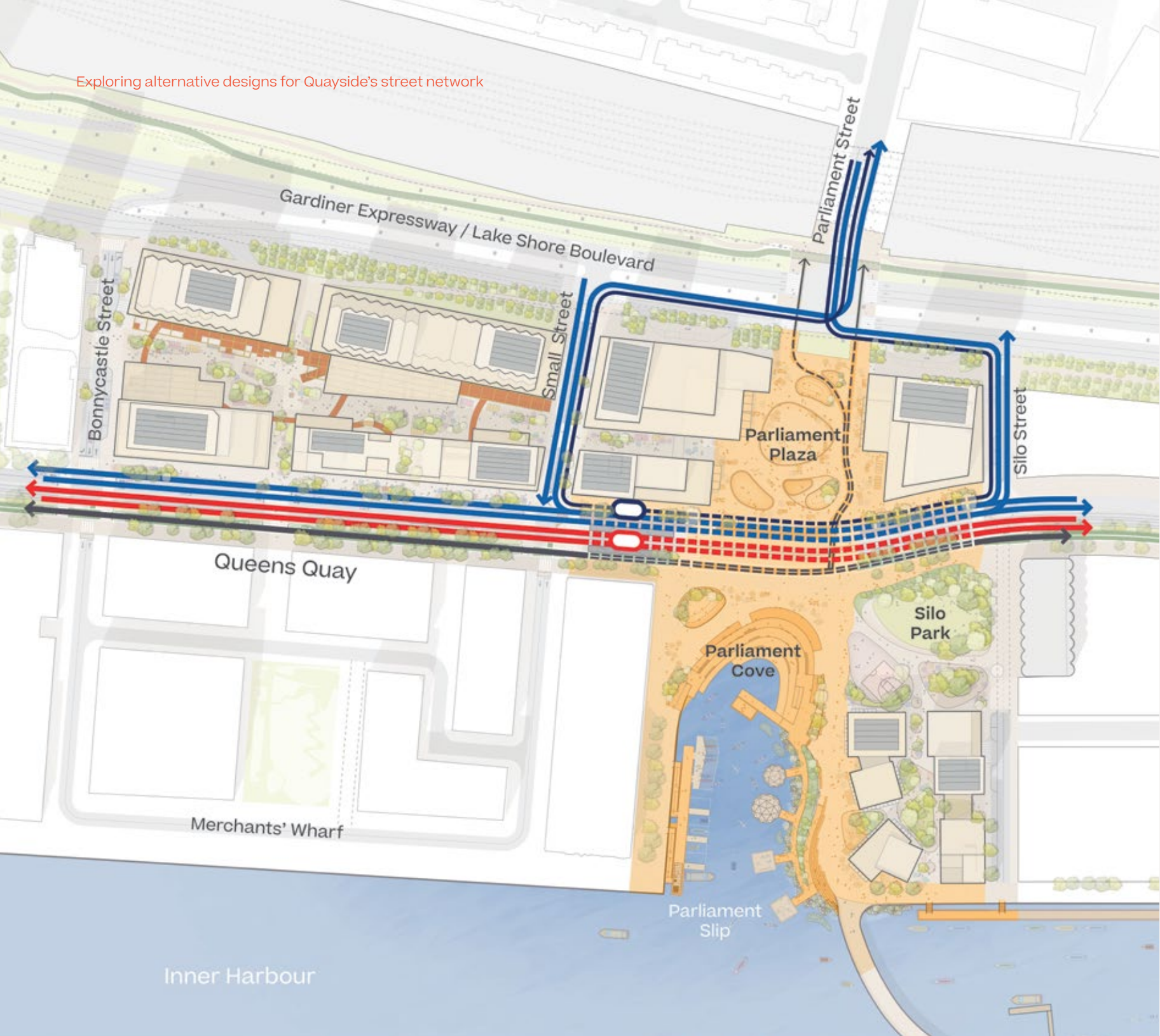
Working with Waterfront Toronto and the City of Toronto, Sidewalk Labs explored more than a dozen designs for a proposed new plaza in Quayside, at the base of Parliament Street, aiming to balance road network connectivity with the creation of a safe and vibrant public space. These alternative road network designs for Queens Quay considered many options: full vehicular access across both Queens Quay and Parliament, one-way streets, shared streets (building on Toronto precedents such as Willcocks Common), and a light-rail animated, fully car-free plaza. Alternative public realm designs were also explored, including options to retain and extend the head of the slip or partially fill the slip in varied patterns.

The proposed design retains Queens Quay as a two-way, east-west bound connection across a flat pedestrian Parliament Plaza, with Parliament Slip filled and a new head of the slip developed into a cove feature that brings visitors down to the water's edge. Upon opening, Queens Quay between Small and Silo streets is proposed as a slow zone in which pedestrians have priority and all transportation modes move at reduced speeds.

This configuration allows for city buses (and other vehicles) to travel south on Parliament Street, make an easy loop through the Quayside site, and return northbound on Parliament Street. As mobility technologies evolve, the flexibility built into this section of Queens Quay would allow for the evolution of this stretch of Parliament Plaza.

The proposed option was selected because it represents the best balance between providing for east-west vehicular access to link waterfront neighbourhoods and maintain passage to the Port Lands, and the creation of an expansive and flexible public plaza. Filling in a portion of the slip and creating public space south of Queens Quay ensures connectivity between existing public spaces and facilities on the west side of the slip and the new outdoor public green space of Silo Park to the east of the slip.

The proposed design will be assessed by the city as part of the MIDP review and final approval will be subject to the regular public environmental assessment process.



**Quayside proposed design**  
**Two-way Queens Quay slow zone**

- Bus stop
- Bus route
- Vehicular circulation
- Light rail stop
- Light rail route
- Bicycle network
- Slow zone

## Eight possible street designs

**Precinct plan:**  
**Two-way Parliament Street and two-way Queens Quay**



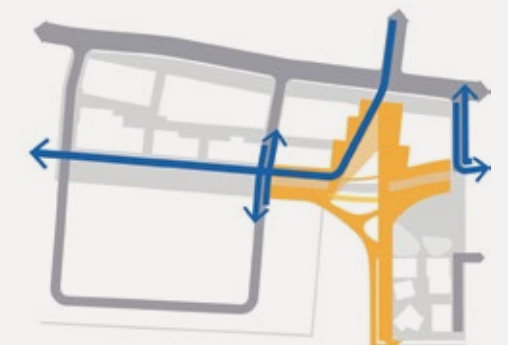
**Car-free plaza**



**One-way northbound Parliament slow zone**



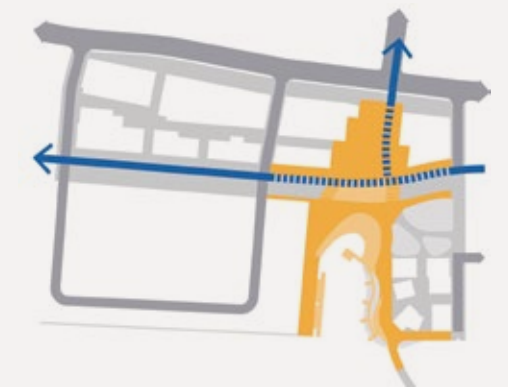
**One-way southbound Parliament Street**



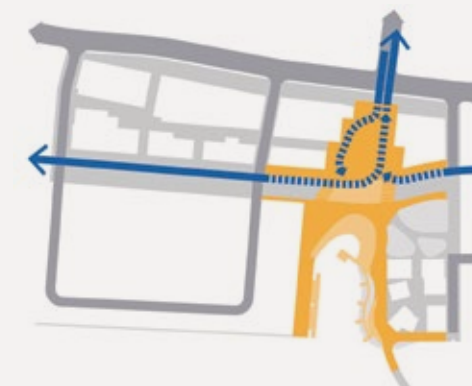
**One-way westbound Queens Quay slow zone**



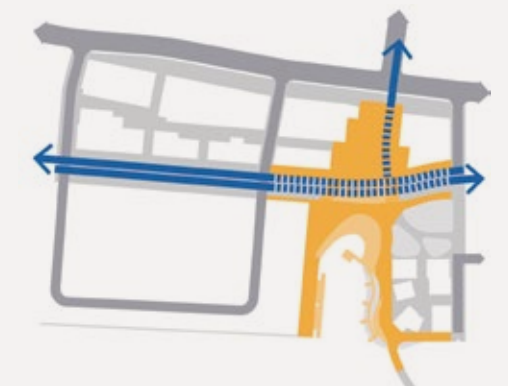
**One-way westbound Queens Quay slow zone and one-way northbound Parliament slow zone**



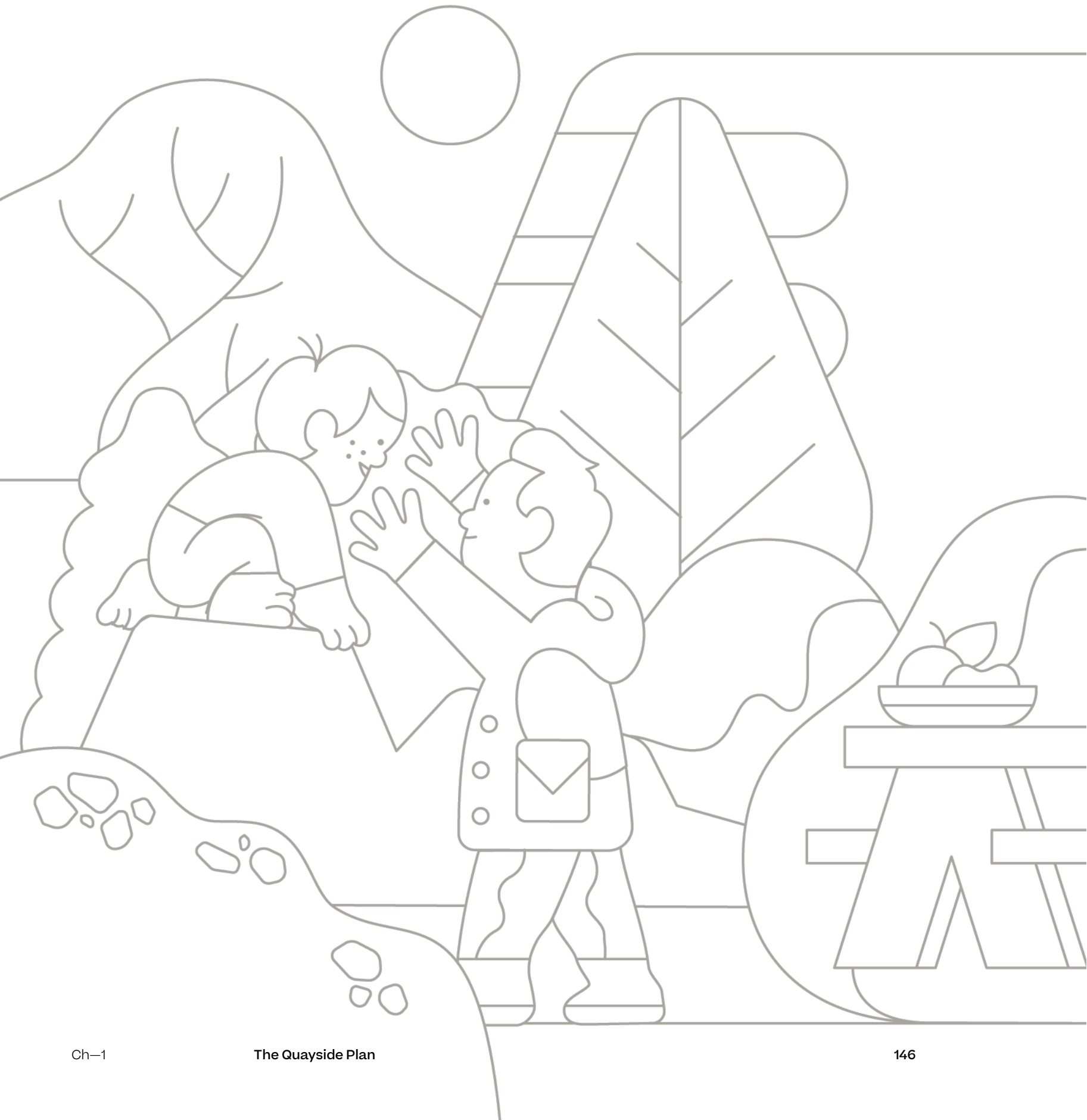
**One-way inbound Queens Quay slow zone and Parliament slow zone loop**



**Two-way Queens Quay slow zone and one-way northbound Parliament slow zone**



# Public Realm



**A system of streets, parks, plazas, and open spaces that encourages people to spend more time outdoors, together.**



See the “Public Realm” chapter of Volume 2 for more details on the urban innovations described in this section.



# Creating an expansive public realm network

The Quayside plan features an expansive public realm designed to bring together residents, workers, and visitors of all ages and abilities and to remove traditional barriers between indoors and outdoors, public space and private space, and land and water.

During the broader public engagement process, Torontonians shared many design priorities for the public realm in Quayside, including the need for accessible amenities, diverse programming, and connections to nature and water. To get further perspectives, Sidewalk Labs commissioned an ethnographic study of the experiences diverse Torontonians seek out in open spaces.

Across demographics, study participants shared six fundamental needs for open space, which Sidewalk Labs has incorporated into Quayside's public realm designs: [convenience](#), [discovery](#), [gathering space](#), [serenity](#), [spectacle](#), and [all-ages play](#). The following pages go into greater detail on how these spaces reflect the current needs voiced by Torontonians — while remaining adaptable to future ones.

This approach aims to create a truly connected public realm network that provides more space and is more usable more of the time.

## A truly connected public realm network

Quayside's public realm does not treat the neighbourhood in isolation, instead aiming to create a network carefully stitched together with surrounding areas. This approach means designing in concert with the neighbourhood to the west of Quayside, Bayside;<sup>56</sup> with future improvements to the public realm under the Gardiner Expressway; and with public spaces to the north of Quayside, in particular in the Distillery District and St. Lawrence neighbourhood. In addition, this approach builds on the innovations established along the Central Waterfront to date. Together these efforts strive to create an experience around a slip unlike any other in Toronto, with a remarkable sense of arrival from the north, direct access to the lake, and a diverse blend of indoor and outdoor uses for all seasons.



### Quayside's public realm

- 1 Parliament Plaza
- 2 Silo Park
- 3 Parliament Cove and Slip

## New community spaces connected to Lake Ontario

The heart of the public realm in Quayside is the Parliament Plaza, Cove, and Slip area, which brings together a series of public spaces between Lake Shore Boulevard and Lake Ontario, from Small Street to Silo Street.

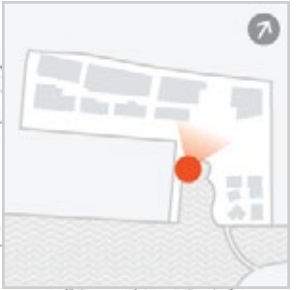
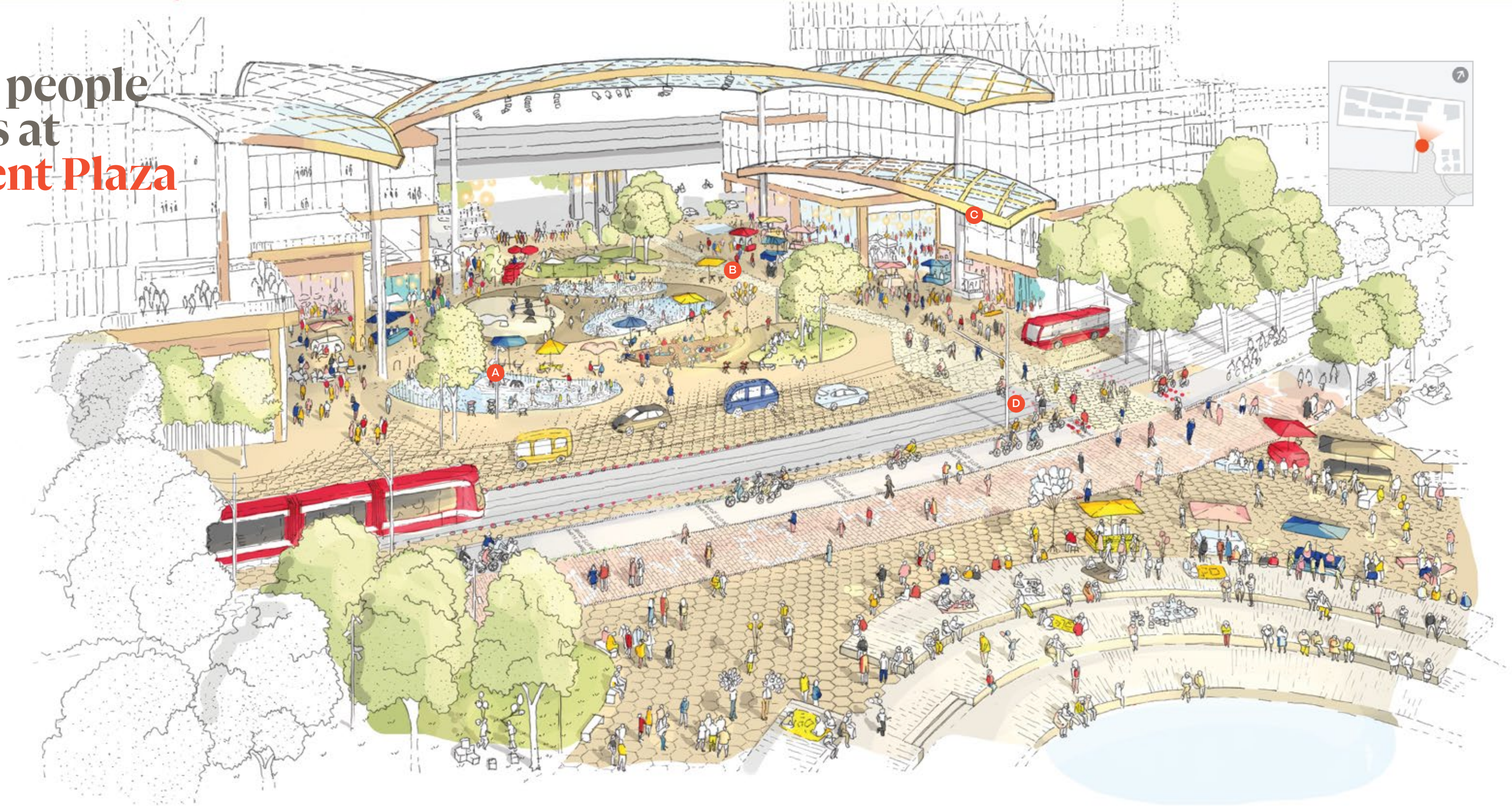
Each space has a unique character and programming potential. [Parliament Plaza](#) itself is a flexible space well-suited for markets, public art installations, all-ages play, and events that integrate with surrounding buildings — all made possible by the closure of Parliament Street to vehicles. This emphasis on arts and culture builds on the precinct plans that envisioned a sculpture garden adjacent to Parliament Street.

The plaza design is complemented by recreational and social infrastructure uses to the south, including the Bayside Community Centre, the greenery of [Silo Park](#), and a school amid the collection of Site 5 buildings near the lake's edge. These areas are directly connected with [Parliament Cove](#), allowing for seamless pedestrian movements between the community centre and Silo Park as well as direct access to the water for marine or cultural uses (such as an amphitheatre that encircles a floating stage).

The western side of [Parliament Slip](#) remains a reinforced dock wall and provides easy access to marine transit; the eastern side has floating structures for additional water-based programming. A floating walkway also begins on the eastern side of the new bridge, establishing expanded space for ecologies and water uses up through the Keating Channel.

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# Drawing people outdoors at Parliament Plaza



The proposed 6,000-square-metre Parliament Plaza would provide a stirring entrance to a reimagined waterfront, drawing people through a vibrant open plaza towards Parliament Slip to experience the water in exhilarating new ways. Parliament Plaza

would fulfill the need for spectacle, through its innovative art installations, as well as the need for convenience, through the provision of food and goods from a bustling group of small vendors and shops lining the plaza's edge.

**A Interactive water features.** Visitors entering Parliament Plaza from the north would be greeted by interactive water features the moment they cross Lake Shore Boulevard. The flexible plaza space is designed to transform from an active water play space into a site for art installations through a dramatic lighting system and technology that can manipulate the water into mirror-like stillness, fine mist, splash pad, or dry zone.

**B Ground-floor activation.** The stoa surrounding Parliament Plaza would be filled with shops, pop-up booths, maker spaces, cultural installations, and other uses that can spill out onto the plaza, creating a lively market destination. These stoa spaces would be connected to a series of pedestrian pathways that begins at Yonge Street and runs parallel to Queens Quay, culminating at Parliament Plaza.

**C Outdoor comfort systems.** Sidewalk Labs plans to deploy innovative weather-mitigation systems that would make outdoor spaces such as

Parliament Plaza comfortable for 35 percent more hours throughout the year, compared with conventional development.<sup>57</sup> The additional days for programming — which could support outdoor markets, movie festivals, art installations, and more — would create a more vibrant street life that also yields direct economic benefits. An overhead canopy would span the plaza, offering protection from wind, rain, and snow, as well as providing shade on sunny days. The canopy would be equipped with rigging and power mounts, enabling varied installations.

**D Slow zone.** Parliament Plaza would feature a designated slow zone in which the light rail, vehicles, cyclists, and pedestrians all share space while travelling at low speeds (10 km/h). Modelled on shared plazas from Amsterdam (Dam Square) and Nice, France (Place Masséna), this zone would ensure connectivity across the site while still allowing for a safe, vibrant plaza.

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# Facilitating recreation for all ages at Silo Park



The proposed 5,000-square-metre Silo Park — framed by the Victory Soya Mills silos and sheltered by abundant trees — would be the green heart of Quayside. The park would be seamlessly connected by bridges to a community centre at Bayside,

creating a lively mix of indoor and outdoor recreational facilities. The Silo Park plans fulfill the need for gathering via bookable community spaces, as well as for all-ages play, through multi-generational recreational opportunities.

**A All ages play-scape.**

A play-scape would consist of such activities as children's nature play, adult-scale swings connected to sound and light, exercise equipment for all ages, skateboarding surfaces, and space for other active sports. This intergenerational design is intended to create public space that is inclusive for everyone.

**B Multi-sport area.**

A multi-sport recreation area would use lights embedded in the ground to reconfigure the field to accommodate a variety of interactive games, including basketball, ball hockey, tennis, pickleball, and futsal.

**C Abundant tree canopy.**

More than 430 trees would be planted throughout Quayside.<sup>58</sup> Silo Park would be densely planted with trees designed with a “forest patch” strategy that combines diverse species of tall trees with smaller bushes and plants to promote natural regeneration, adaptive resilience, and support for pollinators. Plant health would be monitored by a digital maintenance system capable of providing park officials with real-time alerts about landscaping and watering needs.

**D Experimental Zone.**

Sidewalk Labs is working with Toronto's Indigenous community to design and program an Experimental Zone, guided by principles around environmental history, cultural history, place and tradition, and respect for nature. Programming would change across the seasons: in colder weather, the area could host a design competition for local Indigenous artists to develop innovative structures for winter gatherings; in warmer weather, it could host student projects that use digital media to add a layer of cultural interpretation, storytelling, and learning into the landscape.

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# Connecting people to the water at Parliament Slip



Parliament Slip and a new Parliament Cove would provide direct access to the water for a range of activities. The promenade is designed as a place to walk and linger, encouraging people to picnic as the water laps onto the shores, gather around fire pits, or travel

across a new pedestrian bridge to visit the stunning new parklands of Villiers Island. Parliament Slip fulfills the need for serenity through its expansive view of Lake Ontario, as well as the need for discovery through water-based programming.

**A Parliament Cove.**

A set of floating wooden terraces would bring people directly down to the water and an intimate cove. A floating stage could enter this area, enabling water-borne performances. The shoreline to the east side of the slip would be naturalized, restoring aquatic habitat and supporting biodiversity.

**B Floating walkway.**

Along the promenade, on both the west and east sides of the slip, a floating walkway would bring people down to the water and curve around

the edges of the slip to provide direct access to the Inner Harbour. Comfortable seating, aquatic plantings, and stations for kayak rentals and water taxis would create opportunities for contemplation and active transportation on the water.

**C Floating spaces.**

Along the restored ecology of the Parliament Slip shoreline, a planned series of floating structures could provide space for artist workshops focused on the creative exploration of nature, technology, and urbanism, as well as opportunities for visitors

to picnic, sunbathe, or just gather and linger on the water. One structure would house an ecological research station, providing opportunities to conduct water-based research studies.

**D Boardwalk bleacher.**

At the southern edge of the slip, a six-tiered bleacher with seating for approximately 200 people would surround the dock wall, providing further opportunities for people to gather and connect with the lake.


# Planning a dynamic arts and cultural landscape

Quayside's signature neighbourhood spaces are designed with public art and creative culture at their core, providing expansive digital, physical, and programmatic infrastructure for ongoing creation, expression, and dialogue from diverse voices.

Art and creative culture are central to creating an inclusive and participatory public realm. Today, the thoughtful integration of emerging technologies into the urban environment offers new and engaging ways to further support community identity and social connections.<sup>59</sup> Despite public art's immense potential, in many neighbourhoods it remains limited to static modern sculptures. The Quayside plan aims to shift this paradigm.

All public spaces in Quayside would have access to high-speed connectivity, power, mounts, projectors, speakers, lighting, water, and storage — the vital

ingredients to making emerging forms of participatory public art easy. This shared infrastructure would enable public art to flourish: from an Experimental Zone for Indigenous placemaking in Silo Park, to water-based performances in Parliament Cove, to workshops on floating structures in Parliament Slip, to projection mapping on building Raincoats along Queens Quay, to an arts hub with access to fabrication and prototyping tools, to the installations and performances in the underpasses, Parliament Plaza, and Parliament Cove illustrated on these pages.

In Quayside, a proposed new non-profit entity called the Open Space Alliance would have a robust programming budget to support ongoing community arts programs, design competitions, and residencies for local and international artists and technologists. 

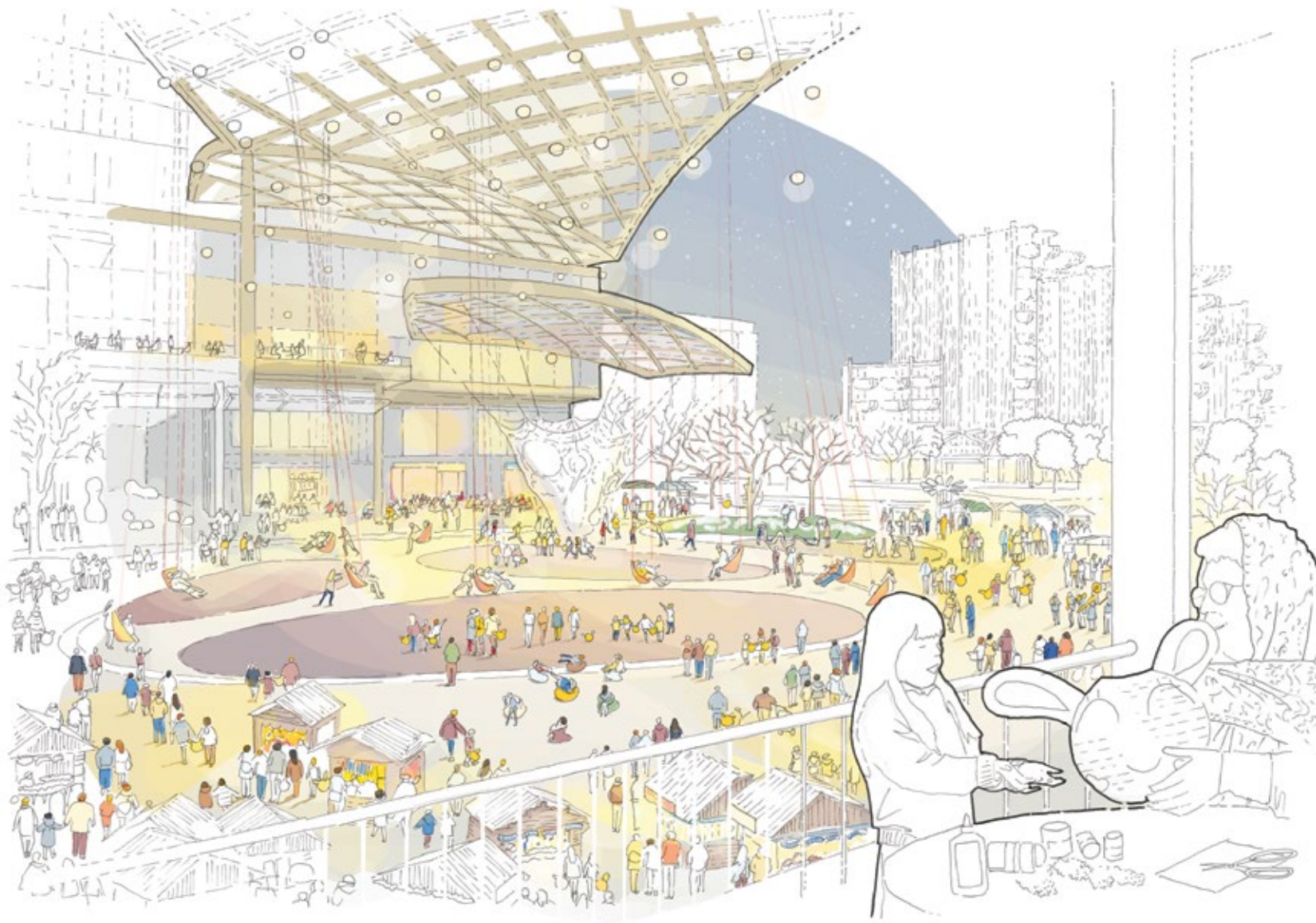
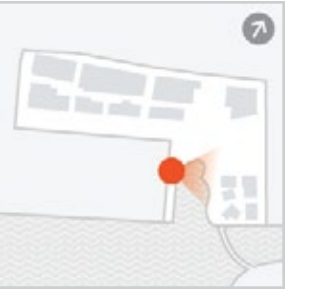


## Underpass installation.

The public art experience would begin in the underpasses on Parliament Street north of Lake Shore, where what currently is a damp, dark tunnel can become a multimedia installation of projection and sound that evokes the arrival on the waterfront.



See the "IDEA District" chapter of Volume 3 for more details on the proposed Open Space Alliance.



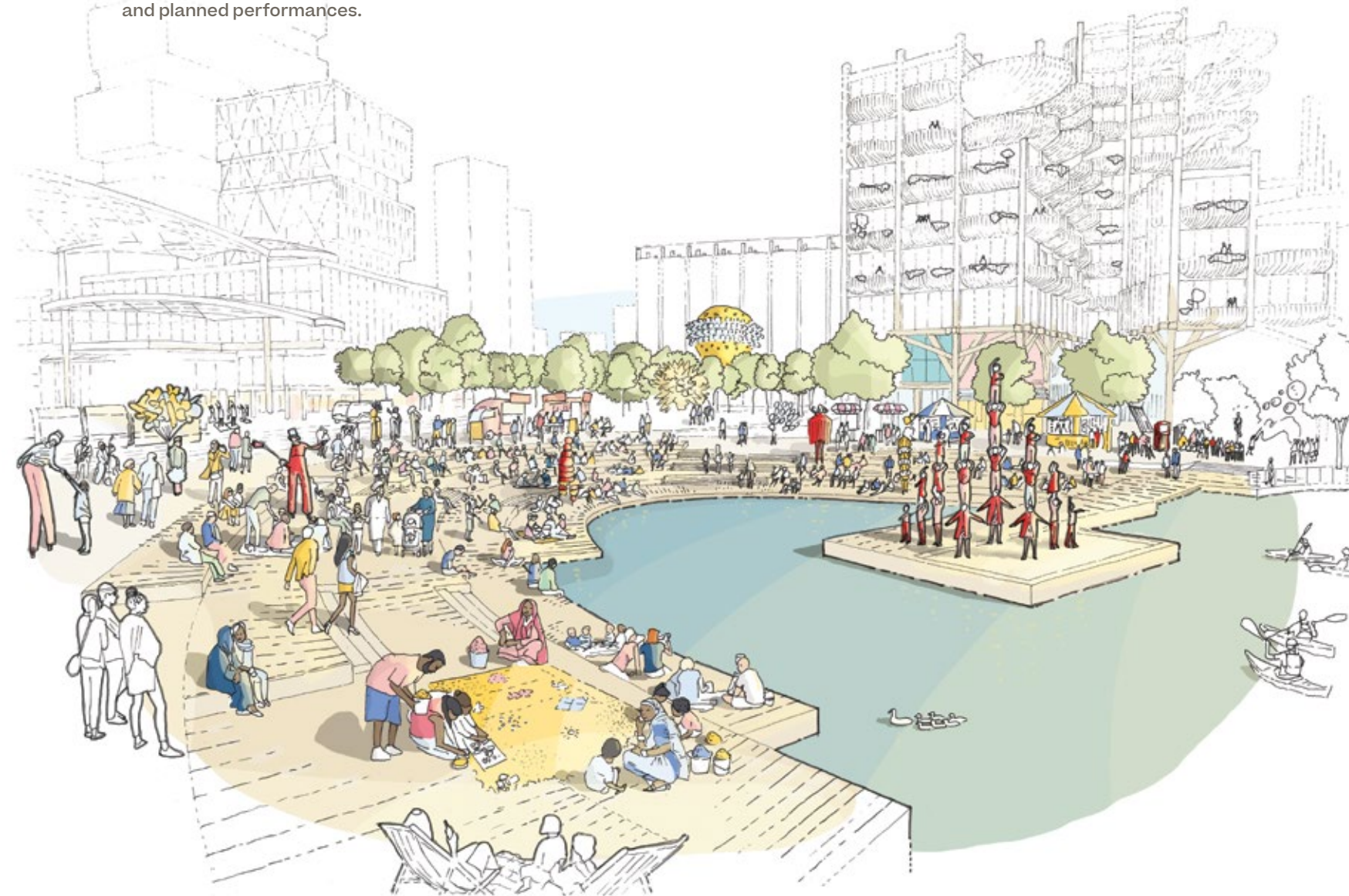
**Parliament Plaza.**

The planned centre for neighbourhood culture is Parliament Plaza, designed as a year-round open-air theatre where artists can create immersive, multi-sensory installations using flexible infrastructure. The ground can provide mist, the building facades can be opened or

closed, and a canopy can provide rigging to support the suspension of materials. Imagine a forest of large-scale swings hanging for all to enjoy, each swing triggering sounds recorded on Lake Ontario, harmonizing when people move together.

**Parliament Cove.**

An intimate amphitheatre would encircle Parliament Cove, with a barge providing opportunities for spontaneous and planned performances.



# Reimagining ground floors as diverse, vibrant, adaptable spaces

The Quayside plan supports a variety of retail, office, production, and community spaces within its ground floors through flexible floor plates that connect directly to the street to create a larger, livelier public realm.

Summer



**Retractable facades.**  
Some facades would include retractable glass door systems that can open easily to create a more seamless public realm.

22°C – Fully conditioned stoa

24°C – Semi-conditioned stoa

28°C – Outdoor unconditioned



**Building Raincoats.**  
Buildings in Quayside would have Raincoats that can protect against rain, snow, wind, and sun.

0°C – Outdoor unconditioned

12°C – Semi-conditioned stoa

Vibrant ground-floor spaces are key to a neighbourhood's energy and convenience. But changing market forces — from online shopping to rising construction costs — and rigidly sized storefronts are limiting the variety of tenants who can survive. Toronto's waterfront has started to address this challenge through its ground-floor animation agreements, and the Quayside plan aims to build on this progress by devoting the lower two floors to flexible stoa structures that promise a return to the bustling public markets of an earlier time.

Stoa's adaptable spaces and a digital leasing platform can support a broad mix of pop-ups, arts and cultural installations, community uses, small businesses, maker spaces, and markets, alongside established retail tenants.<sup>60</sup> Stoa is designed with the ability to open directly onto the street and be protected by innovative weather-mitigation strategies, creating seamless indoor-outdoor spaces that strengthen the neighbourhood's sense of activity and community.

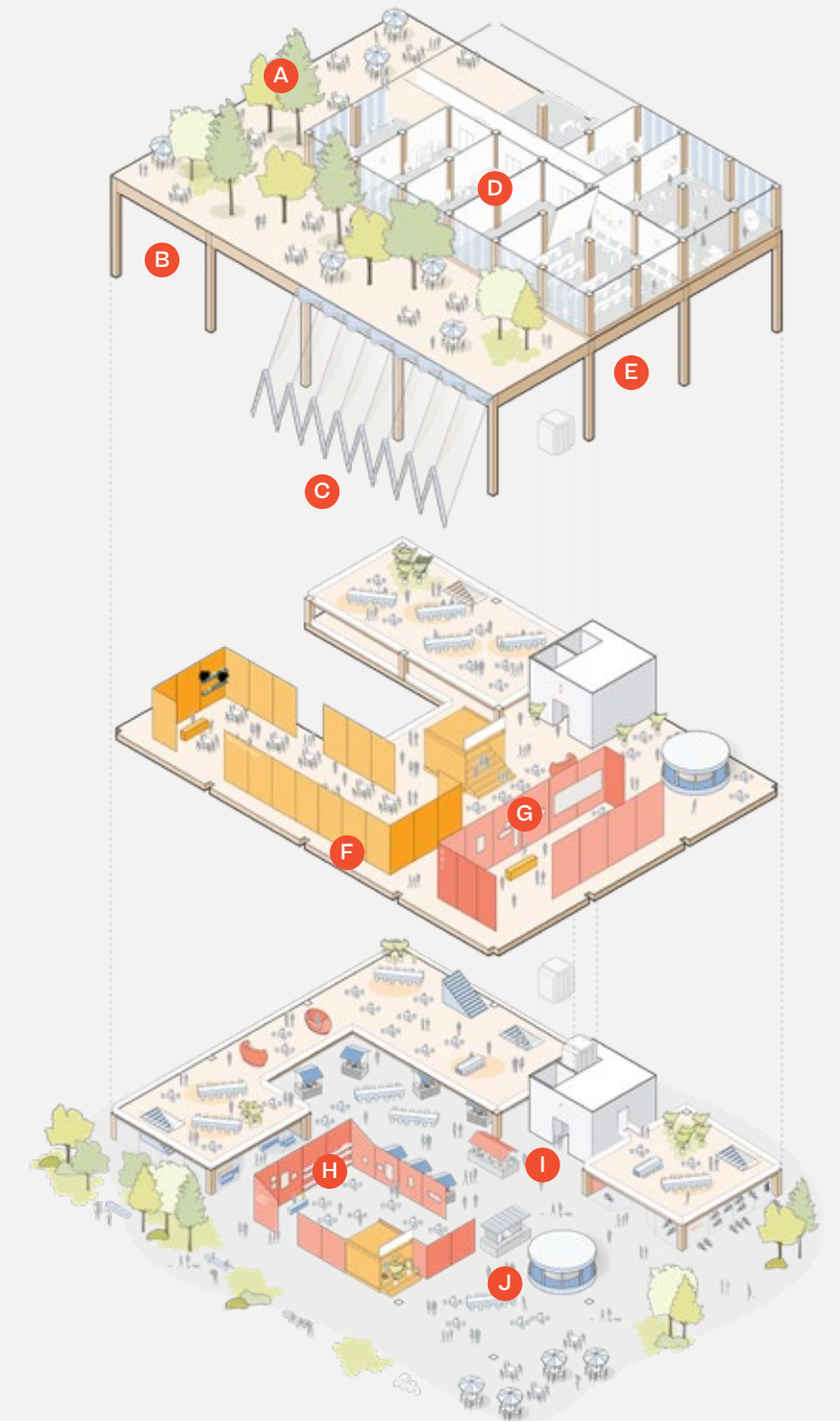
Winter



22°C – Fully conditioned stoa

## Quayside stoa: Floors 1 and 2 and rooftop

- A Rooftop terraces
- B Spacious column bays 40-by-40 feet
- C Building Raincoats
- D Modular ceiling grid with lighting and AV plug-ins
- E Exposed timber beams and walls
- F Double-storey ceiling height six metres per floor
- G Deconstructable partitions 50% of walls
- H Utilities wired through flexible baseboards
- I Polished concrete floors
- J Movable kiosks



### Providing a flexible shell for exploration.

For many businesses, a lack of customizable ground-floor spaces and high fit-out costs prevent them from adapting to a changing market — or opening at all. Stoa's physical structure is designed to remove those barriers by creating adaptable spaces that can be reconfigured quickly and affordably.

A flexible floor configuration of deep column bays enables a marketplace thrumming with 100-square-foot stalls to coexist beside 6,500-square-foot anchor tenants that provide long-term neighbourhood stability. Interior walls are designed and wired for quick, low-cost transformations. With this design, Sidewalk Labs estimates that the costs associated with structural elements

of renovation, like moving walls and electrical wiring, would decline by 50 percent.<sup>61</sup> Open areas for public events, casual gathering spots, and community hubs could be threaded throughout stoa spaces.

The Quayside plan calls for stoa spaces in Sites 1 to 4 to exist on two floors and stoa in Site 5 to occupy one floor.<sup>62</sup>



# Supporting a wide array of tenants

In Quayside, stoa can transcend the traditional retail strip to become its own diverse micro-neighbourhood. That means integrating pop-up markets, civic gatherings, arts and

cultural events, health services, work stations, community classes, and even light production facilities alongside traditional stores and everyday essentials.



## Weaving publicly accessible space throughout Quayside

The public realm typically ends at the walls of the buildings lining the streets. In Quayside, stoa would become an extension of the sidewalk, inviting pedestrians to wander through public markets, galleries, and community hubs, past plazas, production spaces, and shops, and connect through these interior walkways to the street on the other side.

Expanding the public realm network into the lower floors of buildings also creates new opportunities for exploration and connection. As people are drawn through the site along new pathways that weave through, between, and around buildings, they can encounter the range of diverse experiences and new chances for discovery that are the strength of thriving cities.

### Key

- Loading and operations space
- Publicly accessible space

# Four types of programming on Quayside's lower floors

## First floor



## Second floor



- Retail, food, and beverage.** Local retail and restaurants play an essential role in the street life of a community, satisfying basic needs (as in the case of grocery stores), offering outlets for creativity (artisan crafts), and facilitating connections (cafés). On Day One in Quayside, more than half of stoa space would be devoted to retail, food, and beverage, which can range from seasonal stalls to restaurants and clothing stores to commissary spaces.
- Production.** Production space has a vital role in the modern economy. In Quayside, artisan workshops, commercial kitchens, 3D printing, and other forms of light production would animate studios throughout stoa, with opportunities to sell wares to the public. Real-time building-code tools would help ensure that these facilities can coexist without excessive noise or nuisance impacts on surrounding tenants (see Page 77).
- Office space.** Stoa is designed to offer a variety of professional spaces, primarily on the second storey, including co-working stations for individuals and offices for businesses. Co-working stations could be permanent or operate during certain hours, similar to the Toronto startup FlexDay, which converts restaurants and bars into work spaces before the evening rush.
- Social infrastructure space.** Quayside's community spaces include the proposed Care Collective, which would provide health and well-being services and programming, as well as the Civic Assembly, which would become the hub for the community, arts, and cultural gatherings. These spaces would exist near cultural, educational, and recreational areas to nurture the interactions that build relationships and forge a healthy, vibrant, and engaged community. (See Page 216 for more information about the Care Collective and Civic Assembly.)

# Preparing for the future of retail

**Market forces, such as online shopping, are changing the future of brick-and-mortar businesses. In Quayside, stoa space will offer retailers the chance to experiment with different physical, operational, financing, and leasing models.**

As part of its planning process, Sidewalk Labs interviewed 30 business owners about the challenges facing the retail sector, from lengthy

launch timelines that drive up costs, to inflexible spaces that cannot adapt to changing market needs, to storage constraints that put small businesses at a disadvantage.

Stoa's adaptable design can help address these challenges by supporting entrenched, beloved businesses as well as up-and-coming entrepreneurs. Its flexible floor plate enables stores to evolve in response to market forces

while reducing economic and logistical barriers for aspiring retailers to test concepts. A proposed digital leasing service, Seed Space, would show all available spaces, possible configurations and fit-out options, leasing durations and terms, and potential matches for co-tenancy.

## Low-risk physical space.

Opportunities for shorter lease terms (one-month versus traditional 10-year leases) and alternative leasing models (charging tenants a percentage of their sales versus a fixed rent) — all easily accessible through Quayside's leasing service — would help businesses open and evolve.



## Business collaboration.

Adaptable spaces and a digital leasing platform enable businesses to connect with other businesses to exchange tips and discuss best practices, plan joint programs and marketing efforts, or even find co-tenants — for example, a flower shop could connect with a pop-up jazz club for evening events.

**“We are actively looking for ways to partner with complementary businesses. The more integrated the experience we offer, the better.”**

— Canadian General Merchandise Retailer



## Integrating on- and offline.

Online retailers are turning increasingly to temporary spaces as a way of spreading the word about their brand or meet customers where they live. In Quayside, online businesses would be able to rent small spaces to meet customers in a store and to match those rent times to promotional campaigns.

**“We get reasonable traffic online, but they only really become our customer when they get to know us in store. We aren't sophisticated enough to start that conversation online.”**

— Toronto Apparel Retailer



## New inventory strategies.

Quayside's on-site storage service at the logistics hub could free up retail stores to act more like showrooms, with the ability to send products directly to customers who live in the neighbourhood (via the neighbourhood's automated freight system) or to those who live elsewhere (via trucks from the logistics hub).

**“Managing backroom inventory can be a challenge. It requires constant monitoring and can take associates away from the sales floor where they could be helping customers.”**

— Multinational Merchandise Retailer

## Startup support

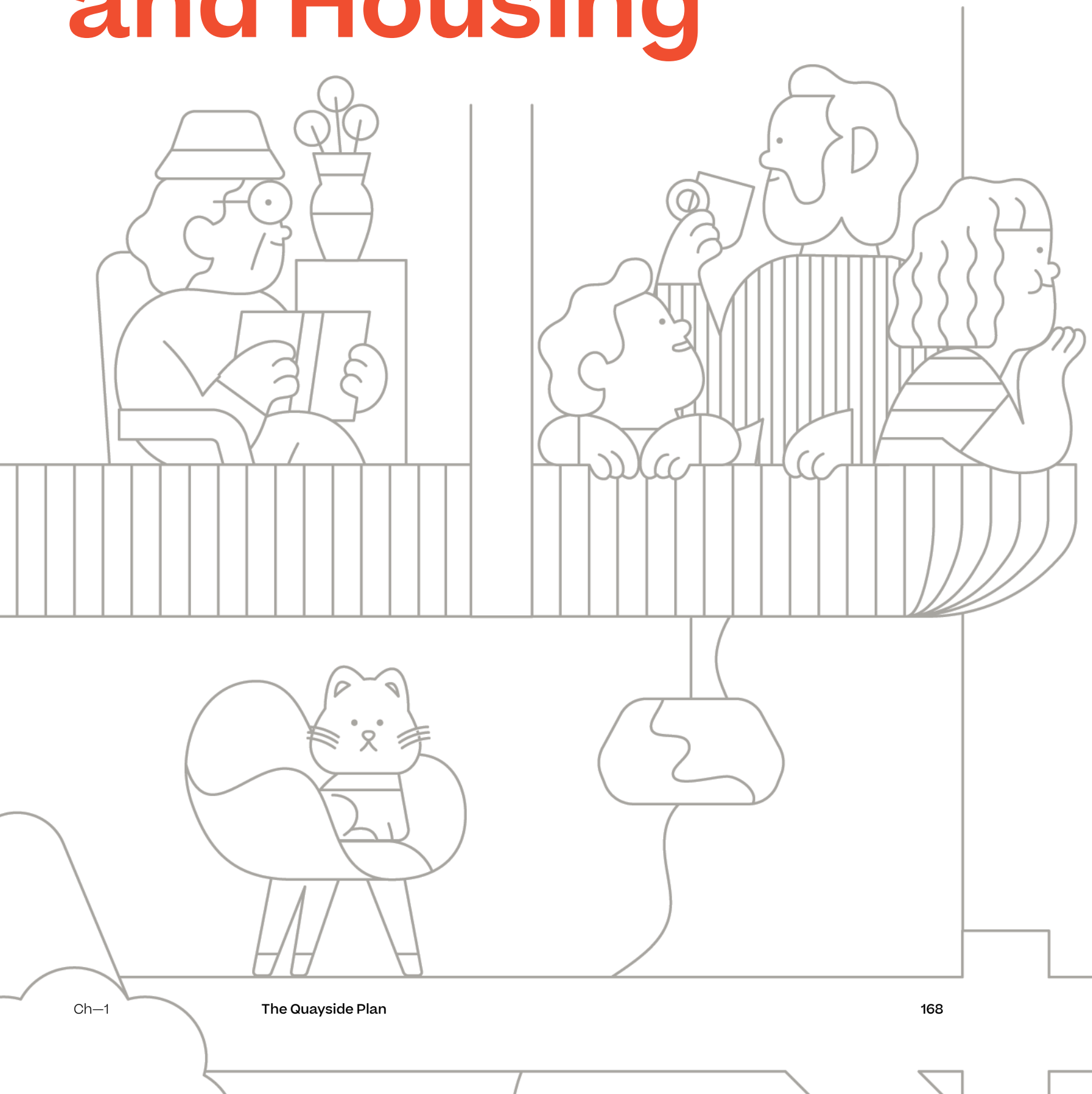
# Incubating small businesses

Aspiring entrepreneurs all have different dreams, but they face common challenges: limited capital to cover startup costs, operating expenses, and long-term leases, and a lack of experience navigating logistical and bureaucratic hurdles. Certain groups face additional barriers as they attempt to enter fields where they are underrepresented and potentially overlooked.

To help these groups thrive, Sidewalk Labs plans to issue a Request for Proposals for partners to launch and operate a small business incubator designed to provide training and support to small business entrepreneurs across the Greater Toronto Area.

A portion of stoa space in Quayside would be reserved for these businesses at below-market rent, enabling entrepreneurs to test their ideas and sharpen their business skills in a low-risk environment. Participants would also have access to shared fabrication equipment such as 3D printers, laser cutters, and robotic routers in the central community hub called the Civic Assembly (see Page 224 for more details), as well as use of the shared commissary kitchen spaces.

# Buildings and Housing



Sustainable buildings that can be constructed and adapted far more quickly, and a new set of financial and design tools that help improve affordability and expand options for all households.



See the “Buildings and Housing” chapter of Volume 2 for more details on the urban innovations described in this section.

# Building a more affordable and inclusive neighbourhood

Quayside's innovative approach to buildings and housing — including factory-produced mass timber, flexible floor plates, and an ambitious affordability program — would create a neighbourhood that is more inclusive and responsive to evolving community needs.

For two years running, Toronto has hoisted more construction cranes than any other city in North America.<sup>69</sup> But to remain a leader in openness and inclusion, Toronto must continue to push for greater levels of affordability and economic opportunity during the building boom. That goal involves helping developers meet new demands for housing by completing projects more quickly; creating true live-work

communities that host a lively mix of homes, offices, shops, and services; and finding new ways to expand support for affordable housing.

The 2.65 million square feet of built space in Quayside can forge a new paradigm. Quayside would be the first neighbourhood built entirely of mass timber, an emerging material as strong and fire-resistant as steel, but easier to manufacture and far more environmentally sustainable. Flexible floor plates can accommodate multiple uses at once, enabling a complete community that provides every need — housing, jobs, shopping, childcare — within a short walk. When coupled with an ambitious, wide-ranging affordable housing program, this plan can recreate the kind of welcoming, integrated Toronto community that has defined the city for decades.

## A more welcoming neighbourhood

Quayside's buildings are designed to foster a welcoming spirit where everyone can find their place: from the warm, wooden construction of varying heights that top out at around 30 storeys; to the open, flexible ground-floor spaces and commercial offices designed to nurture aspiring entrepreneurs alongside established businesses; to the array of housing options that support a wide range of lifestyles and incomes.

## A more affordable neighbourhood

The Quayside plan creates a more affordable community for more people. A new factory-based building approach can accelerate project timelines while reducing costs and uncertainties for developers, helping them create mixed-income housing. Quayside's proposed housing units leverage more efficient designs and off-site storage to further reduce costs. But to create a truly inclusive community, additional action is needed, so Sidewalk Labs proposes to devote 40 percent of Quayside's housing stock to below-market units.

## A more responsive neighbourhood

Quayside's buildings are designed to support the community's evolving needs. Flexible floor plates and movable walls enable residents and businesses to adapt their spaces quickly and inexpensively as their situations change — or to shift uses entirely. By accommodating this mix of housing, retail, offices, light production, and community spaces, every resident can meet their needs within a short walk. As described on Page 77, a proposed digital building code system could help ensure that this vibrant mix of uses can thrive without creating nuisances, such as noise.



Site 1

Site 2

Site 3

Parliament Plaza

Site 4

Silo Park

Site 5

Keating Channel

Villiers Island

## Achieving sustainable construction with mass timber

The Quayside plan calls for all buildings to be made from an emerging material known as mass timber, which is as strong and fire-resistant as steel, easier to manufacture, and dramatically more sustainable.

While most mid- and high-rise buildings in cities are currently constructed out of steel or concrete, these materials come with downsides. They are increasingly expensive — in Toronto, steel prices rose 16 percent in 2017 alone<sup>64</sup> — and they are difficult to produce, assemble, and transport, leading to lengthier, costlier, more disruptive construction projects. They also bear a steep environmental cost: concrete and steel emit CO<sub>2</sub>, whereas timber sequesters CO<sub>2</sub>.<sup>65</sup>

Cities like Toronto have started to explore a promising alternative: an emerging type of engineered wood called mass timber. Mass timber has been successfully tested in Toronto and is particularly well suited for factory-based construction, an approach in which building parts are created in an off-site facility and shipped to a site for faster assembly. For Quayside, Sidewalk Labs proposes to advance these efforts by supporting the launch of a factory in Ontario that would process mass timber building parts, reducing construction timelines by as much as 35 percent<sup>66</sup> and catalyzing a new industry around this sustainable material.

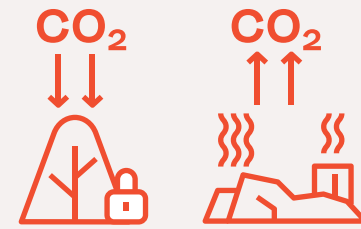
## Accelerating construction through modular buildings

The Quayside plan uses factory-produced mass timber to construct buildings faster and more sustainably, without sacrificing safety or architectural excellence.

Virtually every construction project suffers from a complicated construction process that faces logistical challenges from heavy materials like concrete and steel, relies on significant on-site fabrication work that generates considerable waste, and requires going back to the design phase for aspects of a plan that fail to meet code. As a result, delays drive up costs and tie up streets with disruptive noise and blockages. Factory-produced buildings can streamline the process but have traditionally resulted in limited designs.

Quayside plans to achieve a new standard for modular construction that creates unique, efficient, and sustainable buildings. An off-site fabrication process — with each building component pre-reviewed by the city — would reduce uncertainty in the construction process, accelerate assembly, reduce waste, limit neighbourhood disruption, and improve site safety. A customizable library of building parts would enable architects to benefit from these efficiencies while still creating radically different designs.

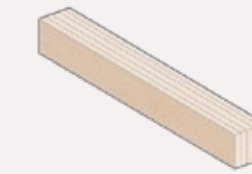
**Quayside can be the catalyst for a new, sustainable mass timber industry in Canada.**



**Sustainable material.**  
Forest-harvested timber sequesters carbon, trapping 1 tonne of CO<sub>2</sub> in every cubic metre of wood.

## Timber production and products

The factory would process two mass timber products: cross-laminated timber structural panels (CLT) and glulam beams, each created by combining three to seven layers of wood, milled about 25 millimetres thick.

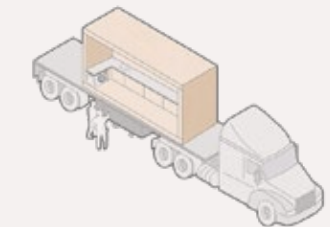
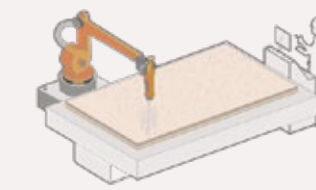


### A Glulam structures.

The wood pieces in glulam beams are glued together with grains in the same long direction, creating superior load-bearing strength. In Quayside, glulam structures (along with CLT floor panels) would be used to develop buildings around 30 storeys tall.

### B CLT panels.

The wood pieces in CLT panels are glued together with grains at perpendicular angles, then compressed into panels that can self-support a 12-storey building.



### C Shikkui plaster.

Shikkui plaster is a Cradle to Cradle certified sustainable material that has a fire-resistance rating comparable to that of drywall and many additional advantages, including health benefits (it is a natural killer of bacteria and mold), faster application times (cutting the time typically devoted to paint and drywall in half when mechanically applied in a factory), and a green waste stream (recyclable as plant-beneficial fertilizer).

### D Efficient shipping.

Factory-produced modular parts are designed to maximize shipping in a standard truck. The lightness of timber allows trucks to be more fully packed, as compared to shipping concrete or steel, reducing the number of site deliveries by 85 percent.<sup>67</sup>

## Library of building parts and digital design

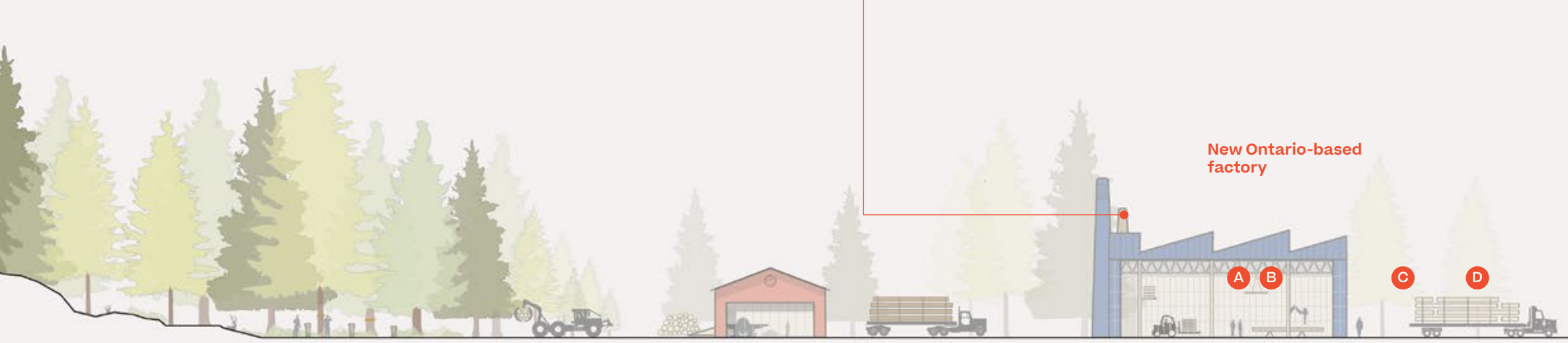
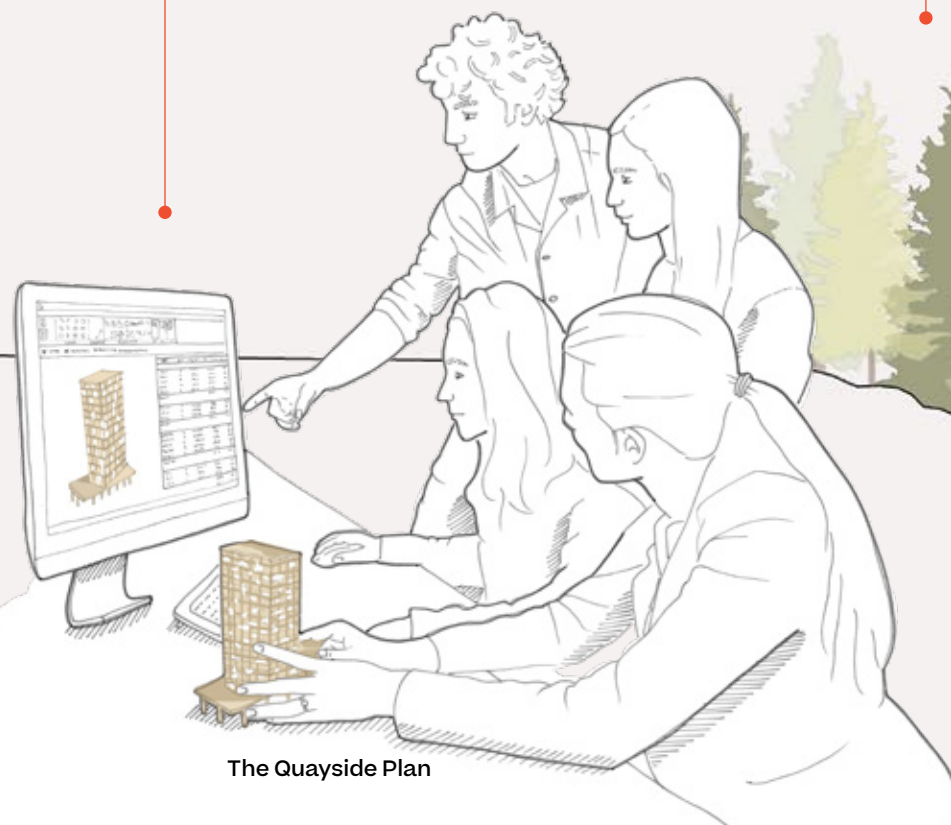
To accelerate project timelines, improve predictability, and reduce costs in a holistic way, Quayside's buildings would draw from a complete library of factory-made building parts that can be customized for each project to allow for a diverse and interesting variety of buildings that achieve design excellence. A digital coordination system would ensure that these parts can be efficiently sourced and fabricated.

## Local sourcing

Spruce trees from the boreal forests of Quebec and Ontario and Douglas fir trees from British Columbia would supply the wood for mass timber construction.

## Ontario-based factory construction

Operating in collaboration with Canadian foresters, sawmills, and other industry partners, a new Ontario-based factory would process building parts out of mass timber, catalyzing a new Canadian industry.



New Ontario-based factory

Well-managed forests thrive

Collaboration with local sawmills

Day 0 to Day 10 – Fabrication starts

## Faster assembly

Quayside's factory-based mass timber buildings can be completed 35 percent faster than traditional concrete construction — including basic structural assembly as well as the installation of all finishes, the connection of all electromechanical equipment, and the execution of all tests.

The reasons for faster completion include the off-site fabrication of tricky building components such as kitchens and bathrooms, as well as modular cores that integrate elevator supports. Building components would be cut into assembly-ready posts, beams, and panels at the factory and fitted with interlocking metal cleat technology that makes it easy to snap parts into place quickly. Additionally, the lightness of mass timber structures would require less extensive foundations.

## Concrete cores

Modular cores that are fabricated off-site and integrate elevator supports can better match the timber assembly timeline, speeding the overall pace of construction.

**Traditional approach:** Cast-in-place concrete cores need to be poured before other components can be assembled, a much lengthier process than modular assembly. Temporary, expensive construction elevators are required to deliver materials.

## Kitchens, bathrooms, and HVAC systems

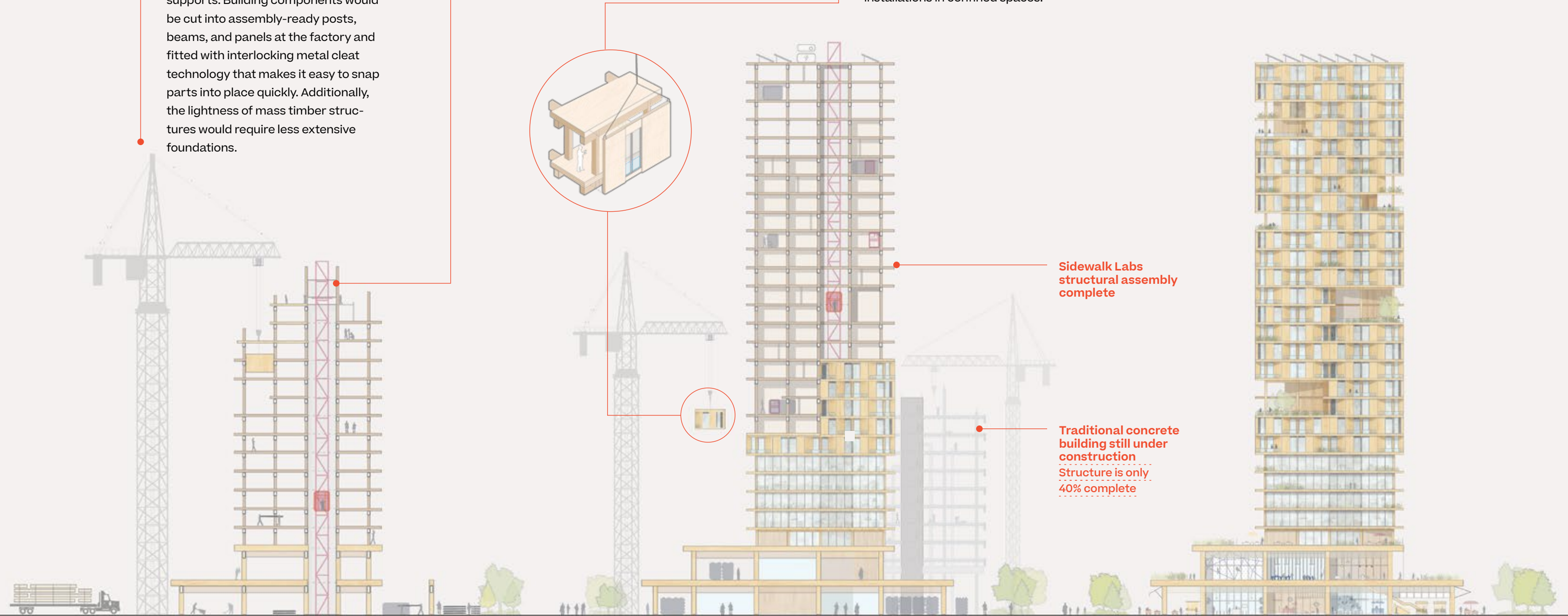
Off-site fabrication of kitchens, bathrooms, and HVAC systems allows for greater quality control, more efficient inspection and commissioning, and faster installation.

**Traditional approach:** On-site installation of kitchens, bathrooms, and customized HVAC systems is a lengthy, complicated process due to multiple trade workers needing to layer in their installations in confined spaces.

Tall timber building completed

# 35%

faster than traditional buildings



Days 11 to 23 – Structural assembly working

Days 24 to 43 – Assembly of modular components

Fully operational at 18 months – Completed tall timber building

# Creating flexible building interiors

Quayside buildings would feature adaptable floor plates and interior walls to improve flexibility, renovation speed, and affordability — helping the neighbourhood evolve.

Adaptable building spaces enable a community to respond more effectively to larger trends and changing markets. But today, renovating a building space to accommodate a new use requires a lot of time and money. Walls are lined with electrical wiring, pipes, sprinkler systems, and other infrastructure, making them difficult and expensive to move. That can make it hard for businesses and residents to find locations that can adapt to their changing needs, whether that is a shop seeking to expand or empty-nesters looking to downsize.

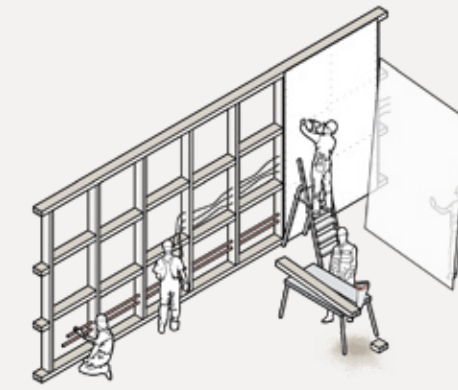
Quayside's buildings would leverage adaptable Loft space to keep pace with the evolution of the neighbourhood and the needs of individual tenants. Loft is designed for flexibility, incorporating reconfigurable floor plates, high ceilings, and movable interior wall systems freed from the traditional tangle of wiring and pipes. These designs enable businesses and apartments to expand or shrink quickly and inexpensively and help spaces shift between commercial and residential uses.

## Innovative building components that enable flexible wall systems

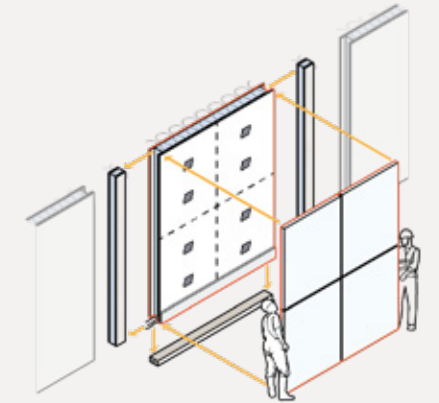
### Commercial.

Renovating a traditional commercial space (left) for a new use can be a lengthy process that requires knocking down walls to move utilities and power systems embedded within them.

In contrast, Loft's flexible interior walls (right) are designed with modular fittings and mounted (rather than embedded) utility and power systems for fast renovation.



Traditional approach

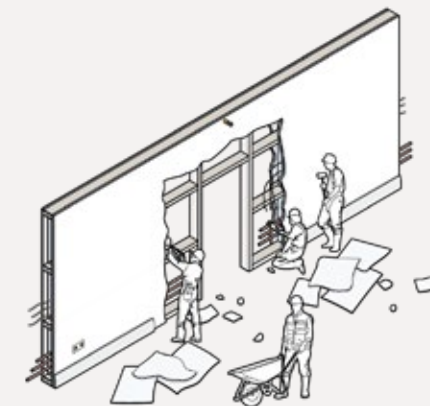


Sidewalk Labs approach

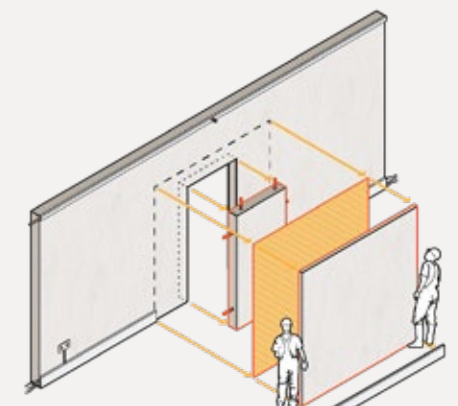
### Residential.

As with commercial spaces, changing traditional residential units often requires substantial renovations that involve knocking down walls and relocating utilities (left).

Residential flexible walls (right) would be fabricated in the factory and arrive at the construction site nearly complete. When a residence needs to expand, the removal of a prefabricated wall section would connect the residence to an adjacent room in hours and would generate no renovation waste.



Traditional approach



Sidewalk Labs approach



### Mist-based fire protection systems.

These systems are equally effective as traditional sprinkler systems yet use 10 percent of the water volume, reducing potential flood damage. Smaller, surface-mounted tubing can be hidden in moldings and easily moved during renovations.<sup>68</sup>



### Low-voltage DC power systems.

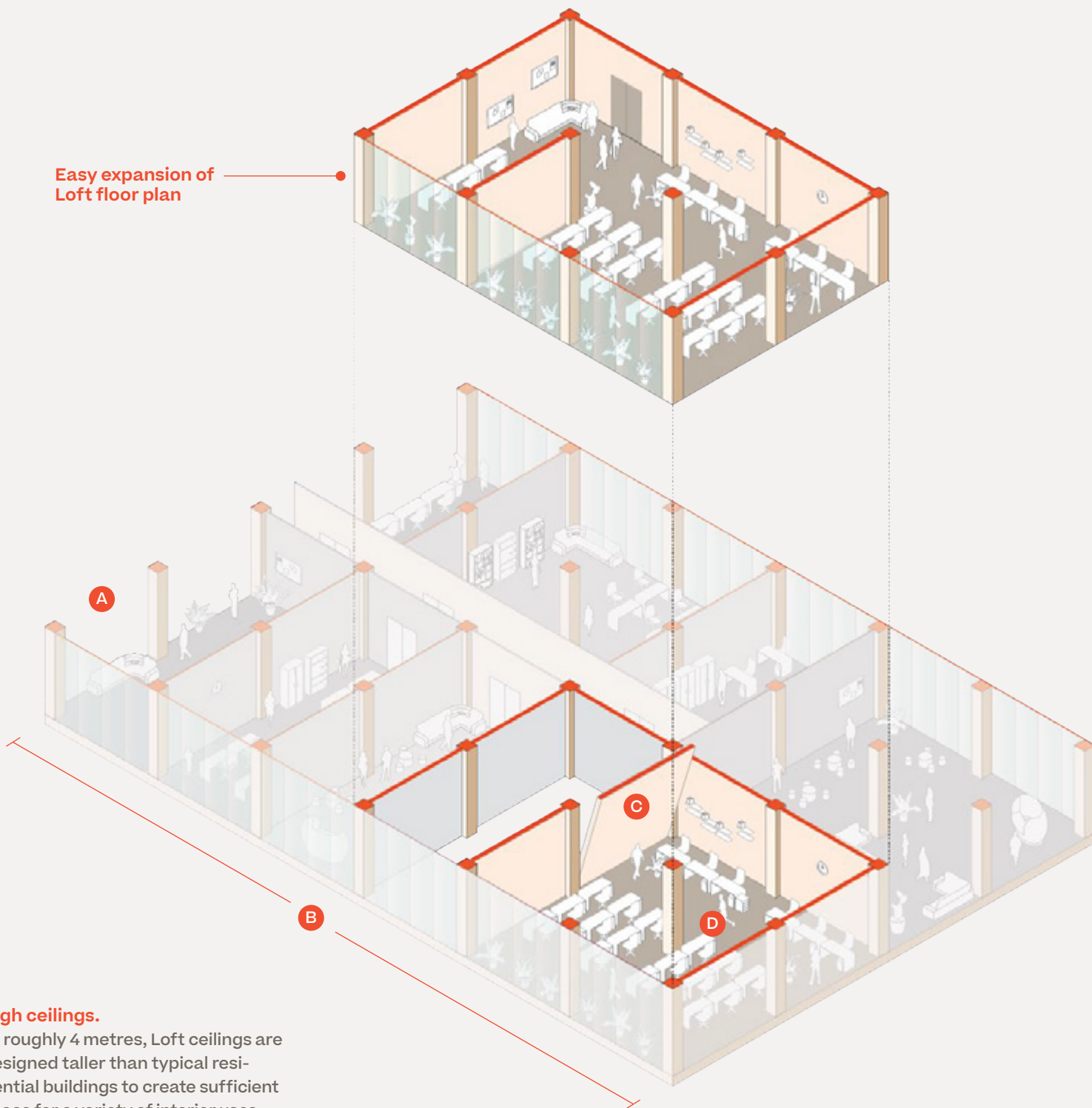
These systems reduce fire risk over traditional AC power systems and can run through the baseboard, allowing for faster reconfigurability of walls. They also require 50 percent less wiring.<sup>69</sup>



### Utilities.

Utilities typically embedded in traditional walls can be moved to floor boards or crown molding, making the interior wall system far easier and less expensive to reconfigure.





**A High ceilings.**  
At roughly 4 metres, Loft ceilings are designed taller than typical residential buildings to create sufficient space for a variety of interior uses, such as art studios, small businesses with lots of inventory storage, or smaller apartments that feel more comfortable with higher ceilings.

**B Long floor spans.**  
At 27-by-33 feet, with few columns interrupting the space, Loft floor spans provide for the flexible arrangement of spaces and make it easier to subdivide the same space for new uses.

**C Loft flexible walls.**  
Equally strong as typical walls, Loft's flexible interior walls are designed to accelerate renovation by hiding power and sprinkler systems instead of embedding them within walls.

**D Modular fittings.**  
Loft's doors, interior walls, finishes, and other modular fittings are designed to be interchangeable across all uses, as well as to be reusable.

## Creating three unique designs from one library of parts

Using the same set of modular components, three global architecture firms developed creative design concepts for Quayside's mass timber buildings.

The library of building parts created and assembled in an off-site factory would include structural pieces (such as glulam beams and CLT panels), exterior facades and windows, interior wall systems, kitchen and bathroom systems, and roofs.

These parts would be produced in sufficient volumes to reduce both costs and sourcing time for developers and contractors. Sidewalk Labs has started to work closely with local regulators to enable these pieces to be pre-approved, creating more certainty around construction timelines and the permitting process. And these parts would still be customizable by architects seeking to deliver distinctive designs.

To help bring the vision for a more affordable and sustainable Quayside to life, three leading architecture firms — Heatherwick Studio, Snøhetta, and Michael Green Architecture — used this library of parts to conduct design explorations that prioritized a mix of uses throughout buildings, energy-efficient building design, and the needs of a diverse population.

As the following pages demonstrate, new developments can achieve design excellence by providing the tools for different architects to reconfigure and assemble these same basic building blocks in thousands of original ways, allowing for truly unique, customizable, and welcoming spaces.



Michael Green Architecture is a leading Canadian architecture firm and an innovator in mass timber building design.  
Credit: Michael Green Architecture



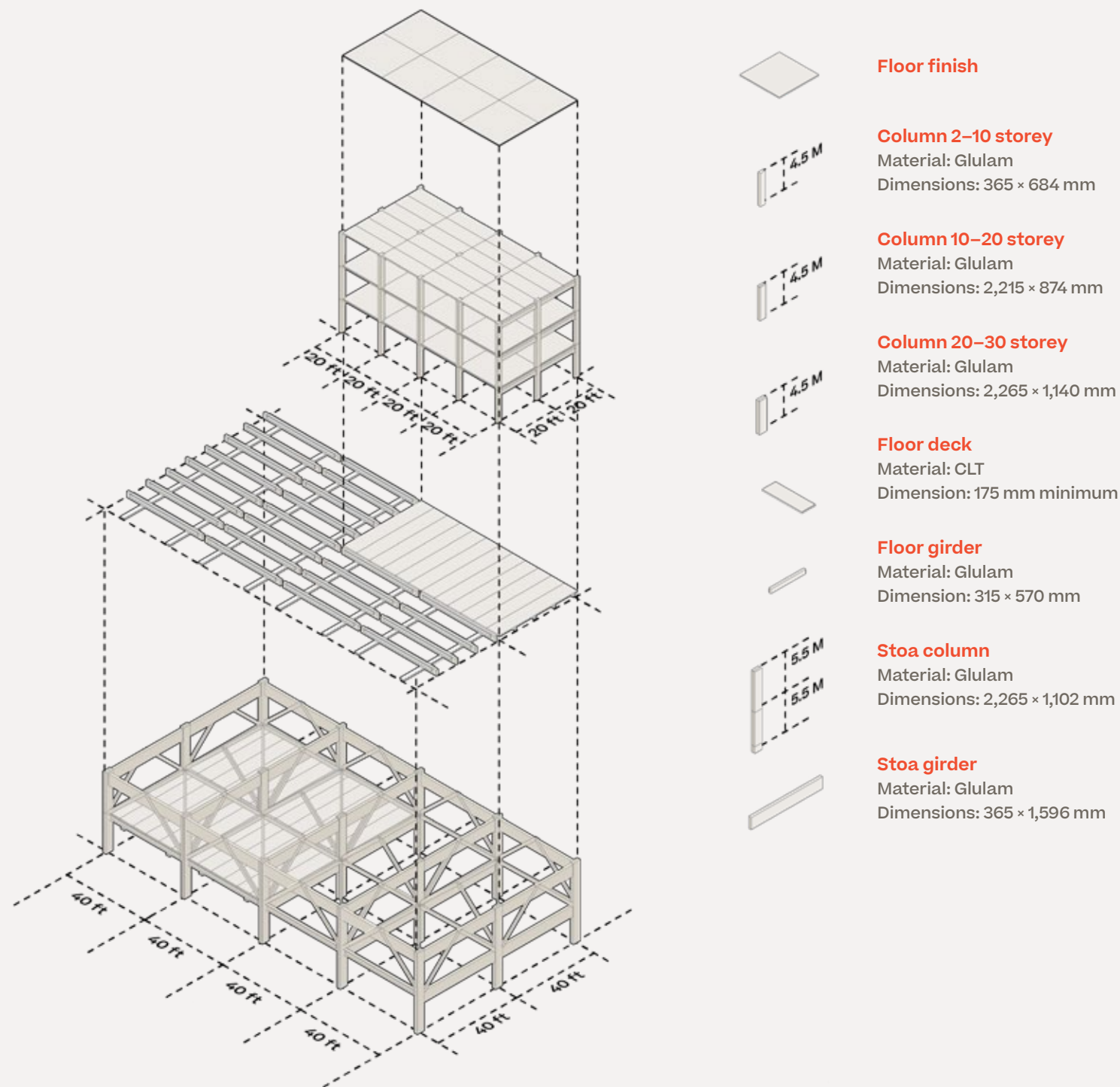
Snøhetta is an international architecture firm that recently completed the Ryerson University Student Centre in Toronto and the new Central Library in Calgary.  
Credit: Snøhetta



Heatherwick Studio is an international firm focused on large-scale architectural, space, object, and infrastructure projects in cities all over the world.  
Credit: Picture Plane for Heatherwick Studio

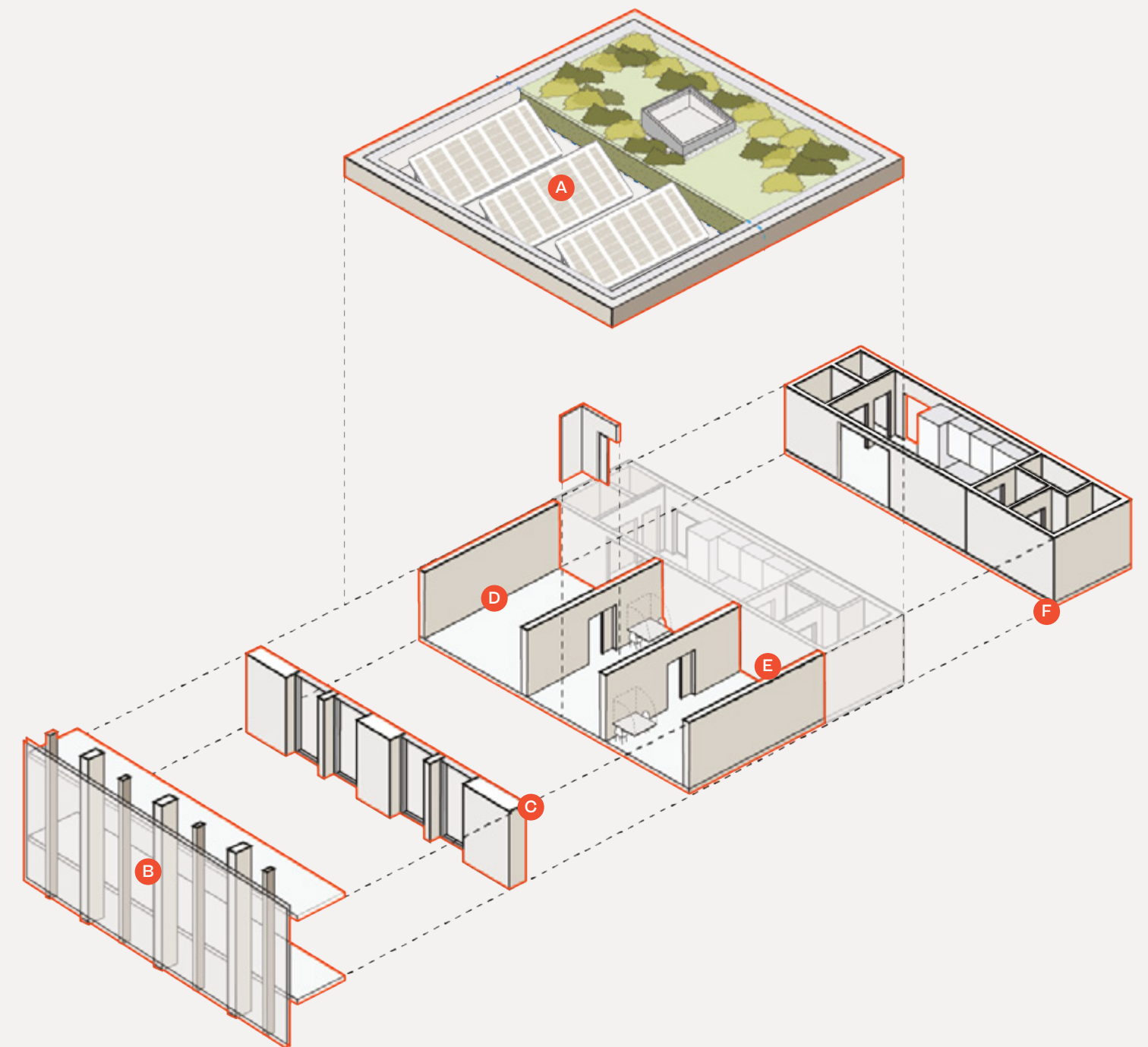
# Using the mass timber library of parts

## Structural components



## Modular building components

- A** **Building roof** options would include photovoltaic roofs that harvest solar energy, green roofs to integrate nature, and “blue roofs” to help manage stormwater.
- B** **Exterior facades and windows** would be part of a customizable facade system that could reflect unique architectural visions.
- C** **Exterior wall systems** could feature many different materials and create an airtight building seal that reduces the need for heating and cooling.
- D** **Interior structural wall systems** could be made out of CLT panels.
- E** **Interior non-structural wall systems** could be clipped into place for faster, easier renovations while remaining as strong as traditional interior walls.
- F** **Kitchens and bathrooms** would be preassembled off-site for faster, higher-quality installations.



# Library of parts interpretation: Michael Green Architecture

Sites 1 and 2



**“Designing with the toolkit allows us to create a diverse range of public and private spaces that enhance the quality and value of our built environment. These new neighbourhoods, composed of wood, natural materials, and garden spaces, strengthen our connection to our homes, communities, and environment.”**

— Michael Green, Principal Architect

Credit: Michael Green Architecture

# Library of parts interpretation: Snøhetta

Sites 3 and 4



“Working with Sidewalk Labs’ toolkit for mass timber structural systems provided a unique challenge. Our design team took advantage of the flexibility and modularity of these systems, such as in the stoa and plazas. Yet we also found ways to unlock new formal possibilities, such as the double-curved form of the commercially programmed ‘hull.’ Finding ways to playfully stretch the model allowed us to create compelling, site-specific architecture from the standardized kit.”

— Matt McMahon, Project Leader



Credit: Snøhetta

# Library of parts interpretation: Heatherwick Studio

Site 5



**“At the beginning of our study, we asked ourselves: can buildings created using a repetitive modular construction system still be expressive and unique? In fact, using the system freed us from the distractions of ‘how’ and allowed us to focus on a design driven by the specifics of the site: the need for an intimate human scale intertwined with the public realm and a vibrant waterfront.”**

— Charlotte Bovis, Project Leader




Credit: Picture Plane for Heatherwick Studio

# Making housing more affordable for more people

The Quayside plan proposes an ambitious affordability program that sets aside 40 percent of units for below-market housing, creating new living opportunities for households across the income spectrum.

For decades, Toronto forged an identity as a city of diverse neighbourhoods, with a flourishing middle class thriving at its spiritual — and geographic — heart. But Toronto's recent success and rising construction costs have forced it to reckon with a challenge faced by many other growing cities: an increasingly urgent affordability crisis. Since 1970, Toronto has tended to sort itself into “Three Cities”: wealthy areas downtown, low-income areas forced to the edges, and middle-income pockets that continue to shrink.<sup>70</sup> Limited housing size options and an aging rental stock have further led to inadequate choices for multi-generational, single-person, and middle-income households.

A mix of incomes, lifestyles, and life stages is a foundational element of urban life, generating a neighbourhood's sense of community and its energy. That is why Quayside's housing program has been designed to set a new standard for inclusive communities. An ambitious affordability program creates opportunities for residents across the income spectrum, including lower-income tenants and middle-income households unable to afford market-rate units or hefty down payments. Every unit is designed to reflect a broader effort to offer a wider range of housing options that enable more affordability across the board and meet the evolving needs of Toronto's diverse households. 

## 40% below-market housing

The Quayside housing plan includes 40 percent of units at below-market rates, outpacing recent development on the waterfront and downtown. This affordability program features unusual depth and breadth, including 20 percent affordable housing, at least a quarter of which would be available to lower-income tenants with “deep” affordability needs and be operated by experienced non-profits. Quayside would also devote 20 percent of units to middle-income Torontonians who are currently struggling to afford market prices.

## 40% family-sized units

Toronto households are evolving — they are increasingly single, senior, and multi-generational — and so are their housing preferences. The Quayside plan offers an array of new housing options, including family-sized units from two to four bedrooms, co-living options that offer more communal supports, and efficient units with flexibility to grow or shrink as needs and households change.



### Efficient unit designs.

Quayside's proposed efficient apartments would be 7 percent smaller on average than equivalent traditional apartments. Reducing unit footprints enables the creation of more units and increases revenue potential, allowing developers to meet greater affordable housing commitments. Clever design maximizes the space in these units, including features like convertible furniture, built-in shelving, and fold-out tables and beds to improve livability.

### Healthy, warm interiors.

Quayside's mass timber buildings would offer warm, inviting spaces with exposed wood and elegant finishes. Exposed wood also unlocks “biophilic” health benefits, such as reduced stress, that have been shown to occur with exposure to nature in cities.

### Off-site storage.

Residents would have access to off-site storage space at the neighbourhood logistics hub, with packages sent and delivered on demand by self-driving dollies and tracked via app.

### Borrowing library.

Residents could summon useful items that are too bulky to store inside an apartment (like ladders) from a borrowing library at the logistics hub, via on-demand delivery.

### Communal spaces.

Residents in co-living units could access communal spaces, such as extra bedrooms for visiting family and friends or large dining spaces for hosting dinner parties.

## 50% rental and 50% ownership

Creating a rental pipeline is an essential element for all cities seeking to build mixed-income communities, offering an entry point that does not require a large down payment and providing more flexibility than home ownership. Estimates suggest that Toronto must build 8,000 rental apartments a year through 2041 to improve affordability.<sup>71</sup>

The Quayside plan includes 50 percent purpose-built rentals to address the pent-up demand in Toronto. In addition to these rentals and traditional ownership options, the Quayside plan explores alternative ownership models, such as shared equity, which allows families to put a down payment on a portion of an apartment, enabling them to build equity with a lower up-front cost.



See the “Buildings and Housing” chapter of Volume 2 for more details on Sidewalk Labs' housing vision.

# Creating housing options across a lifetime

Housing options should be as dynamic and adaptable as the families that live in them. Quayside's wide range of options are designed to meet the needs of residents as they evolve across a lifetime.

Quayside's housing program promises to do more than attract and support a range of people from across the socio-economic spectrum — it also recognizes that, across a lifetime, housing needs, budgets, and aspirations change.

Part of creating a complete community is ensuring that residents can find a comfortable home no matter their stage of life. Whether residents are recent college

graduates, newlywed couples, young parents, empty nesters, or on another life path entirely, Quayside can support their journey with housing that is appropriate and affordable.

These pages tell one hypothetical story for how a resident might grow within Quayside, across the neighbourhood's full spectrum of types and tenures.



## Jaime moves to Quayside after college.

After taking a new job, Jaime searches for an apartment close to the office, a network of friends, and the amenities and convenience of downtown. The catch? Budget. A sleek **ultra-efficient studio** in Quayside — renting for less than other downtown studios — is a perfect fit. In addition to the affordable cost, the apartment features **space-saving furniture and energy-efficient ventilation systems** designed to improve interior comfort.

## Jaime gets married.

Jaime falls in love at a dog park in Quayside. The couple decides to move in together, but even with two incomes they cannot afford to buy a condo. Instead, they put their savings towards a small down payment for a **shared equity unit**. The total monthly cost — 25 percent in mortgage, 75 percent in rent— is

in line with similar one-bedroom rental units but allows them to build equity on the portion they own. The well-designed space offers **exposed wood and off-site storage** for their combined possessions.





**The family has kids.**

By the time Jaime's family welcomes its second child, they have enough savings to explore condo options. With the appreciation from reselling their shared equity unit, they put a down payment on a two-bedroom condo. The family enjoys Quayside's expanded set of

parks, plazas, and public spaces — comfortable year-round thanks to weather-mitigation systems. A few years later, after a next-door neighbour moves out, they are able to expand their unit by removing one of the building's flexible interior walls.



**The couple ages in place.**

In their later years, as empty nesters, the couple downsizes to a two-bedroom unit within a co-living community with shared building spaces that include guest bedrooms for visiting family, as well as other supports for seniors, such as good access to health programs on the ground floor.



# Supporting aging in Quayside

With accessible design, affordable housing options, a network of amenities and programs, and strong social connections, Quayside could be a vibrant community where seniors can age with greater ease and dignity.

Seniors are the most rapidly increasing segment of the population in Canada<sup>72</sup> and Toronto.<sup>73</sup> As reinforced throughout the Sidewalk Toronto public engagement process, the vast majority of seniors want to be able to live well in their own home or community for as long as possible. However, for some, living independently becomes increasingly difficult with age.

To support the ability of residents to age in their communities, Sidewalk Labs partnered with the Futures Team at SE Health, a non-profit social enterprise, to better understand how neighbourhood and home design, alongside social and health programming and services, could maximize well-being later in life.<sup>74</sup>

Building on this research and community feedback, Sidewalk Labs proposes meeting (and whenever possible surpassing) AODA requirements<sup>75</sup> as well as other guidelines, such as the World Health Organization's recommendations for Age Friendly Cities.<sup>76</sup> Sidewalk Labs plans to ensure that 20 percent of residential units are built with flexible fixtures, such as height-adjustable sinks or light switches, that can be easily modified to seniors' physical needs.

Sidewalk Labs also plans to provide emerging housing types, such as co-living, that create communal supports; affordable housing options that can help seniors living on fixed budgets; and affordable space for health and community service providers, so they can be centrally located in the community.



The Quayside plan would support aging through residential unit design, communal supports, affordable housing options, and access to community services, among other approaches.

In addition to nearby access to formal health care and community services, older adults benefit from living in communities with strong social capital, where informal supports can be relied upon. Neighbours Helping Neighbours is an example of a programmatic approach to activating communities to support socially isolated seniors, who are at higher risk of poor health.<sup>77</sup> Currently being developed by the Health Commons Solutions Lab in Toronto, a cross-disciplinary group that co-creates local solutions to health challenges, the initiative will

assess seniors' well-being and respond to identified needs by matching individuals with programs, activities, or services that address their unique needs. Sidewalk Labs is working with the Health Commons Solutions Lab to identify where technology can add the greatest value to this solution by developing and piloting a rapid prototype in 2019.

In these ways, the Sidewalk Toronto project would create a vibrant, dense, multi-generational community where seniors can age with greater ease and dignity.

# Sustainability



**A new standard of sustainability that creates a blueprint for truly climate-positive communities.**



See the “Sustainability” chapter of Volume 2 for more details on the urban innovations described in this section.

# Designing ultra-efficient, low-energy buildings

The Quayside plan includes buildings that feature ambitious energy-efficient construction inspired by the Passive House movement — meeting Toronto Green Standard Tier 4 for greenhouse gas intensity.

Toronto's buildings account for roughly 60 percent of the city's greenhouse gas emissions, predominantly by burning natural gas for heat and hot water.<sup>78</sup> Inefficient building designs — for example, with doors, windows, and exterior facades that leak heat — miss opportunities to conserve energy and improve comfort forcing tenants to compensate by using more energy.

In Quayside, Sidewalk Labs proposes to require that buildings meet rigorous energy-efficient building design standards inspired by the Passive House movement, including high-performing wall insulation, airtight exteriors, and

high-quality windows. Balanced ventilation systems would circulate fresh, filtered outside air year-round. On cold days, this system would transfer warmth from the older interior air to help the cool outdoor air reach the desired temperature with minimal energy use; on hot days, the system would transfer warmth and moisture from the incoming hot and humid outdoor air to the exhaust air, cooling and drying the new air supply and reducing the need for supplemental air conditioning.

Together, these efforts reduce the “loads” of buildings: heating, cooling, ventilation, and other systems needed for people to be comfortable. As a result, Quayside buildings would meet Toronto Green Standard Tier 4 for greenhouse gas intensity — the highest standard available.

## Improving modelling through real-time metering.

Today, a building's energy usage is modelled during the design phase, prior to construction, but rarely revisited once the building is operational. In Quayside, operational building energy would be measured against the original design-level targets, providing invaluable data on the gap between industry-accepted modelling techniques and actual building performance — and helping to improve energy standards.

### A Ultra-insulated.

Smarter installation strategies — such as high-performance windows, doors, fasteners, and facade design — would help the building resist heat loss and preserve interior temperature, like a thermos. They would also help prevent heat or cooling from escaping the building via conductive metal framing (known as “thermal bridging”).

### B Airtight.

Airtight construction reduces the need to heat and cool buildings. Before opening, Quayside buildings would undergo “blower-door” testing to help expose and address air leaks. In blower-door testing, fans are placed in doorways to blow air inside and pressurize the building, which is then measured for how well it holds this new pressure.

### C Air quality and heat recovery.

In Quayside buildings, fresh outdoor air would be filtered and ducted directly into living rooms, bedrooms, and office spaces, while old stale air would be vented out, ensuring high levels of air quality. Ventilation systems would be equipped with “heat recovery” devices that transfer heat and moisture between the warm and cool airstreams, reducing energy use. On particularly cold days, the air could be further heated before it is distributed throughout the building.

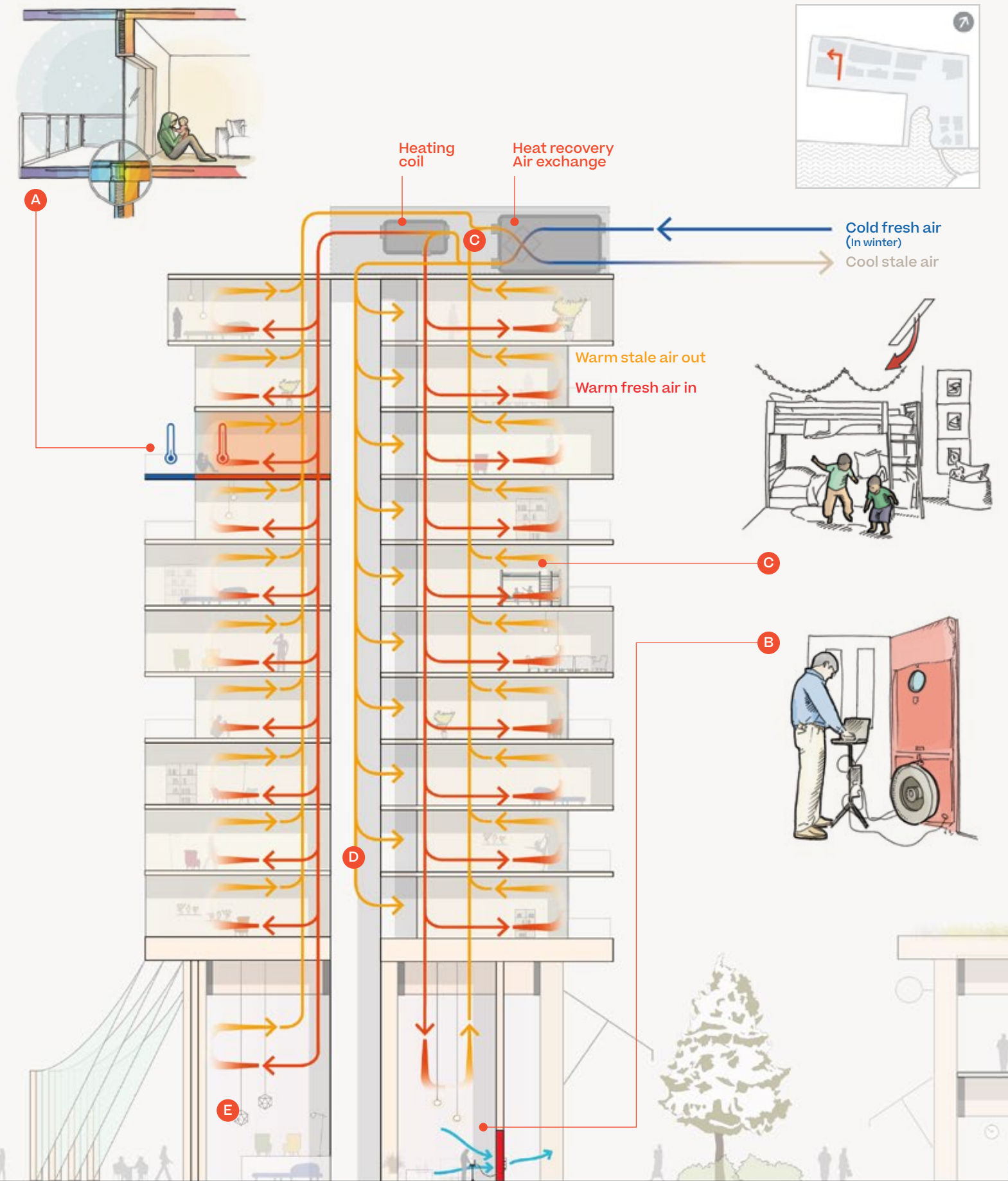
### D Corridor conditioning.

Sidewalk Labs estimates that using heat recovery alone to temper the air in corridors can reduce building energy usage by as much as 20 percent.<sup>79</sup> This design means a hallway passage could be hotter or cooler than people's homes, depending on

outdoor conditions, but as people generally dress for the outdoors when going out, it is not anticipated to significantly decrease comfort.

### E Cold air curtain.

In summer, it is nice to get a cold wash of air conditioning when walking into a building lobby. But often the lobby as a whole is too cold, wasting energy. In Quayside, there would be no lobby air conditioning, but the lobbies — tempered using heat recovery only — would still provide a cool air curtain to offer initial relief for people as they enter the building.

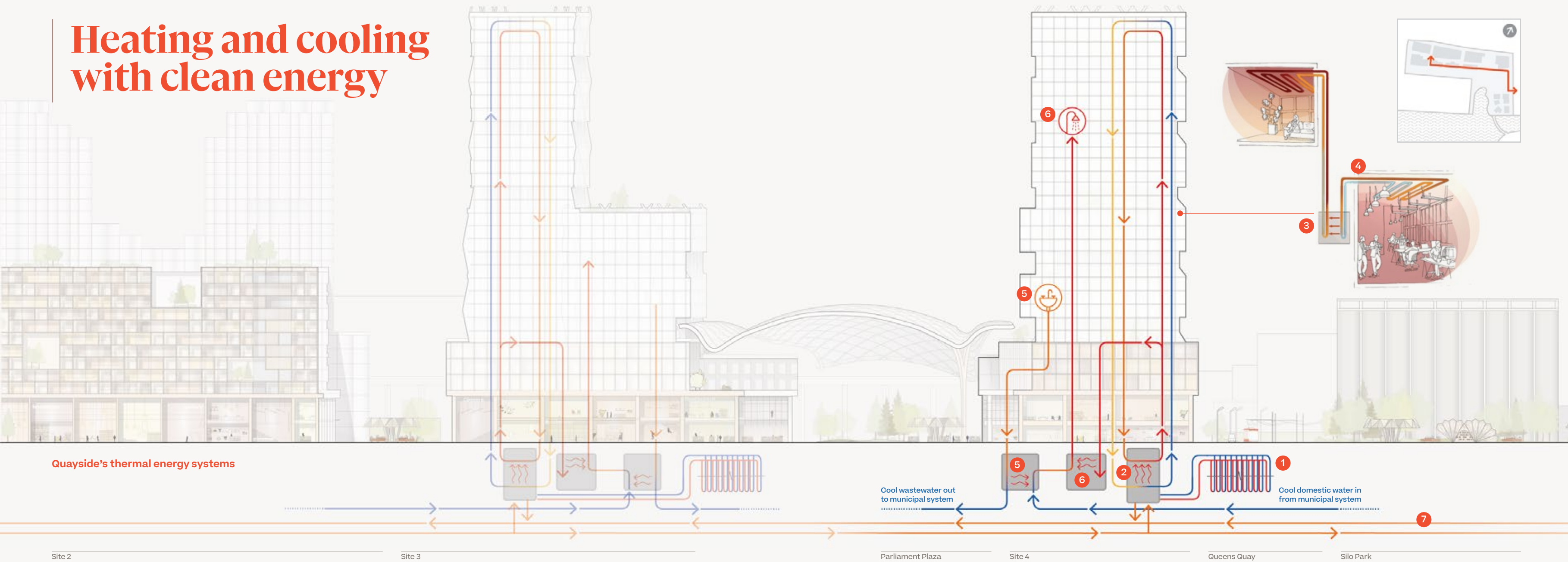


Quayside low-energy building systems in winter

Site 1 South

Pedestrian Walkway

# Heating and cooling with clean energy



Quayside's thermal energy systems

Site 2

Site 3

Parliament Plaza

Site 4

Queens Quay

Silo Park

The Quayside plan recycles every source of “waste” heating or cooling created in its own buildings to keep residents comfortable. When that is not enough, it would draw from a “thermal grid” that runs on clean energy.

Low-energy buildings can dramatically reduce the need for additional heating and cooling. But even Passive House-inspired designs cannot eliminate that need, especially in a cold-weather climate like Toronto's waterfront. To deliver heating and cooling to residents and businesses without using fossil fuels, the Quayside plan would deploy a type of district energy system called a thermal grid.

Quayside's thermal grid would rely on clean energy sources to heat and cool buildings. At the building level, waste heat generated by wastewater would be repurposed to provide energy for heating and domestic hot water systems. For additional needs, buildings could draw from a hot and chilled water loop at the site level, generated by a mini heat pump plant that can exchange geothermal energy via underground wells.

A neighbourhood loop of the thermal grid would connect all of the site plants and allow for the transfer of energy among sites. It would also be designed to incorporate other large-scale clean energy sources in the future, such as heat recovered from sewage stations.

## Why a thermal grid, not gas boilers?

Natural gas boilers are an inexpensive way to provide heat — much less expensive than geothermal wells. However, 87 percent of the greenhouse gas emissions from buildings in Toronto are associated with the use of natural gas for heating and hot water.<sup>80</sup> In addition, a building study commissioned by Sidewalk Labs discovered that Toronto multi-unit residential buildings were using 39 percent more gas for heating and 21 percent more gas for generating domestic hot water than shown in energy models.<sup>81</sup> The Quayside plan aims to forgo gas altogether and move towards a system of low-energy buildings, geothermal heating, and affordable electrification.

### 1 Geothermal energy.

Quayside's thermal grid would use the bedrock of the Canadian Shield like a huge battery — storing heat that is pulled out of buildings in the summer for use in the winter through “geothermal wells.” Each site would host a small well field under its buildings, connected to a mini heat pump plant that distributes the heat. Wells would be drilled 244 metres into the rock.

### 2 Mini heat pump plant.

The mini heat pump plant would generate hot and chilled water, which would circulate to buildings through the site.

### 3 Waste heat.

One of the mini plant's sources of heating for hot water is the “waste” heat extracted from spaces in a building (such as busy offices), which can be given to other areas that need heat (such as residential apartments in winter). Up to 31 percent of Quayside's heating and 27 percent of its cooling requirements could be met using such waste heat.<sup>82</sup>

### 4 Radiant ceiling panels.

Heating and cooling would be provided by radiant ceiling panels served by a building's heating and cooling loops.

### 5 Wastewater heat.

Domestic hot water would be pre-heated using heat recovered from bathrooms, kitchens, and other sources of building wastewater.

### 6 Domestic hot water.

After being pre-heated, water for domestic use would be further heated with an electric heat pump that draws heat from the loop serving the building's heating system.

### 7 Additional waste heat sources.

The thermal grid extends throughout Quayside and in the future could connect to additional sources of waste heat, such as data centres or municipal wastewater systems.

# Using clean electricity and actively managing energy use

To help reduce greenhouse gas emissions and strive towards a climate-positive neighbourhood, the Quayside plan shifts from gas infrastructure to clean electricity and proposes to use new digital tools to help manage energy consumption.

In Toronto, residents and businesses draw power from a centralized electricity grid that can run primarily on clean energy sources (including nuclear, hydro, or renewables) during off-peak periods, such as overnight. But at peak times, when electricity demand is high, this grid must use a greater portion of natural

gas-generated power to meet the task, increasing the greenhouse gas intensity of the grid power supply as a whole. In addition to being expensive, natural gas-generated power has 15 times the GHG intensity of the Ontario grid's current average,<sup>83</sup> so increasing its supply would increase both utility costs for households and businesses and GHG emissions for the community.

Quayside's building systems are designed to help residents and businesses minimize their use of the grid's most expensive and GHG-intensive power while providing new sources of clean energy, such as community

batteries (that store clean energy) and solar panels. These strategies enable Quayside to accommodate significant new electricity-intensive technologies — such as electric vehicles — without expensive power grid expansions that can often lead to higher utility bills.

## A Low-voltage DC power.

Quayside's buildings propose to incorporate a digital electricity power system that can travel over lightweight cables, such as ethernet cable, into residential units and offices, providing plug power for computers, lighting, and many appliances. (AC power would continue to operate for larger kitchen appliances, such as ovens.) As a controlled system that only sends power when a device is present, digital energy can dramatically reduce shock hazards and electrical fire risks.

## B Solar and battery power.

Photovoltaic cells would be installed on every tower roof to capture almost 1 megawatt of solar energy, and batteries housed indoors would store 4 megawatts of clean energy taken from the grid during off-peak hours. The batteries would support almost 75 percent of Quayside peak load<sup>84</sup> — reducing the use of grid power at costlier and more GHG-intensive peak times.

## C Backup power.

Quayside buildings would have on-site backup generators, fueled by bio-diesel, to provide emergency services, such as elevators and hot water, for multiple days.

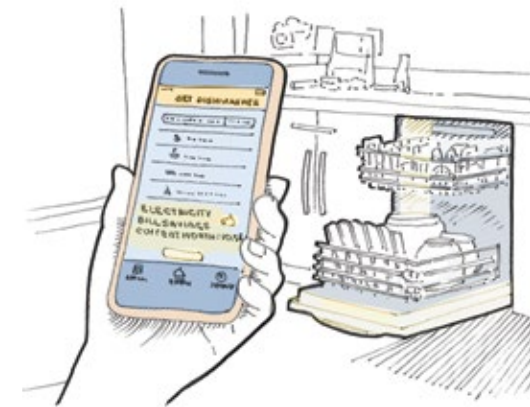
## D Advanced power grid.

Sidewalk Labs has been working in collaboration with Toronto Hydro to design an advanced power grid that would have two connections to the main Toronto electricity grid as its primary source of power, supplemented by local solar generation and battery storage. The advanced power grid is designed with the ability to disconnect from the larger grid (“islanding”) through switching and connections, so that on-site energy resources could be fully used during a larger grid outage. It is also designed with enhanced distributed energy management visibility, control, and coordination into the neighbourhood resources (often called “behind the meter” insight) through a distributed energy resource management system to enhance demand management functionality and grid reliability. Even when disconnected, the Quayside grid would remain under Toronto Hydro control and management.



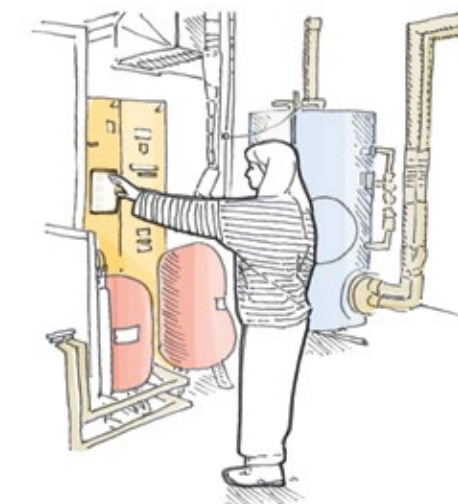
## Office Scheduler

A proposed digital Office Scheduler tool is designed to help commercial tenants manage their energy use and costs by optimizing all the systems under their control. For instance, these Schedulers could automatically adjust the interior temperature based on occupancy, and could also point workers to warmer and cooler areas in their office, depending on their preferences.



## Home Scheduler

A digital Home Scheduler tool would help residents manage energy use and utility bills in Quayside. This Scheduler can automate devices such as dishwashers to run during off-peak hours, when energy is cleaner and cheaper. (Residents can always override these settings if they wish and pay peak-hour utility prices.)

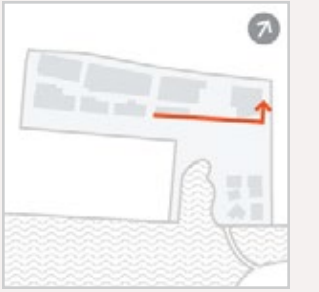


## Building Operator Scheduler

Building operators make dozens of daily decisions about how to manage the centralized heating, cooling, lighting, and electric systems in buildings. The Building Operator Scheduler can help optimize core building energy systems, freeing up managers to focus on things that require more personal attention, like preventive maintenance.

Key

- Alternating Current (AC) electricity distribution
- Digital Electricity (DE) distribution
- - - Solar energy connection to building system
- DE distribution point Every 10 floors



Quayside's advanced electricity systems

Connection loop between Sites 2 and 3

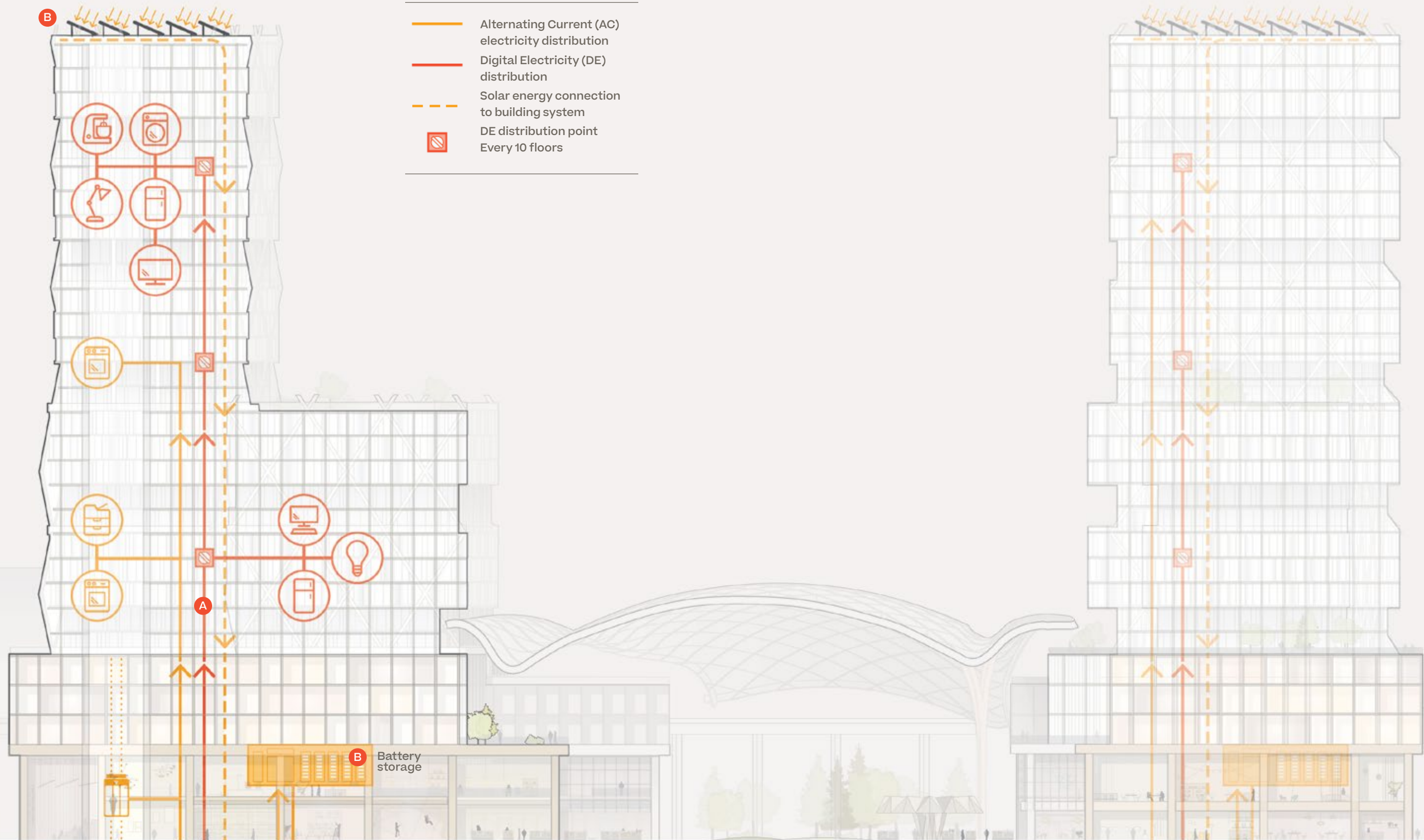
Connection to Toronto Hydro grid

Site 3

Parliament Plaza

Site 4

Queens Quay



B Battery storage

C Backup generator

Digital electricity (DE) system

Electric system infrastructure AC current

Biodiesel tank

D

# Creating a smart waste system



Quayside's smart chute and pneumatic waste collection system

Lake Shore Boulevard

Site 2 North

Site 2 South

Queens Quay

The Quayside plan features a series of technological, policy, and infrastructure advances to exceed Toronto's goals for landfill diversion and demonstrate an innovative path forward for neighbourhood waste.

Despite a citywide waste reduction target of diverting 70 percent of recyclables and organics from landfill waste by 2026,<sup>85</sup> multifamily buildings in Toronto currently divert only 27 percent;<sup>86</sup> commercial buildings are worse, diverting only 13 to 18 percent.<sup>87</sup> This outcome has major climate impacts: food waste that ends up in a landfill produces methane, a greenhouse gas 25 times more potent than carbon dioxide.<sup>88</sup>

Quayside can achieve a landfill diversion rate of 80 percent<sup>89</sup> by providing real-time feedback on common recycling mistakes, using smart chutes to separate waste and institute a "pay-as-you-throw" system to reduce waste, which has proven effective in single-family homes, and conveying waste to a centralized location through underground tubes to reduce contamination.

### 1 Smart collection.

Refuse rooms on every floor would be equipped with three separate disposal chutes: organics, recyclables, and landfill.

### 2 Pay-as-you-throw.

Smart chutes for each waste type could be unlocked from an app or a touch screen to charge tenants for what they deposit, creating an incentive to throw away less trash. Sensors would measure volume and weight.

### 3 Waste transfer.

In the basement, waste would connect to an underground pneumatic tube system designed to handle almost 1.5 tonnes a day, and move waste at speeds of up to 70 km/h<sup>90</sup> to the neighbourhood's collection point: Terminal Station. Sensors would release only one type of waste stream at a time, eliminating cross-contamination.

### 4 Outdoor waste disposal.

Disposal chutes in strategic public locations would be tied directly into the pneumatic system, and in other locations, deployable smart bins would send alerts to maintenance staff when they are ready to be emptied.

### 5 Special waste.

Oversized and speciality items that cannot go through the waste tubes (like paint and recyclable cardboard) would be transported through the underground freight tunnel system to Terminal Station.

### 6 Terminal Station.

Terminal Station is planned to be co-located at Site 1 with the Quayside logistics hub, integrating freight and waste management. A crane system would hoist full airtight dumpster-sized containers onto garbage trucks for removal and replace empty containers.

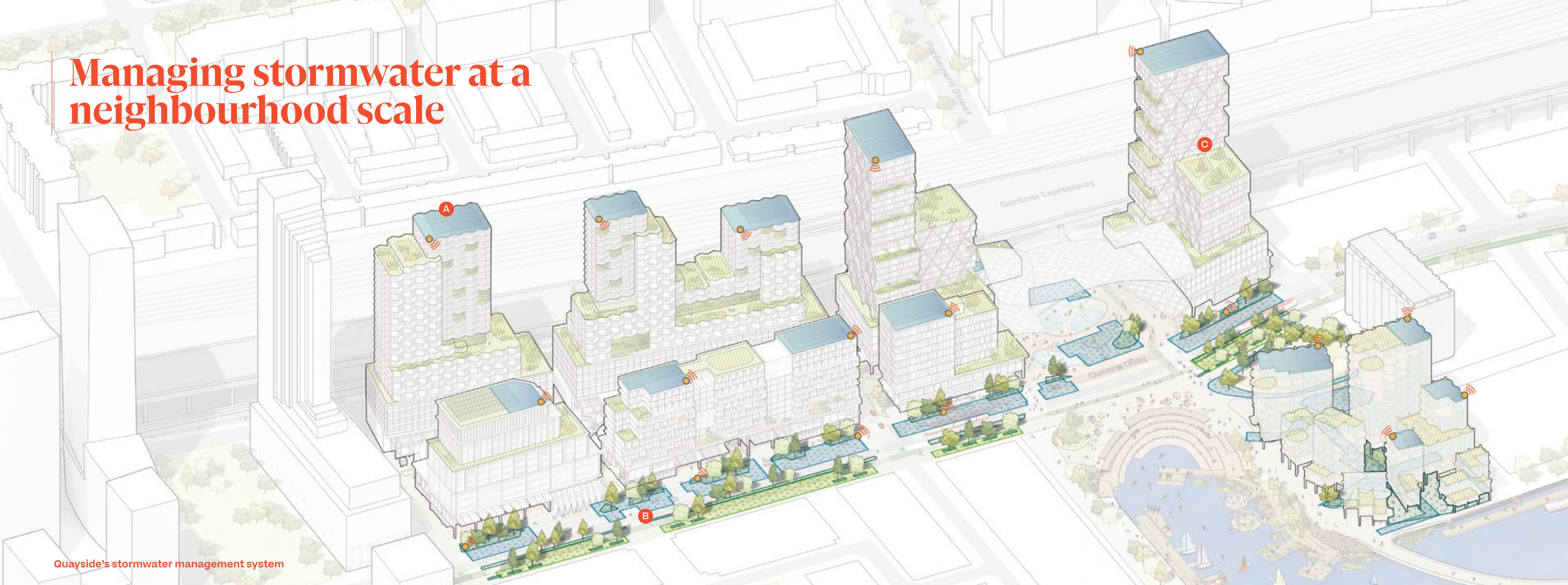
### 7 Off-site disposal.

Trucks would transport the waste to three locations for disposal. Organic materials would be taken to one of Toronto's world-class anaerobic digestion facilities, such as Disco Road.<sup>91</sup> Recyclables would be brought to one of Toronto's material recovery facilities, in which glass, metal, paper, and other materials are sorted and processed for sale on a secondary market. Other materials would be taken to Green Lane landfill.

### 8 Feedback loop.

Sidewalk Labs proposes to collaborate with material recovery facilities to track contamination in the recycled waste stream via computer vision software. The results would be displayed on smart screens in building refuse rooms to provide feedback on the most common recycling errors and contamination rates, helping tenants recycle more effectively. Over time, cleaner waste streams would reduce waste disposal costs for residents and businesses.

# Managing stormwater at a neighbourhood scale



Quayside's stormwater management system

**Quayside's holistic and active approach to stormwater management would integrate technology and green infrastructure to create a neighbourhood-wide system that is more effective, sustainable, and beautiful than typical developments.**

In the face of climate change, cities must prepare for the impact of increased storm intensities. For example, Waterfront Toronto's vital \$1.25 billion flood-mitigation project will help protect the eastern waterfront from flooding during heavy rains.<sup>92</sup> The Quayside plan builds on such efforts with a neighbourhood-wide stormwater management system

that features two core components: "green" infrastructure and active management capabilities.

Developments typically manage stormwater by using large-scale "grey" stormwater infrastructure, such as concrete or plastic tanks, to capture stormwater for detention. Mechanical treatment centres then filter it for pollutants. These costly facilities are single-purpose and take up valuable space that could be used for the public realm or other development uses.

In Quayside, a coordinated network of green infrastructure, such as street plantings and green roofs, would help retain stormwater and filter it

in natural ways. To complement this infrastructure, digital tools would empty stormwater tanks or cisterns in advance of storms, minimizing grey infrastructure needs and improving resilience. The same tools could also monitor the operational health of the system — from plants to pipes.

At opening, this integrated system would meet or exceed Toronto Green Standard Tier 3 retention requirements (25 millimetres) for every rain event, resulting in on-site management of at least 90 percent of the water that would typically end up entering the municipal system.<sup>93</sup> This approach also contributes to a greener, healthier public realm.

## A Active management.

Quayside's active stormwater management system consists of environmental sensors (described on the following page) that would manage blue roof cisterns on all buildings and one large underground tank at Site 1. The system would empty tanks in advance of storms to maximize storage capacity and use water for site irrigation.

## B Green infrastructure.

The Quayside plan uses landscaping and green infrastructure as a first layer of stormwater management, to naturally retain and filter rainwater. This network includes tree plantings and bio-retention zones (described in more detail on the next page) that help retain stormwater in spaces beneath the sidewalk, where it can irrigate the plantings or evaporate without needing treatment.

## C Green roofs.

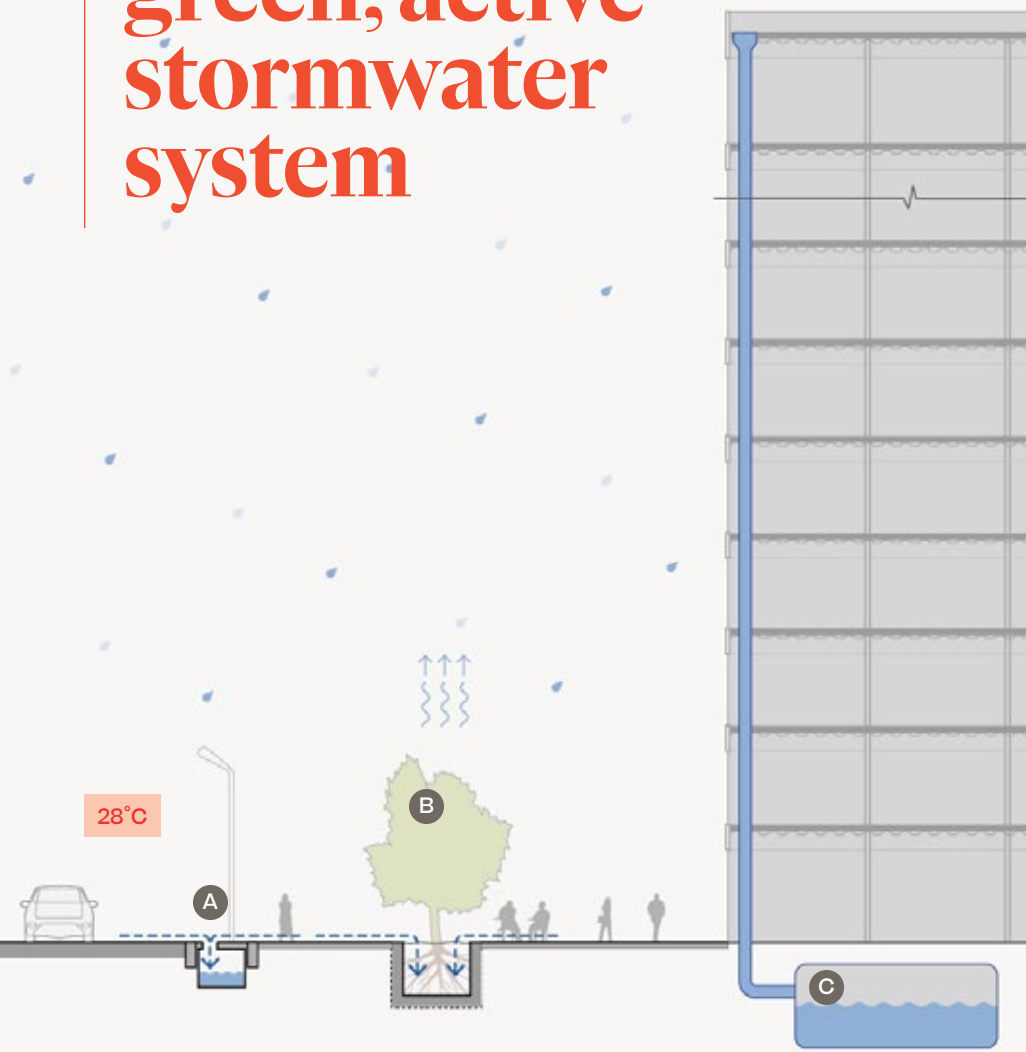
The Quayside plan uses a combination of photovoltaic cells (installed over the blue roof areas) and green roofs to adhere to the Toronto Green Roof Bylaw.<sup>94</sup>

-  Blue roof 80%
-  Green roof 30-50%
-  Bio-retention High infiltration
-  Bio-retention Low or no infiltration
-  Active control and monitoring sensors



# Designing a green, active stormwater system

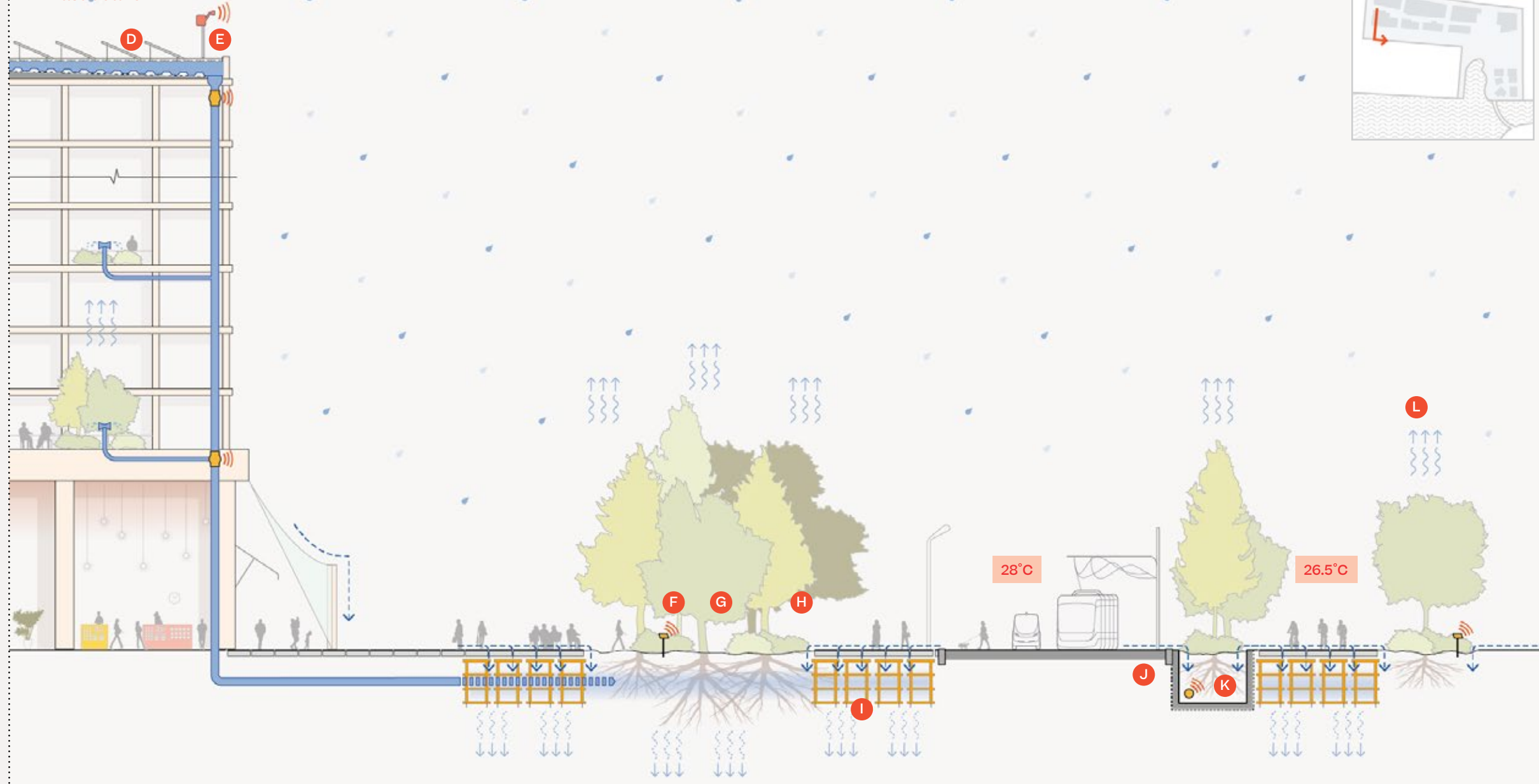
Conventional development



Compared to business-as-usual stormwater design, which uses large underground tanks and pipes, Quayside's lush public landscape is designed to act as a robust stormwater management system. Digital tools would help handle excess stormwater by proactively emptying storage tanks before a storm.

- A Stormwater drains.** Rain flows directly from the street into underground pipes and must be treated by large-scale municipal facilities. In heavy rains, the system can be overloaded, leading to flooding.
- B Standard street trees.** Most street tree-planting areas are not specifically designed for water infiltration, treatment, and conveyance.
- C Grey infrastructure tanks.** Tanks and pipes in traditional developments are expensive and must be sized for maximum detention, leaving them underutilized in good weather. These systems are also passive, in that they are unable to respond to anticipated storm events.

Quayside's stormwater infrastructure



Site 1 South

Queens Quay

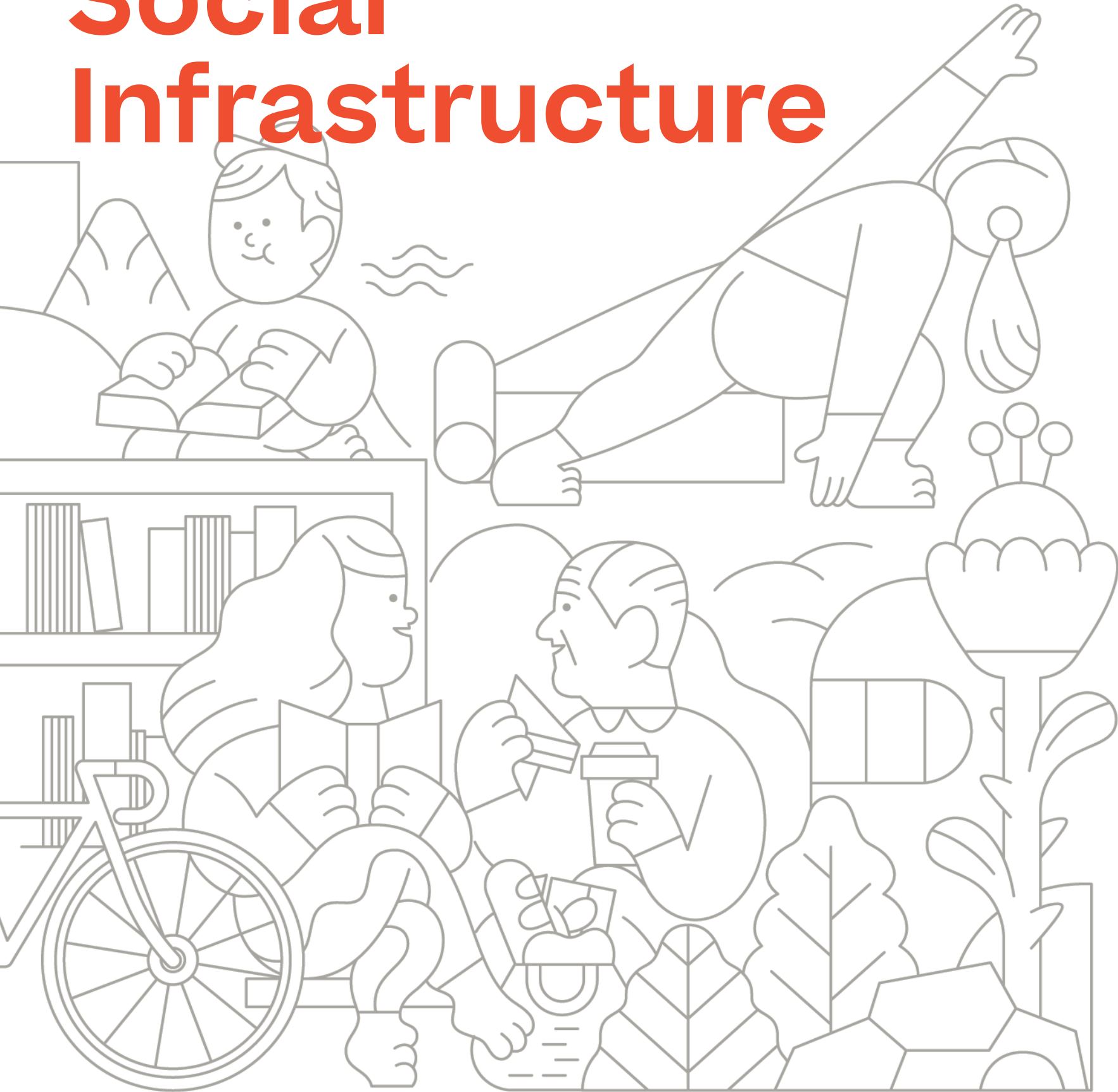
- D Blue roof.** The water captured by blue roof systems would be used to irrigate rooftop gardens and other plantings within the building, or conveyed to green infrastructure areas for controlled site irrigation.
- E Rainfall gauge and weather station.** A proposed active stormwater management system would use real-time weather data to identify potential rain events. Control valves for rooftop and underground cisterns would automatically empty tanks to maximize storage capacity in advance of storms, helping to reduce flooding.

- F Agriculture sensors.** Agriculture sensors typically used in farming, including moisture sensors and infrared technology used to measure nitrogen and salinity levels, would be piloted to track and maintain ecological health.
- G Bio-retention zone.** Extensive planted areas throughout the site would reduce the flow of stormwater into the municipal system while irrigating plants and prefiltering the water. Permeable pavers used extensively around these planted areas would filter surface runoff and prevent inundation, and soil cell infrastructure underground would allow for extensive root growth.

- H Plant diversity.** A diverse selection of plantings would be designed to collectively maximize root growth and water absorption, resist street salt, and demonstrate phytoremediation (or contaminant abatement) abilities.
- I Pavers and soil cells.** Permeable pavers used extensively around planted areas would filter surface runoff and prevent inundation, and soil cell infrastructure underground would allow for extensive root growth.
- J Flow-monitor and water-quality sensors.** Stormwater sensors would measure water quality and reduce

- operational issues by tracking water flows and identifying blockages in the system.
- K Contamination control.** In areas with more contaminated soil, such as the south side of Queens Quay, green infrastructure like soil cells would use impermeable bottom liners to keep polluted water from entering the system.
- L Heat island effect.** Trees and plantings would reduce the heat island effect by shading streets, releasing moisture to cool the environment, and providing natural wind mitigation.<sup>95</sup>

# Social Infrastructure



Provide the health, civic life, learning, and workforce initiatives and facilities that enable everyone to thrive.

# Building towards a complete community

The Quayside plan would integrate space for social infrastructure from the start, creating opportunities for community organizations and local service providers to activate these spaces, strengthen the community, and help community members thrive.

Whatever its form — library, online forum, health centre, weekly meetup — social infrastructure fosters health and well-being, ties together communities, and helps people reach their highest potential.

While Sidewalk Labs would not provide any community services, to build towards a complete community in Quayside it proposes allocating 90,000 square feet towards social infrastructure as well as supporting local community organizations and service providers with expertise, digital prototypes, resources, and planning to bring innovative service delivery models to the community. Sidewalk Labs would also work with partners to ensure that critical services are accessible to all populations, including the most vulnerable, and that Sidewalk Labs' commitments to diversity, equity, and inclusion are sustained.

While social infrastructure cuts across a wide range of disciplines, Sidewalk Labs has chosen to focus on social infrastructure spaces and programs that relate to health and community services, civic life, and learning, as a starting point to show what could be possible in this unique site.

Sidewalk Labs' contribution to **health and well-being** has two core components.

One is a development plan that encourages healthy living and community well-being. Another is a physical hub called the Care Collective dedicated to enhancing health and well-being by co-locating health care and community services alongside proactive health programming. Upon approval of the MIDP, Sidewalk Labs plans to seek a local partner to convene health care and community service providers; working together with the community, this group could explore opportunities to provide proactive, integrated, digitally enabled, and holistic service delivery offerings.

Sidewalk Labs' contribution to **civic engagement** is anchored by a physical hub called the Civic Assembly, a place for gathering, learning, and engaging amongst the community. To complement the physical space, fully accessible digital tools — both those already existing in the market and others created in partnership with the community — could help people to participate in civic life, collaborate, and shape their neighbourhood and help governing bodies to undertake more transparent, inclusive, and responsive decision-making.

Sidewalk Labs' contribution to **learning** provides opportunities to push the boundaries outside the four walls of the classroom. It begins with an elementary school (proposed to be operated by the Toronto District School Board) and a collaboration with the Toronto Public Library to further expand the reach of its programming throughout the community.

In addition to the planning of physical spaces and partner-led programs, the conditions for innovation established throughout Quayside create unique opportunities for social infrastructure. For example, educational programming could pop up in Quayside's flexible spaces; organizations could explore new digital tools, with the confidence that all community members will have access to digital supports; and a community service provider could explore the implementation of a new operating model.

These contributions should evolve through the leadership and ownership of local partners and institutions — hopefully, resulting in a network of diverse and inclusive social infrastructure spaces, digital complements, and services that will continue to respond to a wide, inclusive range of community needs.

## Prototype spotlight

### Engaging the community in local decisions

Together with local communities and Digital Public Square, a non-profit spun-out of the University of Toronto, Sidewalk Labs prototyped a new digital tool in early 2019 called Collab.

This online resource engages community members in local decisions that can shape their neighbourhood, such as programming in a central public space, through a transparent process that reveals the decision-making framework and all community inputs. Users propose their choices for events in their community, and then the tool walks them through the trade-offs associated with each proposal — a farmers market provides fresh produce and draws a lot of foot traffic, but the space may feel too congested for a community picnic — and how their individual choices impact the community.

The Collab prototype has a publicly available Responsible Data Use Assessment. For use in Quayside, Collab would need to be approved by the proposed Urban Data Trust and would abide by all Canadian laws and the Responsible Data Use Guidelines for the Sidewalk Toronto project. The prototype is available to try at [collab.sidewalklabs.com](https://collab.sidewalklabs.com).

With new and existing technologies like these serving as easy entryways to engagement, everyone in the community could be activated to shape the Quayside neighbourhood.

# Designing a healthy place

The Quayside plan will be developed through a health and well-being lens; in this way, the neighbourhood would encourage and enable healthy living.

Research has found that 60 to 80 percent of a person's long-term health outcomes are determined not by access to quality care, or even genetics, but by environmental conditions, social circumstances, and individual lifestyles and behaviors.<sup>96</sup> To enable all people to live well, these “social determinants of health,” defined by the World Health Organization as “the conditions in which people are born, grow, live, work and age,” must be addressed. One way to do this is through planning and design.

Since the mid-20th century, many cities have been developed in ways that undermine people's abilities to lead healthy

lives. Too many people spend too much time commuting in cars and sitting all day in offices and spend too little time being active, outdoors, or interacting with people face-to-face — all risk factors for poor health and, in particular, preventable chronic diseases.

Designing for good health should be a key planning principle. To help guide the development of Quayside, Sidewalk Labs plans to use The Community Wellbeing Framework, developed by the Conference Board of Canada and the design firm DIALOG in 2018, which provides useful, evidence-based guidance for developers, urban planners, and architects to apply a health and well-being lens to their work.<sup>97</sup>

The Quayside plan incorporates a range of strategies to create a healthier neighbourhood for all, including mass timber buildings, abundant open and green spaces, and a lively mix of community spaces.



## Supporting a mix of uses

Quayside's development program calls for 67 percent of space to be devoted to housing, with roughly 33 percent devoted to office, retail, community, and maker spaces, as well as other non-residential uses. This approach to creating a dense, walkable, mixed-use neighbourhood can enable increased physical activity and enhanced social well-being.

## Promoting active transportation

Safe and accessible cycling and pedestrian infrastructure can lead to increased physical activity. Sidewalk Labs plans to deploy heated pavement in bike lanes to make cycling more attractive all year and in some sidewalks to reduce falls and injuries.

## Providing abundant green space

The Quayside plan provides accessible green spaces throughout the neighbourhood, helping to bring people together as well as to reduce levels of stress, depression, and anxiety. Sidewalk Labs' proposed outdoor comfort systems would also make outdoor spaces comfortable for 35 percent more hours throughout the year, compared with conventional development.

## Encouraging social interaction

Formal and informal community spaces, activated with community-led programming, are designed to draw in diverse groups of people, enhance cohesion, and reduce isolation. Locating community spaces alongside spaces for the delivery of health care and community services can make interactions with service providers part of day-to-day life.

## Designing healthy buildings

Buildings that embody biophilic design principles, optimize for natural light, use healthy materials (such as mass timber), and ensure indoor air quality can ensure that residents, visitors, and workers have healthy indoor environments.

## Providing ubiquitous connectivity

Affordable, high-speed Wi-Fi, as well as access to digital support, would enable providers to extend support beyond the clinic via virtual care and digital health management tools.

# Care Collective: Enabling health, well-being, and access to holistic care

The Quayside plan sets aside a central space, called the Care Collective, which would be dedicated to enhancing health and well-being by co-locating health care and community services alongside proactive health programming, and would be activated by local partners. If these partners choose, the Care Collective could demonstrate a forward-looking model of integrated local health programming and health care and community service delivery.

The city's Downtown Plan recognizes a need to plan for more affordable, accessible, and appropriate spaces for delivering community services in downtown Toronto; what's more, enhanced coordination in planning and delivering health care and community services, especially in parts of the city that are growing rapidly, has also been recognized as an urgent need.<sup>98</sup> The Care Collective is envisioned as a convenient place for community members to not only access both health care and community services but to receive proactive support so they can lead healthier lives and better care for themselves.

Helping people to remain healthy requires an increased focus on prevention and early intervention, alongside the delivery of more integrated health care and community services.

In Quayside, Sidewalk Labs plans to be a catalyst when it comes to promoting health, not a direct service delivery provider. In this role, Sidewalk Labs proposes providing a space, called the Care Collective, for the co-location of preventive support, health care, and community services as well as offering leases at below-market rates to ensure a diverse set of service providers, including non-profit organizations.

Local service providers would be invited to work together to activate the space and coordinate services to provide residents, workers, and visitors with responsive, community-based care.

The Care Collective would be located adjacent to a number of community spaces, including the Civic Assembly (see Page 224) as well as amenities (such as cafés, gyms, or health-related shops) that make it an essential community resource — a place for people to go not just when unwell, but to spend time and seek proactive support.

To envision what kinds of spaces could respond to the emerging health and well-being needs of future populations, Sidewalk Labs commissioned Toronto-based design studio Idea Couture to undertake preliminary concept work for a people-centred design of the space.<sup>99</sup>

A plan for the Care Collective, and a vision for how health care and community services could be delivered in Quayside, must be led by local stakeholders and should build on the lessons learned from existing models.

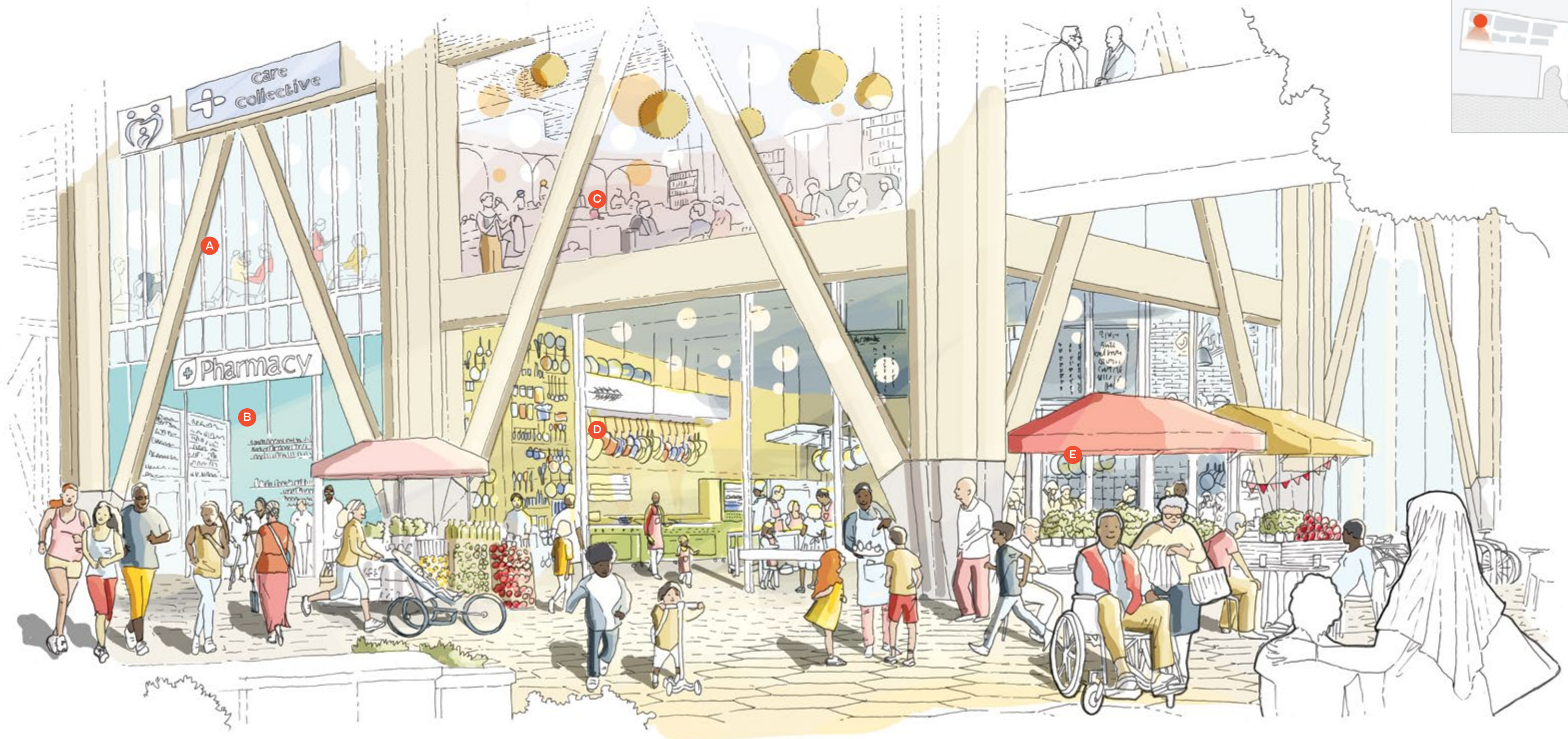
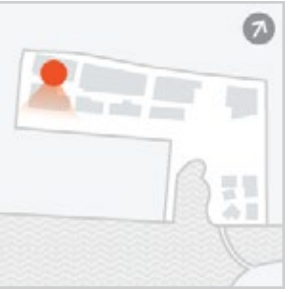
For example, recognizing growing health and equity gaps across the city, United Way Greater Toronto has supported the development of community hubs in underserved neighbourhoods, each a “one-stop-shop” that makes a range of services and programs available under one roof.<sup>100</sup> This model and others, such as family health teams and community health centres, are compelling examples of

operating models that seek to better coordinate services through co-location, respond to community needs, and treat people holistically through team-based care.

As governments and health care providers work to address the social determinants of health, and as care increasingly shifts from acute to community-based (and virtual) settings, new models of community care in new types of community spaces will be required in every neighbourhood.

If the MIDP is approved, a leading entity or entities (not Sidewalk Labs) could convene health care and community service providers and the community to co-create a proposal for the operations of the Care Collective. If desired by this group, the Care Collective could demonstrate a forward-looking model of integrated local health promotion and care delivery. This model could provide continuous disease prevention and management support as well as integrated community-based care, leverage emerging digital solutions and virtual care to enhance access, and reduce health inequities to improve health outcomes for all.

Sidewalk Labs proposes contributing resources to support the development of a proposal for the Care Collective. If desired, Sidewalk Labs would offer its expertise, including support on technical roadmaps for new or existing digital tools that could meaningfully improve outcomes, efficiency, and experience.



**A Spaces for service delivery.** Spaces for the delivery of health care and community services, including consult rooms, meeting rooms, and flexible multi-purpose spaces. Virtual consult rooms, which would be stocked with diagnostic tools and staffed with in-person technical support, could enable virtual care with specialized providers that aren't located in the Care Collective.

**B Spaces for health-related retail.** Retail spaces with a health and well-being focus, such as a pharmacy or fitness club, could be located near the Care Collective.

**C Space to enhance health literacy.** A health resource centre where visitors could test, learn about, and borrow a range of curated digital health tools and apps recommended by care providers. Staff in this centre could guide visitors to helpful resources in their

community and lead educational programming focused on health literacy, digital health, and self-care.

**D Space to support healthy, communal eating.** A community kitchen and dining space for use by residents, community organizations, and pop-ups could teach healthy cooking and eating skills while also providing space for communal dining to bring people together.

**E Spaces to support well-being.** Dedicated sanctuary space could help people to maintain their mental well-being by providing a place to relax, relieve stress, and unplug in a quiet, nature-infused environment. These spaces could support social prescribing (for example, a doctor could prescribe time in the sanctuary space).

# Civic Assembly: Creating a connected community that is civically engaged

The Quayside plan sets aside a central space to connect with neighbours, learn about what is going on in and around the neighbourhood, share ideas, debate, engage in cultural activities, stay abreast of the newest digital tools, access local services, and participate in community decisions. This Civic Assembly would be the physical heart of civic life in Quayside.

It can be hard in the rush of urban life for community members to meet each other and connect, let alone to join in the shared project of shaping their neighbourhood. In the words of a Sidewalk Toronto Reference Panel resident: “A big part of social capital is the accident of bumping into people you know, and having unplanned conversations. It’s that magical pixie dust that happens between people when we are out together.”

The Quayside plan allocates space for both the Civic Assembly and the Care Collective in a prime location that spans Sites 1 and 2 (the first phase of

development). This space has direct access to Queens Quay and an animated pedestrian corridor, and is adjacent to housing and office space. This location would enable the Civic Assembly to draw off the energy of local street life, enhancing the likelihood of serendipitous connections and becoming a vibrant daily gathering place that brings people together and activates the community.

Community members and organizations could book space in the Civic Assembly for meetings or gatherings. Located in an adaptable stoa space, the assembly could evolve according to the

community’s needs and interests: one day, a stay-at-home dad could host a book club there; the next, a senior could teach a giant knitting class; or, throughout one summer, an emerging artist could lead a projection-mapping workshop.

Sidewalk Labs has started to prototype many of the ideas that could be present in the assembly — including innovative arts programming and tech demonstrations — in its collaborative workspace, 307, and will continue to pilot ideas leading up to the development of the Sidewalk Toronto project. However, Sidewalk Labs would not operate this space alone; Sidewalk Labs plans to convene and contribute resources to support local stakeholders to develop a proposed plan for the program and operations of the Civic Assembly, offering an opportunity for many organizations from across the city to shape this central gathering space with the community as it grows.

**The Civic Assembly would become a central hub for community, arts, and cultural gatherings and could evolve to meet neighbourhood needs.**

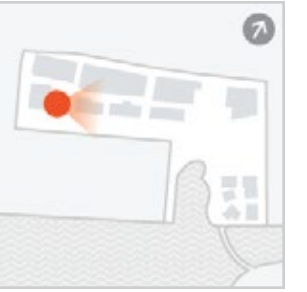
## Digital spotlight

### Activating civic life in Quayside

In Quayside, community members could attend neighbourhood meetings or provide input by visiting the Civic Assembly. With inclusive access to Wi-Fi and digital support, all community members could also use digital tools designed for participation, collaboration, and influence, helping residents as well as those who visit or work in Quayside to have a greater sense of ownership and belonging in the community.

Community organizations and governing bodies could also choose to leverage these technologies to help them engage with a diverse range of community members and use that community feedback to inform their decision-making processes. While Sidewalk Labs would not operate any of these bodies, it has secured the support of Toronto-based non-profit Digital Public Square to convene a panel of community members and experts that would advise on the creation of a Quayside Neighbourhood Association and offer insight into opportunities for new tools and spaces as well as processes for transparent decision-making.

When combined with Quayside’s flexible spaces that community members can adapt to meet their needs, and plentiful civic and gathering spaces that bring people together, these responsive governing bodies and convenient digital tools could activate the Quayside community to participate, enabling a strong, inclusive, and vibrant community.

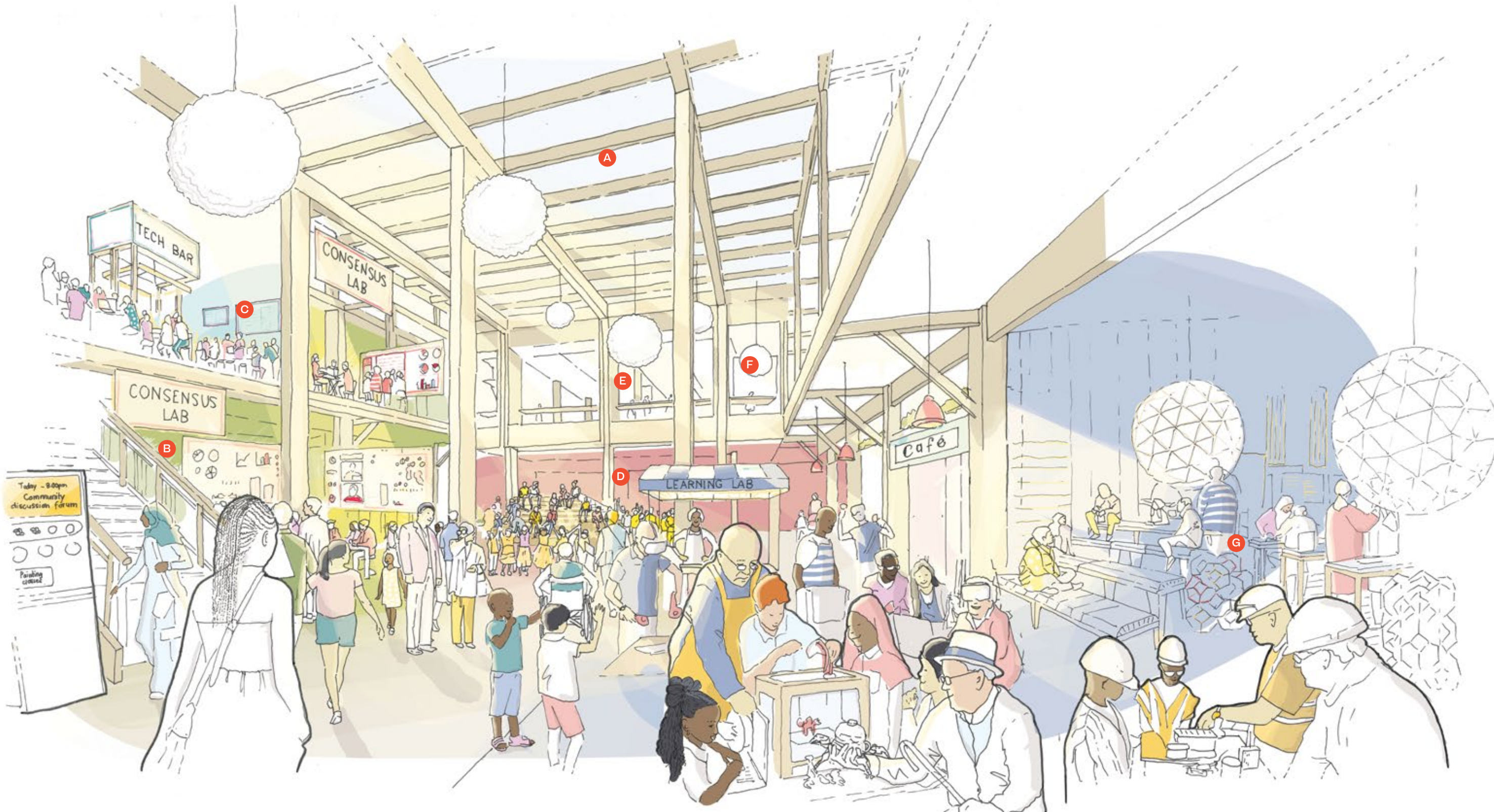


**A Community Central.**

This flexible central atrium could draw and accommodate hundreds of people day and night and could feature digital displays that announce upcoming events and activities, new community ideas and participation opportunities, and environmental conditions.

**B Consensus Labs.**

This space could allow community members to explore the latest community initiatives, weigh in on a pending issue, contribute their ideas, or vote for community projects using large screens and touch tables that visualize initiatives and facilitate conversation.



**C Tech Bar.**

This space — staffed by digital experts who know the ins and outs of all of the technology in the neighbourhood — would allow community members to access support for any of their digital needs. Leaders in the field, such as the Toronto Public Library, could offer free digital and data literacy classes, as well as host open hours to facilitate input on digital tools and new use cases.

**D Pop-up Learning Lab.**

In this space, community members could use new technologies, such as robotics and 3D printers, computer workstations, or audio and video equipment to participate, learn, connect, and create online.

**E Flexible bookable spaces.**

These spaces would enable the community to connect, discuss ideas, build consensus, and participate in civic discourse, with breakout rooms for committees and smaller events as well as flexible spaces for government and non-profit programming.

**F Office spaces.**

Organizations, such as the Quayside Neighbourhood Association or the Open Space Alliance could reside in the Civic Assembly to easily reach the community.

**G Arts and culture areas.**

These spaces would include shared fabrication equipment and tools (such as laser cutters and wood-working machines) and have the flexibility to be carved into smaller studio spaces.



# Elementary school: Making the community a classroom

Sidewalk Labs plans to work with the Toronto District School Board (TDSB) and the Ontario Ministry of Education to ensure that neighbourhood families in and around Quayside have access to a best-in-class school located near complementary services from the start.

To accommodate projected population growth in the eastern waterfront, the TDSB has proposed to locate a new school in East Bayfront / North Keating.<sup>101</sup>

To help accelerate this development, Sidewalk Labs proposes to work with the TDSB to plan up to 60,000 square feet on the lower floors of a mixed-use building for an elementary school for up to 600 students spanning grades pre-K through 8. A portion of the ground floor space of the school site could also be allocated for a child-care facility.

The TDSB would operate the school, which could support the short- to mid-term needs of this growing population.

## Collaborating with TPL to expand community programming.

Planning Quayside around flexible spaces and high-speed connectivity enables lessons, after-school programs, and other learning opportunities to expand outside the classroom — in community spaces or even in the public realm.

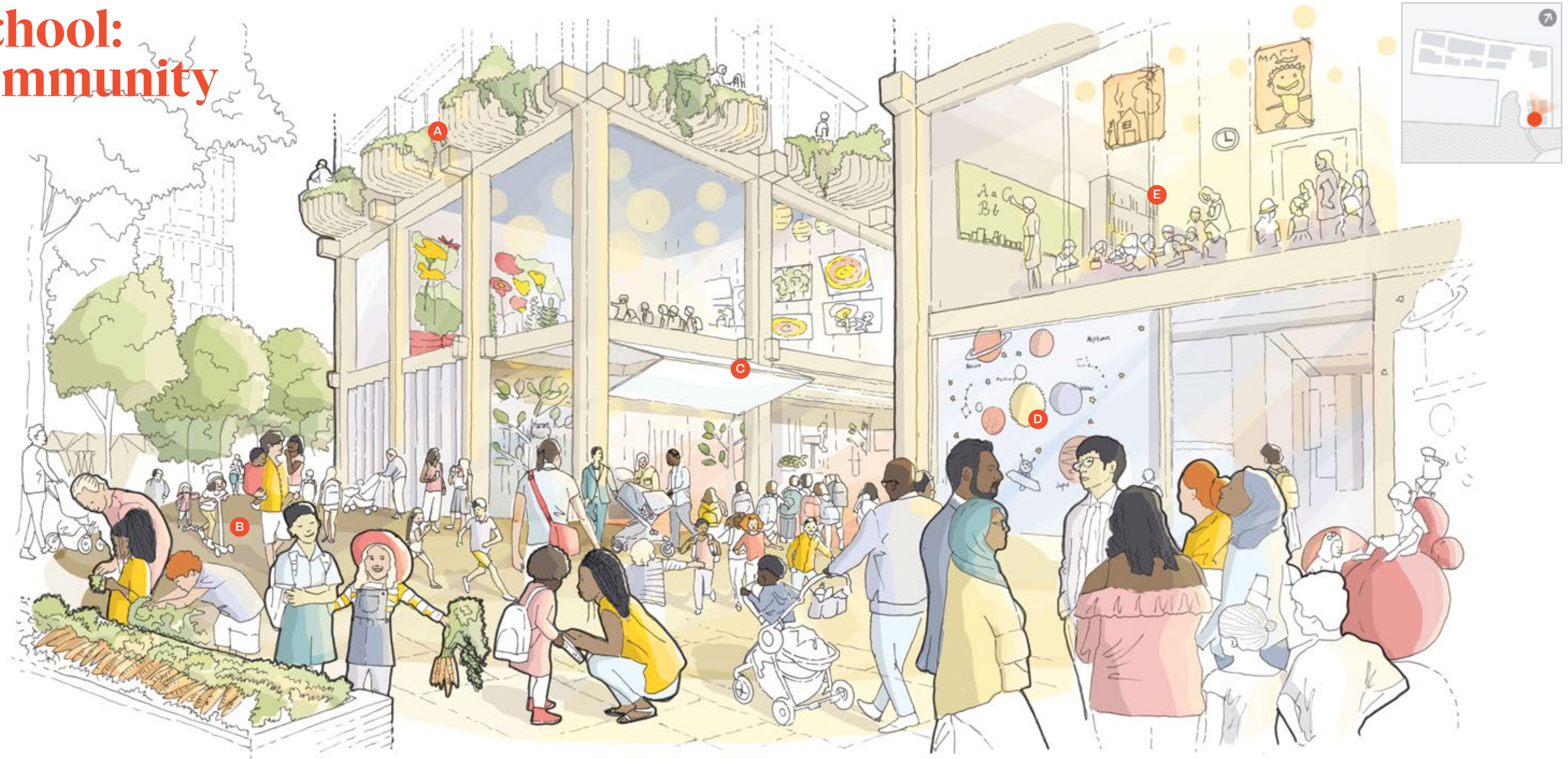
To begin activating opportunities for learning throughout the community, Sidewalk Labs is pursuing collaborations with educational leaders in Toronto. Sidewalk Labs and the

Toronto Public Library (TPL) are currently exploring opportunities to seamlessly integrate the library's presence throughout Quayside, building on the theme of learning happening everywhere.

These opportunities could include pop-up learning labs or lending services; TPL-developed classes, particularly those that support data, AI, and algorithmic literacy; or digital consult rooms in library branches or

pop-up library stations that could allow residents to easily book a private session or meeting with service providers.

Sidewalk Labs also proposes supporting TPL's Innovator in Residence program and working with TPL, employers, and other institutions, such as George Brown College, to explore the development of new training pathways.



### A Mixed-use location.

Locating the school in a mixed-use, flexible building would lower up-front capital and operating costs and provide the ability to adapt to dynamic community needs.

### B Proximity to open space.

Locating the school in proximity to vibrant open space, Silo Park and Parliament Slip, would allow students to learn from real-world situations. The waterfront could offer a living laboratory for a biology lesson, for example. Or teachers could create opportunities for students

to learn from community members, say by visiting an artist's studio in the Civic Assembly to gain exposure to new materials and techniques.

### C Adaptable classroom spaces.

Classrooms with modular furniture and movable walls would allow educators to test new models of learning, such as a “flipped classroom,” where students consume lectures outside the classroom and participate in one-on-one and group work in the classroom.

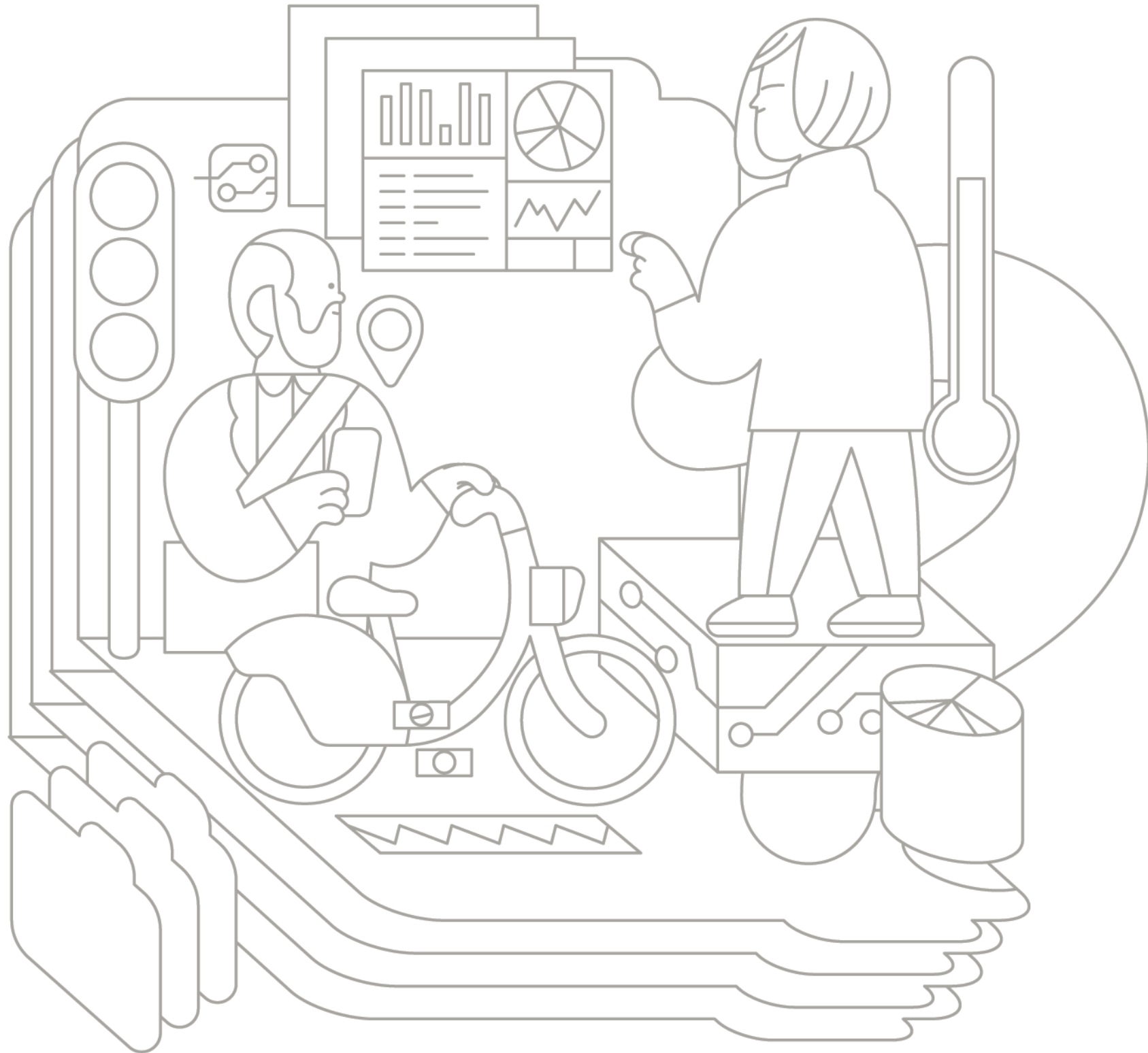
### D Common social spaces.

Common spaces outside the school would allow for gathering, lingering, and socializing for members of the school and the larger community, helping to build relationships and connections.

### E Proximity to community services.

A school location near housing and complementary community services — such as primary health-care and childcare — would provide convenient access, save households time, and ensure students' and parents' holistic needs are met.

# Digital Innovation



Catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data in cities.



See the “Digital Innovation” chapter of Volume 2 for more details on the urban innovations described in this section.

# Creating the conditions for digital innovation

Quayside represents an important first step towards showing an innovative path forward on digital governance — demonstrating that cities do not need to sacrifice their values of inclusion and privacy for economic opportunity in the digital age.

## Key Term Urban data

refers to information gathered in the city's public realm, its publicly accessible spaces, and even some private buildings.

The ability to create the conditions for digital innovation is at the heart of Sidewalk Labs' vision for the city of the future.

Digital innovation is the basis for many of the core planning initiatives that Sidewalk Labs has proposed throughout this Quayside development plan to achieve Waterfront Toronto's priority outcomes. It is also essential for catalyzing an ecosystem of new services and solutions by individuals, Canadian companies, local Toronto entrepreneurs, and other third parties from around the world.

But digital innovation raises a number of challenges that cities like Toronto are just starting to address. These challenges are especially complicated for "urban

data," which Sidewalk Labs defines as information gathered in the city's physical environment, including the public realm, publicly accessible spaces, and even some private buildings.

Toronto and Ontario have taken some important initial strides to advance the conversation around data governance principles. Sidewalk Labs proposes to build on that progress in Quayside by taking a holistic approach that creates four core conditions for digital innovation to flourish responsibly.

### Providing more affordable and flexible digital infrastructure.

First, Sidewalk Labs proposes to establish open digital infrastructure that provides a shared foundation for using urban data to improve quality of life. That includes a powerful ubiquitous connectivity network that leverages new advances to improve speed and security. A standardized mount system would dramatically reduce the cost of deploying innovations and eliminate vendor lock-in.

### Setting data standards that are open and secure.

Second, Sidewalk Labs proposes to outline clear standards that make data publicly accessible, secure, and resilient. Third parties depend on open hardware and software as well as on an agreed-upon set of standards and protocols to successfully deploy their ideas. A set of published standards around open-data architecture, access, and sources would enable third parties to build upon a shared foundation, supported by a common set of security, formatting, and communication standards.

### Creating a trusted process for responsible data use.

Third, Sidewalk Labs proposes a trusted process for responsible data use that would apply to all parties (including Sidewalk Labs).

To meaningfully enable responsible data use across the IDEA District, Sidewalk Labs proposes that urban data be controlled by an independent entity called the Urban Data Trust, charged with balancing the interests of personal privacy, public interest, and innovation. This public steward would establish a clear process for approving any initiative that involved the use or collection of urban data for all parties, including those proposed by Sidewalk Labs.

This process would be anchored by a Responsible Data Use (RDU) Assessment — an in-depth review that is triggered by any proposal to collect or use urban data — and guided by a set of RDU Guidelines that incorporates globally recognized Privacy by Design principles.

### Launching core digital services that others can build on.

Finally, Sidewalk Labs proposes to launch a minimal set of digital services that would catalyze this ecosystem of urban innovation. These services and applications remain essential to achieving Waterfront Toronto's priority outcomes. Furthermore, the properly protected urban data generated by these launch services would be made publicly accessible, enabling companies, community members, and other third parties to use it as a foundation to build new tools.

The following pages describe how Sidewalk Labs plans to approach each of these conditions in Quayside.

# Expanding opportunity with ubiquitous Wi-Fi

The waterfront currently incorporates world-leading internet speeds, thanks to the work of Waterfront Toronto and its telecommunications partners. Sidewalk Labs proposes to go even further by taking advantage of recent advances in fibre-optic technology.

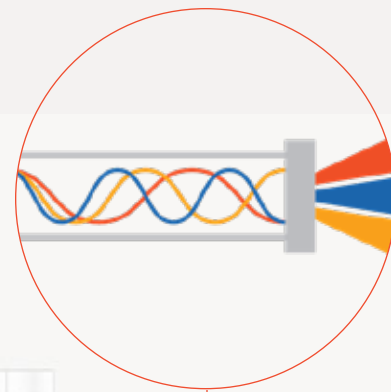
Digital connectivity is what unlocks many of the innovations found in the Quayside plan. It is also the catalyst for new services or businesses and the cornerstone of a digital economy.

The Quayside plan would offer super-fast, super-secure Wi-Fi service that is accessible to residents and workers everywhere they go. Designed to span the entire neighbourhood, be upgraded easily, and minimize interference between devices, this network would always give users the highest speed possible.

This network would build on the work done to date along the waterfront to bring even more secure and reliable connectivity to all corners of the community, at all times.

## Super-PON, super speed.

As part of its network planning, Sidewalk Labs is exploring a new technology called Super-PON (Passive Optical Network). By splitting lights into distinct wavelengths, Super-PON can support 768 users per fibre-optic strand, at least 12 times more than conventional systems, and extend fibre reach to 50 kilometres, at least 150 percent more than conventional systems.<sup>102</sup> The result would be a network that provides increased speed over greater distances while requiring significantly less cable, equipment, and electricity.



## Buildings as networks.

Sidewalk Labs proposes that all buildings conform to a set of specifications that balance the goals of the Super-PON network with the ability for other providers to offer their own network services, including having three distinct points of entry; a “Meet Me Room” where all communications-related equipment would be installed; vertical risers dedicated to communications wiring accessible on each floor; horizontal risers connecting vertical risers to each unit; and Cat 6A wiring in each room for power-over-ethernet wireless access points.

## Points of Presence.

The proposed design for a fibre-optic backbone would be connected to two major internet Points of Presence in downtown Toronto. Conduits holding the fibre would have express and local routes, as well as regular handholes (access points).

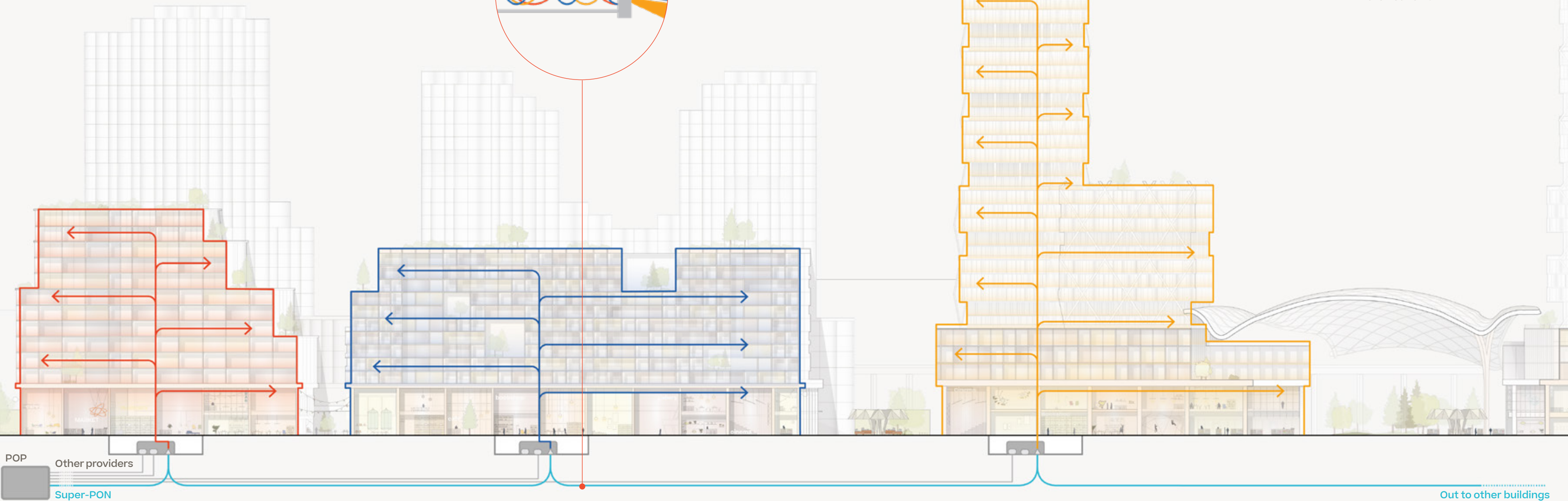


## Wireless infrastructure.

Sidewalk Labs is working to determine the optimal location for Wi-Fi access points and antennas inside buildings and throughout the public realm in Quayside. This connectivity would ensure that many of the systems designed to improve life can operate seamlessly, from bike lanes that heat up using real-time weather information, to energy management systems that constantly optimize themselves, to accessibility beacons that help people navigate public spaces.

## Personal, secure connectivity.

An emerging security approach known as a “software-defined network” can help people stay connected to their own personal home or office Wi-Fi network no matter where they are in Quayside, including parks and public spaces. These networks have advanced security capabilities; they are able to detect potential security risks aimed at connected devices and quickly disconnect an impacted device from the network.



Quayside’s advanced fibre-optic network

Site 1

Site 2

Site 3

Parliament Plaza

Site 4

# Reduce installation and maintenance costs with an “urban USB port”

A standard connection point for digital devices would drive down the cost of installing and maintaining digital hardware by 92 percent, making it easier for an array of third parties to develop new solutions to urban challenges.

Today, when cities (or their private-sector vendors) deploy devices that can collect data, the installation process creates significant disruption to street life and costs thousands of dollars, because light poles and other street fixtures were never designed to host digital hardware.

Adding a single car-counting device to an intersection requires the city to take the following steps:

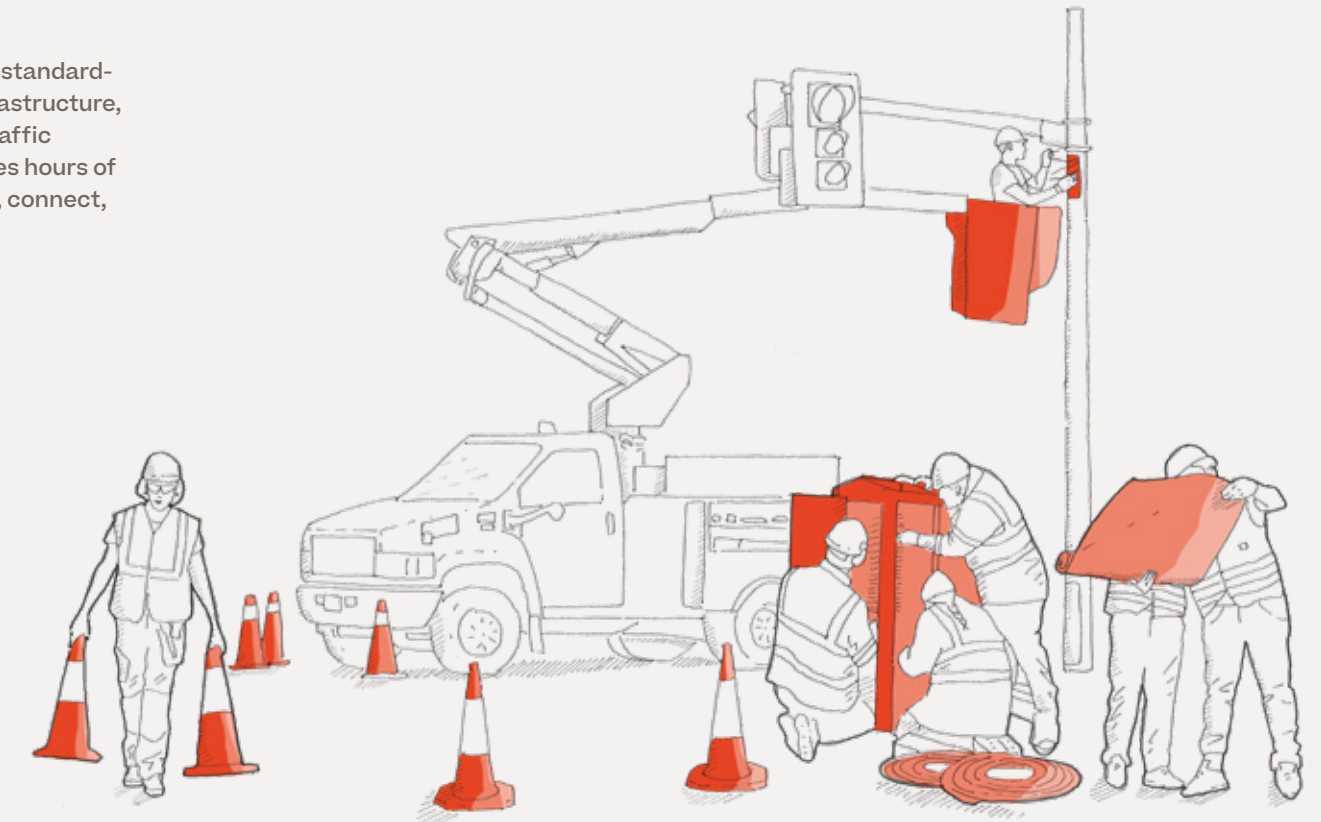
- **Shut down** a lane of traffic for hours or even days.
- **Send** a bucket truck with several staff to the intersection.
- **Devise** a creative mounting solution involving special clamps to adapt to the particular conditions of a traffic pole while maintaining safety standards.
- **Employ** an electrician to shut down the supply to the pole and possibly run a network wire up the pole, a process that might involve digging a trench to the nearest connection point.
- **Repeat** much of this labour-intensive process for repairs or upgrades.

To tackle this challenge, Sidewalk Labs has designed a standardized mount called “Koala” that would make it fast, inexpensive, and safe to install a device on a light pole or other street fixture by providing a sturdy physical mount, power, and network connectivity. Sidewalk Labs estimates its mounts would reduce the time of installation by roughly 92 percent — down from 30 hours today to two hours.<sup>103</sup>

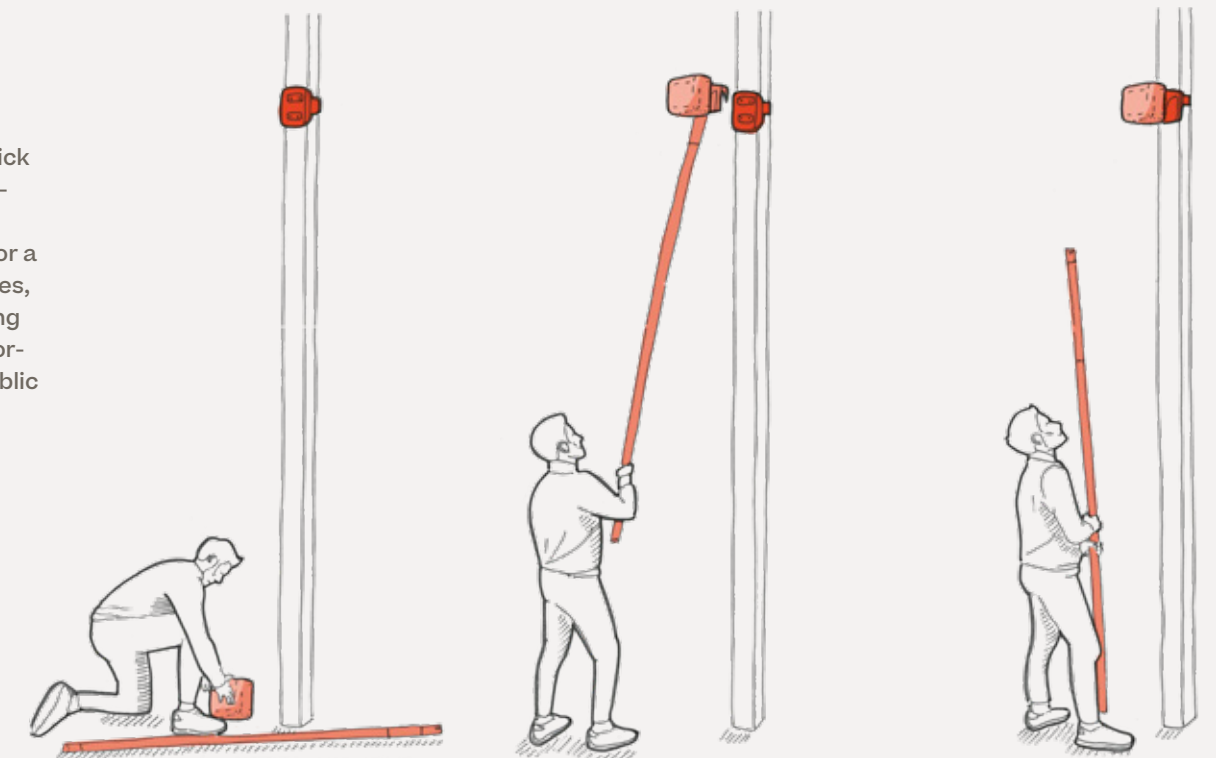
In addition to saving costs, Koala mounts would help cities avoid proprietary lock-in, as this open infrastructure would be capable of working with any device that meets its published standards — just like a USB port. Any proposal to collect or use urban data would be subject to the responsible data use process described on Page 240.

## A standardized mount to reduce disruption

Today, without standardized digital infrastructure, even a basic traffic counter requires hours of work to mount, connect, and test.



Koala mounts would make it easy and quick to connect to a ubiquitous network and collect urban data for a multitude of purposes, from bicycle counting to air-quality monitoring to interactive public art installations.



# Setting data standards that are open and secure

In Quayside, Sidewalk Labs plans to apply published standards and to use best-in-class security and resiliency techniques.

## Key Term APIs

are standardized programming tools that enable computer systems to communicate. For example, when a Transit App shows bike-share availability at a nearby dock, it is using an API to connect with the bike-share system's real-time database, process that data, and display it on a phone.

## Enable third-party innovation with published standards

Openness is essential to provide new services that help improve quality of life and to inspire urban innovation by third parties. Just as no single company owns the web, no single company, organization, or agency should own the data or databases used by cities. They must be publicly accessible to improve upon, build on top of, or even replace.

Sidewalk Labs proposes a three-part plan to achieve its goal of a digitally open city:

### Open architecture and APIs.

In Quayside, any digital hardware and software that Sidewalk Labs creates would use public standards that make it possible not just to access data easily but also to replace aspects of the hardware or software itself, avoiding lock-in from a single technology provider and encouraging innovation.

Sidewalk Labs commits to publishing an ongoing list of standards it uses. Where relevant standards do not exist, Sidewalk Labs would work with other companies, researchers, and standards bodies to create those standards.

To make that urban data available in ways that software developers can readily build, Sidewalk Labs proposes to provide data via well-defined, public application programming interfaces (APIs) — standardized programming tools that enable computer systems to communicate.

### Open access.

In Quayside, Sidewalk Labs proposes to make properly protected urban data publicly accessible by default, enabling others to use it to create new services, tools, or products. As an extension of this policy, Sidewalk Labs proposes that this information be integrated into existing open-data portals containing relevant urban data — including the Toronto Open Data Portal and the Ontario Open Data Catalogue — expanding access even further.

### Open source.

In Quayside, Sidewalk Labs proposes to make the software source code required for others to integrate with each of these systems publicly available under a free software licence. Sidewalk Labs has released several of its tools as open source, including the CommonSpace app for supporting public life studies. Sidewalk Labs plans to continue doing so in the future and to encourage others to do the same.

## Use best-in-class resiliency and security

Sidewalk Labs plans to ensure that the digital technology used in Quayside is resilient as well as secure. Digital systems should not only be secure from hackers — they should also be reliable in the face of inadvertent actions or environmental effects and maintained in a way that keeps them functioning at a consistent level over time.

Sidewalk Labs' approach to digital reliability emphasizes three design goals:

- **First, as much as possible, prevent disruptions** and the loss of functionality.
- **Second, rapidly detect any loss in functionality** or increased risk of loss of functionality through audits and other approaches.
- **Third, prepare to rapidly restore functionality** to any service that experiences a disruption.

These priorities are modelled after the standard approach taken by government and municipal services to ensure the resilience of critical systems, and are parallel to the software architecture concept “security by design.” Security by design refers to the principle that rather than being an afterthought, security should be considered at the beginning of the systems design process.

In Quayside, digital security and resiliency would be designed in from the start.

## Technical spotlight

# Current Sidewalk Labs cybersecurity practices

Though best practices in cybersecurity are always evolving, there are a number that Sidewalk Labs follows today and plans to follow in Quayside, including:

- **Encrypting** as much data as possible in storage and in transit using AES keys of 256 or 512 bits
- **Storing** keys in a key management system backed by FIPS 140-2 Level 3-certified hardware security modules
- **Enabling** client-managed encryption keys running on top of the same modules for any storage or computing resources to third parties
- **Using** HMAC to ensure message integrity with symmetric encryption
- **Preferring** elliptic-curve-based approaches over RSA for asymmetric encryption and digital signatures
- **Using** SHA-256 for general hashing and bcrypt for passwords
- **Preferring** multi-factor authentication methods over passwords alone
- **Routing** all traffic through TLS and, when that is not an option, physically partitioning devices from other networks

# Creating a trusted process for responsible data use

Through the creation of an independent Urban Data Trust to oversee matters of digital governance, Quayside could establish a new standard for the responsible collection and use of data in cities.

## Key proposed aspects of the Urban Data Trust:

- Independent entity (not controlled by either Sidewalk Labs or Waterfront Toronto)
- Five-person board with diverse representation
- Chief Data Officer to run daily operations
- Approve all collection or use of urban data in Quayside

A core condition for digital innovation is earning community trust that information collected in cities will preserve the privacy of individuals and be used for the greater good — all while supporting the growth of new businesses and the rise of new tools to improve urban life.

To help achieve this goal in Quayside, Sidewalk Labs proposes the establishment of an Urban Data Trust: an independent entity that would serve as the steward of urban data and the public interest.

Provincial and federal privacy commissioners would continue to oversee compliance with all privacy laws. Additionally, the Urban Data Trust would oversee matters of the digital governance of urban data for Quayside, including the approval and management of data collection devices placed in the public realm, as well as of any activities that involve the collection or use of urban data.

As described more in Volume 2, Sidewalk Labs believes the Urban Data Trust should be managed through a democratic process, and also supports the consideration of other recent proposals, including from MaRS and the Toronto Region Board of Trade, calling for independent entities whose mandate could be to govern data collection and use.

Beginning in Quayside, Sidewalk Labs proposes that the Urban Data Trust have two initial tasks.

First, it should establish a set of Responsible Data Use (RDU) Guidelines that would apply to all entities seeking to collect or use urban data in the IDEA District, incorporating globally recognized Privacy by Design principles. Second, it should implement and manage a process for approving the responsible collection and use of urban data anchored by a publicly auditable Responsible Data Use (RDU) Assessment — an in-depth review that is triggered by any proposal to collect or use urban data.

## RDU Guidelines

Sidewalk Labs believes the Urban Data Trust would be in a position to determine the most appropriate RDU Guidelines. For consideration as an initial set, however, Sidewalk Labs submits the following guidelines, which it has implemented internally for pilots that undergo privacy assessments:

### Beneficial purpose.

There must be a clear purpose and value to any proposed use of urban data.

### Transparency and clarity.

Organizations should inform individuals of how and why data would be collected and used in a way that is proactive, clear, and easy to understand.

### Data minimization, security, and de-identification by default.

Organizations should collect the minimum amount of data needed to achieve the beneficial purpose and use the least invasive technology available to achieve the beneficial purpose.

### Publicly accessible by default.

Organizations should make properly de-identified or non-personal data that they have collected publicly accessible to third parties by default, formatted according to open standards.

### No selling or advertising without explicit consent.

Such precautions are necessary because individuals often do not know when their personal information is being sold or used for such purposes.

### Responsible AI principles required.

Organizations should be required to show how they have incorporated Responsible AI principles to reduce the likelihood of biased and unethical outcomes.

## A clear process for approval

Sidewalk Labs proposes that once the Urban Data Trust and RDU Guidelines have been established, a transparent process should be created for any proposals seeking to collect or use urban data.

### Step 1:

#### Classify the data.

If urban data is involved, then the proposal would fall under the jurisdiction of the Urban Data Trust and the data collector should move on to Step 2 of the process.

### Step 2:

#### Submit an RDU Assessment.

Entities seeking to collect or use urban data complete an RDU Assessment: an in-depth review outlining the purpose of the digital proposal, the type of urban data it aims to collect, its potential impact on the community, and its risks and benefits.

### Step 3:

#### Receive a decision.

Sidewalk Labs proposes that the Urban Data Trust determine whether the data activity should proceed based on the organization's attestation to applicable laws, as well as a subjective and objective evaluation of the RDU Assessment.

### Step 4:

#### Meet post-approval conditions.

A set of post-approval conditions include transparency (making RDU Assessment summaries available), device registration (including a real-time public map of digital devices), data access, data sharing and licencing agreements, and auditing.

Sidewalk Labs has already committed publicly that it would not sell personal information to third parties or use it for advertising purposes. It also commits to not share personal information with third parties, including other Alphabet companies, without explicit consent.

# Catalyzing innovation by launching core digital services that others can build on

Sidewalk Labs proposes to launch a limited set of digital services in Quayside designed to tackle tough urban challenges and inspire countless subsequent innovations by third parties.

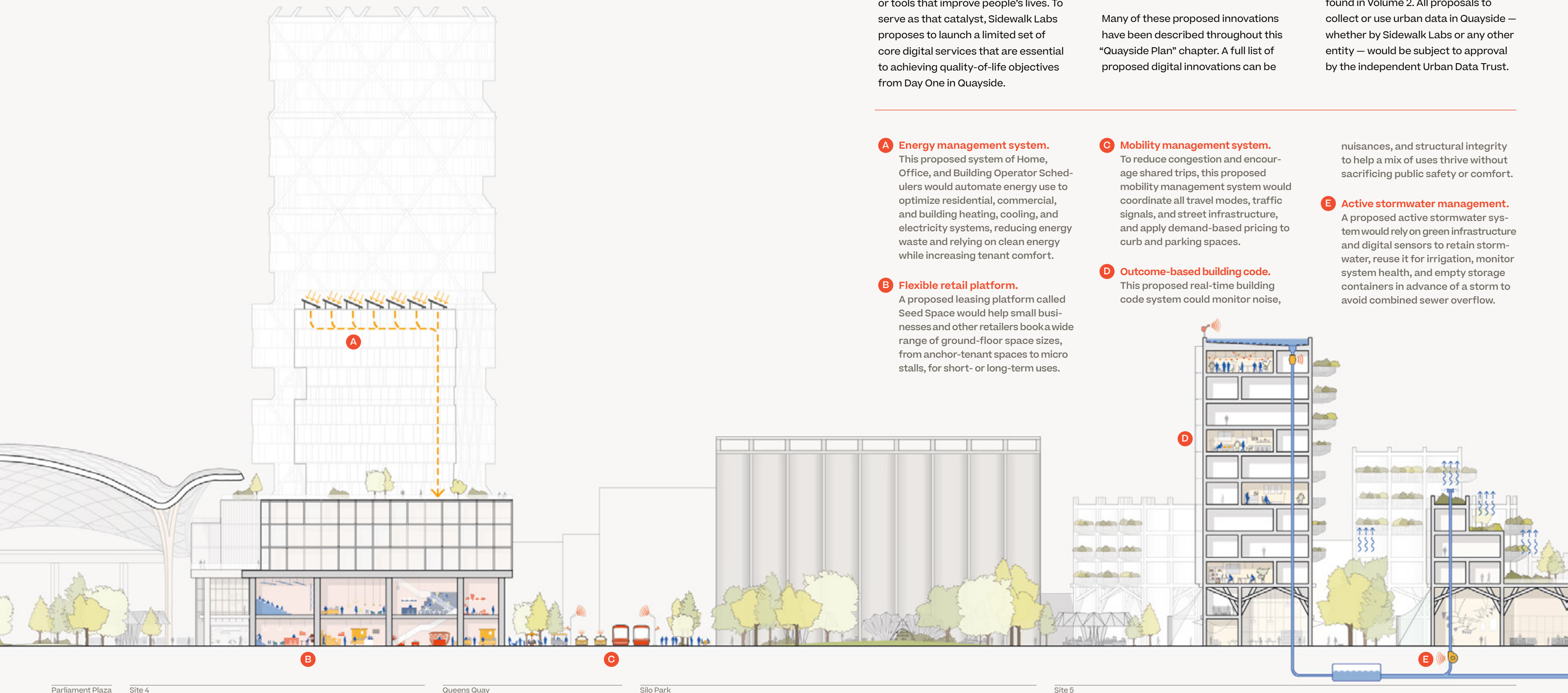
A true ecosystem of urban innovation requires a catalyst that makes it possible for third parties to build new digital applications, services, products, or tools that improve people's lives. To serve as that catalyst, Sidewalk Labs proposes to launch a limited set of core digital services that are essential to achieving quality-of-life objectives from Day One in Quayside.

These core services would not only deliver improvements in affordability, mobility, sustainability, and economic opportunity, but also would make the urban data they generate publicly accessible to others (with proper protections), enabling countless subsequent innovations to emerge from local companies, entrepreneurs, startups, researchers, agencies, civic groups, and others.

Many of these proposed innovations have been described throughout this "Quayside Plan" chapter. A full list of proposed digital innovations can be



found in Volume 2. All proposals to collect or use urban data in Quayside — whether by Sidewalk Labs or any other entity — would be subject to approval by the independent Urban Data Trust.



- A Energy management system.**  
This proposed system of Home, Office, and Building Operator Schedulers would automate energy use to optimize residential, commercial, and building heating, cooling, and electricity systems, reducing energy waste and relying on clean energy while increasing tenant comfort.
- B Flexible retail platform.**  
A proposed leasing platform called Seed Space would help small businesses and other retailers book a wide range of ground-floor space sizes, from anchor-tenant spaces to micro stalls, for short- or long-term uses.

- C Mobility management system.**  
To reduce congestion and encourage shared trips, this proposed mobility management system would coordinate all travel modes, traffic signals, and street infrastructure, and apply demand-based pricing to curb and parking spaces.
- D Outcome-based building code.**  
This proposed real-time building code system could monitor noise,

- nuisances, and structural integrity to help a mix of uses thrive without sacrificing public safety or comfort.
- E Active stormwater management.**  
A proposed active stormwater system would rely on green infrastructure and digital sensors to retain stormwater, reuse it for irrigation, monitor system health, and empty storage containers in advance of a storm to avoid combined sewer overflow.



# A Robust Public Engagement Process, Reaching Thousands of People

The Sidewalk Toronto project teams solicited a wide range of feedback and inputs from thousands of people across the city, including residents, researchers, community leaders, and government agencies. This unprecedented level of preliminary public input helped shape the Quayside development plan.

**Consultation by the numbers**

- ~21,000 people engaged in person during Sidewalk Toronto and 307 events
- ~280,000 online views of live-streamed events or videos
- More than 11,000 visitors to 307 since June 16, 2018

To date, the Sidewalk Toronto public engagement program has reached more than 21,000 Torontonians of all ages.  
Credit: Jenna Wakani

After Sidewalk Labs was selected by Waterfront Toronto as Innovation and Funding Partner, the Sidewalk Toronto project launched in October 2017. Public engagement began shortly after the project launch and occurred alongside this period of intensive planning work. This type of extensive engagement from the outset is critical to designing a plan that truly reflects the aspirations and ideas of Torontonians.

In November 2017, some 530 Torontonians showed up on a chilly evening, packing the St. Lawrence Centre for the Arts to hear about the Sidewalk Toronto project. The live-streamed discussion from this initial Town Hall has since been viewed by over 5,000 people online. It was the start of a sprawling conversation that, over the course of the next 18 months, would become one of the city’s largest-ever public discussions on an urban development — and is still ongoing.

At that first Town Hall, Torontonians said they wanted a community engagement process that would be inclusive, transparent, frequent, wide-reaching, and meaningful. Soon after, Sidewalk Labs released its participation plan:

13 different programs that would ultimately connect the project with tens of thousands of Torontonians.

Sidewalk Labs’ subsequent outreach has included dozens of community meetings and programs. A series of large-scale roundtable meetings helped to keep people informed of the latest project updates and asked them to weigh in on key topics, from the principles guiding the planning process to the initial drafts of the plan for Quayside. A series of public talks brought local and global experts to broaden the conversation on safe street design, housing affordability, accessibility, and sustainable buildings.

The engagement plan included two intensive programs for representative groups of Torontonians. One was the Sidewalk Toronto Residents Reference Panel: a group of 36 residents from every corner of the city and diverse backgrounds. Across six Saturday sessions, spread over nine months and dozens of hours, the panelists received an in-depth look at many aspects of the Sidewalk Toronto project and provided a detailed set of recommendations, helping to shape the plan in the best interests of all Torontonians.

The other intensive program was the Sidewalk Toronto Fellows program, designed as an opportunity for 12 early-career Torontonians aged 19-24 to travel to cities across North America and Europe and learn about waterfront revitalization and the use of technology. The fellows represented a range of perspectives, skills, and educational backgrounds from all over Toronto. They synthesized their learnings and published a report of recommendations that has directly influenced Sidewalk Labs’ planning teams.





The outreach effort stretched across all ages, including a partnership with the YMCA that led to a kids camp.

Bringing informed scrutiny into the heart of the project was essential. Sidewalk Labs convened six topic-specific advisory boards filled with local experts to challenge and improve the project's assumptions. Project members also held hundreds of one-on-one or small group meetings — including concerted outreach to the business, academic, non-profit, and institutional sectors — and engaged extensively with Waterfront Toronto and public officials at all three levels of government.

This programming was complemented by consultations held by Waterfront Toronto, including Civic Labs focused on digital elements of the project and “design jams” that provided stakeholders and residents with an opportunity to engage deeply with aspects of the project focused on vertical living, cycling, and the water.

**Consultation by the numbers**  
 → 100+ hours spent co-designing with communities  
 → ~1,700 total hours volunteered by Resident Reference Panel members  
 → ~2,300 total hours committed by Sidewalk Toronto fellows  
 → Worked with 75 experts, across six expert advisory groups



Sidewalk Labs' Amina Mohamed discusses a student-created model imagining the future of Quayside with visitors to 307. More than 11,000 Torontonians have visited 307 since it opened in June 2018. Credit: Jenna Wakani

## Learning from many voices

In June 2018, Sidewalk Labs opened a Toronto office and innovation workspace in Quayside called 307, housed in a former fish-processing plant in Quayside. All summer long, 307 hosted special events

that attracted residents, artists, and innovators to learn more about the Sidewalk Toronto project, engage with early explorations into a variety of urban innovations, and provide valuable feedback.

Since its opening, 307 has welcomed more than 11,000 people, creating a dynamic and original venue for consultation and exploration.

In the latter half of 2018, Sidewalk Labs reached out to groups whose voices had been missing and brought them to the design and planning table, and also strived to meet people in their own communities.

Teams worked with members of the Indigenous community for a design workshop; engaged seniors in a charrette around housing; travelled to middle schools to ask children and youth for their ideas; and held a series of co-design sessions with members of the accessibility community and with people with lived experience of addiction and mental health challenges, in collaboration with the Inclusive Design Research Centre at the Ontario College of Art and Design University.

Consultations were also held with residents and students from the inner suburbs of Rexdale and Scarborough, with the Lived Experience Advisory Group to the City of Toronto's Poverty Reduction Strategy, and with the Toronto Community Benefits Network to explore ways in which the project could drive equity, opportunity, and social inclusion.

Planning teams also commissioned ethnographic research that emphasized the inclusion of diverse voices or voices often missed in the traditional public engagement process for reasons such as geography, awareness, or access.

These studies focused on public space, family housing, and community care.

### “North of the Water”:

#### Generating open space principles

Sidewalk Labs collaborated with Doblin, Deloitte's consulting practice on human-centred design, and Park People, Canada's leading charity devoted to improving public space, to understand which factors contribute to a sense of belonging in public space. The “North of the Water” research involved 40 Torontonians who had previously not participated in a formal public engagement process, representing 23 different neighbourhoods and a mix of ages and backgrounds.

The work drew from in-depth interviews, “research walks” through public space, and daily diaries. A final report — available on the Sidewalk Toronto website — resulted in six design principles for great, inclusive public space.

### “Living Well on the Waterfront”:

#### Understanding health needs

Sidewalk Labs commissioned the design firm Idea Couture to provide an understanding of the health needs of Torontonians. Twenty residents and service providers — from a mix of age groups and cultural, professional, and political backgrounds — were interviewed in their homes and communities. Idea Couture and Sidewalk Labs then hosted a co-design charrette at the Centre for Social Innovation in Toronto, with participants from both the public and private sectors, to co-create more than 90 ideas on the future of community care. The resulting report sketched out a concept for a new type of community-based care hub in Quayside.



### “Family Lifestyles”:

#### Informing a new housing toolkit

With SHS Consulting, a Toronto-based housing research firm, Sidewalk Labs conducted research with 25 low- or middle-income couples and families to uncover the housing needs of Torontonians — beyond the typical downtown resident. This work interviewed couples and families from the Toronto core, Etobicoke, and Scarborough in their homes and conducted a three-hour co-design workshop at 307, where families responded to a unit mock-up, tried out digital prototypes, and filled out workbooks. This direct feedback helped the Sidewalk Labs planning teams develop and validate certain concepts in a new housing toolkit.

To date, Sidewalk Labs has heard first hand from more than 21,000 Torontonians.

But the listening does not stop here. Sidewalk Labs will continue learning from Torontonians and incorporating their feedback as the plans for Quayside and the eastern waterfront come to life.

Accessibility has been a core focus of the Sidewalk Toronto public engagement program, with Sidewalk Labs' planning teams holding more than 14 co-design events and 70 hours of workshops with the accessibility community. Credit: Jenna Wakani



See the “Public Realm” chapter of Volume 2 for more details on this research.



# Consultation milestones

**November  
2017**

**First Town Hall**  
More than 530 people attended the Sidewalk Toronto project's first town hall meeting, at the St. Lawrence Centre for the Arts, with another 5,700 more participating via livestream.

**February  
2018**

**Public engagement plan release**  
The Sidewalk Toronto team released its full public engagement plan, outlining dozens of ways to get involved across a variety of programs.

**March  
2018**

**First public roundtable**  
Waterfront Toronto and Sidewalk Labs host the first public roundtable. Roughly 800 people attend in person, with another 1,700 joining via livestream.

**May  
2018**

**Initial data framework and second public roundtable**  
Sidewalk Labs presents its initial Responsible Data Use Policy Framework for feedback at the second public roundtable, which is attended by roughly 400 people, with another 1,300 joining via livestream.

**June  
2018**

**Opening of 307**  
Sidewalk Labs opens a Toronto office and experimental workspace at 307 Lake Shore Boulevard East, welcoming the public to learn about the Sidewalk Toronto project and participate in regular programs held in partnership with local vendors. About 2,000 Torontonians attend.

**August  
2018**

**Third public roundtable**  
Waterfront Toronto and Sidewalk Labs host the third public roundtable, focused on initial thinking for public realm, streets, and buildings. Roughly 460 people attend in person, with another 8,700 joining via livestream.

**September  
2018**

**Design jams**  
Waterfront Toronto hosts three "design jams": full-day sessions for local residents to help shape the project. Themes include vertical living, water connections, and cycling.

**November  
2018**

**First look at the plan**  
Sidewalk Labs releases its Draft Site Plan for Quayside, laying out specific goals for the neighbourhood: 40 percent below-market housing, mass timber construction up to around 30 storeys, a 75 percent reduction in greenhouse gas emissions, and more.

**December  
2018**

**Fourth public roundtable**  
Waterfront Toronto and Sidewalk Labs host the fourth public roundtable. Roughly 400 people attend in person, with another 3,400 joining via livestream.

**January  
2019**

**Advisory Working Groups' final meetings**  
After six months to a year of meetings, the Advisory Working Groups — which include 75 experts from across six critical areas: community services, sustainability, mobility, digital governance, housing, and public realm — meet for the final time.

**February  
2019**

**Draft accessibility principles**  
After participating in 70 hours of co-design sessions with the accessibility community and hosting 14 accessibility-related events, Sidewalk Labs releases a set of draft accessibility principles to guide the planning process for the Sidewalk Toronto project.

**March  
2019**

**Fourth Open Sidewalk**  
At the fourth Open Sidewalk at 307, Sidewalk Labs unveils two new prototypes: the modular pavement and building Raincoat systems. About 785 people attend.

**May  
2019**

**Reference panel recommendations**  
The 36-member Residents Reference Panel releases its 60-page final report. Across six sessions spread over nine months, and a collective 1,728 hours, the residents received an in-depth look at the Sidewalk Toronto project, provided feedback, and helped to shape the plan in the best interests of Torontonians.

**June  
2019**

**Draft MIDP release**  
Sidewalk Labs submits its Master Innovation and Development Plan to Waterfront Toronto and the City of Toronto for consideration.

## Endnotes

General note: Unless otherwise noted, all currency figures are in Canadian dollars.

Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalk-toronto.ca/midp-appendix](http://www.sidewalk-toronto.ca/midp-appendix).

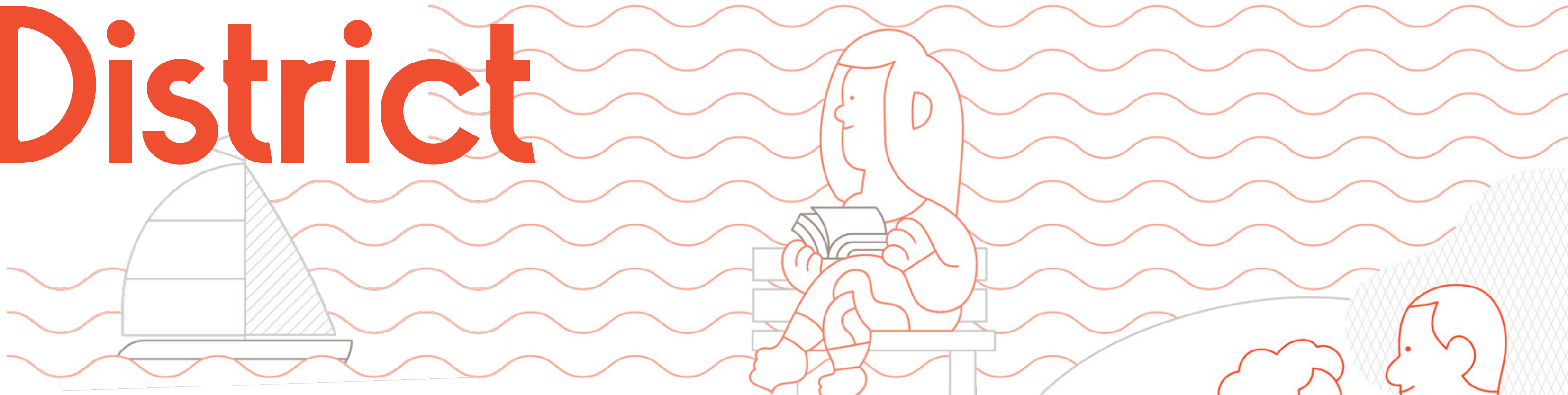
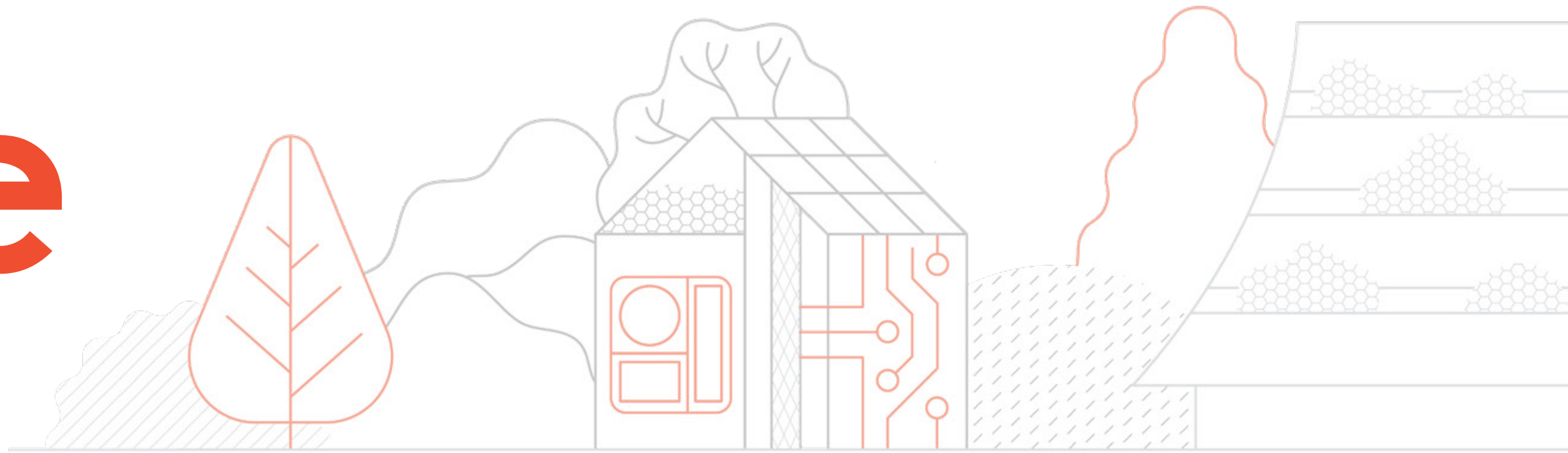
1. The technical figures, projections, and other calculations that inform this site plan are supported by a number of accompanying documents, all of which are included in the MIDP Technical Appendix, available at the Sidewalk Toronto website. For Volume 1, the key supporting documents in the Technical Appendix are the “Quayside Planning Supplement,” the “Planning Policy Justification Report,” and the “MIDP Engineering Basis of Design” reports. In addition, many aspects of this site plan are explored in greater detail in other sections of the MIDP Technical Appendix, as referenced in these endnotes.
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Quayside can emerge as a starting point to address the broader challenges of city life and become a model for how urban communities can meet the needs of new generations.

# The River District



## Introduction

p256

## Part 1

### Neighbourhood Planning Concepts

p292

## Part 2

### Scaling Urban Innovations

p348

## The Future Is Now

p408



# Planning Holistically to Achieve Toronto's Goals

Extending Quayside's innovations into the River District would enable Toronto to capitalize on existing public investments and leverage the significant proposed investments by Sidewalk Labs to fulfill the waterfront's extraordinary potential.

For decades, Toronto's planners have recognized the opportunity for the eastern waterfront to play a critical role in addressing Toronto's challenges.<sup>1</sup>

Yet despite the success of the Film District studios and the improvements to Cherry Beach, the area continues to have much greater potential to contribute to the fabric of the city than is currently being realized. While there has always been a general agreement that the eastern waterfront should have a strong focus on employment and jobs, unlocking that potential has been an ongoing challenge for decades.

An important step was taken when Waterfront Toronto and its government partners initiated the Don Mouth Naturalization and Port Lands Flood Protection Project Environmental Assessment, which considered how to eliminate a first barrier to development: flooding. The result was the \$1.25 billion Don Mouth Naturalization plan currently underway.<sup>2</sup>

As another important step, the Port Lands Planning Framework and Villiers Island Precinct Plan have established a vision to guide the transformation of the area over the next half century.<sup>3</sup> The framework emphasizes the development of mixed-use neighbourhoods surrounding the renaturalized Don River and on the newly created Villiers Island to provide much-needed spaces for production, interactive, and creative jobs and for affordable housing, anchored by an expanded transit network and vibrant public spaces.

But even with the significant recent public investment, the area still lacks even basic infrastructure and remains separated from the great neighbourhoods that surround it to the north. Despite a shared recognition of the systems required to achieve

the eastern waterfront's potential, such as new public transit lines, there is currently no clear path to funding and building them.

Drawing on its unique mission to integrate new technology and urban design to improve urban life, Sidewalk Labs proposes to work with Waterfront Toronto and the City of Toronto to develop innovative approaches, tools, and resources to deliver the necessary infrastructure to build on Toronto's planning foundation and accelerate the realization of major policy objectives.

*This partnership could fulfill the revitalization vision for the eastern waterfront with a focus on urban innovation, economic development, environmental sustainability, improved mobility and affordability, and social inclusion.*

As described in the previous chapter of Volume 1, the opportunity begins in Quayside, which can become a globally significant demonstration project that advances a new model for sustainable and innovative urban development. Its relatively intimate scale presents a perfect environment to prove the viability of the proposed innovations.

*But many of the innovations initiated in Quayside can only achieve their full potential and become financially feasible when applied at a larger scale. That is why Sidewalk Labs is proposing a second phase for the project across a larger geography it is calling the River District.*

Together, Quayside and the River District form the basis of the Sidewalk Toronto project proposal to transform a small portion of the eastern waterfront — less than one third to be developed over 20 years — into an Innovative Design and Economic Acceleration (IDEA) District that can catalyze tens of thousands of jobs and help tackle the major challenges facing Toronto today.



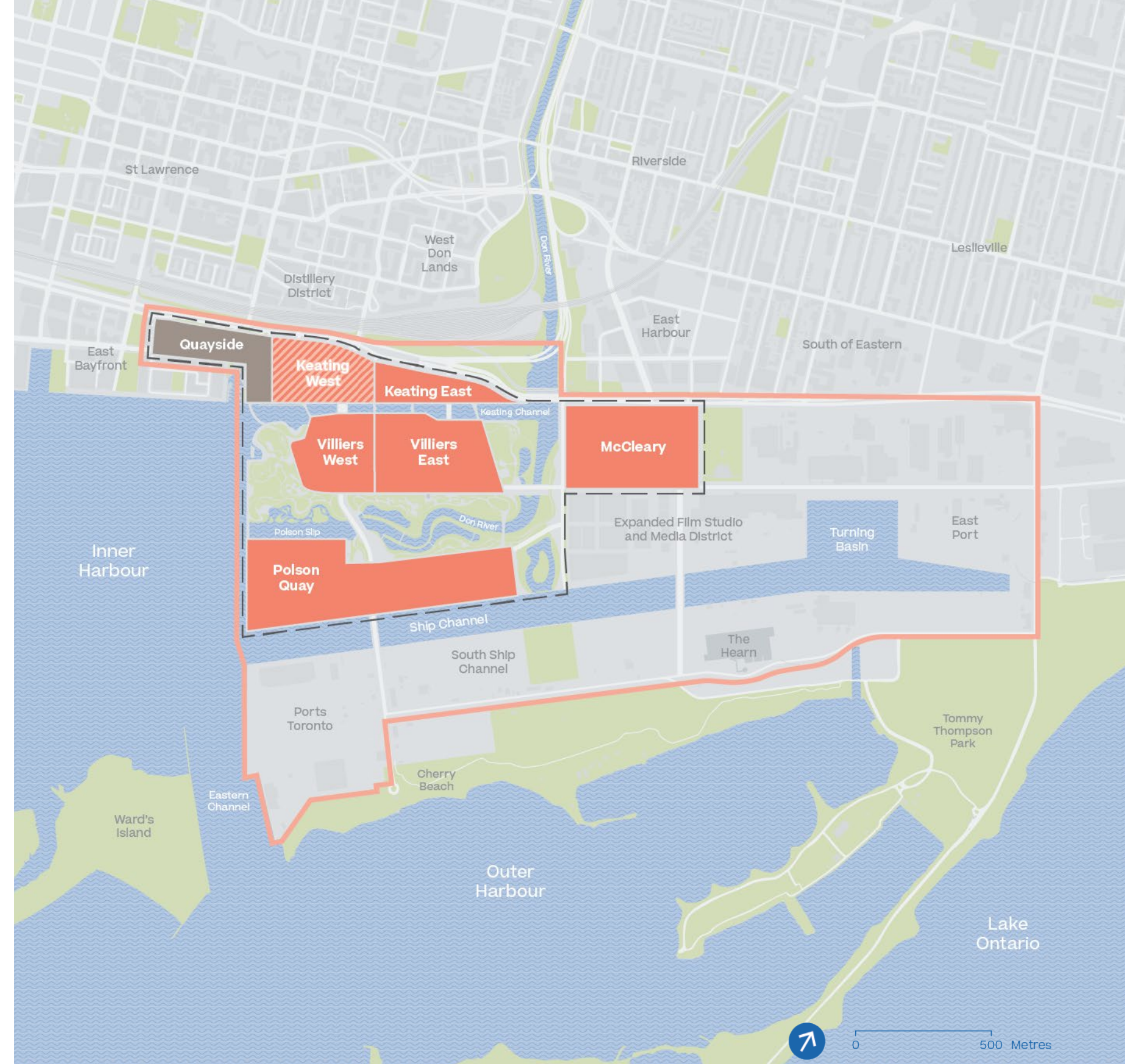
Unlocking the full potential of the underutilized eastern waterfront for inclusive urban growth has been a challenge for decades.  
Credit: Mark Wickens

This limited geography recognizes that there are successful industries already in place that require their own spaces to expand. That is why the growing Film District is not included as part of the proposal. Neither is East Port, which is an important location for the consolidation and ongoing operation of larger industrial uses.

While the Film District and East Port are not part of this proposal, the River District development would seek to partner with them and support them where appropriate. Such efforts might include incorporating technology into the streetscape to facilitate film shoots or fostering research into green industrial practices that could benefit companies in the East Port.

The River District also does not include Keating West, which consists of two privately owned parcels that have already undergone precinct planning and had zoning bylaws adopted by council. These sites would, at their discretion, have the option to participate in the advanced sustainable infrastructure program proposed by Sidewalk Labs.

Sidewalk Labs' proposed role in development would also shift as the project expands into the River District; this role is described more in the following section, beginning on Page 260.



Map  
**The IDEA District and eastern waterfront geography**

- Eastern waterfront
- IDEA District
- Phase 1: Quayside
- Phase 2: River District
- Optional participation in Phase 2



# The River District: Proposed geography and roles

The River District, a 62-hectare area just beyond Quayside that surrounds the naturalized Don River and ends at the Ship Channel, would consist of five neighbourhoods: Villiers West, Villiers East, Keating East, McCleary, and Polson Quay.

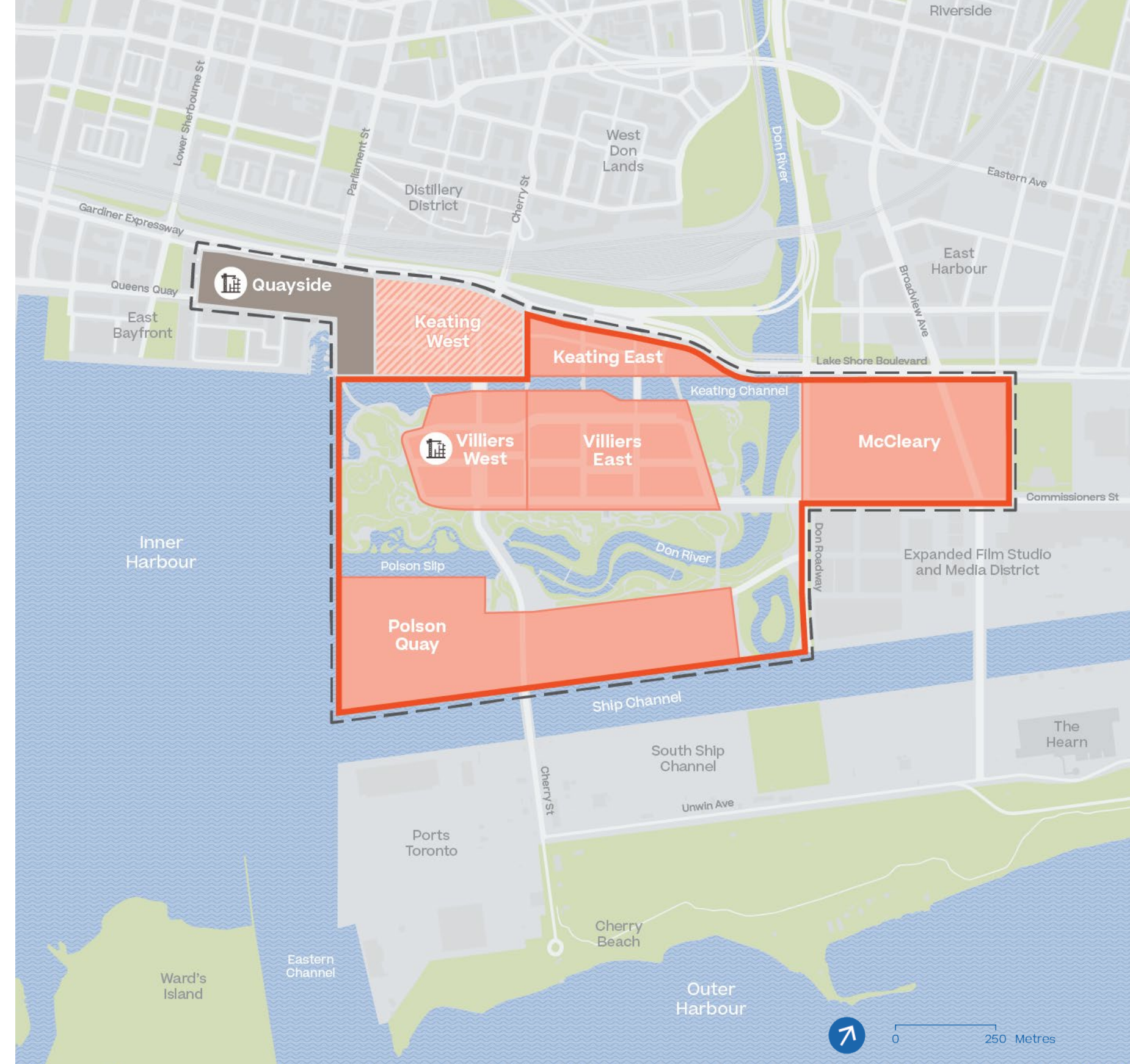
Collectively, these areas contain sufficient scale, density, and diversity to unlock opportunities for Waterfront Toronto and the city to fully realize shared objectives. While the specific plans developed by the responsible government agencies would respond to the unique potential of each neighbourhood site, collectively these communities can become a global showcase for a new kind of live-work-make model for urban life, driven by adaptable designs that can respond to the changing needs of future generations.

It is Waterfront Toronto's mandate to lead the urban planning, design, infrastructure delivery, and real estate development associated with broader geographies along the eastern waterfront. Sidewalk Labs proposes that government designate a public entity to serve – or in the case of Waterfront Toronto, continue to serve – as revitalization lead for the IDEA District.

Waterfront Toronto selected Sidewalk Labs as the partner best suited to achieve its objectives around economic opportunity, sustainability, mobility, and affordability. As a company founded to leverage the latest innovations to improve the quality of life in cities, Sidewalk Labs can bring together the expertise and tools required to devise, finance, and implement creative solutions to large-scale problems.

Sidewalk Labs believes that the best way to achieve Toronto's goal of creating an innovation showcase along the waterfront is by demonstrating leadership and empowering others to do the same. That is why a fundamental part of its plan is to create conditions that allow third parties to easily access, explore, adapt, and build on its ideas and technologies.

In one area of the River District, Villiers West, Sidewalk Labs proposes to be the lead real estate developer in concert with local development partners, with Google's relocated Canadian headquarters as the centrepiece, to create a major economic hub focused on urban innovation. In total, Sidewalk Labs proposes leading development (with local partners) only on Quayside and Villiers West – less than 7 percent of the eastern waterfront.



## Map River District geography and roles

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- ▨ Optional participation in Phase 2
- 🏢 Sidewalk Labs develops real estate and advanced systems



For more information on proposed roles, see the “Innovation and Funding Partnership Proposal” chapter of Volume 3.

In the rest of the River District, an array of third parties would take over the development, and Sidewalk Labs’ roles would include supporting Waterfront Toronto as the planning, design, and implementation partner (including the creation of innovation design standards and guidelines); deploying a core set of technology solutions required to achieve key project objectives; and financing infrastructure (an optional role). A mixture of public, private, and non-profit entities would develop buildings, create jobs, provide housing opportunities, and deliver social and community infrastructure.

Reflecting these roles, the River District chapter includes considerable planning details for Villiers West but only includes concepts for the other proposed River District neighbourhoods. This chapter also describes how each core innovation pillar initiated in Quayside generates greater quality-of-life benefits — and in some cases only becomes financially viable — at scale.

Sidewalk Labs believes that its unique approach to planning, supported by a new partnership model that harnesses the private sector’s ability to help realize public policy goals, would create the conditions that enable third parties to develop urban innovations, unlocking improvements and solutions that are as yet unimagined.

**The proposed River District would create the conditions that enable third parties to develop urban innovations, unlocking improvements and solutions that are as yet unimagined.**

# The River District’s Scale Is Necessary to Realize Priority Outcomes

Quayside’s five hectares make it a perfect place to explore new innovations to improve quality of life, but many can only become effective or financially feasible at the scale of the 62-hectare River District.

Waterfront Toronto has established five priority outcomes to guide the MIDP: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).<sup>4</sup> Achieving these goals will require establishing strong economic anchors; building new public transit connections; designing, financing, and operating advanced infrastructure systems; and developing financial tools that can generate significant new value to help fund affordable housing.

These systems and approaches become feasible only when they are applied to an area large enough to support the substantial resources required to develop, implement, and run them. For that reason, several of the foundational innovations proposed in Quayside are possible only when they are designed and implemented in the context of the broader geographic area that includes the River District.



# Proposed innovations that can only exist at scale

Many urban systems benefit from scale; more space can mean more amenities and more potential experiences. Some require scale to exist at all. They simply cannot be financed or successfully operated without a certain amount of density to support them. Here is a list of the innovations proposed in the MIDP that would only be possible at the scale of the River District, either for technical, financial, or operational reasons.

This list is introduced briefly here and described in greater depth in the sections that follow.

## 1 Attracting new economic anchors is only possible at scale.

→ **Urban innovation cluster.** A mixed-use development area with sufficient space and amenities is needed to attract an economic anchor that can generate significant jobs and establish an ecosystem of ongoing urban innovation.

→ **Factory-based construction.** A critical mass of construction is needed to catalyze a Canadian tall timber industry and justify investment in a modular production factory in southern Ontario.

## 2 Supporting advanced infrastructure to achieve climate positivity is only possible at scale.

→ **Climate positivity.** A sufficient development area and density are needed to finance and operate the advanced infrastructure systems core to creating a climate-positive community.

## 3 Unlocking significant progress towards affordability is only possible at scale.

→ **Affordable housing.** Sufficient development areas and densities are needed for new financial tools to ensure that developers can help support public goals around below-market housing, managed by a new housing trust.

## 4 Creating a 21st-century mobility network is only possible at scale.

→ **Public transit expansion.** A sufficient development area and density are needed to self-finance the construction of the planned public transit extensions — without competing with other city funding priorities.

→ **New mobility options.** Providing an area large enough to establish a full network of new mobility options is necessary to integrate new technologies and to improve and expand multiple modes, including public transit, walking, cycling, ride-hailing, and micro-mobility options.

# 1

## Attracting new economic anchors

### Sparking an urban innovation cluster.

Quayside can establish the foundation of a district that actively supports innovation, creativity, and exploration, but it does not have the space to accommodate an economic cluster's potential expansion or a sufficient density of housing, retail, and amenities to support tens of thousands of new workers and residents.

The River District presents this opportunity. Alphabet commits to establishing a new Canadian headquarters for Google on the western edge of Villiers Island, as part of an agreed-upon transaction within the IDEA District. **Alphabet would target up to 500,000 square feet, which would be sufficient to accommodate as many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring would depend on market conditions and business requirements).**

This new headquarters would be the centre and catalyst for a new innovation campus, amplifying the area's economic potential. Based on experience in a variety of other cities, it is expected that the Google tenancy would attract an array of other companies in the Toronto tech ecosystem to locate at the innovation campus.

This campus would also include the Urban Innovation Institute, a new non-profit applied research institute designed to bring together academia, industry, entrepreneurs, advocates, and public agencies to collaborate on tackling urban challenges. The proposed institute would be developed with local universities and

government partners, with the idea of helping innovators access, contribute to, and export the learning made possible throughout Quayside and the River District.<sup>5</sup>

The innovation campus would be a major employment anchor for the revitalized eastern waterfront, complementing the Film District expansion and the East Harbour development. **In total, Sidewalk Labs estimates that 10,500 of the 93,000 IDEA District jobs would be focused on urban innovation, creating a new economic engine around this emerging area.**

### Catalyzing a mass timber industry.

As the world's first entirely mass-timber neighbourhood, Quayside can help demonstrate the feasibility and benefits of this new sustainable building material. But Sidewalk Labs estimates that a larger development area — roughly 6 million square feet — is needed to justify an investment in the factory-based production of mass timber, as well as for such a factory to hit peak efficiency in producing sustainable building components on a predictable timeline that developers can trust.

**Extending this approach across the River District could catalyze the creation of a new Canadian industry that capitalizes on the country's abundant green-certified forests, and could support a new modular factory that accelerates construction timelines by up to 35 percent.<sup>6</sup>**

# 2

## Supporting advanced infrastructure to achieve climate positivity

Waterfront Toronto sought a unique funding and innovation partner because it recognized that its ambitious goal of creating a climate-positive community — which requires exporting clean energy outside of a project area or actively reducing Toronto’s current greenhouse gas emissions through carbon offsets — cannot be achieved by simply extending existing infrastructure into new neighbourhoods. But designing, implementing, and operating the new, advanced infrastructure systems necessary to achieve climate positivity requires a large enough customer base to be effective and financially feasible.

Specifically, to keep Quayside resident energy bills in line with Toronto averages, the advanced power and thermal grids would require a \$19 million supplemental

innovation investment based on the current plan, due to factors including the high cost of geothermal exchange and initial electric grid connections, in addition to the poor economies of scale for operating costs. While this is not financially sustainable at the scale of each neighbourhood, no additional supplemental innovation investment would be required to extend operations into the River District beyond Villiers West, because the systems scale in a financially sustainable way.

The River District would provide a large enough area to support these investments, including new infrastructure to eliminate the use of natural gas and implement an advanced electric power grid, a new thermal energy grid for heating and cooling buildings, a new anaerobic digestion facility to process organic waste, and new digital technologies that can optimize energy use within buildings.<sup>7</sup> This holistic plan could also encourage local companies and innovators to invest in new technologies (such as advances in battery storage capacity) to support the emerging cleantech industry.

With public-sector support, the Sidewalk Toronto project could become the largest, densest climate-positive district in North America and the third largest in the world — establishing a credible path forward for cities to follow.

**The Sidewalk Toronto project could become the largest climate-positive district in North America.**

# 3

## Unlocking significant progress towards housing affordability

Waterfront Toronto has recognized that the eastern waterfront can become an essential piece of the city’s strategy to address increasingly urgent affordable housing needs — and that doing so creates an opportunity to honour the city’s commitment to inclusive, diverse neighbourhoods.

Sidewalk Labs has embraced this mission, with an ambitious commitment to make 40 percent of units in Quayside available at below-market rates.<sup>8</sup> But with 2,600 total housing units, and roughly 1,000 below-market units, the neighbourhood has a limited ability to make a substantial dent in the city’s housing market.

To make a significant dent, Sidewalk Labs plans to explore a series of private funding sources that can help support an ambitious vision for housing affordability. These sources include affordability by design (using efficient unit design to create more total units, and thus additional value); the increased value of public land due to factory-built timber construction; and a condo resale fee.

At the Quayside scale, however, only affordability by design would create value (roughly \$37 million) that could be directed towards a below-market housing program. Generating land value from factory-based construction requires 6 million square feet of delivery output — far more than available in Quayside — to refine the factory process and reliably accelerate project timelines and reduce project risks for developers. And generating funds from the resale fee require ongoing condo turnover, and thus additional phases of development.

Applying these strategies at the scale of the River District has the potential to generate more than \$1.4 billion for below-market housing and support the creation of a housing trust fund that can assemble and distribute these funds.<sup>9</sup> With this approach, the district would include an estimated 13,600 below-market units. (See Page 384 for more details.)

It also would offer a new range of housing types, ownership and rental models, and flexible units, creating inclusive communities that welcome Torontonians across all lifestyles, life stages, and income levels.

**Housing affordability by the numbers:**  
→ 40% below-market vision  
→ More than \$1.4 billion in private funding  
→ Up to 13,600 below-market units (with additional government support)

# 4

## Creating a 21st-century mobility network

### Extending the LRT into the Port Lands.

Toronto has planned an extension of its public transit network across the eastern waterfront since 2006, recognizing light rail's role in supporting the development of sustainable neighbourhoods. But the plans, which could cost as much as \$1.2 billion, remain unfunded.<sup>10</sup> Sidewalk Labs is proposing, if public funding is not available, that this critical project can be built now and financed through future revenue streams generated by the development made possible by the transit extension.

This self-financing approach is a proven strategy for accelerating transit construction in a way that does not compete with other public spending priorities.<sup>11</sup> Sidewalk Labs is prepared to provide financial support to this approach, but it only becomes viable if the new transit lines would serve a sufficient amount of development.

Quayside's proposed development of 10 buildings (roughly 2.65 million square feet) is not large enough to sustainably support the financing of the waterfront light rail. An area the size of the proposed River District (nearly 27 million square feet) could provide enough density to pursue promising self-financing methods for the light rail, such as tax increment financing.

Once built, the new light rail lines would become a fundamental driver of the eastern waterfront's economic development strategy, accelerating the creation of thriving new transit-first neighbourhoods.

### Designing a network of new mobility options.

The limited street network of Quayside can be used to develop new ways to design streets that prioritize people and cyclists, improve the efficiency of how space is allocated as travel patterns shift across a day, and incorporate adaptable features that can respond to new mobility options as they emerge. But while the neighbourhood's four blocks can be an effective demonstration project, streets only have transformative impact when they form a network.

If Quayside's mobility innovations are applied across the River District, there would be opportunities to give residents, workers, and visitors a full set of transportation options designed to meet all of their needs without owning a car, helping to reshape mobility patterns across the city. Within the IDEA District, 77 percent of trips could be made through transit or active modes.

Toronto could also take a leadership role on how to thoughtfully integrate emerging mobility options like self-driving vehicles. The River District could showcase the world's first street network designed to integrate self-driving vehicles in a way that supports public transit use, shared rides, and enhanced pedestrian and cycling experiences.

## Creating the conditions for urban innovation

The true impact of the proposed innovations would come not as individual components but as a comprehensive set of initiatives that together can create the conditions to improve how cities function and enhance quality of life.

By establishing the physical, digital, and policy conditions for urban innovation, the River District can become a beacon for researchers, entrepreneurs, civic organizations, government agencies, and innovators from around the globe to create countless new services and products designed to improve urban life.

At the heart of this vision is the ability to create the digital conditions for others to build on. These include:

- Providing more affordable and flexible digital infrastructure, such as ubiquitous connectivity and standardized mounts
- Setting data standards that are open and secure
- Creating a trusted process for responsible data use, with a proposed independent Urban Data Trust to oversee and approve the use or collection of urban data
- Launching core digital services that others can build on through open access to properly protected urban data.

Together, these conditions would help the IDEA District become an economic engine — with a focus on urban innovation — that generates up to 93,000 total jobs, \$14.2 billion in annual economic output (GDP), and \$4.3 billion in annual tax revenue by 2040.

But while Quayside is the perfect demonstration site to begin developing these digital conditions, many require the scale of the River District to realize their full potential.

For example, new advances in fibre-optic technology and network security can build on Waterfront Toronto's progress bridging the digital divide by offering residents and businesses access to secure, super-fast internet connections at an affordable cost. These advances can also enable countless new solutions to be developed by a wide array of third parties, supporting the development of an economic cluster in urban innovation. But such an advanced network only becomes financially sustainable at the scale of the River District, given the number of residents or businesses needed to recoup the initial investment in core enabling infrastructure.

By planning holistically, and over a large enough area, the integration of these systems and innovations can unlock transformative change. This is the opportunity before Toronto.



See the "Digital Innovation" chapter of Volume 2 for more details on these proposed initiatives.

### Key Term Urban data

Information gathered in the city's physical environment, including the public realm, publicly accessible spaces, and even some private buildings.

# River District impact: The new bottom line

The combined impact of Sidewalk Labs' proposal for Quayside and the River District could achieve Waterfront Toronto's priority outcomes around job creation and economic development, sustainability and climate-positive development,

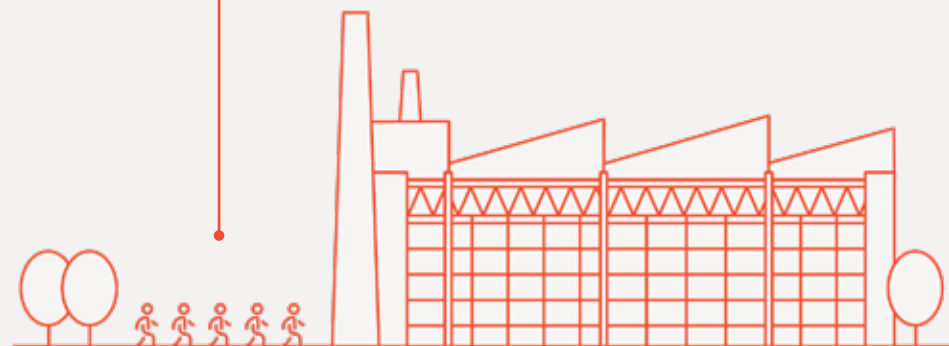
housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance) — establishing the waterfront as a global demonstration project.<sup>12</sup>

**93,000**  
total jobs created

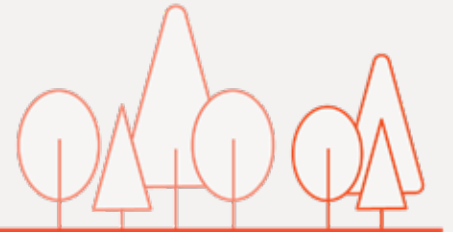
## Economic impact

An economic engine that creates 93,000 total jobs (including 44,000 direct jobs) and generates \$14.2 billion in annual economic impact by 2040

A new Ontario-based factory that catalyzes a Canadian mass timber industry



## Climate impact



**-89%** less CO2

A climate-positive neighbourhood that cuts greenhouse gases by 89 percent

## Housing affordability impact



**40%** below-market units

A housing vision with 40 percent of units at below-market rates, supported by more than \$1.4 billion in new private funding sources

## Mobility impact



**77%** of trips using public transit, walking, or cycling

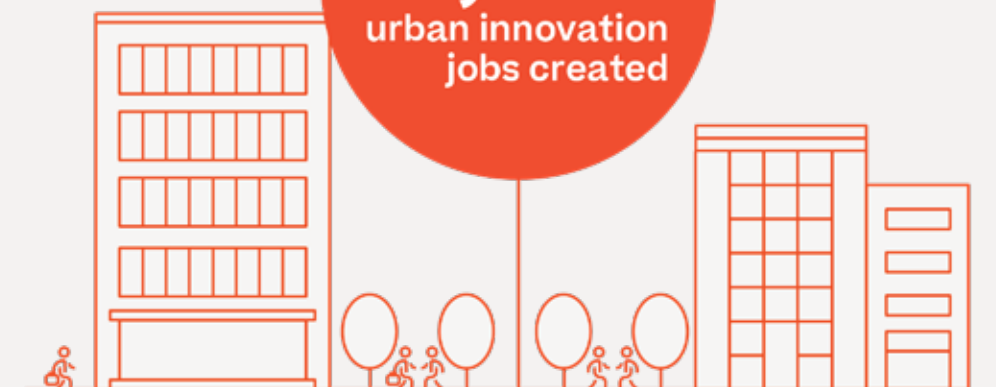
An estimated 77 percent of trips would use public transit or active modes, like walking or cycling

## Urban innovation impact

**10,500**  
urban innovation jobs created

A new innovation campus and economic cluster, with 10,500 jobs (of the 93,000 total) focused specifically on urban innovation

The ability to catalyze digital innovation while protecting privacy and the public good through a new standard of responsible data use



# A Pivotal Moment for the Future of the Eastern Waterfront

The area's lack of basic infrastructure and transit connections are a barrier — and an opportunity. Installing innovative systems across the proposed River District can provide the foundation to attract private development that would fully unlock the waterfront's potential.

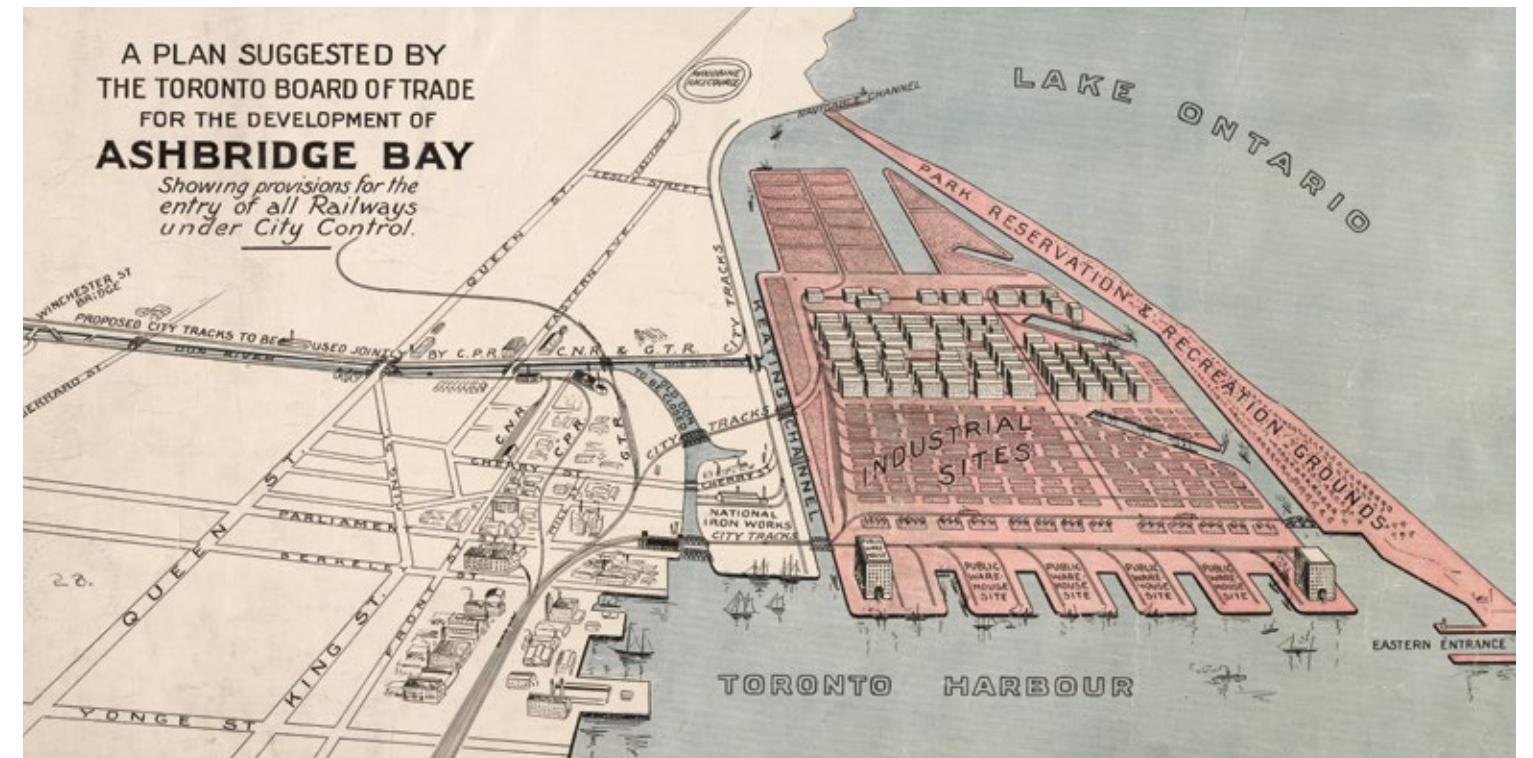
## The River District history: Unfulfilled potential

In the early 1900s, civic leaders targeted what was then the marshy and highly polluted area at the mouth of the Don River, known as Ashbridges Bay, as a potential new centre for shipping, industry, and commerce.<sup>13</sup>

They created the Toronto Harbour Commission in 1911 with the goal of establishing a competitive port, filling in Ashbridge's Bay with lakefill and constructing new quays, extensive dockwalls, and two new shipping channels that cut through the new land. In addition, plans were sketched out for parks, homes, beaches, and winding lagoons that could serve as living and recreational areas for residents.

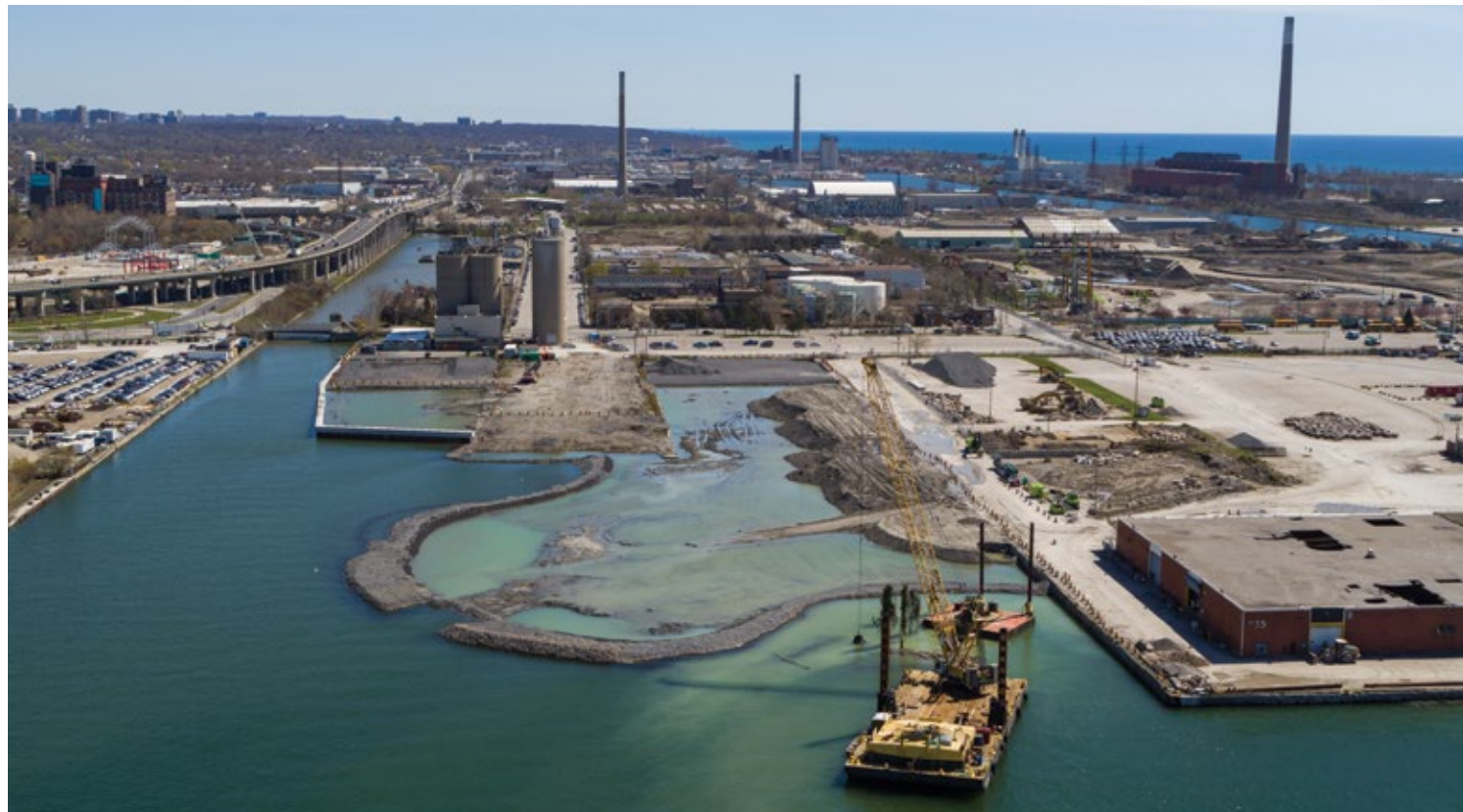
But these ambitions were never fully realized, as the port never achieved the full anticipated growth.

After World War II, Toronto's economy shifted away from manufacturing — as was the case in many cities across North America — leaving the waterfront's industrial areas to enter a long period of decline and neglect. Today, beyond the important Film District, the eastern waterfront is largely a storage ground whose remaining industrial structures serve as a testament to the difficulty of large-scale urban development.



The Ashbridges Bay Development Plan — one of the earliest proposals for the eastern waterfront, from the Toronto Board of Trade in 1909 — envisioned Ashbridges Bay as an island encircled by shipping channels with rail-only access. Credit: Toronto Public Library

# The River District today: Poised to fulfill its promise



In 2018, Waterfront Toronto began construction on a complex, \$1.25 billion plan to protect the Port Lands from flooding, taking a key step towards unlocking revitalization. Credit: DroneBoy

With the central waterfront district approaching completion, and the rezoning for the nearby East Harbour district approved, the eastern waterfront area has once again become a central focus of Toronto's planning efforts. There is widespread recognition that this unique moment requires an ambitious and forward-looking approach to development.

As the city grows, the need for additional sustainable neighbourhoods, affordable housing, and space for growing industries has become more urgent. Whereas the Port Lands were once isolated and distant from the city's core, today

new buildings on the waterfront have marched steadily eastward, with numerous projects completed and others currently under construction within a few blocks of Quayside.

Once again, Toronto's planning efforts have focused on the potential of this area for economic development that can benefit the entire city. But a new generation of thinking, led by Waterfront Toronto, seeks a holistic approach that re-establishes natural systems and provides for a more sustainable and healthy kind of urban growth.

## Planning spotlight

# How the River District proposal adds value to the Port Lands Planning Framework

Released in 2017 by the City of Toronto and Waterfront Toronto, the Port Lands Planning Framework outlines a high-level vision for the future development of this area over a timeline of roughly 50 years.

By extending the innovative approach to planning initiated in Quayside and leveraging long-term resources, Sidewalk Labs can not only help achieve this vision but help to accelerate it and amplify many of its core components. At nearly 27 million square feet of development, the River District envisions a density with the potential to unlock a public transit expansion, dramatically increase the supply of affordable housing, and generate billions in tax revenue for the economy — achieving city and waterfront objectives years sooner than anticipated by the framework.

Some key areas where the River District proposal adds value to the Port Lands Planning Framework include:

### Envisioning Villiers Island as a major economic hub.

The Port Lands Planning Framework identifies Villiers Island as mostly a residential mixed-use area. The River District proposal builds on this foundation by identifying the area as a potential major economic and employment hub anchored around an urban innovation campus, enabling the creation of a true live-work-make community and a significant revenue source for the city. (See Page 292 for more.)

### Preparing for self-driving vehicles.

The framework envisions the creation of a balanced mobility system that emphasizes public

transit, walking, and cycling. The River District proposal complements that approach by designing adaptable streets that anticipate the safe arrival of self-driving vehicles operating as a shared service, dramatically reducing the need for residents and workers to own a car and enabling a significant amount of road and parking space to be reclaimed for public space. Additionally, the potential for self-driving vehicles to operate as electric vehicles is a significant component of the path toward climate positivity.

### Developing advanced energy infrastructure.

The framework calls for innovations and infrastructure that can help realize a climate-positive community but does not identify the advanced systems needed to achieve it. The River District proposal introduces a comprehensive approach towards climate positivity through advanced infrastructure systems (identified on Page 322) supported by digital energy management tools.

### Planning for greater density to unlock a transit expansion and sustainable development.

The River District proposal envisions a greater scale of density than commonly assumed for the Port Lands Planning Framework (particularly in Polson Quay), characterized by a mixture of residential uses alongside non-residential uses such as retail, office, community, and production. Greater density unlocks the ability to finance sustainable infrastructure, such as the transit expansion (see Page 352) and improves affordability through the delivery of a significant supply of below-market housing (see Page 389).

### Expanding the supply of affordable and below-market housing.

The River District proposal strives to exceed current waterfront requirements for housing affordability by promoting a housing vision defined by 40 percent below-market units. This vision targets 20 percent of housing units for middle-income households that currently do not qualify for affordable housing and envisions half of all units being purpose-built rentals to improve long-term affordability. The proposal also outlines paths for developers to support ambitious public goals for affordable housing, including through the use of new financial tools and efficient unit designs that can create new value that can be applied towards below-market programs (see Page 386).

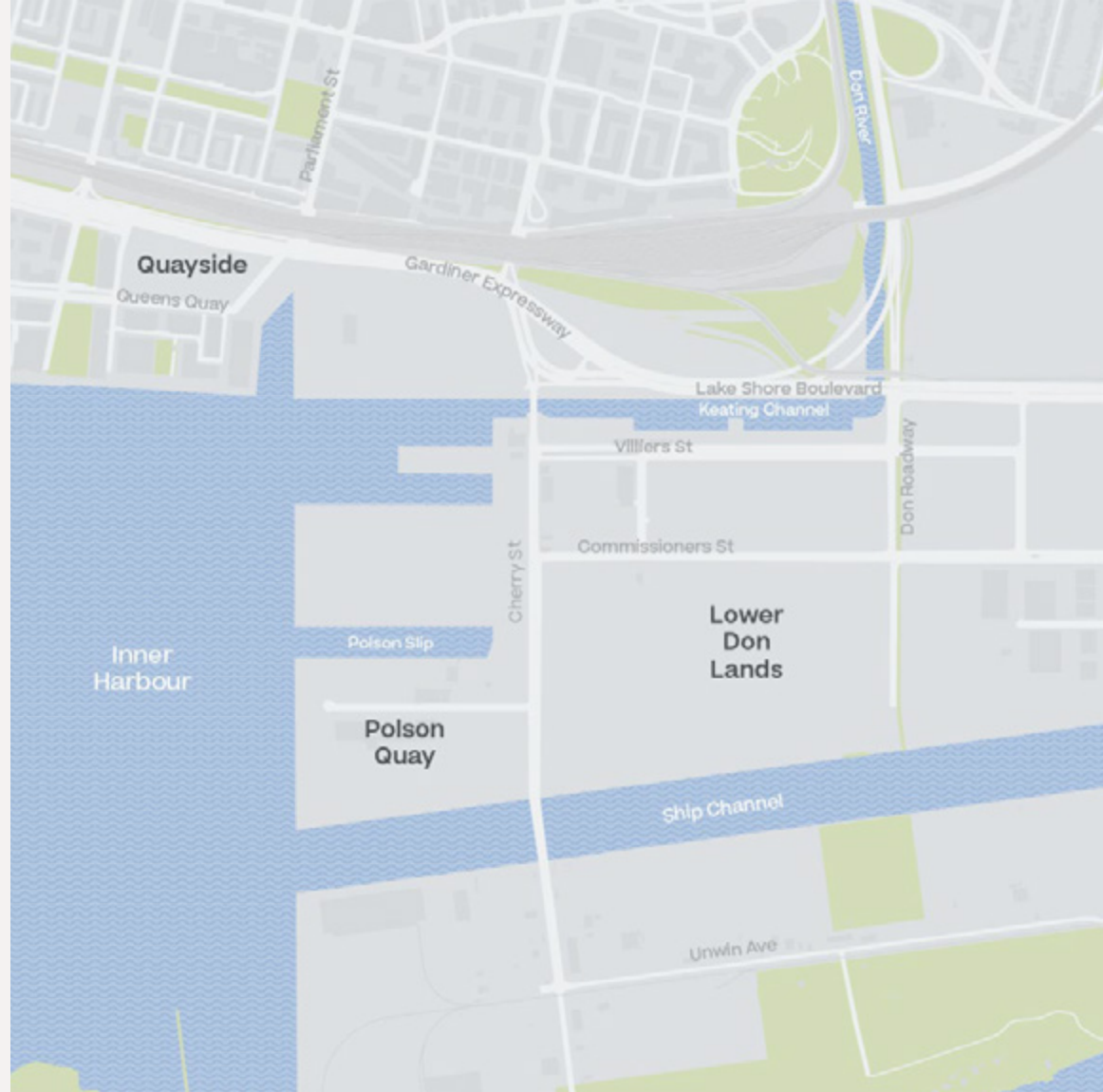
### Accelerating the development timeline.

The Port Lands Planning Framework considers the area's evolution across a period of roughly 50 years. The River District proposal leverages private-sector resources to help deliver more than 30 percent more square feet of development on a timeline 10 years faster than the current plan. (The full IDEA District proposal would produce 32.8 million square feet of development by 2040, versus a baseline scenario of 24.4 million square feet by 2050.) The IDEA District has the potential to generate an enormous annual benefit to the Canadian economy, including over 93,000 jobs, \$14.2 billion in annual economic output, and \$4.3 billion in annual tax revenues. (See the "Economic Development" chapter of Volume 1.)



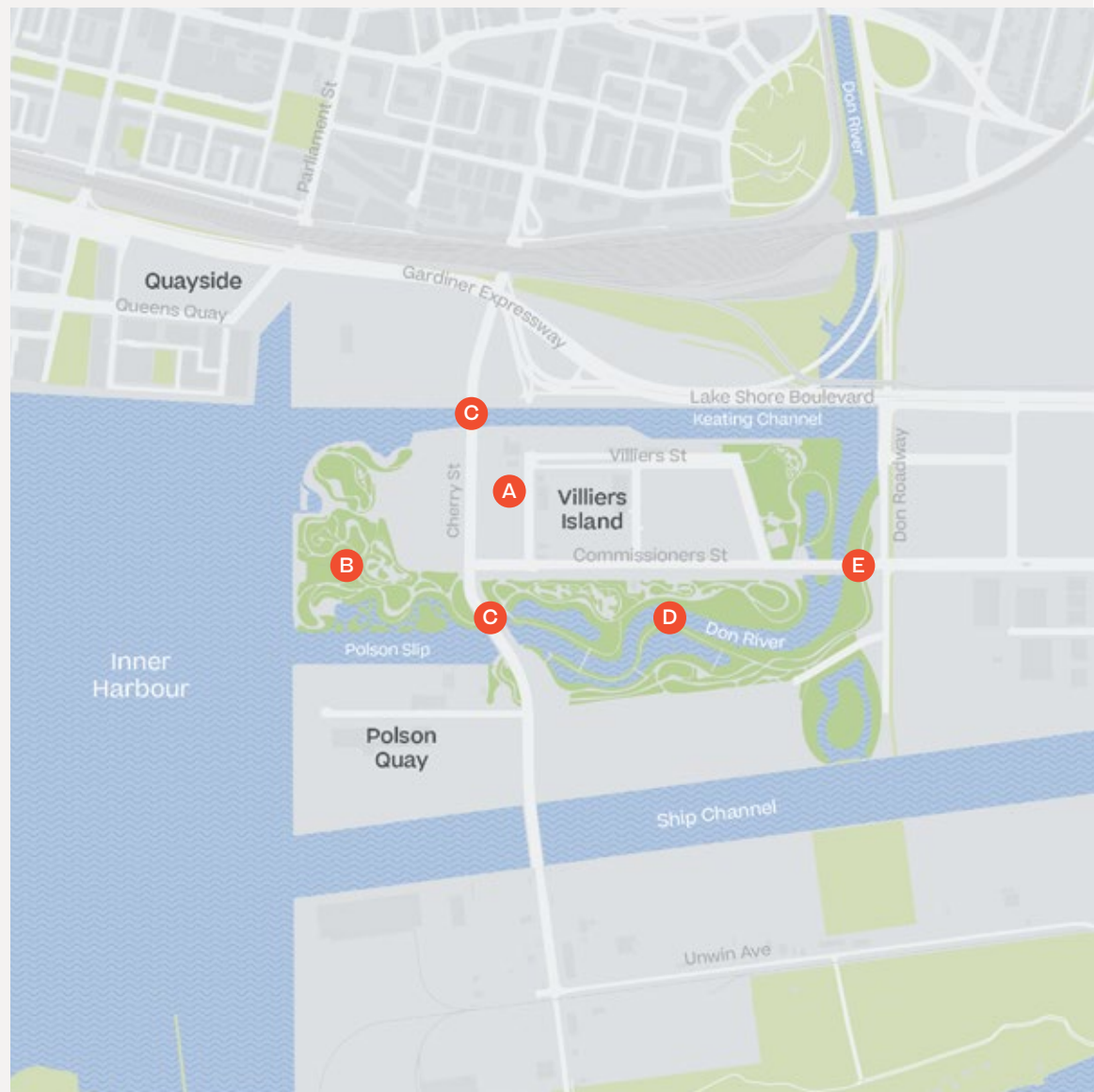
Map  
**Port Lands  
 Flood  
 Protection  
 Project:  
 Creating  
 Villiers Island**

**Before:**  
 The Port Lands today



**After:**  
 The Port Lands  
 after the flood-  
 protection project

- A** Creation of Villiers Island
- B** Establishment of new park system
- C** Construction of new bridges at Cherry Street
- D** Renaturalization of Don River
- E** Construction of new bridge at Commissioners Street



The River District today: Poised to fulfill its promise

The Port Lands Planning Framework lays out a vision to transform these industrial lands into an economic and innovation hub that adapts to changing conditions, enjoys ubiquitous connectivity, respects the waterfront context, and creates a network of dynamic new neighbourhoods. “Over the coming decades, the Port Lands will transform from a predominantly industrial district into a modern and vibrant extension of the urban metropolis,” reads the framework. “The Port Lands will be a showcase for innovation and a leader in environmental performance.”<sup>14</sup>

At a similar size as downtown Toronto, the Port Lands can be reimagined not simply as a series of new live-work communities on the water but as an expansion of the central city itself — with a full and diverse range of innovative areas for working and production that allows the Toronto economy to grow and prosper.

**The Port Lands Flood Protection Project: Setting the stage for development.**

In 2018, Waterfront Toronto began construction on a complex, \$1.25 billion plan to protect large southeastern portions of downtown Toronto, including significant portions of the Port Lands, from flooding. Funded by all levels of government, this investment aims to unlock the Port Lands for revitalization, to enable the creation of new communities, to improve Toronto’s resiliency in response to the growing impacts of climate change, and to lay the groundwork for economic development.

The design concept for the project was the result of an international competition led by Waterfront Toronto, which challenged respondents to think differently about natural systems, public space, and development.<sup>15</sup> As a result, the project takes a highly innovative approach to providing flood protection.

For example, rather than rely exclusively on traditional “hard” concrete infrastructure (such as dockwalls, channels, and pipes) to manage water, the project envisions a renaturalized riverbed that allows the Don River to flow through newly created wetlands and natural habitats configured to allow for expansion of the riverbed during floods and for contraction during normal times. The project is scheduled to be completed in 2024.<sup>16</sup>

While the investment in the Port Lands Flood Protection Project is extraordinary, it is only a first step. Substantial additional investments are required to fully unlock the area’s potential. The lack of modern infrastructure and questions over how to finance it create a formidable barrier to any kind of development, let alone the standard-setting communities envisioned by Waterfront Toronto and the City of Toronto in the Port Lands Planning Framework.

# The River District tomorrow: Infrastructure to meet future needs

Over the coming years, substantial investments in infrastructure will be required at the Port Lands well beyond the flood protection work, and the results will determine the future of the waterfront.

The infrastructure developed nearly a century ago to support an industrial centre is not up to the demands of a modern mixed-use district hosting tens of thousands of workers, residents, and visitors. As a result, the eastern waterfront requires entirely new systems for transportation, energy, information technology, water, freight, and waste.

The standard approach to new development would suggest extending the existing infrastructure along the waterfront into the Port Lands, and incrementally

building it for each new neighbourhood as it develops. But this approach would forfeit an extraordinary opportunity to think holistically about the potential of the eastern waterfront to implement a more sustainable, integrated, and forward-looking set of urban systems that can achieve the city's goals of climate-positive neighbourhoods and new mobility infrastructure, while building in flexibility to meet the needs of future generations.

If implemented, these systems would fuel economic development, empowering Toronto as a driver of innovation, supporting local companies, and attracting investment from around the globe.

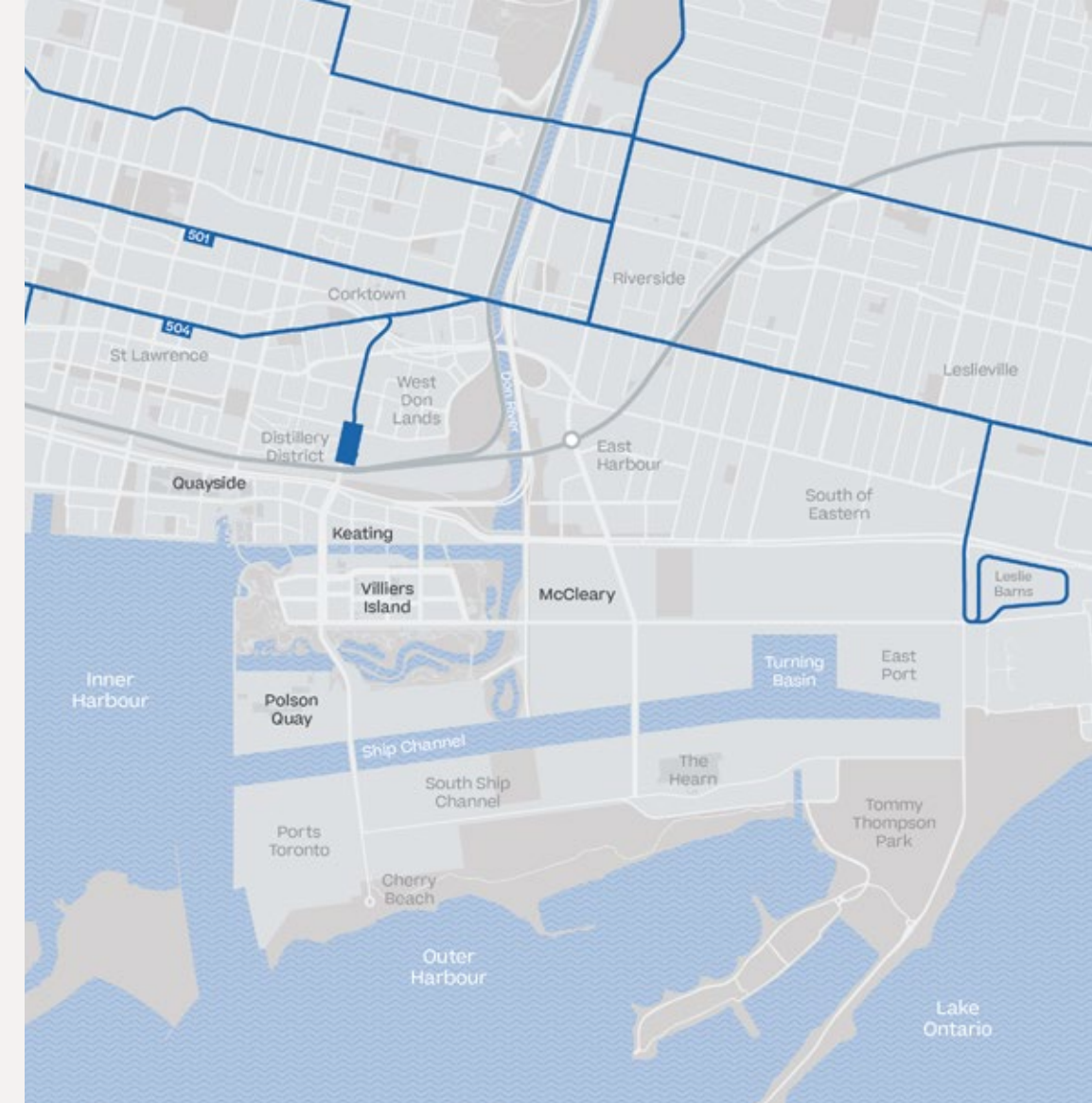
East end of Keating Channel, looking south-west.  
Credit: City of Toronto Archives



## Map Rapid transit connections in the eastern waterfront

### Before: Light rail network today near the eastern waterfront

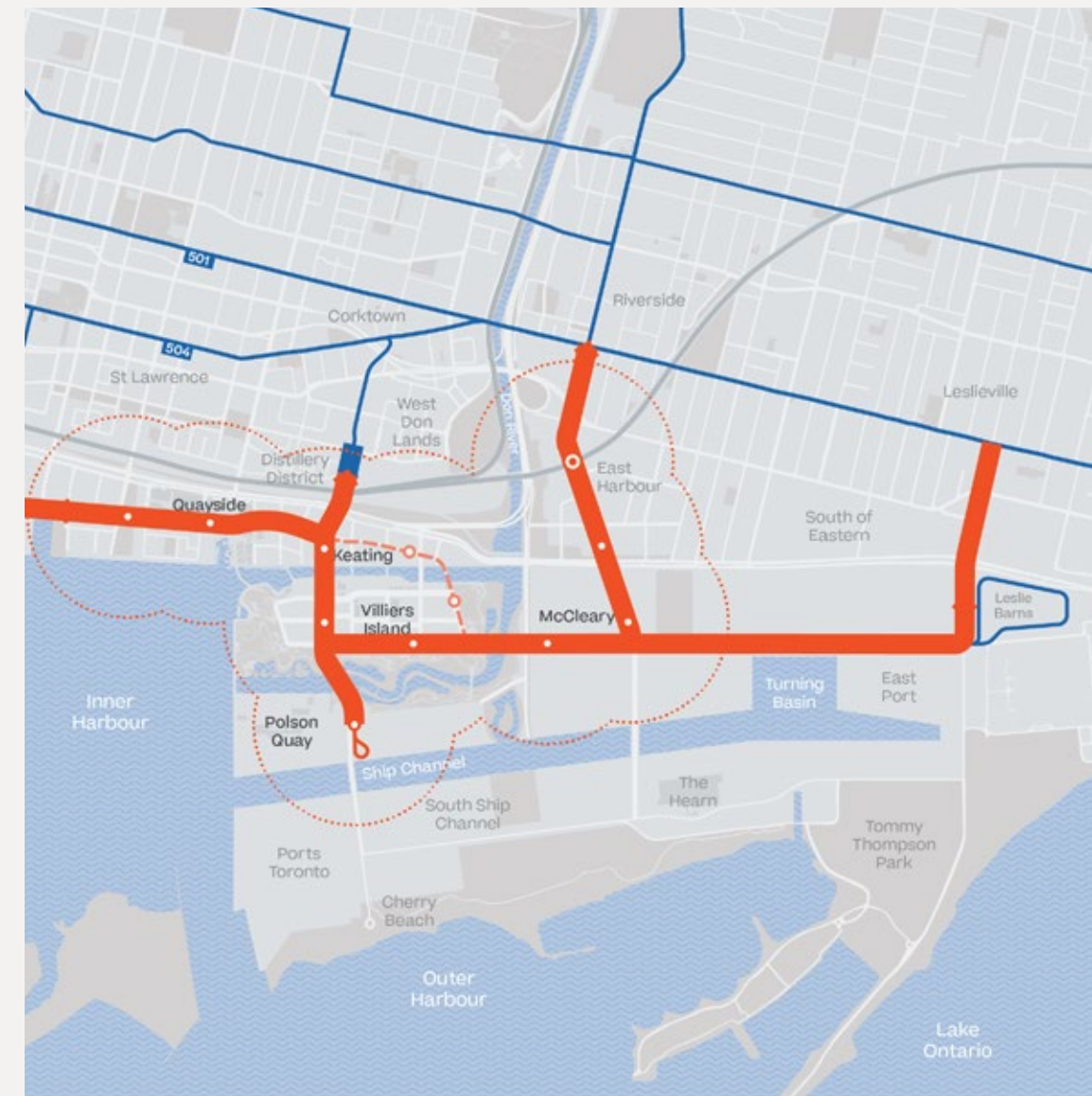
— GO Transit / SmartTrack  
— Existing light rail



### After: Light rail expansion into the eastern waterfront

— GO Transit / SmartTrack  
— Existing Light rail  
— Approved extension  
— Optional  
○ 5-minute walk from new stops  
● Planned East Harbour Station

0 500 Metres



# The River District Can Anchor a Renewed Eastern Waterfront

Collectively, five distinct neighbourhoods have the potential to form a spectacular district driven by innovation, including a new Google Canadian headquarters and an Urban Innovation Institute.

Spanning 62 hectares, the proposed River District would encompass five distinct neighbourhoods surrounding the re-naturalized Don River: Villiers West, Villiers East, Keating East, McCleary, and Polson Quay. These neighbourhoods would be carefully stitched into their surrounding environments, including extending the innovation corridor along Queens Quay and into Quayside.

These are the only areas within the Port Lands Planning Framework that have been identified as appropriate for

mixed-use growth. Consistent with the framework, Sidewalk Labs envisions them as complete communities that integrate residential and recreational uses alongside significant urban innovation jobs focused on production, interactive, and creative industries.

Sidewalk Labs believes that applying new technologies and approaches can foster even more jobs and businesses than a

traditional mixed-use development while providing a higher quality of life for workers, visitors, and residents.

To name just a few examples: new flexible building types, coupled with outcome-based building-code systems, can expand the types of non-residential uses that can coexist in a neighbourhood and strengthen opportunities for true live-work-make communities. New mobility networks that are reliant on public transit and active modes, along with dense housing (including a 40 percent below-market program) adjacent to job centres, can provide a level of convenience and sustainability across the district. Extending the light rail can accelerate the pace of development in significant ways, especially when coupled with digital design

and fabrication strategies for buildings, bringing benefits to Toronto sooner than originally anticipated.

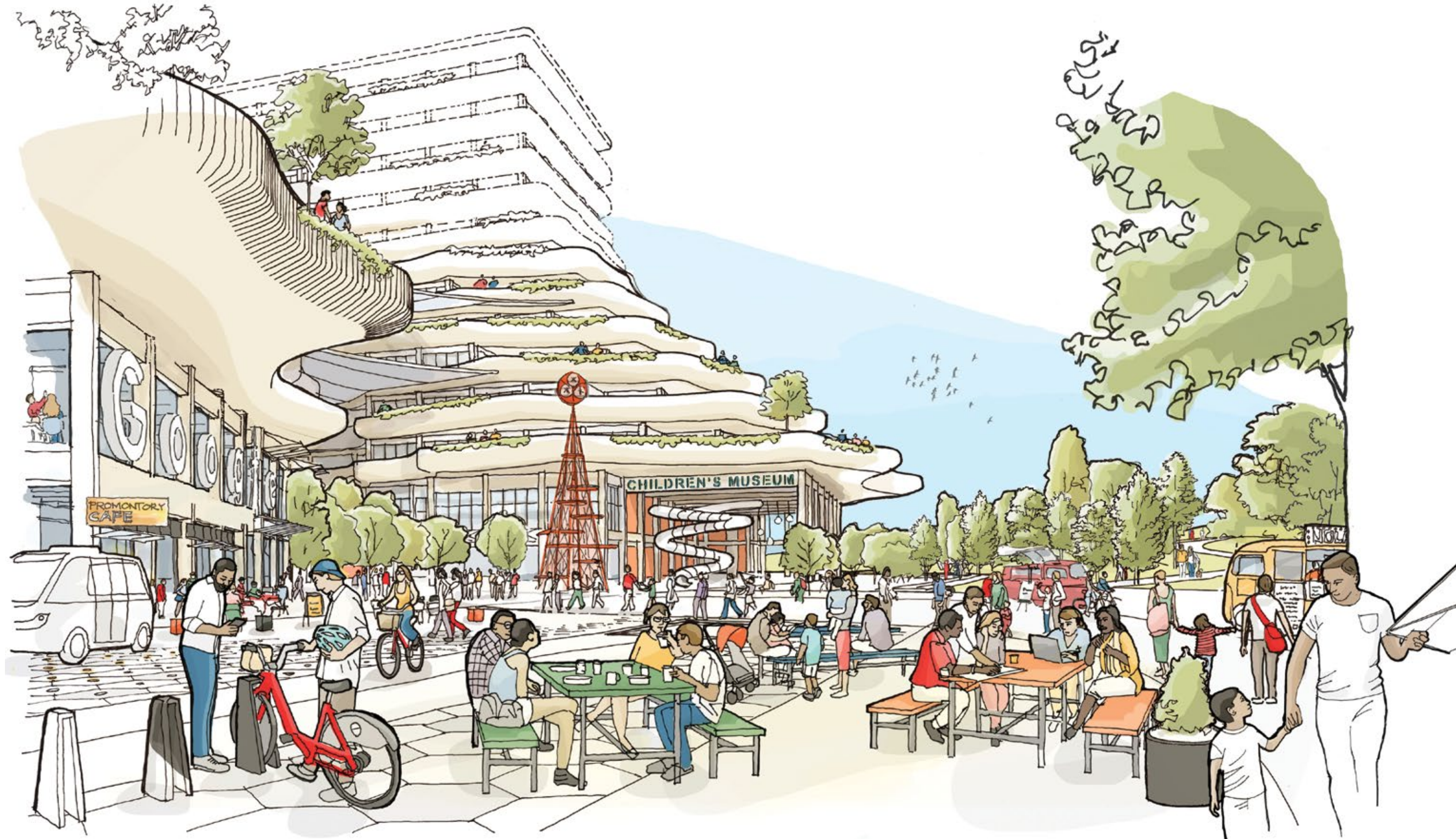
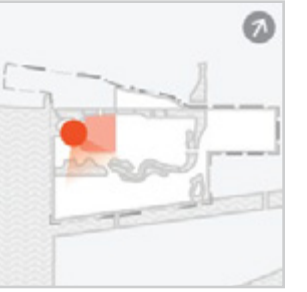
A key focus for these neighbourhoods would be support for existing industries, such as the film industry. That support could include housing options geared towards the labour-force demands of the area, such as workers supporting the film studios.

The creation of an IDEA District anchored by an innovation campus can create an ecosystem of people and businesses continually generating and implementing new ideas to improve urban life. The River District has the potential to become the globally recognized centre where urban innovations emerge, grow, and flourish.



# Villiers West

The 7.75-hectare western half of Villiers Island has the potential to catalyze economic development across the region, anchored by the new Google Canadian headquarters and an Urban Innovation Institute designed to connect seamlessly with the new Promontory Park. Sidewalk Labs proposes to act as the vertical developer for this area in concert with local development partners.

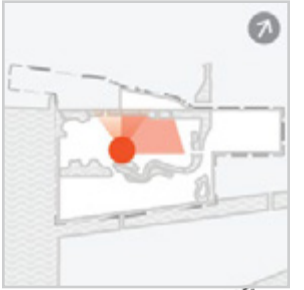


This illustration shows the Villiers West innovation campus and Promontory Park.

# Villiers East

The 11.5-hectare eastern half of Villiers Island offers an exceptional opportunity to create an inviting, walkable live-work community. In addition to jobs, Villiers East could be filled with affordable housing options, retail and other ground-floor uses, and a new pedestrian-first street network designed to create a series of intimate walkways and courtyards, all encircled by a magnificent new park created as part of the flood protection work.

In this area, and for the rest of the River District, Sidewalk Labs would play a supporting role as Innovation and Funding Partner, while Waterfront Toronto and the City of Toronto work with other partners to undertake development.



A conceptual illustration of a Villiers East Accessway and plaza, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood to be led by Waterfront Toronto and the City of Toronto.)

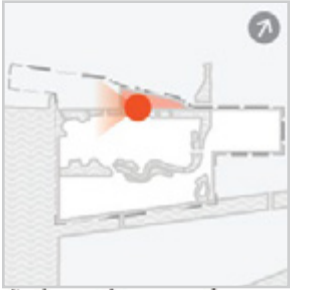
# Keating East

The planned relocation of the Gardiner Expressway will create the opportunity for a new six-hectare neighbourhood along the reclaimed Keating Channel. The Port Lands Planning Framework envisions the channel as the centrepiece of the surrounding neighbourhoods.

Sidewalk Labs embraces this vision and believes that the spirit of innovation animating the adjacent innovation campus can become a driving programmatic force for the channel. A Keating Channel exploration zone could become a dynamic, water-focused spine that showcases groundbreaking work across arts, culture, and production.

Taller buildings along the highway could scale down as they approach this intimate waterway, establishing the canal as a unique place in Toronto with vibrant public space and development on both sides of the water. Multiple new pedestrian and bike bridges are proposed across the channel, creating a character similar to the canals of Amsterdam.

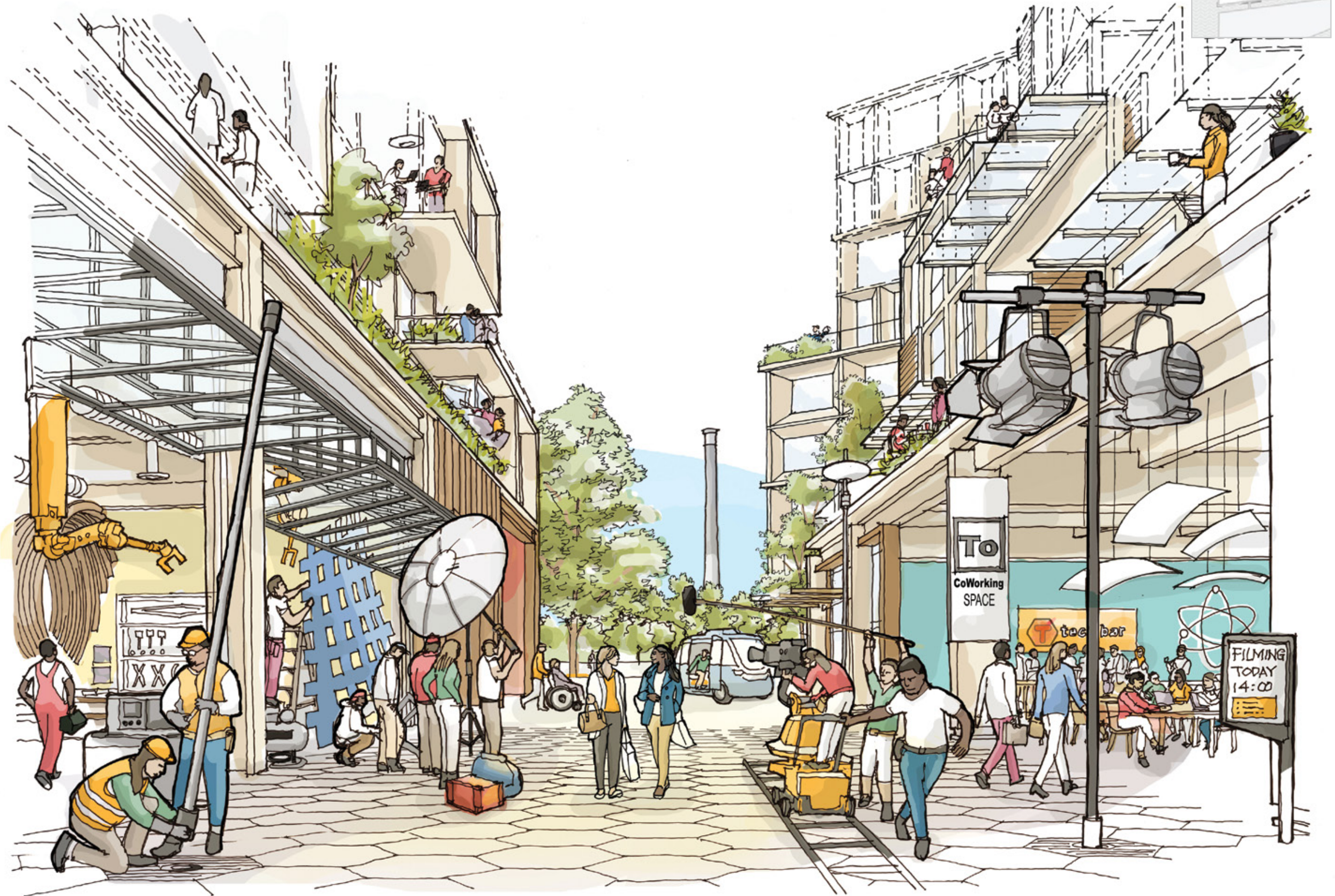
A conceptual illustration of Keating Channel, looking west, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood to be led by Waterfront Toronto and the City of Toronto.)



Consistent with the Port Lands Planning Framework's direction as a mixed-use area focused on production, interactive, and creative industries, the 14-hectare McCleary District could integrate dense housing with commercial space that complements East Harbour and the Film District, with spaces equipped to support production shoots and new economy companies, startups, micro-enterprises, and creative industries.

Located within short walking or biking distance of the Film District, East Harbour, and the innovation campus on Villiers Island, McCleary could become an ideal residential location for people with jobs in the neighbourhood and nearby. In addition, a new light rail stop located on Commissioners Street would ensure access to major transportation hubs and downtown Toronto.

A conceptual view of a future street in McCleary, looking east to McCleary Park, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood to be led by Waterfront Toronto and the City of Toronto.)

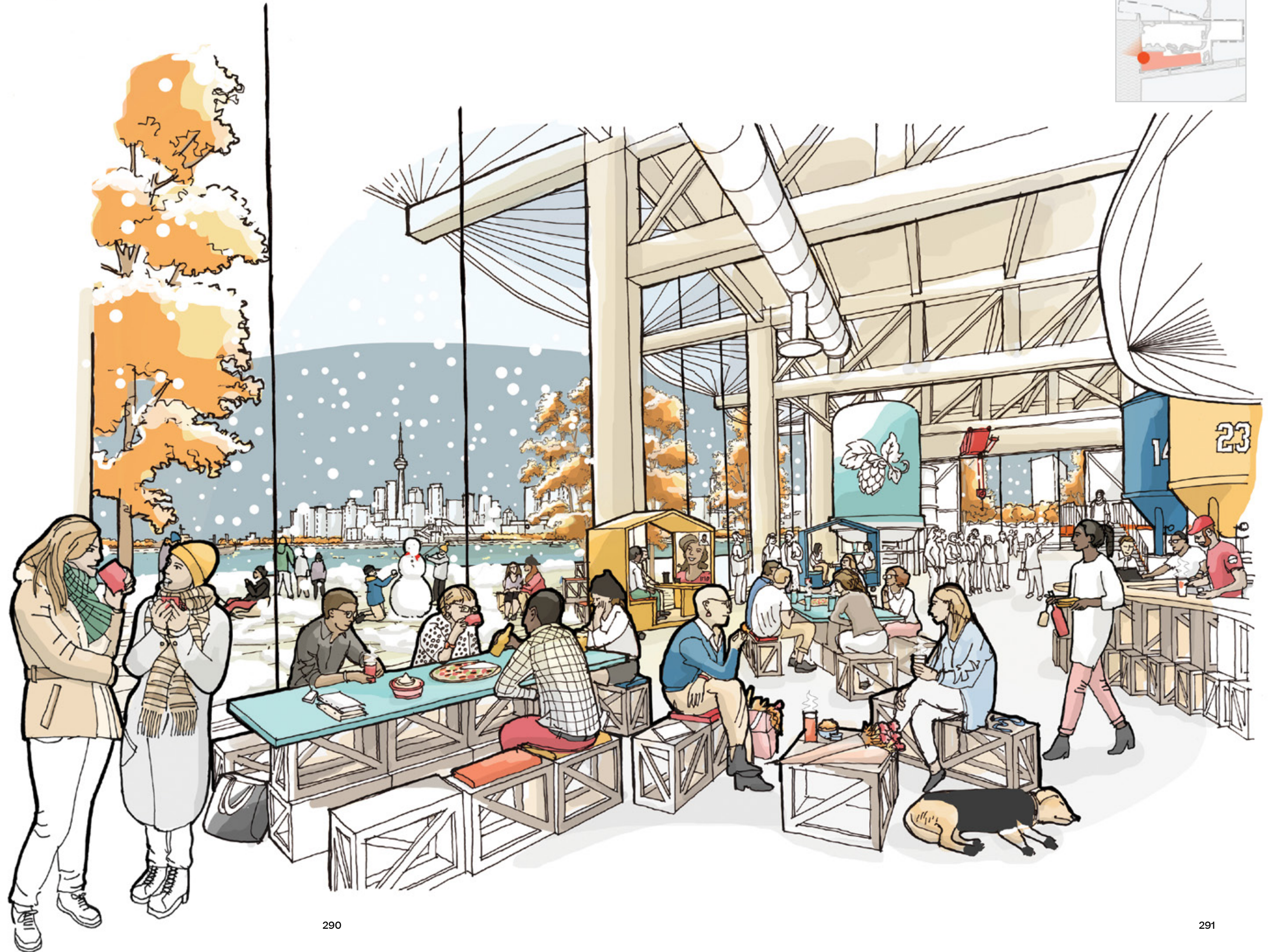


# Polson Quay

Polson Quay encompasses both the Polson Quay and South River areas identified in the Port Lands Planning Framework. Establishing connections to the rest of the city will be critical to the growth of this 23-hectare neighbourhood, located south of Villiers Island and along the south side of the newly naturalized Don River.

As in Villiers Island, a series of bridges in Polson Quay could form important links to the surrounding city, including space for a light rail extension with a new stop in the centre of the neighbourhood. With these key investments in place, Polson Quay can take full advantage of its geography and dramatic views of the harbour and city skyline to become a place where production, interactive, and creative uses can coexist in an integrated way with housing, commercial activity, community spaces, and an accessible public realm — achieving a unique live-work-make waterfront neighbourhood.

A conceptual view of Polson Quay, looking north to downtown, made possible by the IDEA District's innovative approach to development. (Planning for this neighbourhood to be led by Waterfront Toronto and the City of Toronto.)





# Neighbour- hood Planning Concepts

The following section describes Sidewalk Labs development proposal for the Villiers West area of the River District, where it would assume the role of real estate developer in concert with local development partners.

This section also describes visions for the other four neighbourhoods that would make up the district, where Sidewalk Labs would play the role of Innovation and Funding Partner.

# The River District Program

The River District can become a major economic engine for the eastern waterfront while integrating employment, residential, commercial, cultural, and public spaces to become a vibrant urban district.

The Port Lands Planning Framework provides the roadmap for the transformation of the area surrounding the renaturalized Don River from a formerly industrial area to a modern, vibrant, mixed-use urban community. The framework has broad goals, envisioning the creation of “vibrant districts with unique and memorable local identities that promote social interaction, cultural enrichment, ecological health, a low-carbon future, and a prosperous local economy.”

Sidewalk Labs believes that this ambitious vision can be substantially advanced within the River District’s five distinct neighbourhoods: Villiers West, Villiers East, Keating East, McCleary, and Polson Quay.

Collectively, they can form the world’s most innovative urban district, generating thousands of jobs, creating walkable live-work communities that are exhilarating and welcoming in equal measure, and setting new global standards for sustainability.

The River District consists of the same areas within the Port Lands Planning Framework that have been identified as appropriate for mixed-use growth. As described on Page 275, Sidewalk Labs proposes to accelerate development within the River District and to significantly expand the benefits of such development.

Anchored by an innovation campus, the River District would create the conditions for ongoing research and innovation, fostering an ecosystem of people and businesses that continually implements new ideas aimed at improving urban life. It would be supported by advanced infrastructure that makes climate positivity possible, a reconceived mobility network that provides a balanced set of mobility options, and digital infrastructure that helps to bridge the digital divide and facilitate innovation by an array of third parties.

These innovations would allow the development to occur years faster than is currently anticipated and create neighbourhoods that can support higher densities, like Polson Quay, without sacrificing open space or quality of life.

The River District proposal leverages private-sector resources to help deliver more than 30 percent more square feet of development on a timeline 10 years faster than the current plan. (The full IDEA District proposal would produce 32.8 million square feet of development by 2040, versus a baseline scenario of 24.4 million square feet by 2050.)

**Key Term**  
**Stoa spaces**  
(found on the lower two floors) are designed to accommodate a wide range of uses beyond traditional retail, helping to activate the street.

## Establishing a new regional economic anchor.

The River District development program proposed by Sidewalk Labs would be anchored by a new innovation campus located on the western edge of Villiers. This campus would be catalyzed by a new Google Canadian headquarters and the applied research focus of the Urban Innovation Institute, driving thousands of jobs

across the eastern waterfront and attracting new companies to create a global hub for creative and innovative industries.

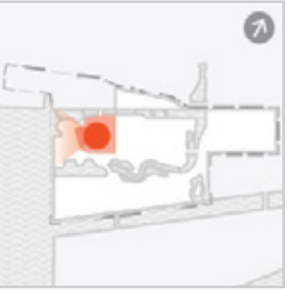
The innovation campus and broader ecosystem of urban innovation would complement the Film District expansion to the east and the East Harbour development to the north, providing another strong economic driver of economic expansion throughout the Port Lands.

## Integrating production spaces.

The Port Lands Planning Framework designates Polson Quay and McCleary as mixed-use areas focused on production, interactive, and creative industries. Such areas are intended to enhance and expand the local economy and ensure Toronto remains a place for creativity and innovation by fostering growth in Toronto’s film industries, interactive and digital media, and art and design.

With key economic anchors in place, and new investments in transportation, infrastructure, and public parks, the River District can be an attractive place to live, work, and visit, with a striking mix of uses throughout its neighbourhoods.

New production and workshop facilities, enabled by Sidewalk Labs’ unique lower-floor stoa spaces, can be located throughout the district, strengthening the commitment to a diversity of uses and providing additional opportunities for small businesses that build off new technologies and capabilities.



**Supporting new live-work communities.**

One highly attractive feature of urban living is the ability to live and work in the same neighbourhood. This opportunity has been appreciated by generations of Torontonians but is increasingly difficult to achieve as downtown living gains in popularity and residential uses compete with commercial and office uses.

Providing housing opportunities on parcels adjacent to employment centres enhances the ability of the employment spaces to succeed and provides a diversity of job opportunities for different income groups.

With a housing vision that could produce around 34,000 new housing units (including 40 percent of units at below-market rates), the River District can make a significant contribution to achieving Toronto’s affordable housing goals, leveraging new private funding sources alongside additional government support.<sup>17</sup> And with the scale of the River District, new and creative housing types can proliferate, providing a wide range of housing options for individuals and families at different stages of life.

**Fostering more ground-floor diversity.**

With thriving commercial centres, a large local population, and safe, walkable streets, the River District would become an attractive place for retail and entertainment. Flexible lower-floor stoa spaces can be expanded across the River District, increasing opportunities for entrepreneurs to explore new ideas and for residents to enjoy a wider and

ever-changing series of retail choices.

The flexibility of the stoa model also provides space for artists, cultural organizations, and small businesses to become a significant and defining feature of these new neighbourhoods.

**Incorporating social infrastructure into the foundations of new communities.**

A key feature provided by the stoa model is the opportunity to incorporate social infrastructure facilities at multiple locations throughout a neighbourhood, rather than to set aside separate parcels of land. At the scale of the River District, a wide variety of health, educational, and civic facilities can form a true network of social infrastructure, increasing access to services and opportunities for residents and workers.

**Drawing people outdoors more of the time.**

By planning for a diversity of flexible spaces and designing streets to increase space for the public realm, the River District could become home both to more open space and to a greater variety of space than previously planned. Nature could be integrated into streets; water could be not only accessible but also part of everyday life; pedestrian-friendly courtyards could open onto plazas full of busy cafés and connect residents and workers to a vast network of parks. The variety of uses could draw ever more people into the public realm, which would act as the backbone of local civic life and as a backyard for families.

**Key facts:**

**Villiers West**

**Development timeline**  
**2023–2027**

**Size**  
**7.8 hectares**

**Total area**  
**Roughly 2.75 million square feet**

The proposed innovation campus in Villiers West would be planned and designed as a public place that is fully integrated into the neighbourhood fabric.

The location on the edge of Villiers Island would benefit new companies but also comes with a civic responsibility to ensure this extraordinary space is fundamentally public, open, and welcoming to all.

The River District could be home to **34,000** new housing units.

# The Villiers West innovation campus



BAKERY

WORKSHOP

AGG  
DIGITAL WORKSHOP

NOW

FRESH  
BREAD



Villiers West would feature a Centre Street pedestrian walkway (shown here, looking west towards Promontory Park).



# Proposed River District densities

The proposed program for the River District would create a significant new addition to Toronto's existing network of vibrant, mixed neighbourhoods in and around downtown. Unlike many recent new developments that have focused heavily on residential development, the River District program is consistent with the land-use designations contained in the Port Lands Planning Framework.

This program takes the mixed-use goal further by proposing a major new economic hub for Villiers West and more

overall development (although densities are not specifically prescribed in the framework and are left to the precinct planning stage). Both are positive changes that provide a major economic benefit to the city.

These levels of density are critical to finance the public transit extension needed to unlock sustainable development, as well as to support the creation of other municipal and advanced infrastructure systems.

## Villiers West: Creating an Economic Hub Within a Thriving New Neighbourhood

Home to a new innovation campus, including a new Google Canadian headquarters, Villiers West can become the economic anchor of the River District, helping to generate 93,000 total jobs across the full IDEA District.

	Residential	Commercial	Retail / Production	Social infrastructure	Total
Land use program (in square feet)					
<b>Villiers West</b>	1,150,000	1,400,000	150,000	50,000	<b>2,750,000</b>
	42%	51%	5%	2%	100%
<b>Villiers East</b>	3,400,000	500,000	200,000	50,000	<b>4,150,000</b>
	82%	12%	5%	1%	100%
<b>Keating Channel</b>	2,250,000	850,000	250,000	100,000	<b>3,450,000</b>
	65%	25%	7%	3%	100%
<b>Polson Quay</b>	7,350,000	1,800,000	450,000	150,000	<b>9,750,000</b>
	75%	18%	5%	2%	100%
<b>McCleary</b>	4,550,000	1,750,000	300,000	100,000	<b>6,700,000</b>
	68%	26%	4%	1%	100%
<b>Total</b>	<b>18,700,000</b>	<b>6,300,000</b>	<b>1,350,000</b>	<b>450,000</b>	<b>26,800,000</b>

Note: Percentages may not add up due to rounding. Table reflects the magnitude of development (in gross square feet for the River District).

# Building an economic cluster around urban innovation



As further described in the “Economic Development” chapter of Volume 1, Sidewalk Labs plans to help catalyze an economic cluster focused on urban innovation. This effort defines urban innovation as going beyond the mere pursuit of urban efficiencies associated with the “smart cities” movement, towards a broader set of digital, physical, and policy advances that enable government agencies, academics, civic institutions, and entrepreneurs both local and global to address large urban challenges.

Anchored by a new Google Canadian headquarters and an Urban Innovation Institute, this cluster would build on Toronto’s leadership in areas such as artificial intelligence and other technology specialties while supporting the growth — and invention — of new cutting-edge industries.

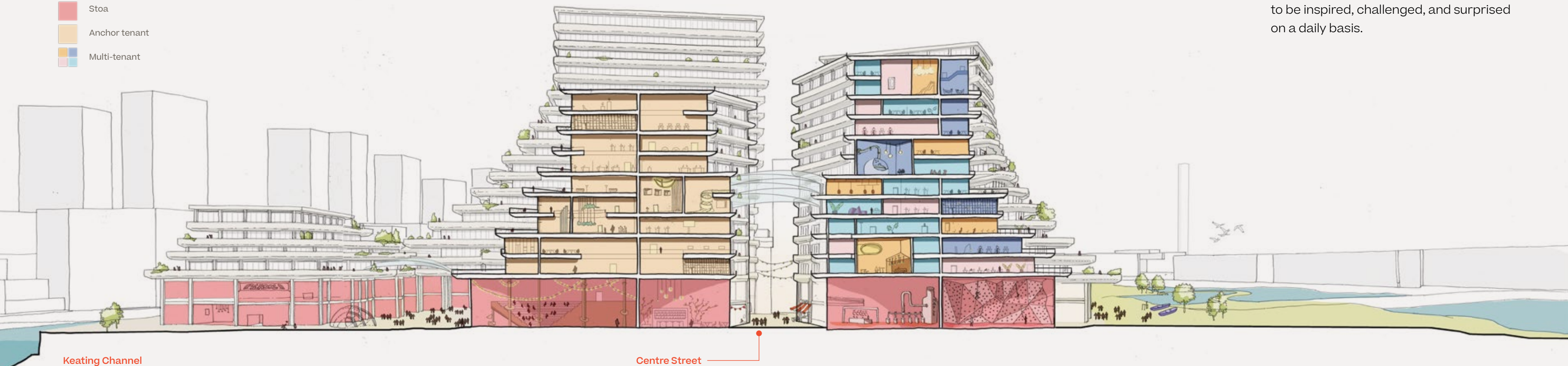
Villiers Island is uniquely situated to foster this kind of development. The proposed innovation campus would be located on the dramatic western edge, next to a new light rail stop, with enough space to accommodate new companies, startups, and institutions as the cluster grows. To the east, thousands of units of housing could be interlaced with retail, community, and cultural spaces, attracting companies seeking a high quality of life for their employees, who would be able to walk to work along the island’s innovative and intimate pedestrian-first street grid.

to the west in Promontory Park, which will offer spectacular views of the harbour and downtown skyline. To the north, Sidewalk Labs proposes to reinvent the Keating Channel — an artificial waterway lined with a series of industrial buildings — with repurposed historic structures and new pedestrian, public transit, and cycling bridges stitching together both sides of the canal, supporting a new creative economy centred around the arts, production, and exploration.

These diverse experiences could fuel each other, drawing workers and residents united by a shared commitment to exploring new ways of thinking, an excitement about the future, and a desire to be inspired, challenged, and surprised on a daily basis.

## Cross section of the innovation campus

- Stoa
- Anchor tenant
- Multi-tenant



The innovation campus would become the heart of a broader innovation ecosystem that extends across the Port Lands, building on Waterfront Toronto’s progressive work along the central waterfront; the bold thinking shaping the future of Quayside; and the innovation partnership between Toronto and Sidewalk Labs, which has the potential to set new standards for leveraging technologies to improve quality of life.


### Anchoring the campus with a new Google Canadian headquarters.

To anchor this campus and catalyze this economic cluster, Alphabet commits to establishing a new Canadian headquarters for Google on the western edge of Villiers Island, as part of an agreed-upon transaction within the IDEA District.

Alphabet would target up to 500,000 square feet, which would be sufficient to accommodate as many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring would depend on market conditions and business requirements).<sup>18</sup>

Fundamental to Google’s approach is the concept of a connected campus that encourages collaboration with neighbouring businesses, institutions, and communities. In the past, this approach has included maintaining active partnerships with local universities and supporting an emerging ecosystem of new small businesses, startups, co-working spaces, and anchor tenants.

Google’s arrival into an area has also supported the growth of local job and real estate markets. A Sidewalk Labs study of several U.S. cities found that Google’s arrival correlated with an increase in office value in the area, as well as an uptick in the local retail and residential inventory of 20 to 108 percent, above and beyond that of the rest of the city. In Chicago for example, the Fulton Market area experienced a 108 percent increase in office inventory, while growing office space value by 5.7 percent.<sup>19</sup>

More broadly, high concentrations of tech employment in cities have been demonstrated to increase the overall number of non-tech jobs as well, amounting to approximately five new non-tech jobs for every new tech job created. 

### Creating an Urban Innovation Institute to support Toronto’s leadership in this emerging field.

Additionally, Sidewalk Labs plans to work with universities and research centres to establish an Urban Innovation Institute — an applied research institute designed to bring together a wide cross-section of researchers, designers, engineers, and entrepreneurs to collaborate on ideas and technologies that drive urban innovation.

This emerging discipline studies how new technologies like ubiquitous connectivity, machine learning, sensing technology, and digital fabrication, along with new approaches to physical design, can help cities tackle tough challenges — leading to a projected market value of \$2 trillion

**By the numbers:**  
 → Google Canadian headquarters up to 500,000 square feet  
 → \$10 million in seed funding for new Urban Innovation Institute  
 → \$4.3 billion in annual tax revenues by 2040

for the sector by 2025.<sup>20</sup> Toronto’s institutions are already leaders in the field, with more than 200 faculty and researchers dedicated to studying urban innovation and related areas of study at the University of Toronto alone.<sup>21</sup>

Envisioned by Sidewalk Labs as an independent non-profit, the Urban Innovation Institute can build on this progress. Sidewalk Labs would seek to work with Waterfront Toronto and local academic institutions to develop the plans and provide funding to support various development stages. Given the importance of the Urban Innovation Institute to the urban innovation ecosystem envisioned for the River District, Sidewalk Labs is prepared to provide \$10 million in initial seed funding (to be administered by an entity to be agreed-upon during the planning process), as well as to facilitate the provision of physical facilities for the institute within the Villiers West innovation campus.

### Catalyzing development across the region.

This critical mass of innovative businesses animating the waterfront can attract more companies of all sizes seeking an environment that will spark new ideas, provide new opportunities for collaboration, actively support exploration, and inspire breakthroughs that lead to transformative change. As a result, this technology cluster could expand beyond the waterfront as Toronto builds on its burgeoning reputation and establishes itself as the intellectual capital for urban innovation.

As described further in the “Economic Development” chapter of Volume 1, a new Google Canadian headquarters on Villiers West can strengthen the growth of an innovation corridor between Toronto and Kitchener-Waterloo, which is home to a rapidly growing hub for technology, including Google’s largest engineering office in Canada. The proposed East Harbour Transit hub would provide a public transit connection for this corridor — supported by the extended waterfront light rail — enabling new opportunities to attract talent in both locations and reinforcing the region’s global leadership.

In the same way that Toronto’s MaRS Discovery District has created an economic incubator centred on medical research and advances, the proposed innovation campus can support businesses focused on advancing ideas, technologies, and products related to solving urban issues and to improving quality of life in cities.

Accelerating development through strategies like extending the light rail or securing an economic anchor tenant like Google could provide tremendous value to the city, as these impacts magnify exponentially over time. Sidewalk Labs estimates that this approach to the eastern waterfront could triple the number of jobs and housing currently projected by the city over the next 30 years. By 2040, the revitalized eastern waterfront could be generating as much as \$4.3 billion in annual tax revenues — more than seven times the city’s baseline estimates over the same time period.<sup>22</sup>



See the “Economic Development” chapter of Volume 1, on Page 420, for more details on plans to ensure that prosperity does not sacrifice equity or affordability.



# Innovation campus: Active in all seasons

A view of the western edge of the innovation campus (looking west towards downtown).



# Stitching this jobs hub into the community

Sidewalk Labs' proposed innovation campus includes four newly created city blocks on the west side of Villiers Island, straddling New Cherry Street, and could total up to 1.6 million square feet of flexible commercial space. Each of the four sites includes the potential for buildings with very large floor plates (ranging from 30,000 to 90,000 square feet) to accommodate the types of open workspaces preferred by innovation economy companies.

The campus would feature a new pedestrian bridge connection to Quayside and have access to the rest of the city through the light rail extension, which would include a new centrally located station.

A key feature of the approved precinct plan is an east-west spine down the middle of Villiers Island called Centre Street, which forms the main connection between the residential community on the east side of the island and the new parks on the west side of Villiers, including Promontory Park, with its spectacular views of the harbour and downtown.

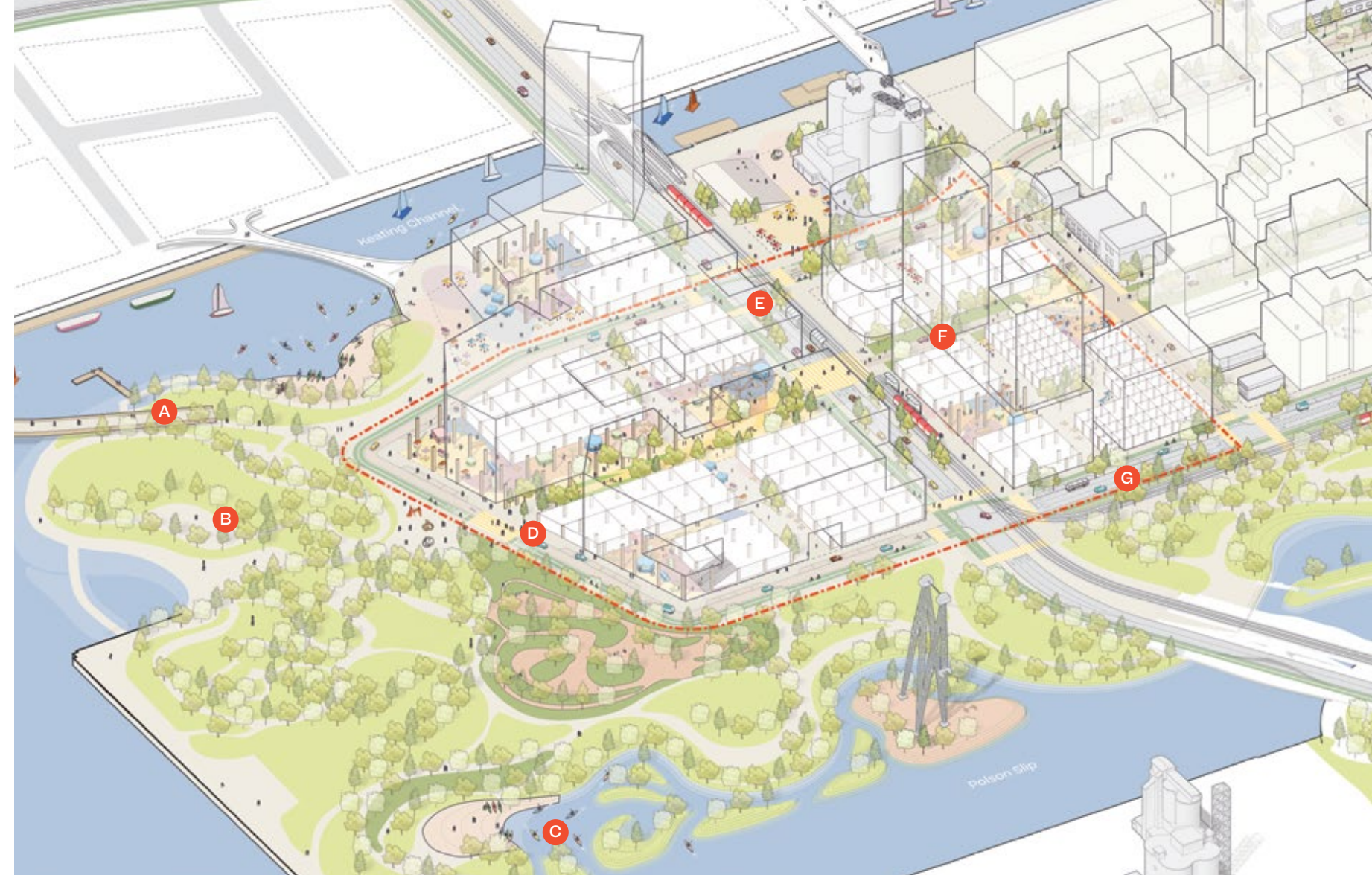
Centre Street would culminate in Promontory Plaza, a flexible space that transitions from mixed-use buildings to the park, supporting diverse programming that spills out from public ground floors. This flexible stoa space would host retail, production, arts, and community uses, with public passageways and interior arcades providing additional ways to move through the site.

The buildings themselves would embrace Sidewalk Labs' adaptable Loft typology, which provides large floor plates for highly flexible uses.<sup>23</sup> The height, bulk, and design features of the buildings would be planned in consultation with Waterfront Toronto and the city to ensure that the innovation campus fits in with the scale of the rest of Villiers Island, which Sidewalk Labs would not be responsible for developing.

## Planning Villiers West for access, connection, responsibility, movement, and adaptability.

Creating a truly mixed-use community can provide significant benefits for residents and businesses: saving time and money, and improving health, by enabling people to walk or bike to work; supporting vibrant retail and cultural experiences; providing public spaces that are activated year-round; and establishing a unique community character with a diversity of uses and voices.

Along with these benefits, there are challenges as well. Too often, commercial centres turn inward, encourage too much parking, or block vital pathways or views within a community. Avoiding these pitfalls requires creating foundational principles for good planning and making sure those principles are applied to the design of the commercial buildings.



## Creating a connected innovation campus

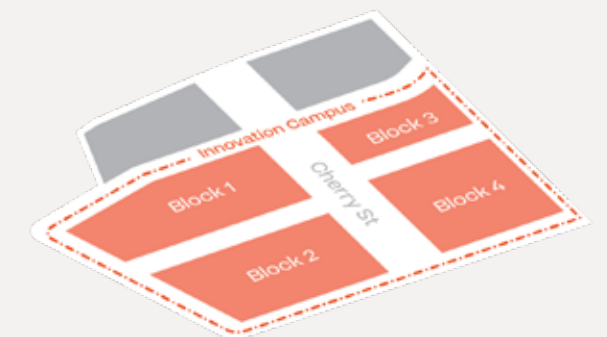
This jobs hub on Villiers West would become a true live-work neighbourhood through a set of features that include a new street network and a light rail connection that provide access to the surrounding city, an extensive park system, and mixed-use blocks.

### New public spaces:

- A** Pedestrian bridge to Quayside
- B** Promontory Park
- C** Canoe Cove

### New streets:

- D** Trinity Boulevard
- E** Cherry Street
- F** Centre Street
- G** Commissioners Street



In considering the location for the proposed innovation campus, along the blocks on both sides of New Cherry Street, Sidewalk Labs focused on developing a design proposal based on its core planning principles: access, connection, responsibility, movement, and adaptability.

**Access.**

Providing multiple modes of access is vital to any commercial centre. The campus's location along New Cherry Street, a broad new boulevard, would allow easy access to the site by light rail, bicycles, and vehicles. Its wide, accessible sidewalks would connect with pedestrian walkways throughout Villiers Island, with footpaths through the adjacent public park, and with the new pedestrian bridges proposed by Sidewalk Labs that would connect Villiers back to Quayside and Keating West.

**Connection.**

The campus, located between Promontory Park and the residential sections of the island, should not interrupt the natural flow of a neighbourhood. Instead, it must act as a public connection point that knits the edges of the island together. By integrating the campus into the street network, with connections to the rest of the city running to and through the site, this hub can become a vital part of the community rather than a closed campus.

The most important connection is through the centre of the site, where Sidewalk Labs is proposing a wide, public walkway lined with commercial activity to the west of New Cherry Street, linking the residential community to the east with the public parks to the west.

In addition, New Cherry Street runs north-south through the site, ensuring easy connections through the technology campus from all directions.

**Responsibility.**

Sitting on a site adjacent to a major new park, the innovation campus has a responsibility to respect and enhance the public realm. The proposed plan would present low-scale massing along the edge of Promontory Park and significant features, such as seating areas and performance spaces, along the perimeter of the buildings to extend the public realm. The proposed plan also includes an opportunity to locate a public facility, such as a museum, at the base of one of the buildings, with easy access to the surrounding transportation network and parks.

**Movement.**

With high levels of access, broad and attractive connections through and around the site, strong retail and public programming at the lower levels of the buildings, and strategically located gathering places along the perimeter, the innovation campus would become a place of constant movement, with workers and visitors engaging with the site in different ways each day.

**Adaptability.**

The innovation campus is not conceived as a complex to house a single business. Although Google's Canadian headquarters and the Urban Innovation Institute would be vital anchors, the campus is sized not only to allow for the growth of these anchor tenants over time but to accommodate many other businesses that may choose to locate there.

Sidewalk Labs anticipates that, combined, the Google headquarters and Urban Innovation Institute would occupy less than 50 percent of the commercial space within the campus. Planning for this extra space, and employing Sidewalk Labs' building strategies for adaptable interior spaces, would permit these buildings to respond over time to accommodate the needs of current and future tenants.

**The innovation campus would become a place of constant movement, with workers and visitors engaging with the site in different ways each day.**

# Beyond Villiers West: A Different Role for Sidewalk Labs

As explained on Page 260, in Quayside and Villiers West, Sidewalk Labs proposes to be the real estate developer in concert with local development partners, to prove out the market viability of innovations and to catalyze an economic engine. For the remainder of the River District, however, Sidewalk Labs proposes to take on a very different supportive role as Innovation and Funding Partner.

Starting in Villiers East, and extending to Keating, McCleary, and Polson Quay, Sidewalk Labs would focus on accelerating development and supporting public policy goals in the River District by serving as an

advisor on planning, design, and implementation; deploying a limited set of core technologies necessary to achieve key project objectives; and providing optional infrastructure financing support.

This role reflects Sidewalk Labs' belief that the greatest cities are built from the community up and that its proposed innovation strategies for achieving public policy goals can only be successful if widely adopted by Toronto's broader development and innovation communities.

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## Key Term Public administrator

Sidewalk Labs proposes that government designate a public entity to serve — or in the case of Waterfront Toronto, continue to serve — as revitalization lead for the IDEA District.

In this role, Sidewalk Labs proposes to work closely with Waterfront Toronto and government partners on three areas of focus:

# 1

## Planning, design, and implementation.

In this role, Sidewalk Labs proposes to help provide cutting-edge infrastructure and support development that meets agreed-upon guidelines and standards for innovation, with the goal of realizing key quality-of-life objectives around economic opportunity, affordability, mobility, and sustainability.

Building on the Quayside innovations, Sidewalk Labs proposes to prepare a set of "Innovation Design Standards and Guidelines" (IDSG) that can be used to ensure that all developments in the River District achieve the desired outcomes. The IDEA District's public administrator would be responsible for overseeing the IDSG and ensuring their implementation as development proceeds.

# 2

## Technology support.

In this role, Sidewalk Labs proposes to deploy a limited set of technologies required to achieve key project objectives — defined in Waterfront Toronto's original RFP as "purposeful solutions" — including a dynamic curb that can adjust throughout the day to accommodate vehicle traffic or pedestrian uses, and a standardized mount system that can help catalyze digital innovation by third parties.

# 3

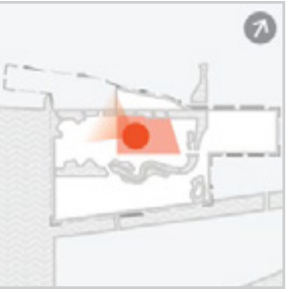
## Infrastructure financing.

In this role, Sidewalk Labs proposes to provide optional support financing critical infrastructure, such as upfront debt service, to help ensure that the city and waterfront can invest holistically in systems that unlock the potential for future development.

See Volume 3 for more details on Sidewalk Labs' proposed role as Innovation and Funding partner.

# Vision for Villiers East: Achieving Key Public Policy Goals

Villiers East could become a demonstration ground for the roles that Sidewalk Labs proposes to play across the larger IDEA District, which includes helping to plan, design, and implement new infrastructure systems; applying a set of innovation guidelines to improve quality of life, and supporting planning efforts with a new digital tool.



Key facts:  
**Villiers East**

Development timeline  
**2025–2029**

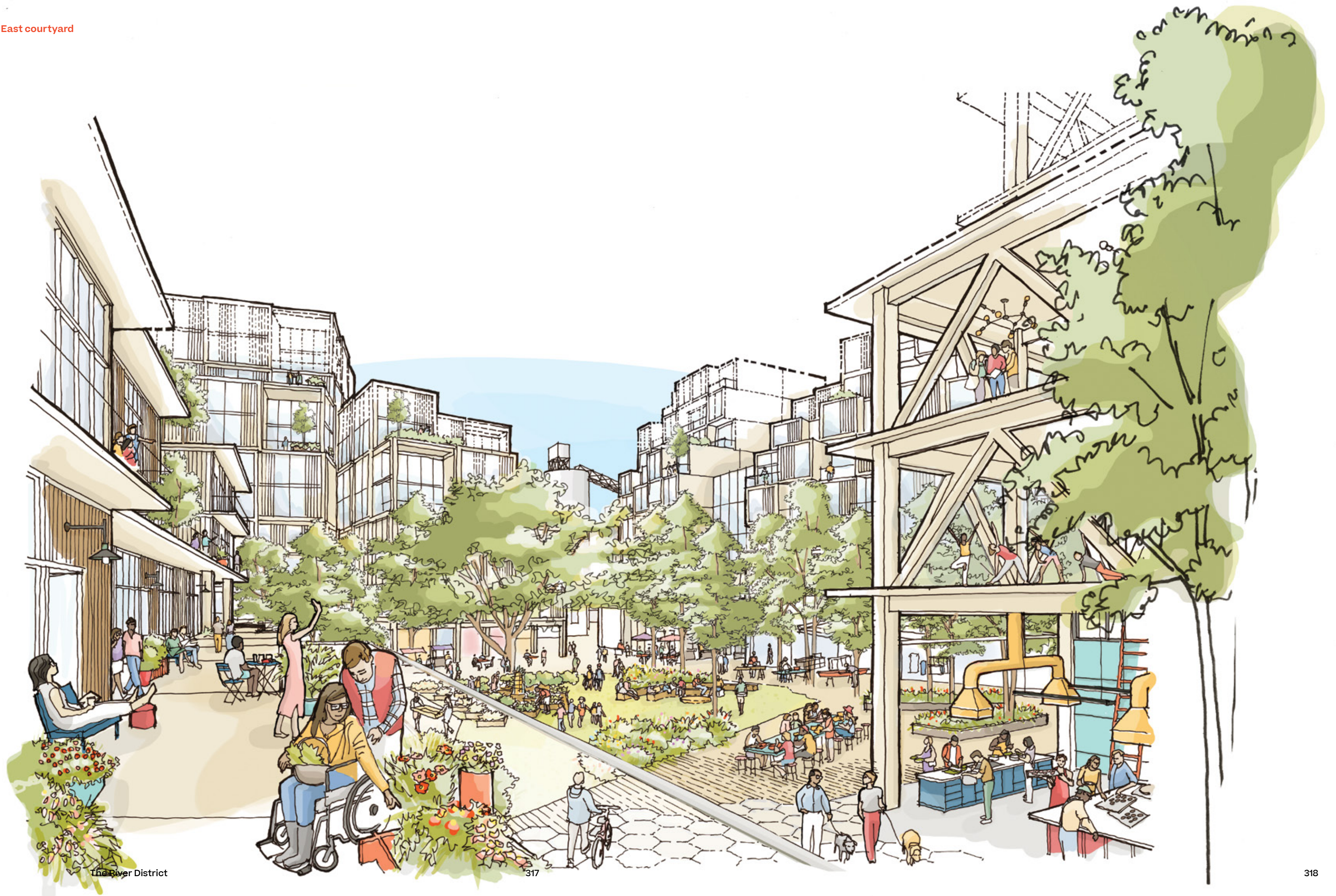
Size  
**11.6 hectares**

Total area  
**Roughly 4.15 million square feet**

Next to the innovation campus described above sits Villiers East, an 11.6-hectare area surrounded by new parks on the east and south and bordered by the Keating Channel on the north.

While the River District can be defined by its progressive mix of uses, the precinct plan calls for Villiers East to feature a

higher concentration of residential development to support the economic development on the western side of the island. These buildings would be constructed by an array of third-party developers, with Sidewalk Labs supporting development as Innovation and Funding partner.



# Helping to plan, design, and implement new infrastructure systems

Before development can begin, a comprehensive set of infrastructure systems must be established to support the thousands of new residents, workers, and visitors projected for the area. This area is where Sidewalk Labs believes it can help.

Sidewalk Labs would help to plan, design, and implement a set of advanced infrastructure systems in Villiers East — as with other neighbourhoods in the IDEA District — that support Waterfront Toronto’s priority outcomes, including for new mobility options and a climate-positive community.

As Innovation and Funding Partner, Sidewalk Labs would help to develop an “Infrastructure and Transportation Master Plan” that sets the guidelines for the types of systems required and identifies and supports pathways to implementation.

## Creating new mobility networks.

As described on Page 254 and in the “Mobility” chapter of Volume 2, Sidewalk Labs intends to support the extension of the public transit system into Villiers and across the eastern waterfront. Once travellers arrive in Villiers, their daily experience would be shaped by the street network.

Sidewalk Labs believes that the mobility strategies outlined in this proposal — such as expanding transportation options

and planning for the future adoption of self-driving vehicles — can be the basis for significant changes to the street grid that create even more opportunities to support a people-first public realm and a new mobility network. Villiers East can serve as a global showcase for integrating self-driving vehicles into the urban environment at a district scale.

While Sidewalk Labs would propose to maintain the precinct plan’s high-volume boulevards and public transportation routes along New Cherry and Commissioners Streets, the interior streets on Villiers Island could be rethought to remove on-street parking, increase space for pedestrians and bicycles, and limit vehicular access to emergency, special access, and self-driving vehicles only.

This approach would have significant impacts on how each street looks and feels. The entire centre of Villiers Island could become a pedestrian zone, while maintaining access by multiple modes of transportation along the perimeter as well as by slow-moving self-driving vehicles within the interior. Centre Street could be configured as a crooked street, designed to block winds in winter and provide a wide pedestrian boulevard-like experience featuring all the signature street features initiated successfully in Quayside. At a size of 19 total hectares,



## Map

# Proposed Villiers East street network

Villiers East could feature a people-first street network designed around Sidewalk Labs’ four proposed street types.

**Boulevards** are designed primarily to accommodate longer-distance car trips and faster traffic.

**Accessways** are designed primarily for cyclists, with traffic moving at bike speeds.

**Laneways** form the foundation of the pedestrian network, with all traffic moving at pedestrian speeds. A subset of Laneways — pedestrian-only **pedways** — would add yet another dimension to the walking network.

**A** Cherry Street

**D** Old Cherry Street

**B** Commissioners Street

**E** Foundry Street

**Transitways** are designed to prioritize public transportation in designated lanes.

**F** Munition Street

**C** Villiers Street

**G** Centre Street

**H** Interior block pedways



See the “Innovation and Funding Partnership Proposal” chapter of Volume 3 for more details on proposed advanced systems.

Villiers Island is a perfect size for a pedestrian-focused community, with no location more than a five- to six-minute walk from the centre of the island.

### Supporting advanced infrastructure systems and climate-positive development.

Building a climate-positive neighbourhood requires a wide variety of strategies — from low-energy buildings to digital management tools — but none is more critical than the provision of advanced infrastructure designed to manage the use of energy, natural resources, and waste as efficiently as possible.

At Villiers Island, both west and east, Sidewalk Labs would work with Waterfront Toronto to identify and establish specifications and a path to implementation for each infrastructure system.<sup>24</sup> Those systems include:

**Thermal grid.** A district-wide thermal grid would draw on clean energy sources, such as wastewater facilities, to provide heating, cooling, and domestic hot water.

**Advanced power grid.** An advanced power grid would use solar energy, battery storage, and time-based energy pricing to reduce reliance on the main power grid during periods of peak demand and make an all-electric community affordable.

**Smart waste system.** To improve recycling and divert landfill waste, a smart disposal chain would feature real-time feedback to improve waste sorting; “pay-as-you-throw” chutes to reduce household and business waste; and an underground pneumatic tube system to

keep these waste streams separated until they reach a collection facility.

### Active stormwater management.

A coordinated network of green infrastructure, including street plantings and bio-retention zones, combined with active management using digital technologies, would improve stormwater retention and contribute to a greener public realm.

**Freight delivery.** A centralized freight system would deliver packages directly to buildings via self-driving delivery dollies, reducing truck trips from local streets.

**Ubiquitous connectivity.** A fibre-optic system would take advantage of recent advances to deliver secure and reliable connectivity at maximum speeds and affordable costs.

**Additional systems.** Additional systems could include tie-ins to existing Toronto-wide utilities, such as water and sanitary sewer connections.

**Ongoing exploration.** In addition to these systems, Sidewalk Labs intends to evaluate alternatives in the hopes of developing a holistic network of advanced infrastructure systems that ensures a high degree of future flexibility, provides access for a wide range of service providers, and allows for easy, inexpensive maintenance and upgrading of systems. Sidewalk Labs is specifically considering models that would encourage service providers of all sizes to access shareable space, with easy access to complementary systems and to users.

Villiers East can  
serve as a global  
showcase for  
integrating self-  
driving vehicles  
into the urban  
environment.



# Applying innovation guidelines at Villiers East to transform streets and buildings

Innovation guidelines can be a critical tool to ensure that the River District achieves the development objectives established by Waterfront Toronto and the city. As a wide array of developers assumes responsibility for designing and building projects throughout the district, innovation guidelines would inform

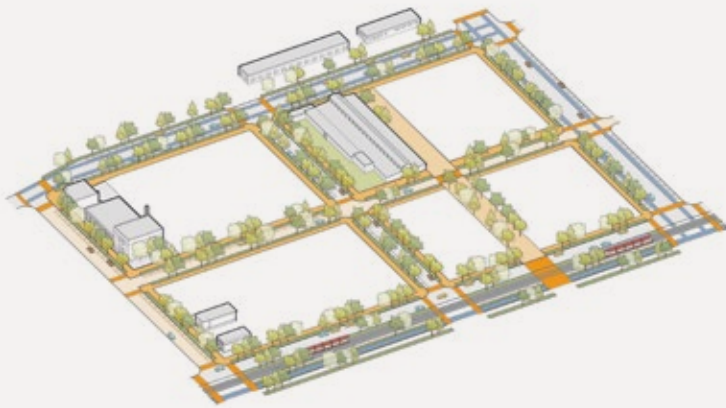
issues ranging from street design to sustainability. They would include technical specifications, design intentions and requirements for buildings and public spaces, and program details to shape how future development is coordinated with infrastructure.

These guidelines would be developed collaboratively between Waterfront Toronto, Sidewalk Labs, and the City of Toronto, and would be responsive to new ideas and technologies as they are proven out in Toronto and beyond.

While the details of the innovation guidelines would be developed over time, the initiatives proposed by Sidewalk Labs across the different urban innovation areas could form the framework,

producing successful neighbourhoods that have a unique look and feel while striving to improve the quality of life for residents, workers, and visitors.

The following diagrams illustrate how adopting a few specific elements of transportation planning and urban design within the guidelines could have a significant impact on the physical qualities and experience of the Villiers East neighbourhood.



## 1 Precinct plan (blocks only).

“Villiers Island will contain a fine-grain network of local streets, with a variety of street types, each contributing to a sense of place and character of the island. Local streets will prioritize non-vehicular movement and flow.” — Villiers Island Precinct Plan

## 2 Creating more intimate, people-first blocks.

Sidewalk Labs believes that expanding mobility options beyond private cars and integrating self-driving vehicles into the urban environment can drastically reduce the need for on-site building parking, allowing for smaller blocks with public courtyards connected by a network of pedestrian walkways.

## 3 Generating a more dynamic, varied streetscape.

Sidewalk Labs’ proposed flexible low-floor stoa space is designed to enliven streets by fostering a greater variety of experiences. New weather-mitigation tools would activate outdoor spaces for more of the year. At Villiers East, the stoa spaces could be designed around strategically selected streets and new interior courtyards to become centres of community life.

## 4 Maximizing building views and sunlight.

Sidewalk Labs proposes to make digital design tools available that can help planners and communities evaluate multiple design options to maximize positive outcomes, such as sunlight on streets, open spaces, and views. Sidewalk Labs envisions sustainable timber buildings throughout the neighbourhood, which can be designed and built more quickly than traditional buildings, are well suited to mid-rise construction, and provide significant benefits to public and environmental health.

# Helping planners and communities improve neighbourhoods using digital tools

When designing a new neighbourhood, planners, architects, and community leaders have always struggled to balance competing objectives. Increased density can generate more jobs, affordable housing, and strengthened neighbourhood vitality — but it can also cause traffic congestion, block sunlight on or constrain public spaces, and result in poor views.

These choices require an ongoing conversation between the public sector and affected communities to establish shared priorities and determine appropriate trade-offs. But while every neighbourhood seeks to maximize benefits and minimize disruption, it can be difficult to assess the full impacts of any given decision. It can also be challenging to make technical planning concepts or guidelines clear and accessible so that communities can weigh in appropriately.

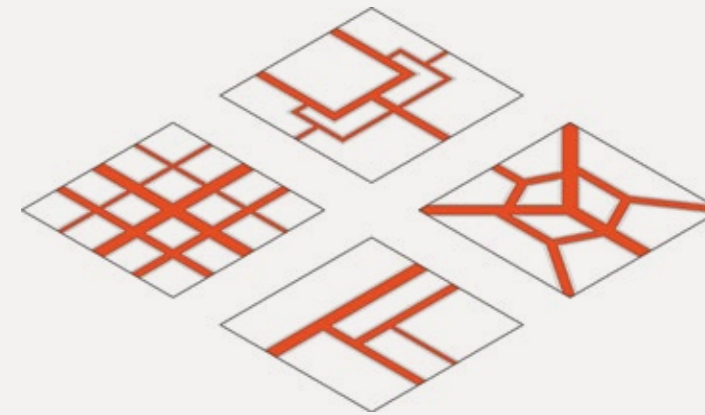
Sidewalk Labs believes that advances in technology and the application of data analytics, computer visualization, and machine learning can empower engineers, architects, planners, community groups, and policy-makers to collaborate more transparently and effectively on building better cities. Sidewalk Labs is developing a digital planning tool called “generative design” that could support this kind of planning effort.<sup>25</sup>

Generative design is a tool that can help all stakeholders explore and assess design options based on a set of site conditions, constraints, and desired outcomes. It can be programmed to factor in all the components that determine the shape, character, and functioning of a place, such as the width and layout of streets, the shape and orientation of blocks, weather impacts, the height of buildings, and more. Advances in technology have made it cost effective to simulate millions of scenarios to determine which options perform best against a community’s stated goals.

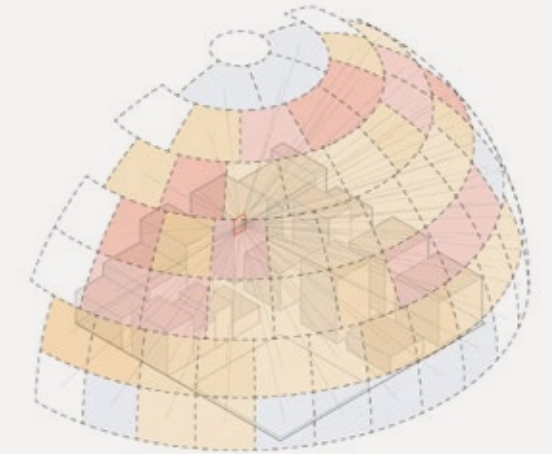
Generative design does not provide answers — on the contrary, it helps people weigh competing objectives and assess potential trade-offs. For example, smaller parks and an irregular street grid can help slow down wind gusts, an important goal in a cold climate like Toronto’s. But people need large parks as well as small ones, and straight streets can be useful. Which design is best? By showing 3D visualizations of the streets and calculating how each decision impacts a range of metrics, the generative design tool can provide reliable information so that these difficult public decisions can be made in an open, transparent, and understandable manner.

# Using digital tools to assess thousands of options

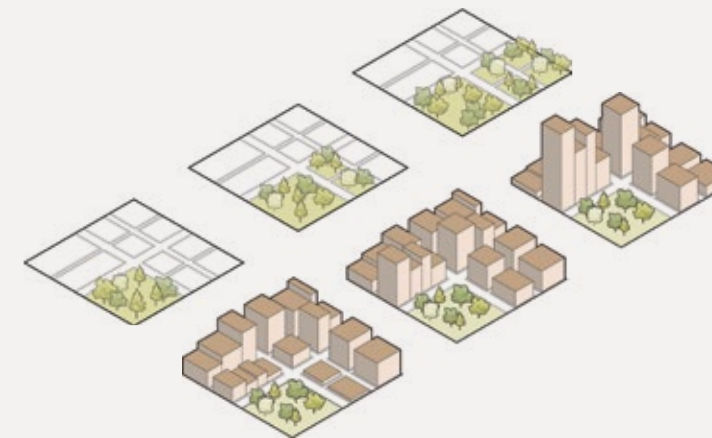
Generative design can help planners and communities evaluate a range of factors individually and as part of an integrated plan, including those shown here.



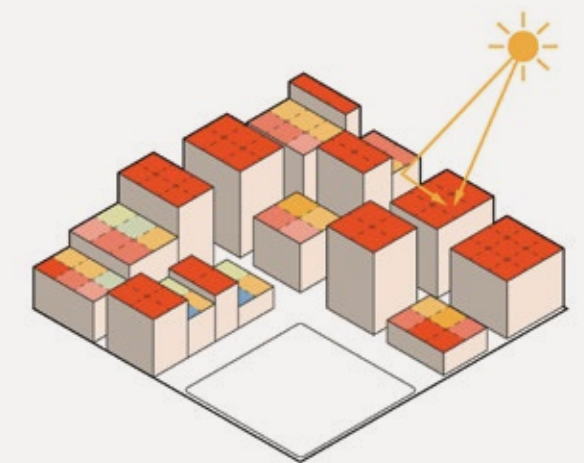
Potential street grids can be explored to help achieve goals such as building access or provision of open space.



Amount of daylight access on streets or open spaces can be explored to help ensure that buildings do not block public spaces from the sun.



Distribution of open space can be explored to balance goals around density and per capita access to green space.



Solar energy yields created by different building orientations can be explored to help communities pursue sustainability goals, such as the ability to generate clean energy on site.

This focus on information and outcomes could open up new possibilities within the regulatory framework to create a performance-based system built around specific targets that are often difficult to achieve through traditional zoning.

In its role as Innovation and Funding Partner (see Page 314), Sidewalk Labs would make these resources available to Toronto planners and the City of Toronto to help create an evaluation framework that could assist in the application of the Innovative Design Standards and Guidelines within the River District. This framework could help ensure that the wide variety of developers, architects, and designers who will be responsible for building out the River District over time will maintain flexibility and creativity in developing new ideas while at the same time ensuring that their proposals achieve key public interest objectives for the River District.

**Case study: Applying generative design to Villiers East.**

In Villiers East, the existing City of Toronto precinct plan calls for dense housing to support the economic development on the island’s western half. That goal requires finding a balance between the desired density of development while ensuring extensive, high-quality open space to support residents, visitors, and workers.

As planning proceeds in Villiers, the generative design tool can help planners evaluate the performance of different options by running thousands of simulations that weigh factors like building massing, access to natural light, and wind.

One strategy proposed by Sidewalk Labs to achieve these goals involves breaking down the development blocks into a series of small buildings with pedestrian courtyards, creating more intimate environments for residents to mingle. As a test, Sidewalk Labs used its generative design tool to conduct a preliminary study of possible courtyard configurations for a two-by-two block area of Villiers, aiming to optimize for three variables: percentage of open space, sunlight access in the courtyard, and density (gross floor area).

In an initial run, the tool generated and analyzed thousands of permutations and surfaced roughly 400 plans that created more open space and allowed more sunlight to reach the streets than the precinct plan baselines – while also adding more density (see visuals).

Generative design can also evaluate district-wide impacts, giving communities the information to take a more active role in shaping their environment. In the end, if generative design does its job, neighbourhoods would work and feel better, because they would more fully achieve the values and priorities of the city.

# Generative design case study: Villiers East

A generative design analysis of a two-by-two block in Villiers Island produced roughly 400 plans (out of thousands of permutations) that created more open space, daylight access, and density than the existing precinct plan.



**Precinct plan**

Open space	45.3%
Daylight access	49%
Total GFA	1,513,144 ft²



**Generative design #00530**

Open space	5.2% increase
Daylight access	13.6% increase
Total GFA	+24,243 ft²

This run was created through making marginal changes to the precinct plan; it has small increases in open space and density, and a large increase in daylight access.



**Generative design #00469**

Open space	3.31% increase
Daylight access	20.61% increase
Total GFA	+196,710 ft²

This run was created through making moderate changes to the precinct plan; it has a small increase in open space, a medium increase in density, and a large increase in daylight access.



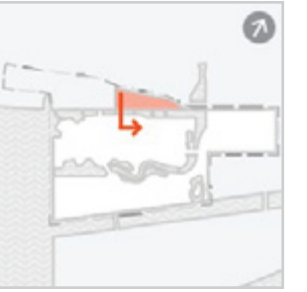
**Generative design #01140**

Open space	12.6% increase
Daylight access	8.6% increase
Total GFA	+496,781 ft²

This run was created through making significant changes to the precinct plan; it has a medium increase in daylight access, and a large increase in open space and density.

# Vision for Keating Channel: Reclaiming a Historic Canal

This historic channel could stitch together the waterfront to create a new kind of urban environment that blends innovative economic development, art, culture, restaurants, retail, and production.



Key facts:

## Keating East

Development timeline

**2029–2033**

Size

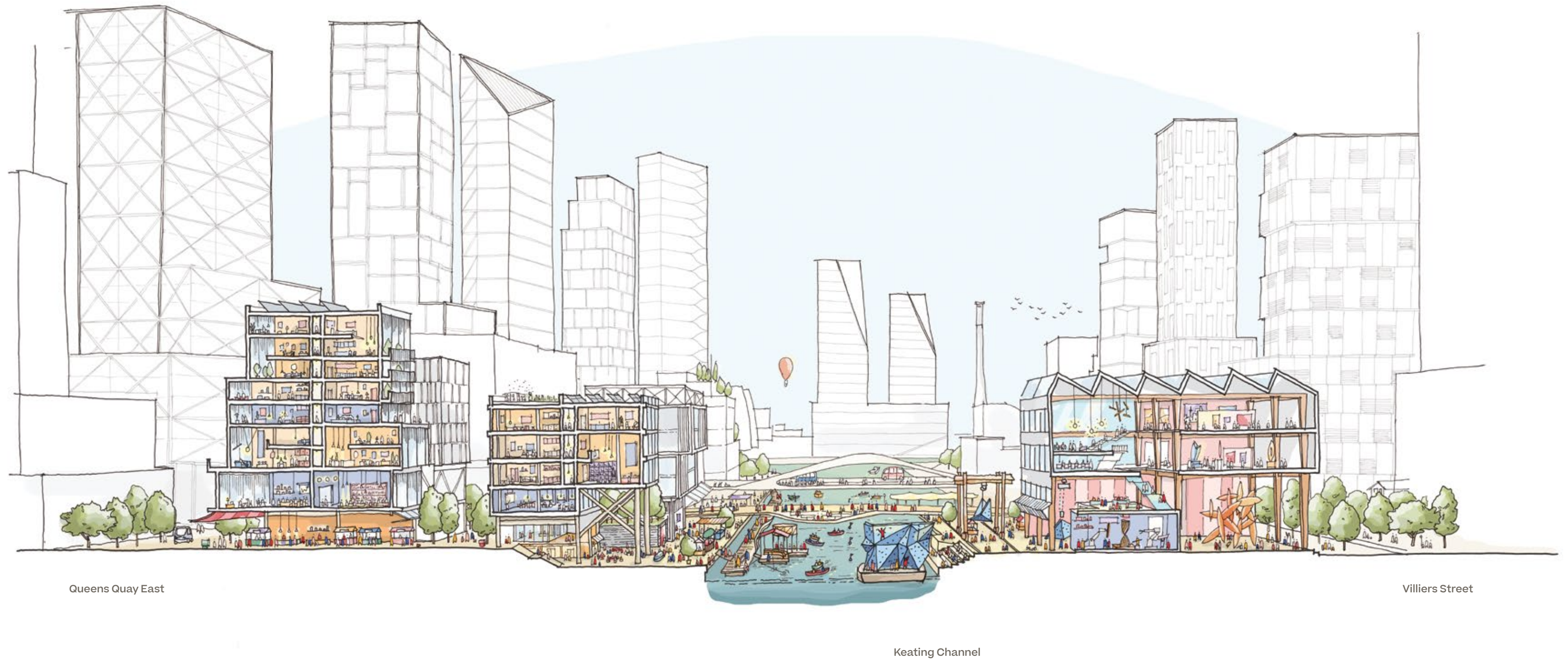
**5.9 hectares**

Total area

**Roughly 3.45 million square feet**

As home to the new Google Canadian headquarters, Villiers Island is envisioned as a major economic engine for the western Port Lands, but the economic development opportunities would not be limited to the innovation campus. Villiers Island's unusual geography and the historic buildings and structures remaining from its industrial and maritime history provide the framework for an additional, entirely different, economic driver.

Great cities around the world, like Rotterdam in the Netherlands and Nantes in France, have reclaimed post-industrial waterfront sites to build new neighbourhoods centred around art, creativity, production, and the creation of an experimental culture that attracts residents and visitors from the local region and beyond. These successful developments share a common approach: they capitalize on the physical features of their sites and draw on the culture of their cities to invent new approaches to urban living.



Queens Quay East

Villiers Street

Keating Channel

With the renaturalization of the Don River, the Keating Channel — built in 1915 as the hard-edged connection between the river and Lake Ontario<sup>26</sup> — can be reclaimed as an urban canal, forming the unifying feature of a new neighbourhood dedicated to creativity and innovation.

**Developing both sides of the channel.**

Transforming this historic waterway will require innovative approaches to infrastructure and mobility, public space, buildings, and development. The key to success will be ensuring that both sides of the channel create a unified centrepiece that links Villiers Island with the Keating neighbourhood, as envisioned in the Port Lands Planning Framework.

On Villiers Island, the historic structures scattered along the channel's edge create an opportunity for non-traditional uses. They could be reclaimed for small-scale arts and fabrication, while a large open plaza could be home to Sidewalk Labs' adaptable stoa concept, hosting a wide range of cultural and public programs. Across the channel, Keating could host small-scale workshops and artist studios, stores, kiosks, and restaurants.

Low-scale buildings on both sides of the channel could provide an intimate setting along the waterfront, which could be connected by new pedestrian and bicycle bridges and a continuous promenade along the water's edge. The public realm could extend onto the water itself, which could host a series of floating barges for cafés, art installations, and recreational activities.

This new exploration zone could host an ever-changing series of events and installations and could capture the spirit of a district built around innovation. As Villiers Island develops over time, the early activation of the Keating Channel zone with temporary uses and special programming to draw people to the site could help to establish the area as a place where new ideas are welcomed and celebrated.

**Keating: A vibrant new community connected to Villiers Island.**

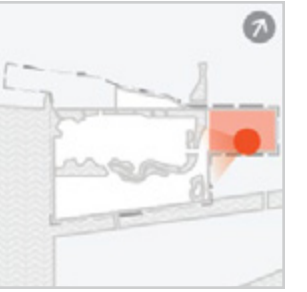
Keating is currently isolated on all sides by the Gardiner Expressway, a railway yard, and railway tracks. In November 2017, the Province of Ontario approved the City of Toronto's plans to relocate the parts of the Gardiner and Lake Shore Boulevard that currently run along the Keating Channel and move them adjacent to the train infrastructure on the neighbourhood's northern edge. That would still leave one side of the neighbourhood inaccessible to the surrounding city but would create possibilities for a new community that embraces the Keating Channel and connects to the Distillery District to the north.

A thoughtful use of scale could minimize the lack of connection to the northern edge and reorient development towards the water. Dense residential towers along the highway could scale down to an intimate presence at Keating Channel, providing easy access to the culture, retail, and community spaces lining both sides of the waterfront.

**A new arts and production exploration zone along Keating Channel could capture the spirit of a district built around innovation.**

# Vision for McCleary: Creating a Model Live- Work Neighbourhood

Nestled between the projected 8 million square feet of commercial development at East Harbour, Toronto’s burgeoning Film District, and the urban innovation hub at Villiers, McCleary could bring thousands of jobs within a short distance of its new residents.



Key facts:

## McCleary

Development timeline

**2028–2032**

Size

**13.6 hectares**

Total area

**Roughly 6.7 million square feet**

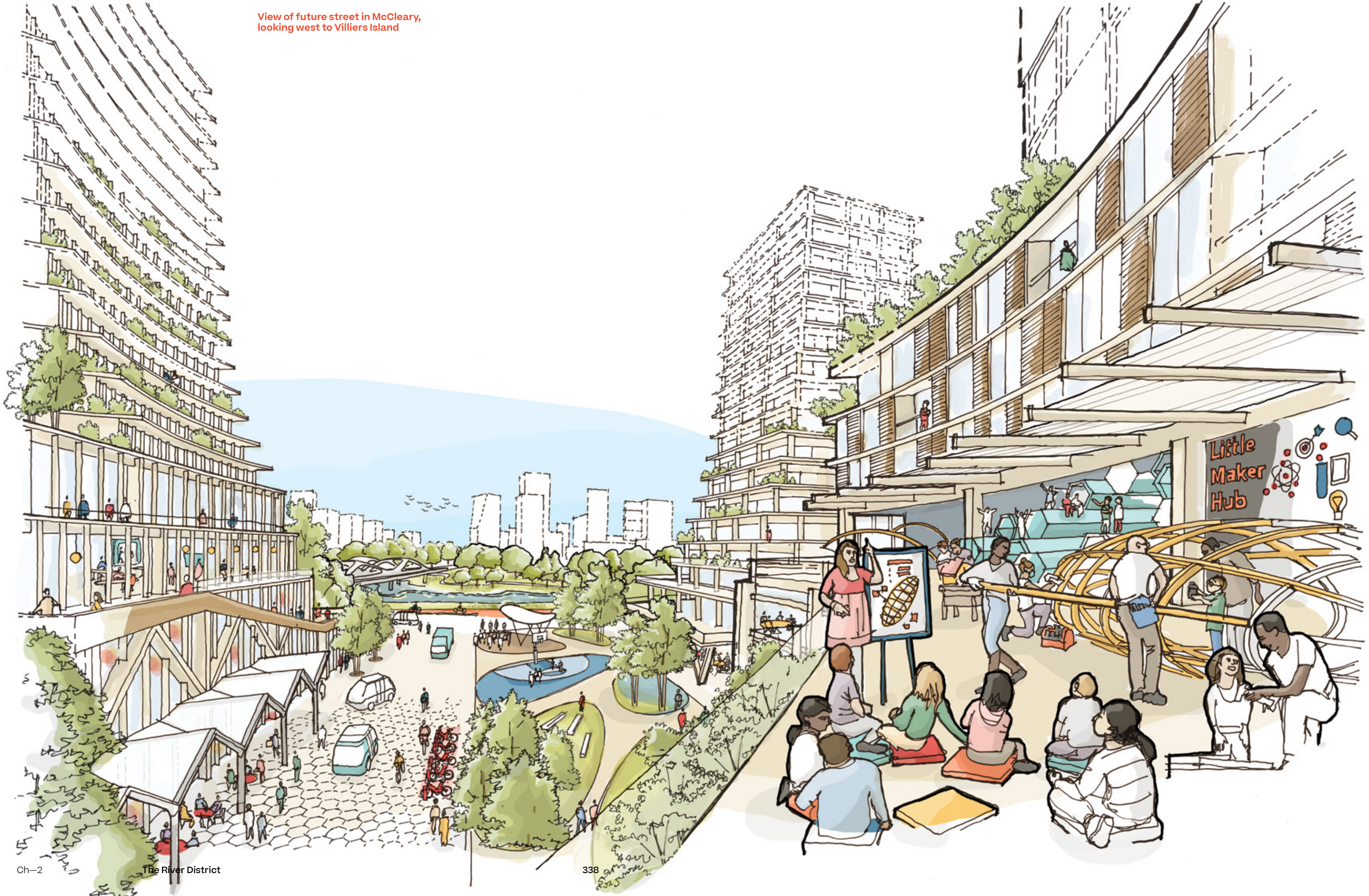
McCleary could become a critical link within the developing eastern waterfront given its proximity to three major job centres, the new planned GO Transit station and Ontario Line,<sup>27</sup> and new public destinations like the park network surrounding the Don River.

This central location makes McCleary uniquely capable of supporting the planned East Harbour commercial district to the north, the expanding Film District to the south, and the innovation

campus at Villiers Island to the west through a dense, mixed-use development plan that could include housing for potential workers, along with commercial and production spaces that could complement the work at each economic hub.

With its mix of housing, new jobs, and striking public spaces, McCleary could embody the model for a sustainable community, supplying a labour force of thousands of residents who can walk or

View of future street in McCleary, looking west to Villiers Island





McCleary could  
feature up to  
**7,000**  
housing units.

bike to jobs within minutes and creating a healthier lifestyle that minimizes commute times and costs, as well as the need for on-site parking.

**Expanding affordable options for the local labour force.**

Dense residential development, which could include up to 7,000 units, would enable McCleary to offer prospective residents a broad variety of housing types and ownership models, creating an inclusive and diverse community.

The tallest buildings and greatest numbers of residents could be concentrated along the neighbourhood's northern edge, adjacent to the 8 million-square-foot East Harbour development. As the neighbourhood approaches the waterfront, the buildings could scale down to integrate into the mixed-use waterfront community.

An expansive, animated public realm network could connect the Don River at the western edge of the neighbourhood to the expanded McCleary Park at the eastern edge. The Port Lands Planning Framework calls for the park to be reconfigured and expanded to support further recreational activities and to seamlessly integrate with the revitalized Commissioners Incinerator building, which could serve as a district-wide community centre.

**Complementing surrounding areas with a unique mix of spaces.**

Consistent with the Port Lands Planning Framework's identification of the area as a Production, Interactive, and Creative (PIC) mixed-use area, McCleary would also host a mix of commercial spaces that complement — rather than compete with — the adjacent developments, particularly the film district.

That could include businesses such as production facilities, light industry space for set or costume design, or offices for technical arts like sound engineering. In fostering film-supportive housing and businesses, Sidewalk Labs believes McCleary can serve a significant role in supporting the ongoing expansion of the film industry.

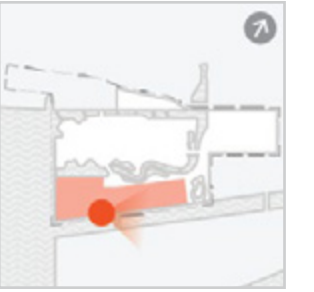
**Supporting the precinct planning process.**

The final vision for McCleary requires a comprehensive precinct planning process. Under Sidewalk Labs' proposal, this effort would be conducted as a joint exercise completed by Waterfront Toronto and the City of Toronto, with Sidewalk Labs in the role of innovation partner. A range of private developers, engaging their own architects and designers, would then be selected by the appropriate public agency to construct the actual buildings.

**With its mix of housing, new jobs, and striking public spaces, McCleary could become a critical link to support three major surrounding job centres.**

# Vision for Polson Quay: Reinventing a Working Waterfront Neighbourhood

Polson Quay could capitalize on its unique economic and recreational potential by creating a waterfront community that integrates housing, creative production and commercial space, and a spectacular public realm network that spans land and water.



Key facts:

## Polson Quay

Development timeline

**2030–2034**

Size

**23 hectares**

Total area

**Roughly 9.75 million square feet**

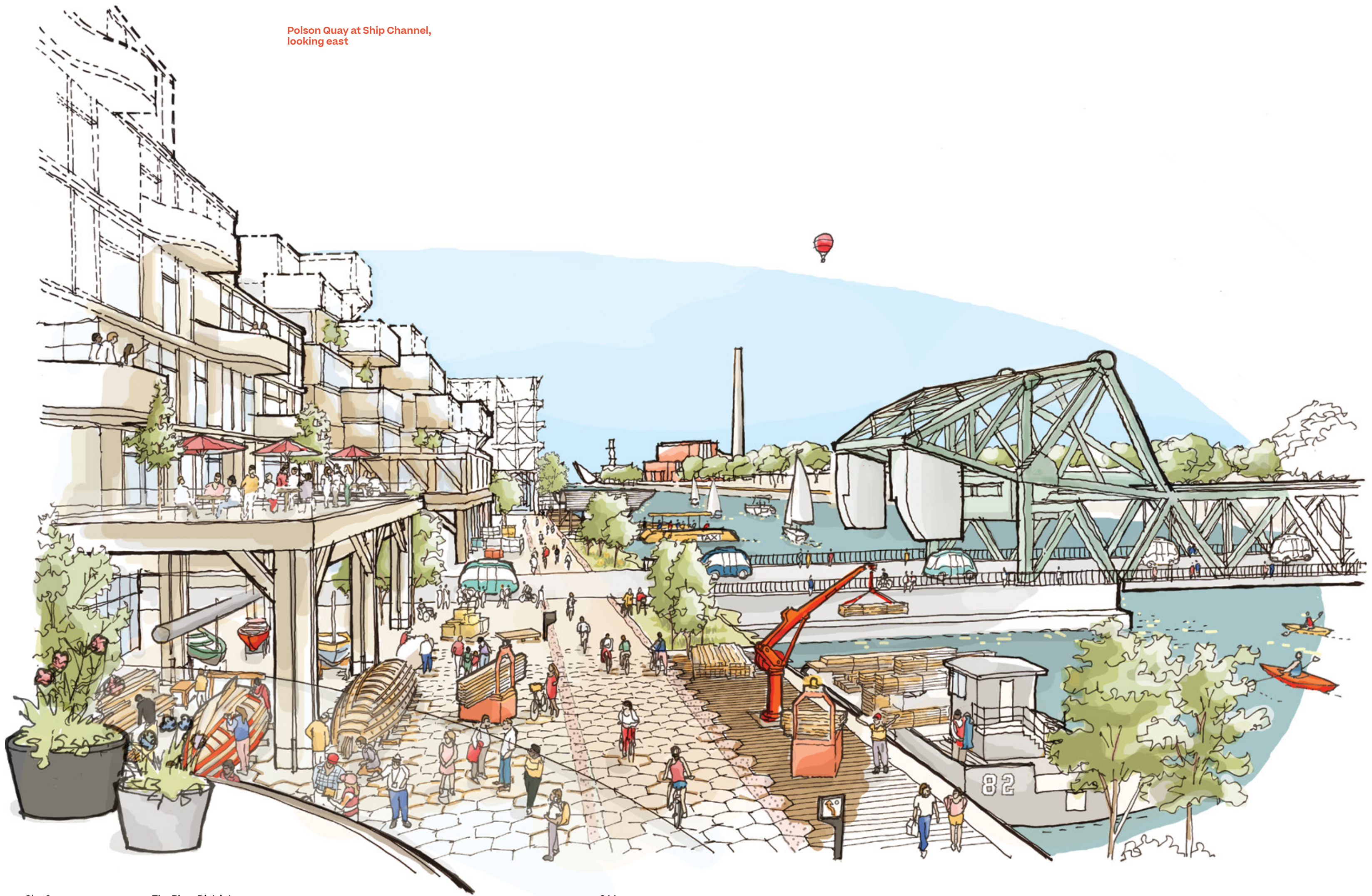
The final piece of the River District to be developed would be Polson Quay, a 23-hectare peninsula surrounded on all sides by water or wetlands — and the only neighbourhood in the eastern waterfront with buildings directly bordering the harbour.

This area includes the Polson Quay and South River precincts identified in the Port Lands Planning Framework. Treating them as a unified neighbourhood would recognize the shared opportunity across

both sites to develop a comprehensive plan to spur economic growth while enlivening the area through a vast new network of parks and public space, ample housing, artisan workshops and production spaces, and unusually intimate waterfront access.

This development can support the inspiring work of the artists, designers, and other makers who inhabit the historic Dominion Box Boards to forge a creative enclave.<sup>28</sup> This heritage structure can

Polson Quay at Ship Channel,  
looking east



become the heart of a fully revitalized neighbourhood, with the existing tenants continuing to play a major role in the community.

The density and diversity of programming at Polson Quay would be supported by an extension of the light rail, with a new stop planned for the neighbourhood's centre.

**Reinventing the working waterfront as a modern mixed-use community.**

With its unique waterfront setting — encompassing an active shipping channel, the harbour, and the renaturalized Don River — Polson Quay has an opportunity to reimagine the city's relationship to water.

As the only neighbourhood in the River District with buildings along the inner harbour, Polson Quay could enable maritime uses that coexist with a spectacular new public realm created by the flood protection plan. That project will create an urban esplanade that curves around Polson Quay and connects to a new central park that stretches between the edges of Villiers and Polson Quay, with pedestrian trails winding through the wetlands.

*Sidewalk Labs proposes an additional pedestrian bridge at the western edge of Polson Quay, which would connect this area with the technology campus and showcase exceptional views of downtown, Lake Ontario, and the Toronto Islands, enabling people to walk one continuous path from Quayside to the stunning new parks on Villiers Island and Polson Point.*

On its southern side, Polson Quay borders the Ship Channel. Boats could become part of the neighbourhood's daily life as sources of transport, recreation, and shipping to support light industry.

Polson Quay could modernize the concept of a working waterfront, with workshops for active and adaptable light industry and production spaces integrated into the streetscape alongside housing, parks, and shops. These workshops could become a foundational part of the neighbourhood's identity.

A range of housing options, including new live-work spaces and affordable rentals, could be designed to meet the diverse needs of people working in production, industrial, or port uses across the Port Lands.

**Supporting the precinct planning process.**

Similar to McCleary, Polson Quay will require the creation of a precinct plan to guide its development. This planning process would need to grapple with some of the unique constraints of the site as identified by the Port Lands Planning Framework, including the Cement Terminal and nearby port and industrial uses, which could pose substantial issues to Toronto's vision for integrating housing alongside industry.

As innovation partner, Sidewalk Labs can provide new technologies to help city planners assess which of these uses are compatible and which should



See the "Buildings and Housing" chapter of Volume 2 for more details on the proposed outcome-based code system.

be relocated to preserve the mixed-use community. Once the neighbourhood is developed, digital tools could help support an ongoing evaluation to ensure that the mix of uses is successful. For example, the proposed outcome-based building code system can provide real-time monitoring and management of environmental concerns, such as noise, odour, and vibrations.

For industrial uses that are deemed incompatible with the mixed-use community, Sidewalk Labs can help craft a transition strategy to explore their relocation.

As with the rest of the River District, Polson Quay's range of private developers would all be required to meet the district's Innovative Design Guidelines and Standards to ensure that the neighbourhood meets world-leading standards for sustainability, affordability, and advanced systems and becomes a fitting culmination to an extraordinary district.

## Polson Quay could modernize the concept of a working waterfront, with workshops and production spaces integrated into the streetscape alongside housing, parks, and shops.

# Scaling Urban Inno- vations

The following section describes how innovations initiated in Quayside can scale across the River District. As described more in Volume 3, Quayside becomes possible only when considered in combination with the River District.

Such scale is necessary for many of the innovations to become financially viable and to maximize their ability to help achieve Waterfront Toronto's core outcomes around job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

# Mobility



## Accelerating mass transit extensions across the eastern waterfront

The River District’s scale makes it possible to realize a long-planned light rail extension across the eastern waterfront through a self-financing mechanism, accelerating transit-centred development that would create more affordable, convenient, and sustainable neighbourhoods.

Toronto’s leaders have long understood that planning for public transportation in tandem with the initial development of the eastern waterfront is essential to the area’s success. Without that service, travel options to the area would be limited and the vision for the Port Lands as a significant economic driver for Toronto’s future would be impossible to realize. Development would become overly reliant on road infrastructure, in contrast to city and waterfront objectives around sustainable mobility.

There is also widespread agreement about the path forward: the city’s 6.5-kilometre light rail extension across the eastern waterfront that would provide dramatic benefits, such as reducing traffic and greenhouse gas emissions, attracting commercial tenants, opening up the

neighbourhoods to a broader range of residents, and accelerating development. The city’s proposed extension would even improve transit service and travel times, with smarter spacing between stops, signal prioritization, and dedicated transit lanes.

Ultimately, this plan could become the foundation for a reconceived mobility network that prioritizes pedestrians, bicycles, and transit, providing exciting possibilities for neighbourhoods that are safer, more affordable, sustainable, and convenient.

But more than a decade after planning began, the light rail plan, which could cost approximately \$1.2 billion, remains unfunded — with no clear path to implementation.<sup>29</sup>



See the “Mobility” chapter of Volume 2 for more details on the proposed innovations and initiatives described in this “Scaling Innovation: Mobility” section.

**The River District is ideal for self-financing.**

Sidewalk Labs believes that a proven financing mechanism of self-financing, sometimes referred to as “value capture,” could finally make this project a reality if governments should not be willing or able to fund from more traditional sources. In this approach, the light rail would essentially fund its own extension, using the projected revenue streams from the future development — made possible by the new transit lines — to finance the upfront construction costs.

Such an approach has been used in Canada before, in Calgary and Winnipeg,<sup>30</sup> and has been proposed to offset the cost of Toronto’s SmartTrack plan to electrify and add new stations to Toronto’s surface-rail network. When applied to the eastern waterfront, it would allow construction of the light rail to proceed as development begins, while limiting the amount of direct public funding required.

This self-financing strategy is only viable for certain projects.<sup>31</sup> The key issue is whether the transit expansion will create enough value to offset the cost of building that expansion. The strategy is often not viable where new transit will serve existing neighbourhoods, because those areas are already sufficiently valuable, meaning that new transit services do not add much. Likewise, a low-density development might not generate enough revenue to cover the high costs of transit infrastructure.

A small neighbourhood such as Quayside, consisting of just a few blocks, could never repay the massive investment required. But the River District provides the potential for enough new development at high enough density to design and fund a rapid transit system that can nourish new neighbourhoods and support their growth.

The approved extension would include up to 19 new stops across a route that connects Quayside, Villiers Island, McCleary, and Polson Quay with the newly planned East Harbour station and the rest of the city.

**The LRT extension can unlock massive economic opportunity.**

In addition to becoming financially feasible at scale, the sweep of the proposed transit extension also delivers greater benefits: adding multiple lines crossing the eastern waterfront delivers access and service to riders that a one-or-two-stop extension does not.

An economic impact report prepared by the engineering and development consultancy Hatch for the Waterfront Business Improvement Area showed that construction of the light rail through Quayside and the River District would generate land value of \$4.5 billion between 2025 and 2045 and \$22.8 billion in additional tax revenue to the governments of Toronto, Ontario, and Canada over the 20 years following completion of the project.<sup>32</sup>

**LRT by the numbers:**  
 → 19 new stops  
 → \$4.5 billion in land value by 2045  
 → \$22.8 billion in additional tax revenue over 20 years after LRT completion



**Map**  
**Proposed light rail network in the River District**

Sidewalk Labs proposes to accelerate the completion of the city’s planned light rail extension, with an additional optional segment through Keating Channel. This would unlock new development and create essential connections to the rest of the city.

- IDEA District
- Existing and planned rapid transit lines
- Approved light rail extension
- - -○- - - Optional light rail extension
- 5-minute walk from new light rail stops
- Planned East Harbour station

Beyond the approved plan, Sidewalk Labs further proposes an optional second phase of construction to add light rail infrastructure to the area north of the Keating Channel to serve future development.

By 2041, these extensions could serve roughly 72,900 Torontonians and would have a significant economic impact.<sup>33</sup>

Given the project's fundamental importance, Sidewalk Labs is prepared to provide certain assistance with the financing for the approved plan. 



See the "Innovation and Funding Partner Proposal" chapter of Volume 3 for more details on optional financing support for the light rail extension.

Strengthening public transit across the eastern waterfront unlocks virtually every goal held by Toronto for its waterfront. Street space can be reclaimed to create a larger, more vibrant public realm that anchors new communities.

Reducing the expenses associated with car ownership supports more affordable lifestyles,<sup>34</sup> making the eastern waterfront accessible to more people. Relying more heavily on public transit dramatically reduces greenhouse gas emissions,<sup>35</sup> forming a critical step in the path to a climate-positive community.

**Relying more heavily on public transit dramatically reduces greenhouse gas emissions, forming a critical step in the path to a climate-positive community.**

**The River District could support enough density to design and fund a rapid transit system that could spur new, thriving neighbourhoods.**



# Creating new neighbourhoods with people-first street networks

Planning for the eventual adoption of shared self-driving vehicles has the potential to reshape streets into people-first mobility networks by dramatically reducing parking and increasing space for pedestrians and cyclists.

The way space is allocated within a typical city street rests on a few assumptions. One is that private cars are the primary way people get around and that they therefore deserve the most space. Another is that those cars are driven by people who, often distracted or driving too fast, pose a significant danger to others and therefore should be permanently separated from other modes of transportation.

The result is a city street where cars have wide rights of way that are marked off with curbs. Cyclists and pedestrians have to squeeze into the spaces on the margins while public transit gets stuck in traffic even though its vehicles carry scores of riders instead of just one.

Waterfront Toronto has built streets based on a different set of assumptions. One is that walking, cycling, and public transit are as important as private cars — and often more efficient. Another is that the more high-quality space provided on the street for each of these modes, the more all of them will be used, as shown by the unexpected high volumes of cyclists on the Martin Goodman Trail.<sup>36</sup>

Sidewalk Labs embraces this vision and proposes to build on this work with an additional assumption: that self-driving vehicles — often called autonomous vehicles — will be both safe and commercially ubiquitous available for rides by roughly 2035, and that smart planning can harness their potential to be better neighbours for pedestrians, cyclists, and



## Map

### Proposed street network in the River District

The proposed street network balances the need for longer trips by vehicles and public transit (on Boulevards and Transitways) with the need for streets that prioritize cyclists, pedestrians, and sidewalk activity (Accessways, Laneways, and the interior pedestrian network).

- IDEA District
- Boulevards
- Transitways
- Accessways
- ..... Laneways
- ..... Pedways
- Open space
- Pedestrian network
- Future neighbourhood street networks to be planned

public transit users. Self-driving vehicles can be programmed to drive more slowly and carefully, as well as to give priority to public transit, bicycles, and pedestrians.

The consequences of these assumptions are profound. By proactively shaping the ways that self-driving vehicles are integrated into city streets and by using a range of policy, pricing, and digital tools to encourage shared rides and prioritize public transit, cities can design streets for people.

This approach enables more space to be reclaimed for the public realm as well as more shared streets, where pedestrians can safely coexist with self-driving vehicles programmed to stay at certain low speeds. (The shared streets concept is already practiced successfully today with traditional cars, especially in Europe.)<sup>37</sup> To accommodate increased pedestrian traffic, city blocks can feature more extensive interior pathways and courtyards.

The ultimate goal is to build more active and engaging streetscapes. More space allows for more trees, public art, street furniture, and other amenities. This change can have a cascading effect. More amenities bring more people to the street, and having more people on the street improves the prospects and usefulness of local retail, which in turn draws more people in a virtuous cycle.<sup>38</sup> This approach can take one of the great joys of urban life — strolling down a lively street — and make that experience fundamental to every corner of a neighbourhood.

#### **New street types for a balanced mobility network.**

To realize the vision of a complete mobility network, Sidewalk Labs has designed four street types to balance the need to travel quickly and efficiently against the imperatives of pedestrian safety and enhanced street life.<sup>39</sup>

Since Quayside is only four blocks long and includes three existing streets whose designs must be largely maintained, it is too small to implement these new street types and realize their full benefits. But the River District presents an opportunity to integrate this new people-first transportation network.

**Smart planning can harness the potential of self-driving vehicles to be better neighbours for pedestrians, cyclists, and public transit users.**

**Four new street types can balance the need to travel quickly and efficiently with the need for pedestrian safety and enhanced street life.**

**Boulevard.** The Boulevard is the widest street type, with a top speed of 40 kilometres per hour and a maximum width of 31 metres. Designed primarily to accommodate longer-distance trips for all modes, Boulevards would typically be situated along the perimeter of a neighbourhood. To help improve safety for all street users, Boulevards feature separated bikeways for cyclists and sidewalks for pedestrians.

**Transitway.** Like Boulevards, Transitways have a top speed of 40 kilometres per hour, but they have a maximum width of only 26 metres, with priority given to public transit. The Transitway features hubs for bicycles and scooters and safe, wide crosswalks, providing seamless cycling and walking access to stations.

**Accessway.** Accessways are narrower streets that serve as a core part of the cyclist network and are intended for traffic moving no faster than cycling speeds. The streets are designed for top speeds of 22 kilometres per hour and a maximum width of 16 metres. Self-driving vehicles are permitted on Accessways if travelling at bike speeds. Accessways do not have separated sidewalks but guide cyclists and pedestrians via lighted pavement or digital signs. Accessways would provide emergency access and servicing to buildings that are not otherwise accessible by Boulevards and Transitways.

**Laneway and Pedway.** These streets form the foundation of the pedestrian network and are envisioned as the most common type of street in Villiers, Polson Quay and McCleary. The only difference between them is that Laneways would allow vehicles travelling at walking speeds and Pedways would not. Laneways are designed for pedestrian speeds, with a top speed of 8 kilometres per hour and a maximum width of 11 metres. Bikes and self-driving vehicles for people with accessibility needs are permitted on Laneways if travelling at the proper speed.

Pedways are the courtyards located within blocks and walkways between buildings and should be open and inviting to residents and visitors. With no regular vehicular access, they would come in all shapes and sizes depending on the varied properties of a block (but would be sized to accommodate emergency vehicles). Both types are meant to help get people places but also to be places unto themselves: they can be quiet side streets where kids play or they can be filled with pop-up shops, street fairs, and other types of community gatherings. Linked with Pedways, Laneways could stitch together a continuous pedestrian-dominated network where it would be a pleasure to walk.



## The four proposed street types

Villiers East offers an illustrative street network that incorporates all four proposed street types.

**1A Laneway**  
Width: 11 metres  
Priority mode: Pedestrians  
Priority speed: 8 km/h



**1B Pedway**  
Pedways (a type of Laneway) are the publicly accessible, pedestrian-only courtyards and walkways between buildings with no regular vehicular access.

**2 Accessway**  
Width: 16 metres  
Priority mode: Cyclists  
Priority speed: 22 km/h



**3 Transitway**  
Width: 26 metres  
Priority mode: Public transit  
Priority speed: 40 km/h



**4 Boulevard**  
Width: 31 metres  
Priority mode: All modes  
Priority speed: 40 km/h



\* Atypical condition

# Expanding opportunities for cyclists

To help cyclists reach higher speeds while improving street safety, the River District's network would feature many separated cycling lanes, including the Martin Goodman Trail.

The district's primary bike network would run on Boulevards, Transitways, and Accessways, including a newly proposed dedicated lane along the extension of Trinity Street, across a bike bridge over the Keating Channel, and through Villiers Island. Similar to Quayside, River District Boulevards and Transitways would feature separated bike lanes that are five metres wide and are equipped with heated pavement and "green wave" lighting that helps ensure cyclists can move through traffic lights safely and with priority.

On Accessways, bikes would be prioritized with centre-running lanes and share space only with other modes travelling at bike speeds. Accessways could offer a central heated running lane of three to five metres wide.

Outside of these areas, cyclists would be welcome to travel on the streets at the prevailing speed and, notably, at walking speed when in pedestrian areas.











All told, the district would feature extensive new dedicated bike infrastructure. Within the River District, the target would be for cyclists to be able to reach 100 percent of buildings using either a dedicated bike lane or a roadway designed for bikes, compared to roughly 15 percent in a typical downtown Toronto neighbourhood today.<sup>40</sup>

**Within the River District, cyclists would be able to reach 100 percent of buildings using streets designed for bikes or dedicated lanes.**



## Map Proposed bike network in the River District

The proposed bike network builds on the city's existing network and planned expansions to create new cycling infrastructure that connects onto Villiers Island, including bike bridges.

- |                                                                                       |               |                                                                                       |                                                          |
|---------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------|----------------------------------------------------------|
|  | Primary route |  | Secondary route                                          |
|  |               |  | Existing bike network                                    |
|  |               |  | City planned and proposed expansion of bike network      |
|  |               |  | Sidewalk Labs proposed further expansion of bike network |
|  |               |  | Future neighbourhood bike network to be planned          |
|                                                                                       |               |                                                                                       | IDEA District                                            |

# A neighbourhood moved by new mobility

The forward-looking mobility systems of the River District would demonstrate the extraordinary quality-of-life benefits that come with designing a transportation system that can adapt to the changing needs and technologies of the 21st century.

The most visible changes in urban mobility in the 21st century so far have been the emergence of ride-hailing, the rise of bike- and scooter-sharing,<sup>41</sup> and the dramatic growth in parcel deliveries driven by online shopping.<sup>42</sup> These trends have all improved convenience, but except for bike-sharing, they have also harmed the urban environment by increasing traffic congestion, especially as delivery trucks and for-hire vehicles fight for curb space.<sup>43</sup>

Quayside can test some solutions to these problems, including a mobility package that discounts some shared rides each month, streets designed for self-driving vehicles, and an underground freight delivery system. But a citywide transportation challenge cannot be solved on four blocks alone.

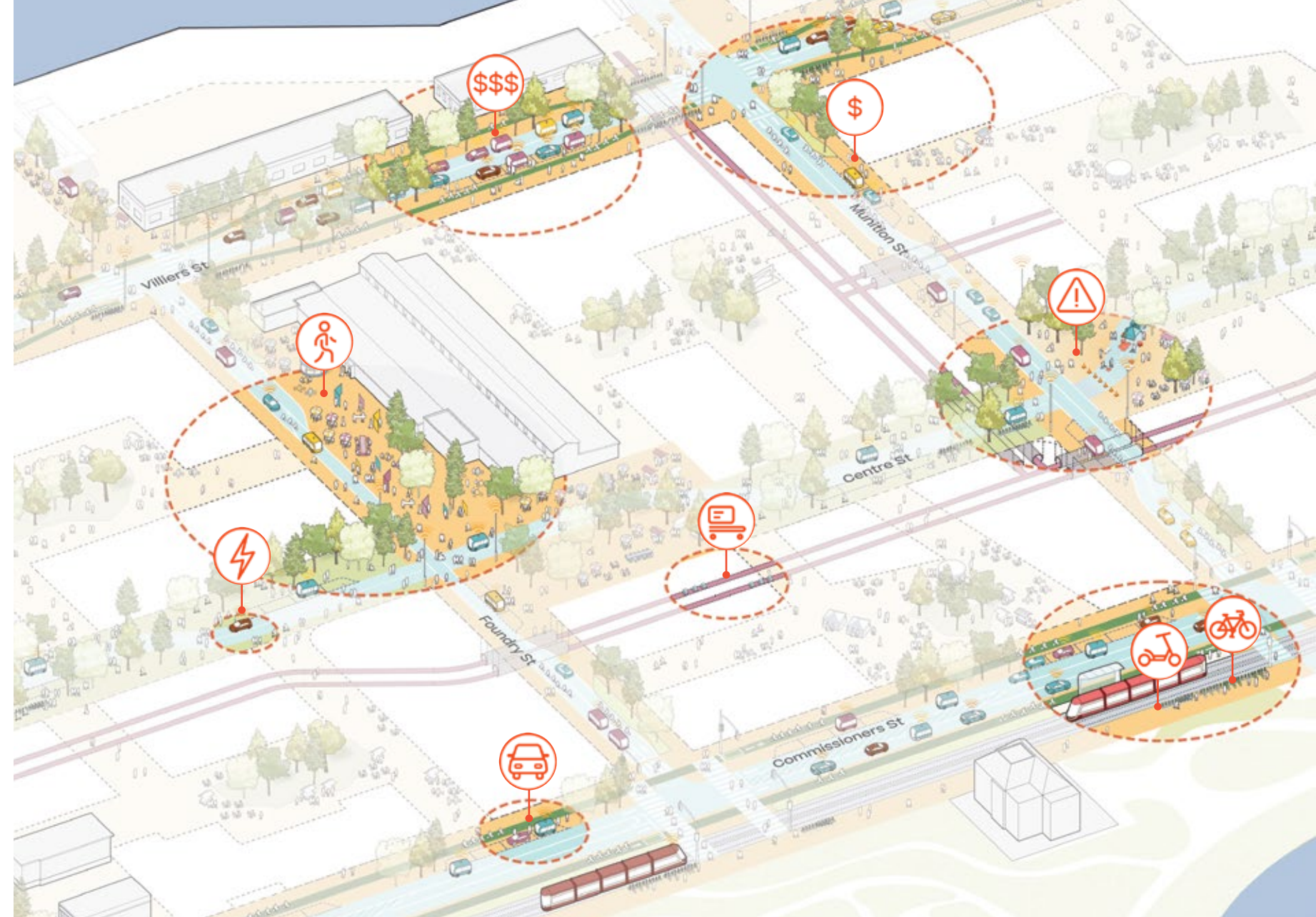
Applying the successful solutions across an entire transportation network can maintain the convenience offered by these new innovations while reducing traffic congestion and its related problems.

The River District has the potential to become a model for 21st-century urban mobility.

### Discounted mobility packages.

Sidewalk Labs is committed to providing people with a full set of transportation options designed to meet all of their needs without owning a car. These options include expanding public transit, creating more walkable neighbourhoods and more extensive cycling networks, and increasing the availability of ride-share and ride-hail options.

But it can be hard for people to evaluate all of their choices — and the costs of various options — in real time. That is why Sidewalk Labs is proposing digital tools that can help residents and workers understand the real price of each transportation option, encouraging the choice of public transit via discounts and credits. A monthly mobility subscription that



### Map

## New mobility systems on Villiers Island



Dynamic curbs provide drop-off and pick-up availability, with pricing based on congestion levels.



Streets restricted to self-driving vehicles reduce vehicle lanes and maximize pedestrian space.



Electric self-driving vehicles create quieter streets and less pollution.



On Boulevards, dynamic curbs provide drop-off and pick-up space for both self-driving and traditional vehicles.



Self-driving delivery dollies operate in below-grade tunnels, reducing truck traffic on streets.



Dynamic streets can adjust space allocations based on real-time traffic conditions, with self-driving vehicles easily routed around street closures.



Multi-modal transportation options, such as bikes and scooters, are located adjacent to light rail stations.

integrates these real-time options could cover a discounted Toronto Transit Commission pass, an unlimited Bike Share Toronto membership, access to e-scooters and other low-speed vehicles, and credits for rides with ride-hail or car-share providers.

At the scale of Quayside, the combination of these strategies can achieve very low rates of auto ownership among residents, but the overall impact would be limited. It would not significantly shape visitor behaviour or create a low-traffic environment, due to the proximity of major roads such as Lake Shore Boulevard.

At the scale of the River District, however, the number of residents and employees would be large enough to achieve volume discounts for transit and new mobility services, creating a self-sustaining base of users.

#### All autonomous.

Sidewalk Labs believes that self-driving vehicles will likely become ready for widespread use as ride-hail services just as the first neighbourhoods in the River District are completed.

Sidewalk Labs has developed a proactive plan to harness the potential of self-driving vehicles to create safer streets that prioritize pedestrians, cyclists, and public transit, positioning the River District to pioneer a transportation network for the 21st century. Once self-driving vehicles are widespread, it will be possible to imagine entire neighbourhoods in which traditional cars travel only on Boulevards, with the rest of the streets reserved for self-driving vehicle use.

Sidewalk Labs seeks to maximize the mobility benefits of ride-hailing through staging areas, pick-up and drop-off zones, and shared-ride pricing. These initiatives aim to ensure that self-driving technology achieves the goals of expanding access to the city without a car, reducing household costs, and recapturing parking space for more vital public uses.

#### Self-supporting freight.

To reduce the impact of delivery trucks clogging city streets, Sidewalk Labs has designed a pioneering system that would consolidate most packages at a central location and deliver them through self-driving delivery dollies travelling through secure underground tunnels that connect directly into building basements.

This system would be a zero-emissions solution that would maintain or exceed convenience to customers.

It is not financially feasible to build and operate this system if the delivery zone is limited to a neighbourhood the size of Quayside. Sidewalk Labs anticipates that, together, Quayside and the River District would attract enough packages to make the construction of this system affordable and deliver savings to companies no longer responsible for delivering every package to its final destination.

#### All-electric.

In Quayside, Sidewalk Labs envisions several efforts to encourage the use of electric vehicles, consistent with Toronto's mobility objectives. But Quayside's noise and air-quality profile would be shaped more by Lake Shore Boulevard and the Gardiner Expressway than by the vehicles owned and operated within the neighbourhood.

At the River District scale, these strategies can begin to reshape the urban experience, as the majority of vehicle trips would be conducted by people who live and work in the neighbourhood. A variety of strategies — including discounts, priority lanes, or pricing — could be used to incentivize the transition. As a result, the streets of the River District could be far quieter and less polluted, offering a vision for a clean urban future.

#### Limited parking.

Similar to the strategy initiated in Quayside, the parking approach in the River District would eliminate fixed on-street parking spots in favour of dynamic pick-up and drop-off curb spaces. A reduced number of hourly parking spots would be offered in garages on site, with additional long-term spots offered at off-site facilities nearby. Spots within the neighbourhood would favour electric-powered car-share services.

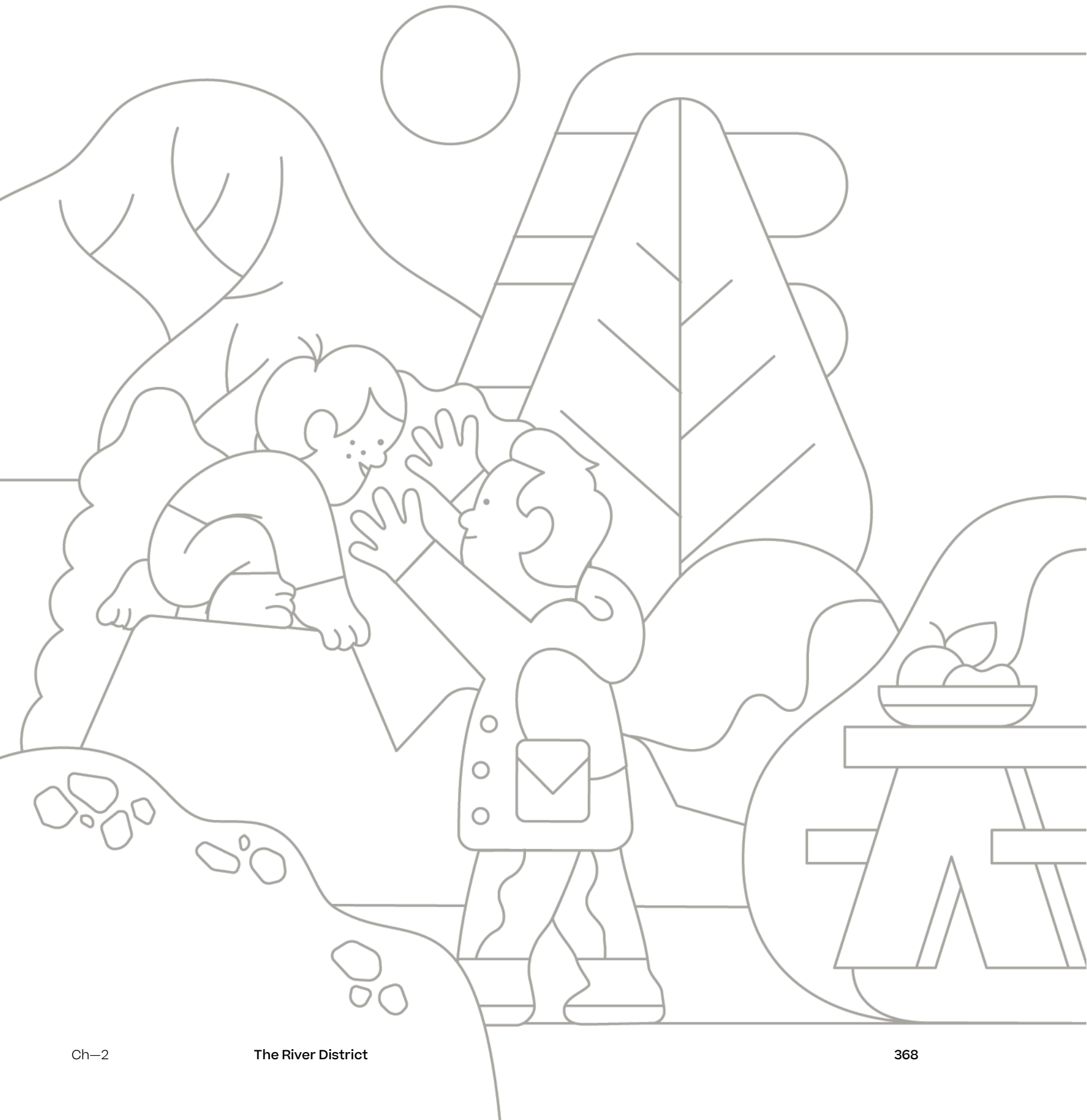
#### Coordinating the network.

In Quayside, the proposed Waterfront Transportation Management Association (WTMA) — a new public entity tasked with coordinating the entire mobility network — can manage traffic congestion at the curb by using real-time space allocation and pricing to encourage people to choose alternative modes at busy times.

At the scale of the River District, however, active traffic management could yield far greater benefits, as the WTMA could not only optimize the available road and curb space but also apply pricing to encourage shared rides during congested periods. Active management would rely on a real-time understanding of the curbs, roads, weather, special events, and other factors, as well as the infrastructure tools to allocate lanes and signal times to achieve traffic objectives.

## Supporting and incentivizing electric vehicles would create streets within the River District that are quieter and less polluted.

# Public Realm



## Creating an expanded, varied, and active public realm network

Expanding the public realm innovations initiated in Quayside across the River District would have a catalytic effect that goes beyond simply adding more parks. It would spark a wider variety of experiences, uses, and possibilities as part of a vast interconnected network.

Sidewalk Labs can build on the extraordinary foundation established by the renaturalization of the Don River<sup>44</sup> and outlined in the Port Lands Planning Framework by adding even more public spaces, supporting greater adaptability, improving all-season use, and creating new connections between streets, parks, plazas, and waterways.

### **Creative ways to expand public space.**

Sidewalk Labs can build on its mobility strategies to generate significant new public space.



See the “Public Realm” chapter of Volume 2 for more details on the proposed innovations and initiatives described in this “Scaling Innovation: Public Realm” section.

Limiting vehicle lanes for cars would lead to expanded, landscaped sidewalks, some of which could become large enough to accommodate public installations such as pop-up markets, performances, and lush plazas. Dramatically reducing the number of space-intensive private garages would enable buildings to shrink their footprints,

creating space for a connected network of interior courtyards as well as winding pedestrian pathways that still maintain sight lines to ensure public safety.

These additional public connections can transform the public realm into its own kind of mobility network, offering a more intimate way to travel through a neighbourhood, which can strengthen community engagement, lead to healthier lifestyles, and spark unexpected connections.

In Quayside, these innovations can create 15 percent more open space than would be created by existing precinct plans.<sup>45</sup> But given that the neighbourhood is only four blocks long, the amount of extra space is modest in real terms.

When a similar approach is applied across an area the size of the River District, however, it would result in a significant increase in Toronto's overall open space network, building on Waterfront Toronto's vision to make public space the anchor for new communities.

### Creating a greater variety of open spaces.

In its Quayside plan, Sidewalk Labs has sought ways to maximize the diversity of uses possible within a small space by breaking down the boundaries between indoors and outdoors, land and water, and green and hardscape. It has also explored ways to create adaptable spaces that can be repurposed for multiple uses — for example, enabling a range of sports to take place on the same field through the use of embedded lighting and other strategies.

Applied at the scale of the River District, this flexible, boundary-breaking approach can lead to an area unlike any other in Toronto, where it is possible to walk to nearly any point in 15 minutes and encounter a range of public experiences on the way — from kayaking along a river into the open harbour, to listening to a concert or playing mahjong on a series of floating barges, to rock climbing on old industrial infrastructure.

The River District's innovation guidelines could ensure that public spaces are designed with the ability to adapt easily, so that as new cultural and recreational concepts emerge, the spaces can respond to meet the community's needs.

### Weather mitigation strategies to expand outdoor hours.

In a cold-weather climate like Toronto, wind, ice, and snow can make it challenging to be outside for much of the year. But the River District's existing precinct plans highlight the need to create a public realm that can remain vibrant and accessible year-round.

To that end, Sidewalk Labs has explored a range of weather mitigation strategies that it would begin implementing in Quayside, including heated pavement that can melt ice and snow and canopies or building "Raincoats" that can extend over the street and connect to the sidewalk, creating airy, insulated pockets during inclement weather. Altogether, these strategies can increase the amount of time it is comfortable to be outdoors in Quayside's public spaces by 35 percent.<sup>46</sup>

But the most powerful tool to improve comfort is modifying the orientation of a street grid and the shape of buildings to reduce wind. Quayside's small size and existing streets make it hard to deploy these techniques to their greatest potential.

Across the River District, these weather-mitigation approaches can have immense impact. Sidewalk Labs projects that if these strategies are implemented as part of the innovation guidelines, they could double the number of comfortable hours outside for key spaces, compared to a typical Toronto development.

Applying these innovations at the scale of the River District also makes them more affordable. Cost is particularly significant when it comes to materials like ETFE (Ethylene Tetrafluoroethylene), a durable, highly transparent, lightweight plastic film that is used for the building Raincoat and is ideal for creating comfortable indoor-outdoor environments.<sup>47</sup>

In 2019, Sidewalk Labs designed and constructed a prototype; based on this work, Sidewalk Labs estimates that maturing the Raincoat technology and installing Raincoats at multiple locations within Quayside would lead to a 71 percent cost reduction per installation (relative to the prototype). There should be an even greater drop in expenses per square foot at the scale of the River District. This scale also affords a great opportunity to explore diverse architectural expressions.

### An interconnected network that becomes a regional resource.

The River District would be developed within the context of an extraordinary new public realm network created by the flood-protection plan work currently underway.

That plan will create a new 30-hectare nature preserve that functions like a central park for the entire River District, providing access to a network of trails, expansive fields, waterways, hills, and wetlands. This green spine will extend through the Don River Valley itself, establishing pedestrian and cycling paths that run alongside the river for miles up the ravine, connecting to Don River Valley Park and other destinations.

The building Raincoat, which protects sidewalks from the elements, is part of a weather-mitigation system that could help double the number of comfortable outdoor hours in key spaces of the River District.





Sidewalk Labs believes that any public realm plan for the River District must take advantage of this exceptional resource and build on the principles it establishes for blurring the lines between water, wilderness, and land, integrating nature into urban life and using the public realm to strengthen connections across the city.

Such principles form the foundation of Sidewalk Labs' public realm proposal for Quayside, but its contribution to the citywide network would be modest. At the scale of the River District, however, substantial new connections are possible — to the park and beyond.

The River District can extend the animation initiated at Parliament Slip through the Keating Channel, creating a vibrant series of land-water spaces brought to life by floating cafés, bars, and performance venues.

Sidewalk Labs proposes a new pedestrian bridge over the Don River as it meets the inner harbour, connecting Villiers Island to Polson Quay through a continuous waterfront walkway. This bridge would position the Polson Quay promenade to become a citywide attraction, making its spectacular views of Lake Ontario and downtown Toronto accessible to more people.

Within Villiers-Keating, Sidewalk Labs believes that multiple new pedestrian bridges across the Keating Channel could create a water-based beating heart of the neighbourhood, similar to great canal cities like Amsterdam or Venice.

The River District could include unique public spaces such as the Keating Channel, featuring a canal with creative programming along both sides and pedestrian bridges linking neighbourhoods across the water.



## An expanded ground-floor network would create new economic, creative, and programming possibilities

Across the River District, the stoa model can be claimed and interpreted by each neighbourhood to reflect its distinct needs and opportunities, reshaping the flexible ground floors to support everything from urban manufacturing to experimental retail to art, culture, and community spaces.

As described in greater detail in the “Quayside Plan” chapter in Volume 1, as well as in the “Public Realm” chapter of Volume 2, stoa is a flexible lower-floor space, frequently spanning two storeys, that can be adapted to serve a wide variety of neighbourhood and citywide needs.

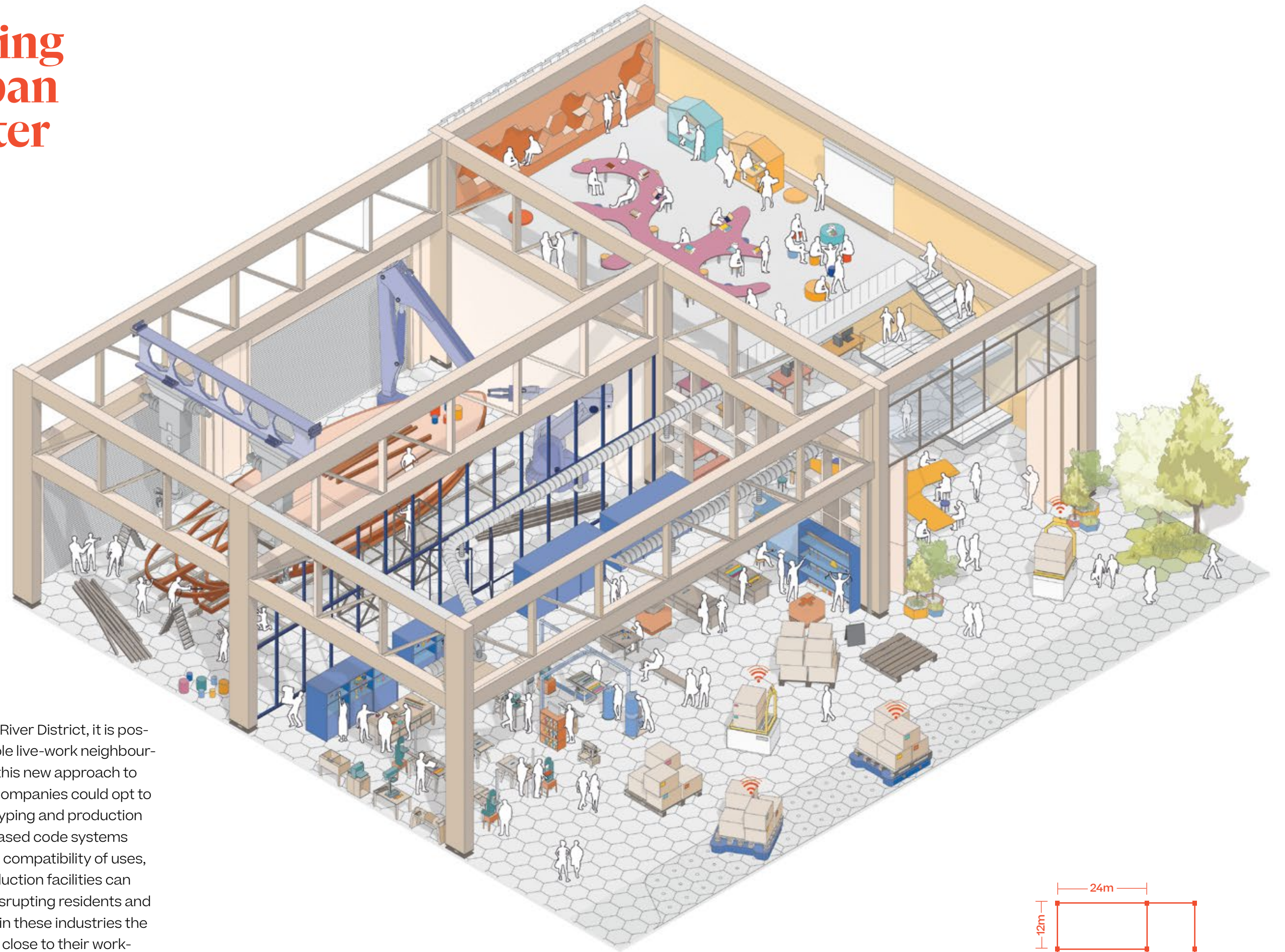
In Quayside, stoa could help test new approaches to retail and experiment with integrating production, cultural, and community spaces into neighbourhoods. But with limited space, it would be impossible to do more than touch on the possibilities offered by this new model.

At the larger scale of the River District, there is an opportunity to implement a wider range of uses and to tailor the uses of each stoa space to support the unique and often changing needs of each neighbourhood.

While each community would feature a mix of retail, commercial, and social infrastructure spaces, some neighbourhoods could focus on workshop and production space while others might emphasize arts and cultural space. The size of the district would provide the critical mass of space to explore a wide variety of uses, reflecting the distinct character of each neighbourhood.

In Quayside, Sidewalk Labs proposes to take on the role of vertical developer (with local partners) and ground-floor property manager to demonstrate the viability of this new approach to lower-floor spaces. At the scale of the River District, the goal would be to have the private market adopt the stoa model — including flexible space and infrastructure, digital leasing and operations, and a highly diverse mix of uses — to serve community needs, provide jobs, and help create lively neighbourhoods.

# Case study: Supporting the growth of an urban manufacturing cluster

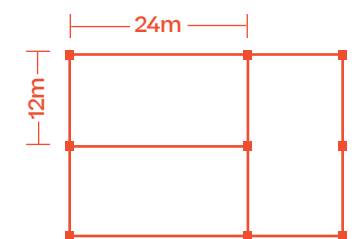


Manufacturing is once again resurgent in urban areas.<sup>48</sup> Businesses are finding success through new models, including prototyping products, producing and selling them on-site, and scaling their businesses in urban environments. Next-generation manufacturing is already growing in Toronto, which is part of why the City of Toronto has launched an initiative to create a Light Manufacturing Incubator for local startups.<sup>49</sup>

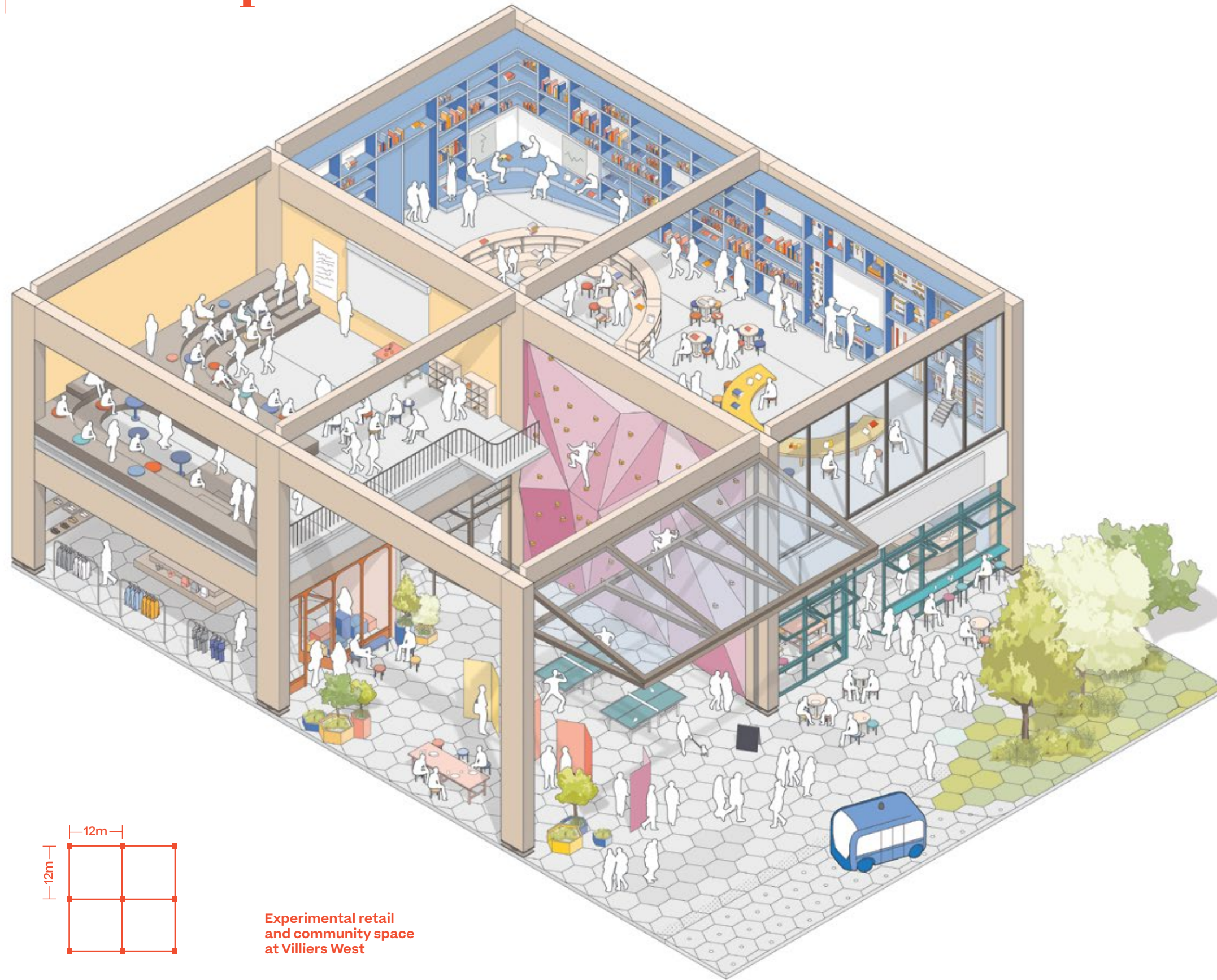
In Quayside, stoa space would accommodate light manufacturing and shared fabrication equipment, creating opportunities for crossover between production and other industries — be it retail, art, culture, or food and beverage. But the site's small size and the need for diverse neighbourhood programming limit the amount of space that can be dedicated to exploring these connections and fostering this industry.

At the scale of the River District, it is possible to create whole live-work neighbourhoods defined by this new approach to the ground floor. Companies could opt to locate their prototyping and production there. Outcome-based code systems could facilitate the compatibility of uses, ensuring that production facilities can operate without disrupting residents and affording workers in these industries the opportunity to live close to their workplaces. The result can be a major catalyst for new jobs in Toronto that are complementary to the urban innovation hub at Villiers West and the Film District to the east.

Urban manufacturing at Polson Quay



# Case study: Experimental retail integrated with community and cultural space



Experimental retail and community space at Villiers West

The Quayside plan aims to explore new models for retail, cultural, and community spaces within a neighbourhood, but Villiers West offers an opportunity to expand the most successful innovations to support the creation of a regional destination.

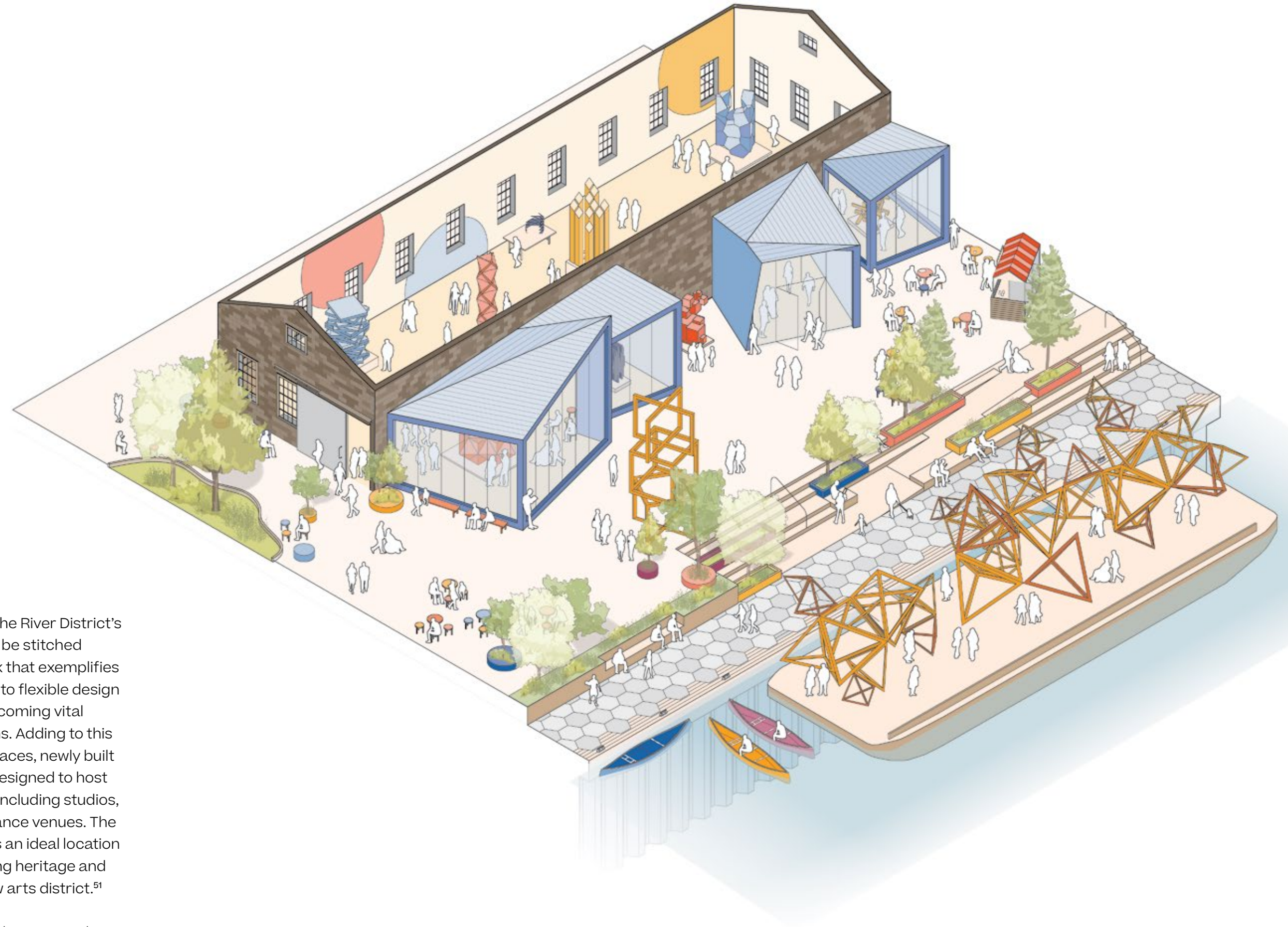
The innovation campus at Villiers West would be anchored by the Google Canadian headquarters and Urban Innovation Institute, drawing a working and visiting population interested in novel ideas and experiences. The adjacent Promontory Park is being developed by Waterfront Toronto as a resource for all Torontonians, with a particular focus on families and children. The proximity of these uses would provide a unique opportunity for the stoa space to showcase its range and adaptability.

The 290,000 square feet of lower-floor spaces in this area are an ideal setting to focus on retail innovation, where emerging businesses and leading brands can test new ideas. These efforts could range from computer vision-enabled payment systems to better integration of online and offline retail experiences. One example of an area that is ripe for innovation is food services. A place like the River District – animated at all hours with the Google campus, Urban Innovation Institute, and nearby parks – would provide a place to try new solutions, such as delivery robots, new food concepts, and urban agriculture.

Beyond enabling retail innovation, stoa's flexible approach creates unique opportunities to integrate community and cultural facilities instead of isolating them in stand-alone structures. Bringing these different experiences together can provide value – such as new foot traffic – to retail spaces and can improve community services by enabling complementary uses like clinics and pharmacies to be located close together.

At Villiers West, stoa can provide space for public programs to serve the population visiting the park, such as an environmental education centre or a museum. With the continuous, varied stream of visitors, the adaptability of stoa can help spaces evolve to serve different purposes from day to night, weekday to weekend, and season to season.

# Case study: Arts production



Arts and production at heritage buildings at Keating Channel

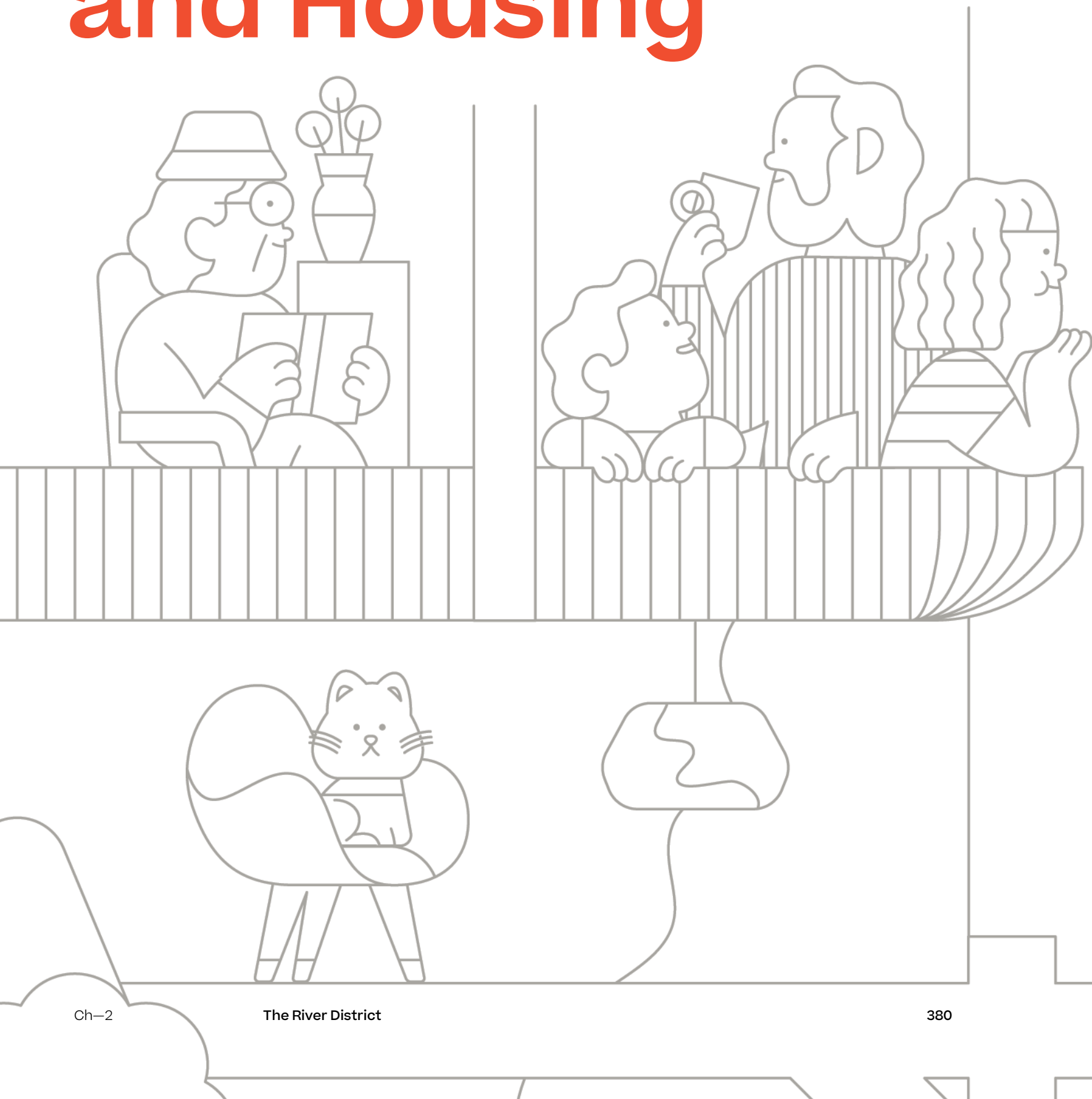
Around the world, revitalized port areas have been energized by the reclamation of historic buildings, which mix the past, present, and future in stunning and powerful ways. Artists have frequently led these projects. For NDSM in Amsterdam, a group of artists and skaters defined, designed, and led the reclamation of a former industrial shipyard.<sup>50</sup>

Unlike Quayside, the River District contains a range of heritage industrial structures that are ideal sites for this kind of reclamation. New leasing and equity models could ensure long-term opportunities for creative production. Some of the sites, such as the Dominion Box Boards building in Polson Quay, already have a vibrant community of artists working there and ready to lead.

Historic spaces within the River District's neighbourhoods could be stitched together into a network that exemplifies innovative approaches to flexible design and adaptive reuse, becoming vital community destinations. Adding to this inventory of existing spaces, newly built stoa spaces could be designed to host cultural and arts uses, including studios, galleries, and performance venues. The Keating Channel area is an ideal location for this approach, mixing heritage and new structures in a new arts district.<sup>51</sup>

The River District could become a clear destination for millions of Toronto's visitors further cementing the city's global identity as a world-class leader in cultural production.

# Buildings and Housing



## Catalyzing a new mass timber industry and construction supply chain

Catalyzing the growth of a sustainable mass timber buildings industry and a new factory for modular construction would create 2,500 jobs, accelerate construction timelines by up to 35 percent, and reduce overall construction costs.

Mass timber, a sustainable building material made from compressing multiple pieces of timber, is increasingly popular as a construction material, with at least 21 timber towers above seven storeys in construction or completed within the past five years.<sup>52</sup> As strong as steel and twice as strong as concrete by weight, mass timber is also easier to manufacture, faster to assemble, and dramatically more sustainable than traditional construction materials. A single building can be the environmental equivalent of taking hundreds of cars off the road.<sup>53</sup>

With nearly 40 percent of the world's sustainable forests, Canada is well-suited to capitalize on this emerging material.<sup>54</sup> But there are very few facilities in North America that can process the quantity of materials needed for even a single building, let alone a larger development. As a result, Canadian mass timber projects have frequently had to import

treated wood from Europe,<sup>55</sup> a lengthy and expensive process that negates some of the cost and sustainability gains the approach would otherwise afford.

To improve the local economy and catalyze a new industry around sustainable mass timber, Sidewalk Labs plans to support the launch of an Ontario-based factory.<sup>56</sup> This new supply chain would begin with local foresters and sawmills creating the baseline mass timber pieces, which would then be sent to the factory to be cut into assembly-ready building components, with local general contractors performing the on-site assembly.

*This unique combination of emerging materials and a streamlined construction process could transform the industry — accelerating timelines, improving predictability, reducing costs, minimizing*



See the “Buildings and Housing” chapter of Volume 2 for more details on the proposed innovations and initiatives described in this “Scaling Innovation: Buildings and Housing” section.

A new local factory could accelerate construction projects by up to

**35%**

Factory-based construction of building parts would result in less waste, better working conditions, and streamlined regulatory approvals.

neighbourhood disruption from work sites, and yielding a healthier, more sustainable, and stunning built environment.

**These benefits only become possible at the scale of the River District.**

But these benefits only become possible with a development area that is large enough to support the creation of a new local mass timber industry, the investment required to build and operate a new factory, and the time and expense required to invent new digital tools that can facilitate design and permitting.

While Quayside's size — it consists of only 10 buildings — is too small to support a re-conception of the entire construction supply chain, the River District would provide the developable area to achieve the full power of this approach. Sidewalk Labs estimates that roughly 6 million square feet of development are needed to justify an investment in the factory-based production of mass timber, as well as for such a factory to hit peak efficiency in producing sustainable building components on a predictable timeline that developers can trust.



A new local factory that processes wood into mass timber components could accelerate construction projects by up to 35 percent, reduce construction costs below current market rates, and significantly improve predictability for developers.<sup>57</sup> Rather than crowding worksites with cranes, trucks, and staging for construction materials, this factory-based process would allow much of the work to take place off-site, resulting in less noise and traffic disrupting the neighbourhood and a smaller, safer construction site that completes its work more quickly.

By planning holistically for development that includes the River District, Sidewalk Labs could have a functioning factory operational by 2021, in time to support the development in Quayside and to achieve the construction speed benefits there.

**A factory-based approach to mass timber construction could generate 2,500 person-years of full-time employment over a 20-year period.**

**Generating thousands of jobs and dramatically reducing greenhouse gases.**

Unlocking the potential of Canada's forests as part of the River District development could generate about 2,500 new full-time jobs.<sup>58</sup> These impacts could grow beyond the waterfront, as more designers and developers tap into this new pipeline for an array of projects. They could be supported by additional local factories and foster a growing ecosystem of Canadian industries that contribute to the supply chain: fabricators, foresters, sawmills, loggers, and more.

Despite the scale of development, the impact on the forests would be negligible. Even if the entire River District were constructed out of mass timber, it would still represent less than 1 percent of the total amount of wood grown in Canada's certified forests each year, which could be replenished with just a few days of forest growth.

The environmental benefits of mass timber construction also increase significantly at scale. For example, the wood required to build the River District would sequester over 600,000 tonnes of carbon, the equivalent of taking more than 127,000 cars off the road per year.<sup>59</sup>

# Achieving new levels of housing affordability, choice, and inclusivity

Creating housing across the scale of the River District would unlock powerful private funding sources that could generate over \$1.4 billion and make significant progress towards the city’s affordability goals. With additional public-sector support, this private funding could help create more than 13,600 below-market units while providing new housing options that can accommodate a wide range of household needs.

No issue is more pressing in Toronto right now than housing affordability, but the tools that exist today to address this challenge are limited. Below-market units are increasingly expensive and difficult for the government to deliver, and housing options could better respond to the needs of residents.

Sidewalk Labs has identified a set of private funding sources that can help support an ambitious vision for below-market housing: the increased value of public land due to factory-built timber construction, a condo resale fee, and new value created by more efficient unit design (an approach called “affordability by design”). These efforts could be supported by

an expanded mix of housing options that create the foundation for a more diverse and inclusive community.

These ideas would be initiated in Quayside, but its small size means that their impact would be limited. At the scale of the River District, however, these approaches can offer a vision for the future of housing, with the potential to unlock over \$1.4 billion. With additional public-sector support, this private funding could help create more than 13,600 below-market units. That would include 6,800 affordable housing units, representing nearly a third of the current annual citywide target for new affordable rental housing units.

Three new private sources could direct a portion of the value generated by the innovations deployed across the River District to below-market housing. Sidewalk Labs proposes that these funds would be managed by a new entity known as the Waterfront Housing Trust. The trust would be operated by the public sector — not by Sidewalk Labs — and it would be responsible for assembling and disbursing funding to below-market housing in the River District.

## 1

### Unlocking \$639 million in land value with factory construction.

Sidewalk Labs projects that its new modular factory approach would generate significant value for developers. The buildings could use the factory’s library of parts, which would have already been reviewed by city agencies and designed to fit together seamlessly, reducing the risk of delays and accelerating construction time by up to 35 percent.<sup>60</sup> These benefits would enable developers to complete more projects, at a lower cost, within a given time frame than they do today.

Developers who recognize this value should be willing to bid a higher price for the land, much of which is publicly owned. These higher land value payments to the government, realized on all publicly owned parcels across the scale of the River District, could generate an estimated \$639 million that could be directed towards affordable housing.

## 2

### Generating \$321 million with a condo resale fee.

A permanent 1 percent resale fee could be applied on the resale of all condos in Quayside and the River District to support affordable housing. Assuming recent market trends for individual unit turnover, each condo could contribute an estimated total of \$23,000 towards below-market housing through 2050. Sidewalk Labs would agree that the fee could be implemented within its own development in Quayside to demonstrate that the impact on condo sales would be negligible and not affect pricing. But those relatively modest fees compound with scale, and over time they could generate an estimated \$321 million across the River District.

# Generating \$1.4 billion in private funding to support a 40% below-market housing vision

Funding sources for 40% below-market program	Quayside		Full proposed IDEA District	
	Below-market program achieved*	\$M	Below-market program achieved*	\$M
<b>Traditional public sources</b>	<b>20%</b>	<b>\$115</b>	<b>25%</b>	<b>\$2,492</b>
Existing government programs**	13	77	10	997
Land value or other gov't contributions	7	38	15	1,495
<b>New private sources</b>	<b>7%</b>	<b>\$37</b>	<b>15%</b>	<b>\$1,435</b>
Affordability by design	7	37	5	475
Factory-driven land value	0	0	7	639
Condo resale fee***	0	0	3	321
<b>Sidewalk Labs contribution</b>	<b>13%</b>	<b>\$77</b>	<b>-</b>	<b>-</b>
<b>Total sources</b>	<b>40%</b>	<b>\$229</b>	<b>40%</b>	<b>\$3,927</b>

\* These figures reflect the incremental impact of each source towards creating a below-market program, based on overall 40 percent below-market program cost of \$229 million.

\*\* Existing government program figures are estimated for Quayside based on recent awards and the proposed below-market housing program. These figures assume programs are scaled up across the IDEA District on the same basis as in Quayside. As a result, totals may exceed annual budget allocations pending timeline of affordable units coming online between 2024 and 2048.

\*\*\* Analysis assumes 2.5 annual percent inflation rate.

Achieving new levels of housing affordability, choice, and inclusivity

## 3

### Creating \$475 million in value through affordability by design.

Sidewalk Labs' proposed efficient and ultra-efficient units, as well as co-living housing options, offer a new way of living for Toronto residents that goes beyond the typical downtown dwelling. While these apartments have a smaller footprint than traditional units, smarter design can ensure that they adapt better to meet the needs of increasingly diverse Torontonians, from seniors looking to age in place as part of an active community to families looking to put down roots on the eastern waterfront.

Achieving a 40% below-market vision would create more than 13,600 below-market units across the River District.

Expanded community spaces and a larger public realm can supplement efficient apartments, providing access to more experiences, resources, and support. For example, rather than having a rarely used dining room large enough to host the occasional special event, residents could access a communal kitchen and dining room stocked with a range of equipment that would require vast amounts of space to store in a personal kitchen (and spend most of the year untouched). Additional features designed to provide adaptability over time could include walls that are easy to move, allowing families to grow or shrink their units as needs change.

The ability to design efficient units that are comfortable and attractive can also contribute to affordability. Reducing the unit's footprint allows developers to build more total units. Sidewalk Labs proposes that a percentage of this increased revenue potential be directed towards affordable housing.

At the scale of the River District, this approach to "affordability by design" can create \$475 million in value that could be applied towards below-market housing.

### Over 34,000 new residential units would offer unprecedented variety.

The promising models initiated in Quayside for increased rentals, co-living options, and new pathways to ownership like "shared equity" — which enables residents to own part of their home and rent the rest — can only impact a small fraction of Toronto's households. While a substantial percentage of units would be below-market housing, the neighbourhood's total unit count would limit the number of non-profit partners that can realistically participate.

The River District has the scale to demonstrate the true potential of new housing options and to engage a range of developers, including traditional developers, non-profit organizations, and innovative



**These new housing options can attract and keep a diversity of residents on the waterfront, helping to create the foundation of a thriving and inclusive urban community.**

companies rethinking housing models. Once the most successful ideas are expanded across the scale of the district, they can begin to broaden housing options for people across the city.

For Toronto families who face the tough choice between long commutes and family-friendly living, the River District can help to establish city living as an option

for a lifetime. And for families finding traditional home ownership out of reach, the River District can establish renting or shared equity as viable options.

These new housing options can attract and keep a diversity of residents on the waterfront, helping to create the foundation of a thriving and inclusive urban community.

## Potential number of housing units at the full proposed IDEA District

At the full proposed scale of the IDEA District — including Quayside and the River District neighbourhoods, as well as the optional participation of Keating West — the housing vision could deliver 34,000 units. That supply includes 13,600 below-market units, supported by new private funding sources as well as additional government support.

	Quayside		IDEA District	
Funding sources for 40% below-market program	%	# units	%	# units
Total market housing	60%	1,560	60%	20,400
Total below-market housing	40%	1,040	40%	13,600
Affordable (<100% AMR)	20	520	20	6,800
Below-Market (100–150% AMR)	20	520	20	6,800
<b>Total</b>	<b>100%</b>	<b>2,600</b>	<b>100%</b>	<b>34,000</b>

# Sustainability



## Achieving climate positivity requires bold solutions only possible at scale

Eliminating greenhouse gas emissions requires entirely new approaches to designing and operating infrastructure and energy management systems. That kind of dramatic reinvention can only be effective and financially feasible when applied across a broad area and supported by strong cooperation between the public and private sectors.

Waterfront Toronto has established the objective of creating a climate-positive community on the eastern waterfront, meaning that the Sidewalk Toronto project must do more than eliminate greenhouse gas emissions within the district — it must actually contribute to lowering the city’s overall emissions.

Toronto and Ontario have taken tremendous strides towards lowering their greenhouse gas emissions, eliminating coal-fired generation in Ontario<sup>61</sup> and embracing policies like TransformTO that support the expansion of electrification, improve building energy efficiency, and nearly eliminate landfill waste.<sup>62</sup> But studies show that most new construction could end up using as much energy as existing buildings.<sup>63</sup>



See the “Sustainability” chapter of Volume 2 for more details on the proposed innovations and initiatives described in this “Scaling Innovation: Sustainability” section.

Achieving the urgent goal of climate positivity requires a dramatic reinvention of how major infrastructure systems are built and operated; the way energy is generated, transported, and consumed; and the partnership model between the public and private sectors.

Sidewalk Labs has proposed a range of new energy solutions to address this challenge, beginning in Quayside, where its initiatives would result in an 85 percent reduction of greenhouse gases.<sup>64</sup> But these initiatives proposed are not economically feasible to deploy in Quayside unless they are part of a comprehensive approach that spans a large enough geographic area to support inventing, implementing, and operating this entirely new ecosystem of sustainable infrastructure.



Map

## Proposed energy infrastructure in the River District

The River District's advanced energy infrastructure would capture a variety of clean energy sources to provide heating, cooling, and domestic hot water.

- IDEA District
- Neighbourhood plant
- Mini plant
- Thermal grid
- ▨ Geoexchange fields
- ▨ Solar and battery storage in all buildings

- Proposed Enwave connection  
Waste heat recovery
- Commercial data centre  
Waste heat recovery
- Cherry Street Sewage  
Pump Station  
Waste heat recovery
- Expansion of possible  
industrial tenants  
Waste heat recovery

- Ashbridges Bay Wastewater  
Treatment Plant  
Waste heat recovery
- Anaerobic digestion facility  
Biogas creation
- Local power plant  
Waste heat recovery

Sidewalk Labs believes the River District is large enough to generate a customer base capable of sustaining the capital costs of major new infrastructure and the expense of designing, building, and installing digital technologies to manage these new systems.

Specifically, to keep Quayside resident energy bills in line with Toronto averages, the advanced power and thermal grids would require a \$19 million supplemental innovation investment based on the current plan, due to factors including the high cost of geothermal exchange and initial electric grid connections, in addition to the poor economies of scale for operating costs. While this is not financially sustainable at the scale of each neighbourhood, no additional supplemental innovation investment would be required to extend operations into the River District beyond Villiers West, because the systems scale in a financially sustainable way.

There are three areas where scale is particularly essential to achieving a climate-positive community: mobility, electricity, and energy data.

# 1

## Creating a more sustainable mobility system.

### Increasing transportation options.

Expanding mobility options across the eastern waterfront — including extending public transit, enhancing walking and cycling networks, and using policy tools to encourage shared trips — would create convenient, affordable mobility alternatives to the private car, leading to dramatic greenhouse gas emission reductions across the River District.

Using scale to reach an all-electric mobility system. While Quayside is too small to reshape mobility patterns, the River District provides an opportunity for transformative change. Policy tools, from pricing incentives to widespread electric charging across the district's extensive street network, could accelerate the use of electric vehicles.

# 2

## **Making full electrification affordable.**

Buildings are responsible for 60 percent of Toronto’s greenhouse gas emissions,<sup>65</sup> with the overwhelming majority of those emissions (87 percent) generated by the burning of on-site natural gas for heating and hot water production.<sup>66</sup>

Ensuring that all heating in new construction is electric, rather than relying on natural gas, is critical to making a serious dent in greenhouse gas emissions. But electricity prices can be significantly higher than natural gas prices due to the high cost of electricity generation, transmission, and distribution infrastructure. Without radical reductions in energy demand, electrifying neighbourhoods has the potential not only to increase the cost of heating and hot water for local customers, but also to increase electricity rates citywide, as the costs for enlarged electrical infrastructure gets spread across all ratepayers.

*Sidewalk Labs has developed a comprehensive set of strategies to make full electrification affordable, but these efforts rely on a business model that requires implementation over a broad geographic area. They include:*

**Reducing energy demand.** Energy-efficient building designs can drive down the amount of energy needed to heat and cool buildings, without sacrificing comfort, through improved building insulation, airtight construction, and other techniques inspired by the Passive House movement. These approaches can be paired with digital energy “Scheduler” tools designed to optimize energy use. At the River District, these savings could be 17 percent.

**Designing an advanced power grid.** Sidewalk Labs proposes to collaborate with Toronto Hydro and technology providers to design an advanced power grid that would integrate energy management strategies and clean energy sources, such as solar power and battery storage, to reduce the need to draw from the main grid at peak times, when the grid is frequently forced to draw on fossil fuel-based sources to meet demand. The grid would include pricing and rely on the aforementioned Scheduler tools to help shift energy use away from peak times.

**Developing a thermal grid.** Sidewalk Labs proposes implement a thermal grid with electric heat pumps to provide cooling, heating, and domestic hot water to buildings. The thermal grid is designed to exchange thermal energy between buildings and to draw from a variety of clean energy sources, such as wastewater heat, deep lake cooling, and industrial waste heat. Existing buildings in the River District would have the option either to continue to use natural gas or to use the thermal grid.

**At the scale of the River District, electrification becomes affordable as a result of the cumulative benefits of smarter energy management; new and increased sources of clean energy; economies of scale in infrastructure development and maintenance; and a larger customer base** across which to spread the costs of setting up and administering a business, including the new metering and billing platforms for the advanced power grid and thermal grid.

# 3

## **Realizing energy targets with the help of building data.**

Studies show that a building’s actual energy use in operation can be far greater than what is shown by a model submitted for energy code compliance. This disconnect is known as the “performance gap.” In its study of nearly 100 buildings in Toronto, Sidewalk Labs found the performance gap to be 13 percent, meaning buildings use more energy when actually up and running than when modelled prior to construction.<sup>67</sup>

Sidewalk Labs has developed two approaches to not only help close the performance gap but enables cities to establish real-time operational energy targets (instead of design-based, pre-construction targets).

**Deploying real-time metering.** Real-time metering of all energy systems (such as heating, cooling, lighting, and equipment) would enable comparisons between actual energy performance and design-based projections, creating a feedback loop for architects, engineers, and developers to help close the performance gap and improve the energy efficiency of buildings.

**Tying energy outcomes to energy codes.** In Quayside, Sidewalk Labs proposes to deploy an energy auditing tool called “Perform” that would incorporate factors such as occupancy, tenant type, and weather to create dynamic targets for energy use intensity. At the scale of the River District, Sidewalk Labs would plan to work with the city to use this type of tool to develop operational energy targets based on real-time metering for new buildings — not on pre-construction designs.

Because Quayside’s development program consists of only 10 buildings, the neighbourhood would create a limited amount of data points to develop actionable insights related to energy use.

*But the River District’s greater scale of diversely programmed buildings could help to accumulate a critical mass of building data, leading to powerful insights that can inform building design and enable new approaches to energy use regulation.*

## Getting over the finish line to climate positivity

With all of Sidewalk Lab's sustainability and mobility initiatives in place, there would still be a small amount of greenhouse gas emissions that the district would be responsible for: roughly 0.72 tonnes per capita per year, which is an 89 percent reduction from today's Toronto average.<sup>68</sup>

**River District sustainability**  
**By the numbers:**  
 → 89% reduction in annual per capita GHG from Toronto average  
 → 11,000 annual tonnes of CO2 offset by anaerobic digestion  
 → 70,444 annual tonnes exported by thermal grid

This amount is due to several factors that are outside of the district's control, including the fact that Ontario's power grid is very clean but not completely fossil-fuel-free,<sup>69</sup> and that insufficient space exists to generate and store all of the electricity needed to avoid using the main power grid when natural gas-fired power generators are being used. If changes in technology allow, the first priority would be to further reduce on-site emissions.

While the River District would approach carbon neutrality, climate positivity is evaluated by a project's impact on the city's overall greenhouse gas emissions. By definition, this means that a district must find ways to export clean energy beyond the project area or actively reduce Toronto's current greenhouse gas emissions.

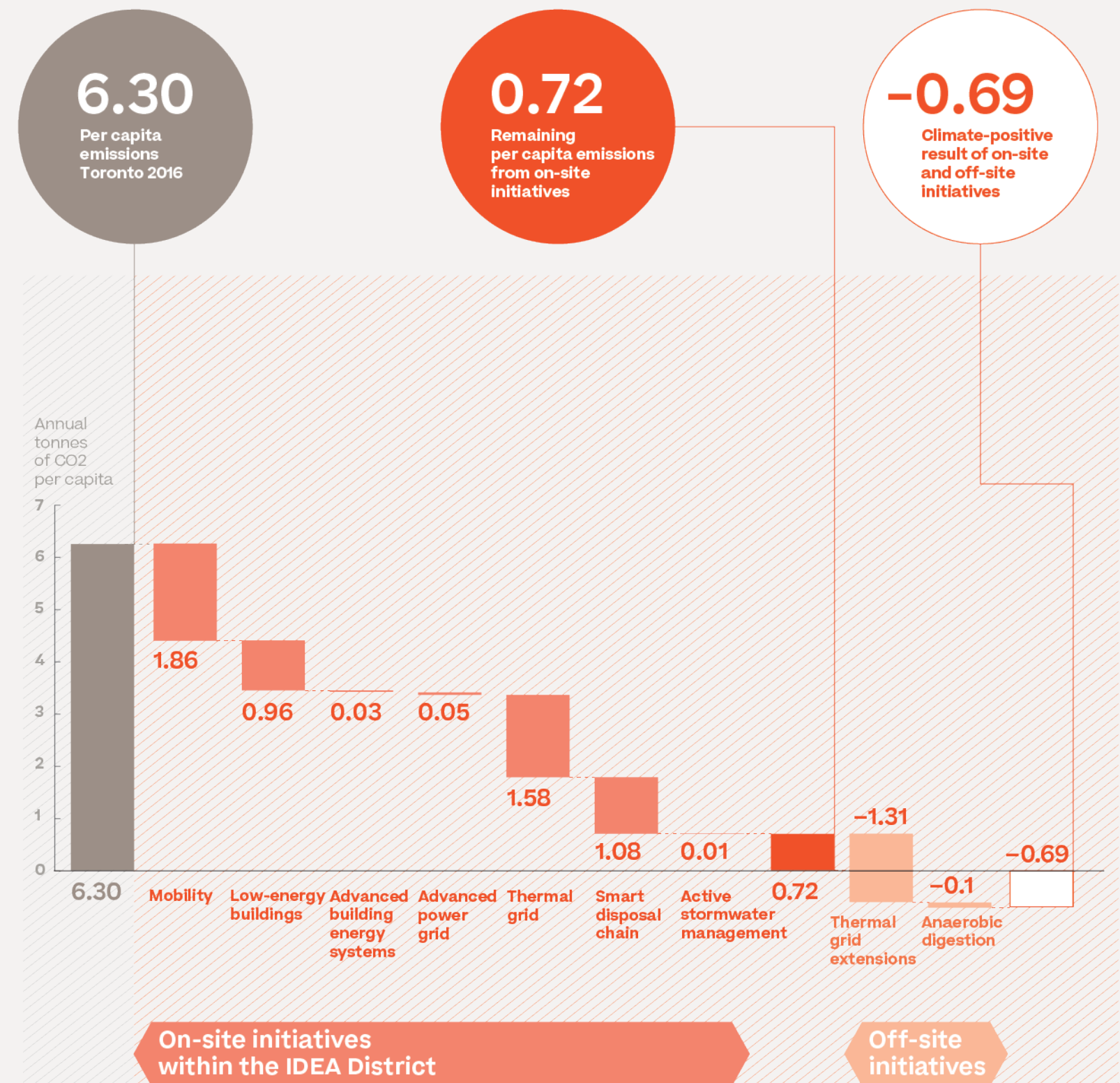
Sidewalk Labs has identified two clear opportunities to achieve climate positivity: a potential generator of biogas and a major source of waste heat.

### Building an anaerobic waste digestion facility.

The River District would generate an estimated 45,150 tonnes of source-separated organic waste annually — enough to make it economically feasible to partner with a local operator to build an anaerobic digestion facility to process organic material and turn it into biogas. A facility serving the River District would produce nearly 1.3 megawatts' worth of biogas. This approach could achieve nearly 11,000 annual tonnes of CO2 offset, pushing the project into climate-positive territory.

## The River District would contribute to lowering the city's overall emissions, thereby becoming a climate-positive community.

## The path to achieving a climate-positive district



Note: Because the estimated GHG reductions shown here are based on a combination of design, technology, and behaviour change, Sidewalk Labs expects unforeseen shortfalls at the neighbourhood scale of Quayside.

The sustainability systems proposed in this plan include self-correction and learning mechanisms (such as advanced energy management tools and a smart disposal chain) that should reduce these variations as development proceeds across the IDEA District.

As a result, Sidewalk Labs has reduced the sustainability plan's expected GHG outcomes 10 percent in Quayside and 5 percent at the full scale of the IDEA District.

**The scale of the River District makes it a credible model for cities on the journey to radically reduce greenhouse gas emissions.**

**Tapping into the energy potential of Ashbridges.**

The largest potential source of energy that the River District could tap to achieve climate positivity is the nearby Ashbridges Bay Wastewater Treatment Plant. Sidewalk Labs has calculated that the effluent from Ashbridges could provide 150 to 200 megawatts of thermal energy potential, creating a surplus of clean energy in the project area that could enable the project to export 70,444 annual tonnes of CO<sub>2</sub>.

Sidewalk Labs would seek permission to partner with the city's Toronto Water division to extend the proposed thermal grid infrastructure to tap into the waste heat generated at Ashbridges, with a commitment not to impact the plant's operations.

**Priority outcome spotlight**

## **Achieving the largest climate-positive district in North America**

The River District would become the biggest, densest climate-positive district in North America and the third largest in the world, after announced projects in Jaipur, India,<sup>70</sup> and Seoul, South Korea.<sup>71</sup>

Waterfront Toronto has already set the goals for this in motion with its Lower Don Lands application to the C40 Climate Positive Development Program.<sup>72</sup> The River District expands the scope of this project into additional adjoining neighbourhoods, and the MIDP aims to chart the path for the practical implementation of these goals.

The scale of the River District makes it a credible model for cities on the journey to radically reduce greenhouse gas emissions. Its size means that it cannot cherry-pick businesses and building activities to artificially lower emissions. Instead, this development must attract and support business and light industry of all kinds, including those with high energy demands.

Further, since the River District would consist of predominantly new construction served by a very clean Ontario power grid, it lacks the easy wins that other projects can claim, like shuttering a coal-fired district heating plant. Instead, its strategy must focus on challenges that all cities face: the transformation of mobility systems and the affordable electrification of heating, hot water, and light industry.

# An opportunity to use waste as a resource

At scale, waste can be used as a resource rather than going straight to a landfill. Waste from the River District would be recovered, recycled, and used to create products or energy — a cycle known as the “circular economy.”

At the River District, Sidewalk Labs would seek to match its target in Quay-side to divert 80 percent of waste from landfill, exceeding the city’s goal of diverting 70 percent and dramatically surpassing the current diversion rates from Toronto’s average multifamily and commercial buildings, which range from 13 to 27 percent.<sup>73</sup>

But the sheer volume of waste generated at a scale like the River District presents new opportunities to rethink the entire waste stream and pioneer new business models to ensure the waste does not ... go to waste.

Sidewalk Labs estimates that 240,000 tonnes of waste could be generated annually across the River District, of which 192,000 tonnes (80 percent) would be diverted. This waste can be repurposed in local facilities, creating circular economies.

In this virtuous cycle, recycled materials would be sorted and sold to specialized recycling centres that process the material and sell it back to manufacturers for use in new products. Organic waste like food could be processed at a new anaerobic digestion facility and exported as fuel to heat buildings outside of the River District.

### Building a new facility to convert recycled materials into new products.

The scale of the River District would make the construction of a local materials recovery facility (MRF) financially feasible, and Sidewalk Labs would look to partner with a third party to create such a facility.

Recycling can be complicated, and people frequently make mistakes, contaminating the recycling stream. MRFs separate commingled recycling streams into individual materials, such as glass, plastic, and metal, and try to remove that

contamination. This “clean” and sorted recycling can then be sold to facilities and scrap yards to be repurposed.

MRFs can receive higher prices for cleaner materials. If the incoming stream of recyclables to the MRF is highly contaminated with non-recyclable material, it becomes impossible to fully clean it, leading to more expensive processing costs at the MRF and lower market value for the materials.

To improve the cleanliness of the recycling and organic waste streams that leave the community, Sidewalk Labs has developed a digital strategy to provide real-time feedback to residents and tenants on how to improve their recycling — efforts that could yield one of Toronto’s cleanest waste streams. But Quayside is

too small to support its own MRF, meaning that its recycling would still need to go to a shared facility, where the materials from surrounding communities would be combined and processed together, making it virtually impossible for Quay-side to secure the cost benefits of its superior recycling.

By contrast, Sidewalk Labs projects that the River District would generate 118,000 tonnes of glass, metal, and plastic recyclables, nearly 25,000 tonnes of cardboard, and 42,000 tonnes of paper annually. That is enough material to support a dedicated MRF that would enable the waterfront to reap the full economic benefit of its clean recycling streams.

Those revenues could be significant: cleaner waste streams could reduce MRF processing costs by as much as 28 percent while increasing the value of its recyclables by more than \$10 million annually. The new facility’s proximity to the district would also reduce the environmental and financial cost of transporting materials to a MRF that is farther away.

## Sidewalk Labs estimates that 240,000 tonnes of waste could be generated annually across the River District, of which 192,000 tonnes (80 percent) would be diverted.

Cleaner waste streams could increase the value of recyclables by more than **\$10 million** annually.

# An expanded public realm could minimize the need for grey stormwater infrastructure

Dramatically expanding the public realm across the River District would bolster the potential for green infrastructure to improve stormwater treatment and reduce flood risk. The new plantings could significantly reduce the need for grey infrastructure, generating significant savings and freeing up space for more public uses.

Sidewalk Labs proposes to use green infrastructure to manage the flow of stormwater. This approach provides environmental benefits, an enhanced public realm, and reduces the need for expensive treatment and storage infrastructure, generating cost savings to the city and to private developers.

When expanded across the scale of the River District, the implementation of green infrastructure as a natural flood-mitigation strategy can begin to provide significant cost savings, including reducing or even eliminating the need for water quality treatment facilities that would typically be required for new development, in addition to the environmental and public realm benefits. This approach would include improved bio-retention,

with hundreds of thousands of cubic metres of soil and plantings distributed across the district to absorb water on the ground. Blue and green roofs, with the ability to detain and store water before it reaches the ground, would be installed on most buildings.

Despite these strategies, some “hard” stormwater infrastructure, such as cisterns, would be required, but their size and cost would be minimized by the introduction of digital tools to manage flows more efficiently. Together, these systems would prevent over 90 percent of the average annual rainfall from entering the stormwater collection facilities.<sup>74</sup>



See the “IDEA District” chapter of Volume 3 for more details on the proposed Open Space Alliance.

These approaches could be implemented as alternative ways to meet water quality standards that would reduce or potentially eliminate the need for the large treatment facilities, which are expensive to build and use significant amounts of energy to operate.

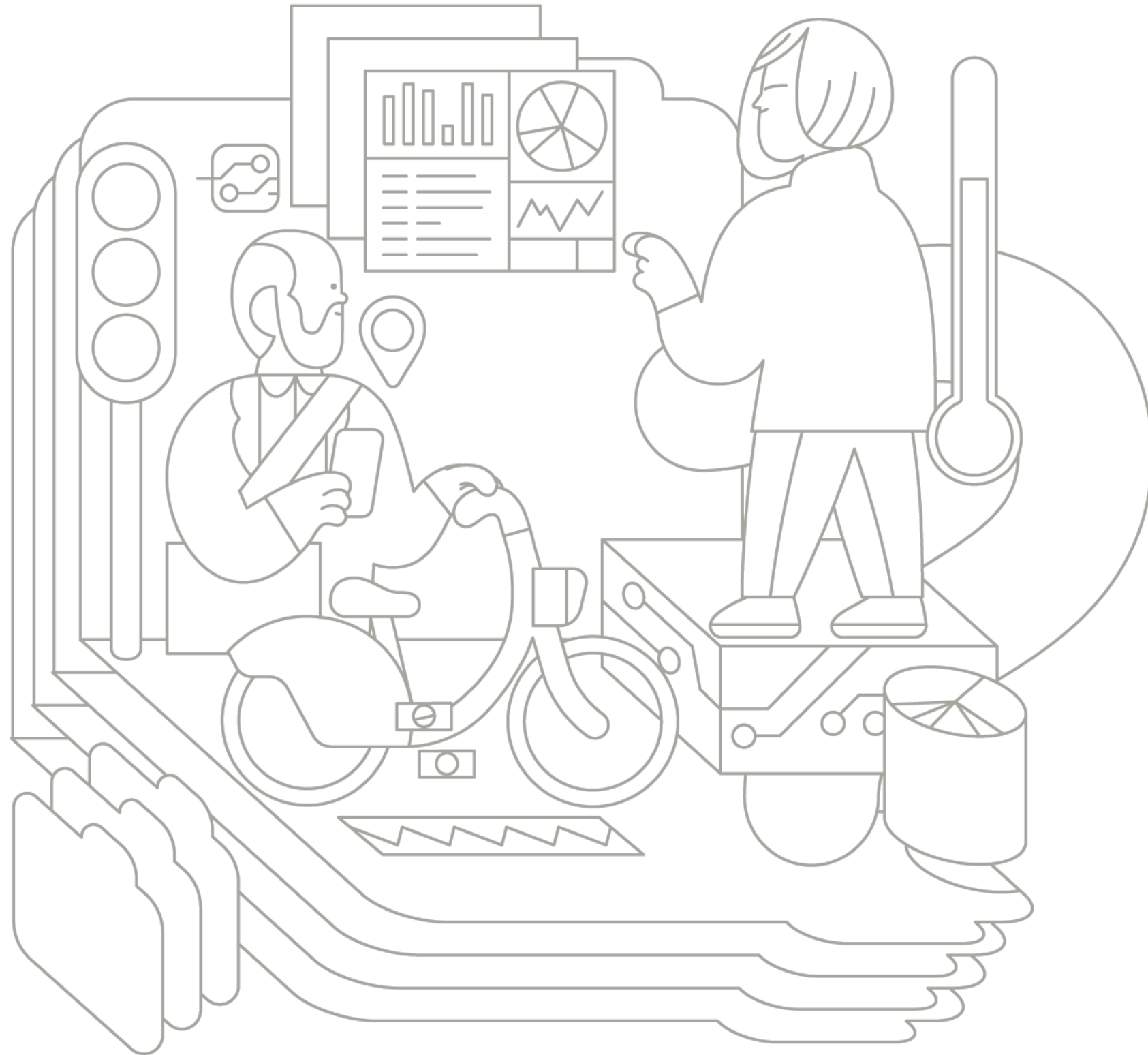
To avoid burdening Toronto Water with ongoing maintenance of green stormwater management infrastructure in the public realm, Sidewalk Labs proposes that the management of these engineered natural systems be taken on by the Open Space Alliance, a proposed new non-profit entity that would manage the River District’s public realm.

Today, developers pay to build and maintain water management infrastructure within their sites. Under this new approach, developers would give the Open Space Alliance an upfront green infrastructure fee that would cost less than the on-site facilities that would otherwise have been required. They would also provide a monthly maintenance fee to the alliance that would be the equivalent of what they would have spent maintaining those facilities.

## Advanced stormwater systems would prevent over 90 percent of the average annual rainfall from entering the stormwater collection facilities.



# Digital Innovation



## Catalyzing the growth of an urban innovation cluster

The River District would foster the creation of a digital innovation cluster and attract innovators from around the world by providing more affordable and flexible digital infrastructure, setting data standards that are open and secure, creating a trusted process for responsible data use, and launching a baseline set of digital services for third parties to build on.

### Flexible, affordable digital infrastructure becomes viable at scale.

Digital infrastructure is a basic building block of the future city – creating connectivity that helps residents, companies, organizations, and local agencies use data to launch new services that improve urban life. It is also the catalyst for new services or businesses no one has thought of yet and the cornerstone of a digital economy. Sidewalk Labs proposes deployment of two primary types of digital infrastructure: ubiquitous connectivity and standardized mounts.

**Connectivity.** Waterfront Toronto has worked to ensure that fast internet connectivity across the waterfront is not a luxury for the few – but, rather, the new standard. Building on this progress, new advances in fibre-optic technology and network security could offer residents and businesses access to secure, super-fast internet connections at an affordable cost.

This advanced network only becomes financially sustainable at the scale of the River District, given the number of residents or businesses needed to recoup the initial investment in core enabling infrastructure. Deployed at a larger scale, this connectivity would enable residents to use their own private network everywhere – from their couch to a park bench – and enable businesses to explore new ideas.

**Mounts.** To significantly reduce the cost and installation time of launching new digital innovations, Sidewalk Labs has designed a new type of “Urban USB port” that would provide a physical mount, power, and connectivity to digital devices (such as Wi-Fi antennae, traffic counters, or air-quality sensors) fixed to street poles and traffic signals. Sidewalk Labs estimates that its mounts could reduce



See the “Digital Innovation” chapter of Volume 2 for more details on the proposed innovations and initiatives described in this “Scaling Innovation: Digital Innovation” section.

the time of the fixed-mount hardware installation by roughly 92 percent — down from 30 hours today to two hours.<sup>75</sup>

The proposed mount requires significant geographic distribution to gain the widespread adoption needed for device manufacturers (such as Wi-Fi antenna producers) to incorporate the standard into their own designs, just as existing USB ports needed to prove their worth before laptop and phone manufacturers made them standard features. The River District would provide the necessary scale for development and adoption of the standardized mount.

**Core digital services can help catalyze an ecosystem.**

A true ecosystem of urban innovation requires a catalyst that makes it possible for third parties to build new digital applications, services, products, or tools that improve people’s lives.

To serve as that catalyst, Sidewalk Labs proposes to launch a limited set of digital services — including the mobility management, energy management, and outdoor comfort systems described in earlier parts of this chapter — that are currently not being pursued by the market but are essential to achieving Waterfront Toronto’s quality-of-life objectives in Quayside and the River District. These proposed services (including their purpose, data collection sources, and some potential third-party applications) are listed in detail in the “Digital Innovation” chapter of Volume 2.

Beginning at the scale of the River District, the urban data that these services make accessible to others could enable countless new innovations to emerge from local companies, entrepreneurs, startups, researchers, agencies, civic groups, and others.

As explained more in the “Economic Development” chapter of Volume 1, Sidewalk Labs estimates that these conditions for digital innovation could lead to roughly 10,500 urban innovation sector jobs at the proposed scale of the River District. That might include anything from a next-generation bike-share service, to small business tools that help retailers launch a successful pop-up, to civic tools that help families find an affordable home, to improved building designs that reduce energy, to new apps that bring people together outdoors.

The list is bound only by imagination.

**Ensuring open standards and responsible data use.**

Digital infrastructure and services would enable the River District to generate a critical mass of urban data that could be used to develop new services, apps, and systems to help tackle urban challenges. But to ensure this information is easily usable by entrepreneurs, researchers, government agencies, and community members across Toronto, Canada, and the globe, it must be standardized, open, and publicly accessible.

Sidewalk Labs plans to achieve its goal of a digitally open city by publishing data in standard formats — enabling third parties to build on top of urban data in new and important ways. At the scale of the River District, a non-profit Urban Innovation Institute could promote these standards and provide a core hub for open data discussions and use.

Another core condition for digital innovation is instilling trust from the community that information collected in cities would preserve the privacy of individuals and be used for the greater good.

Beginning in Quayside, Sidewalk Labs proposes the creation of a publicly accountable independent entity called the Urban Data Trust. This entity would be tasked with establishing clear guidelines

for responsible data use as well as overseeing a process for reviewing and approving all proposals to collect or use urban data in the project area (including all proposals from Sidewalk Labs).

This responsible data use process would apply in addition to existing Canadian privacy laws, and the Urban Data Trust should coordinate with privacy regulators as necessary.

The Urban Data Trust should be launched in Quayside, where it could begin to work through use cases. Over the longer term, once the entity has benefited from many use cases in Quayside and certain parts of the River District, Sidewalk Labs expects that the Urban Data Trust could have broader coverage.

## An independent Urban Data Trust would oversee a process for reviewing and approving all proposals to collect or use urban data in the River District.

Standardized mounts could reduce device installation time by

92%

# The Future Can Start Now

Toronto does not have to wait decades to take advantage of the eastern waterfront. Sidewalk Labs proposes a series of **activation strategies** that can begin reconnecting Torontonians to this area and introducing the **possibilities of its future**.



The opening of 307 on June 16, 2018, featured pop-up Market 307 with Scadding Court Community Centre, as well as First Nations Dancers EJ Kwandibens, Sagatay, and Nicole Leveck. Credit: Sidewalk Labs

While the long-term transformation of the eastern waterfront will take decades, the Port Lands Planning Framework recognizes that it is important to begin animating these sites with experiences that reflect the overall mission and values of the future neighbourhoods.

This approach is grounded in the principles of creative placemaking — an evolving field of practice that leverages the power of the arts, culture, and creativity to drive a broader agenda for change, growth, and transformation in ways that also build character and quality of place.

One of the biggest challenges for new developments is that time is often the most powerful tool for creating diverse communities. This factor is why many new developments may initially feel sterile or uninviting. It takes time for people to accrue experiences, create a history, and share memories. The strength of a new community is also much greater when people have been involved from its initial conception through development.

That is why Sidewalk Labs created 307, a public workshop and creative platform for the local community, located in Quayside. Since the launch of 307 in mid-2018, more than 11,000 Torontonians have visited the space to participate in workshops, provide feedback on ideas, propose solutions to urban challenges, see new prototypes, or engage with emerging local artists.

Over the coming years, Sidewalk Labs would like to build on this experience, working with Waterfront Toronto, the City of Toronto, and local businesses and organizations to develop programs that inspire people to experience the Port Lands in new ways or even for the very first time. It would do this work in collaboration with the local landowners.

Key sites for early activation might include temporary floating installations in Parliament Slip and the Keating Channel; a pop-up park at Polson Quay; and underutilized heritage structures throughout the area.

# Potential early activations

**Sugar Beach**  
A potential stop on a summer ferry route



**Yonge Slip**  
A downtown departure point for summer pop-up ferry service



**307**  
Ongoing prototypes (such as this building Raincoat), public art, and programming at 307, the Sidewalk Labs innovation workspace on Quayside



**Polson Quay**  
A pop-up park and connection to artist studios



**Keating Channel**  
A floating barge with performances and art installations connected to heritage buildings

**Parliament Slip**  
A ferry stop and floating barge with community and cultural events



**Cherry Beach**  
Refurbished bike lanes through the Port Lands to reach Cherry Beach and the outer harbour



# Public art installations and festivals can draw people to the eastern waterfront and provide new, delightful perspectives on the area

The waterfront has the potential to become an epicentre for Toronto's arts community. Public art is already interwoven into new developments like the West Don Lands; Icebreakers, a series of public art installations, is celebrated annually along Queens Quay; and Max Dean, one of the city's most acclaimed artists, has an extraordinary studio in a heritage building on Polson Quay filled with kinetic and interactive sculpture.

This growing cultural energy led to the creation of a new waterfront Toronto Biennial of Art that will launch in the fall of 2019. The event will take place every two years, offering accessible and transformative visual art exhibitions, installations, talks, learning opportunities, and happenings in new and unexpected spaces along the shores of Lake Ontario.

Sidewalk Labs has sought to contribute to this momentum, partnering with local arts groups to support projects that let people experience the lake in new ways. In summer 2018, Art Spin created the Kajama Boat Tour, which repurposed a historic tall ship as a performance vessel

that traveled around the harbour, staging site-specific performances at locations from the Turning Basin to the Eastern Gap.

In winter 2019, projection mapping artist Kavi created an interactive installation on the proposed prototype for a building Raincoat that is designed to protect Torontonians during inclement weather.

For future projects, Sidewalk Labs envisions integrating an Indigenous perspectives. Towards this end, Sidewalk Labs and Waterfront Toronto worked with the Brook Mollroy Indigenous Design Studio to bring together Indigenous artists and designers to discuss Indigenous design principles and how state-of-the-art technology might intersect with the richness of Indigenous design.

Potential upcoming projects include design competitions for Indigenous artists to interpret how to create indoor-outdoor structures that can draw people outside year-round, as well as workshops with local schools and community members to create augmented-reality apps that bring to life the long history and stories of the land.

Toronto singer-songwriter Bruno Capinan performs during the Art Spin Kajama Boat Tour in August 2018. Credit: Priam Thomas for Art Spin, 2018



An interactive installation by Toronto artist Kavi takes place on a building Raincoat designed by Toronto architecture firm PARTISANS, in March 2019. Credit: David Pike



## Temporary creative projects can make the eastern waterfront more accessible, for more people, right away

The Port Lands is currently only accessible through public transit by bus 72, which runs every 15 minutes from Union Station and follows a route along Commissioners Street. Seasonally, bus 172B runs to Cherry Beach. This limited service means that most of the time, the south Port Lands — including Cherry Beach, Cherry Beach Recreation Fields, Tommy Thompson Park, and the Marinas — are not accessible by public transport.

Sidewalk Labs is prepared to fund, design, and operate a summer pop-up ferry service that could be piloted with Ports Toronto from Yonge Slip or Parliament Slip to other parts of the Port Lands, making it accessible and fun for people from across Toronto to visit the area. The ferries could be exclusively electric watercraft.

There is currently a separated bike path through Cherry Beach that is part of the Martin Goodman Trail. But the connection into the city and to the central waterfront is along Cherry Street and is not well-marked, making it dangerous and uninviting for cyclists to travel alongside heavy trucks.

In partnership with the city, Sidewalk Labs is prepared to fund a project to refurbish these lanes, which could include painting the existing bike lane along Cherry Street in a heavy colour. That would make Toronto's growing cycling community feel invited to this area and start establishing the future connection between the park and the city.

**Over the coming years, Sidewalk Labs would like to work with the city to develop programs that inspire people to experience the Port Lands in new ways.**

## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full River District scale are inclusive of the IDEA District's entire proposed geography, including Quayside and all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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59. For more information about Canada's forests and the timber required to build the River District, as well as its carbon benefits, refer to the "Buildings and Housing" chapter of Volume 2. See also the Canadian Wood Council's online Carbon Calculator at [cwc.ca/design-tools/carbon-calculator/](http://cwc.ca/design-tools/carbon-calculator/) (accessed April 12, 2019).
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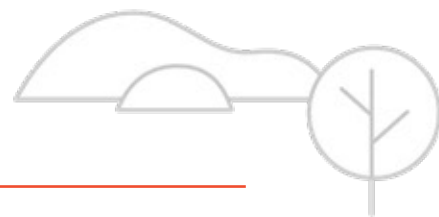
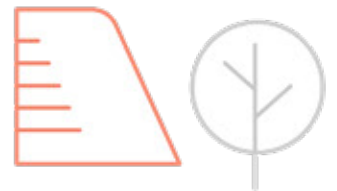
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**The River District  
has the potential to  
become a globally  
recognized centre  
where urban  
innovations emerge,  
grow, and flourish.**



# Eco- nomic Develop- ment



## Introduction

p422

## Part 1

### Accelerating Development

p428

## Part 2

### Sparking a Cluster in Urban Innovation

p460

## Part 3

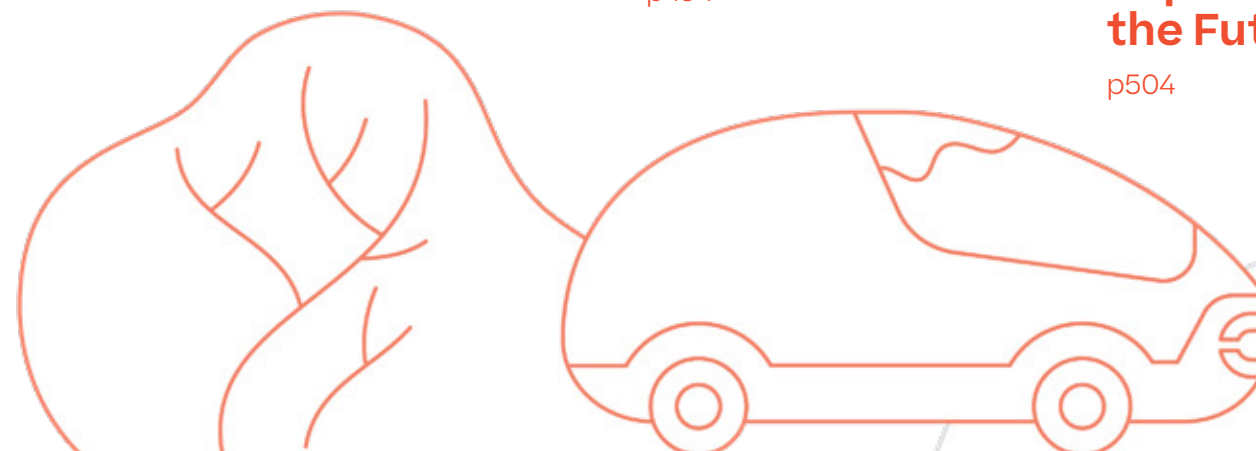
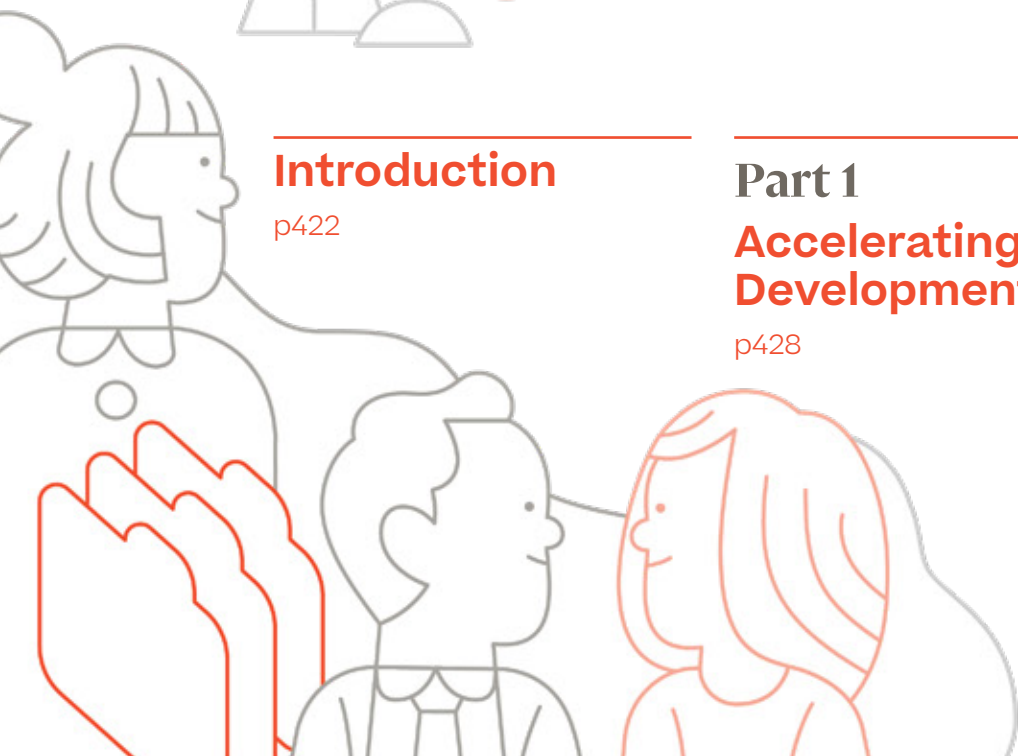
### Measuring Impact

p494

## Part 4

### Exploring Economic Impact Further into the Future

p504



# A New Economic Engine to Drive Job Growth on an Accelerated Timeline

Sidewalk Labs' approach to economic development can help Toronto realize the full potential of the eastern waterfront on a significantly expedited time frame, resulting in more than 93,000 total jobs stimulated by the IDEA District by 2040.<sup>1</sup>

Any comprehensive approach to urban development requires a strong plan for economic growth with an equally strong commitment to inclusion.

In recent years, all three levels of government in Canada have recognized the importance of inclusive growth. These efforts have included federal investment in public transit and affordable housing, community benefit agreements on provincial projects, and social procurement initiatives at the city level. Waterfront Toronto recognized this need in its 2017 Request for Proposals for Quayside, establishing as one of its primary objectives the need “to deliver key economic and social benefits that enable Toronto to compete effectively with other top-tier global cities for investment, jobs and talent.”<sup>2</sup>

Waterfront Toronto also identified a focus for this growth: an economic cluster centred around urban innovation. Broadly defined as the ability to tackle pressing city challenges using new physical, digital, or design advances, “urban innovation” is a burgeoning sector whose global market value is projected to top \$2 trillion USD by 2025.<sup>3</sup> But despite the vast potential for urban innovation to spark economic growth, no one place has put together a holistic plan to become the global hub of this emerging field.

The Sidewalk Toronto project provides a unique opportunity to help meet and exceed government and Waterfront Toronto goals for inclusive growth by generating a new economic engine — one designed specifically to improve quality of life, affordability, and prosperity for residents, workers, and businesses of all sizes. Sidewalk Labs proposes a two-part approach to economic development with the potential to catalyze significant jobs and growth anchored around urban innovation.



## The innovation plan.

First, Sidewalk Labs plans to help boost general economic growth by accelerating development across the underutilized areas of the IDEA District.

This effort involves unlocking new neighbourhoods through upfront investments in critical infrastructure, such as light rail transit; relocating Google's Canadian headquarters to Villiers West as part of a new innovation campus; and implementing a general approach to people-first planning that aims to attract talent through a vibrant mix of homes, offices, shops, civic amenities, and open spaces. Together these efforts would help create an “expanded downtown” area capable of supporting new and existing industries, including the growing film industry in areas adjacent to the IDEA District.



## IDEA District

The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.

## Inside the numbers

# How Sidewalk Labs estimated economic impact

To help predict and measure the impact of this approach to economic development, Sidewalk Labs engaged urbanMetrics, a leading Toronto-based firm with extensive experience on the waterfront. The urbanMetrics analysis, detailed throughout this chapter, demonstrates both the one-time and recurring benefits associated with Sidewalk Labs' proposal, compared to an incremental approach to development based on prevailing land-use policies and planning trends.

The urbanMetrics analysis compared two scenarios. The first (baseline) scenario created by urbanMetrics is based entirely on the current set of government-created planning documents for the project geography (including zoning where it exists, precinct plans, and the Port Lands Planning Framework). This scenario does not make any assumptions about how implementation of proposals in these documents might evolve in the future.

The second scenario is based on the proposed MIDP plan and accounts for specific elements and planning approaches that differentiate these plans from traditional development, including creating the conditions for a cluster in urban innovation, deploying factory-based mass timber construction for the entirety of the program, and using widespread mixed-use design at both the neighbourhood and building level. This second scenario considered the IDEA District to refer to its proposed full geographic scope, including Quayside and the River District.

The results of that report suggest that the economic impact of the project would deliver on the high expectations that Torontonians have for the enormous potential of the waterfront.

Critically, Sidewalk Labs recognizes that its approach to accelerating development must benefit everyone. To plan for prosperity with equity, Sidewalk Labs commits to a robust inclusion program, anchored by an ambitious housing vision that provides 40 percent of units at below-market rates. Building on that foundation, Sidewalk Labs plans to launch a new workforce development program, implement a construction jobs program for equity-seeking populations, and invest in an Ontario-based mass timber factory capable of supporting approximately 2,500 person-years of full-time employment over 20 years.

Second, Sidewalk Labs plans to help catalyze a cluster focused on urban innovation with the potential to spark a new economic engine.

This effort aims to build on Toronto's existing assets in emerging fields of technology and urban design by creating the unique physical, digital, and policy conditions that would enable innovators, entrepreneurs, and companies large and small from around the world to research, explore, build, and scale ideas that can improve the quality of life in cities. This approach involves establishing the IDEA District as a designated zone subject to a special set of regulatory and policy tools to promote innovation and accelerate development.

To further jumpstart this cluster, Sidewalk Labs plans to help launch an independent, non-profit Urban Innovation Institute — designed in collaboration with local academic institutions — to serve as a new epicentre for applied research focused on urban challenges.



### The impact.

Application of Sidewalk Labs' approach in Quayside is a critical first step in realizing the city's goals and the economic potential of the waterfront; it is expected to result in 3,900 direct jobs and a one-time vertical construction impact of \$1.6 billion in value added to the Canadian economy alone. These impacts would extend to the River District, resulting in a total of 93,000 jobs (including 44,000 full-time "direct" jobs), \$4.3 billion in annual tax revenue, and \$14.2 billion in annual GDP — all delivered on a far more accelerated timeline compared to plans in place today to activate the waterfront.<sup>4</sup>

In addition to these ongoing impacts beginning at completion in 2040, the project would also realize cumulative property taxes of \$1.6 billion.

Sidewalk Labs believes the majority of jobs located within the IDEA District would be "net new," meaning jobs that would not otherwise exist in Toronto but for the creation of the district. While Sidewalk Labs recognizes that a portion of the total direct jobs would relocate to the district from elsewhere in Toronto, far more would be new additions to Toronto's economy, driven in part by the establishment of an urban innovation cluster. The historically low vacancy rates in Toronto's downtown core also suggests that if the IDEA District did attract tenants from existing buildings downtown, there would continue to be demand to fill that newly vacated space.



## Benefits of implementing the vision

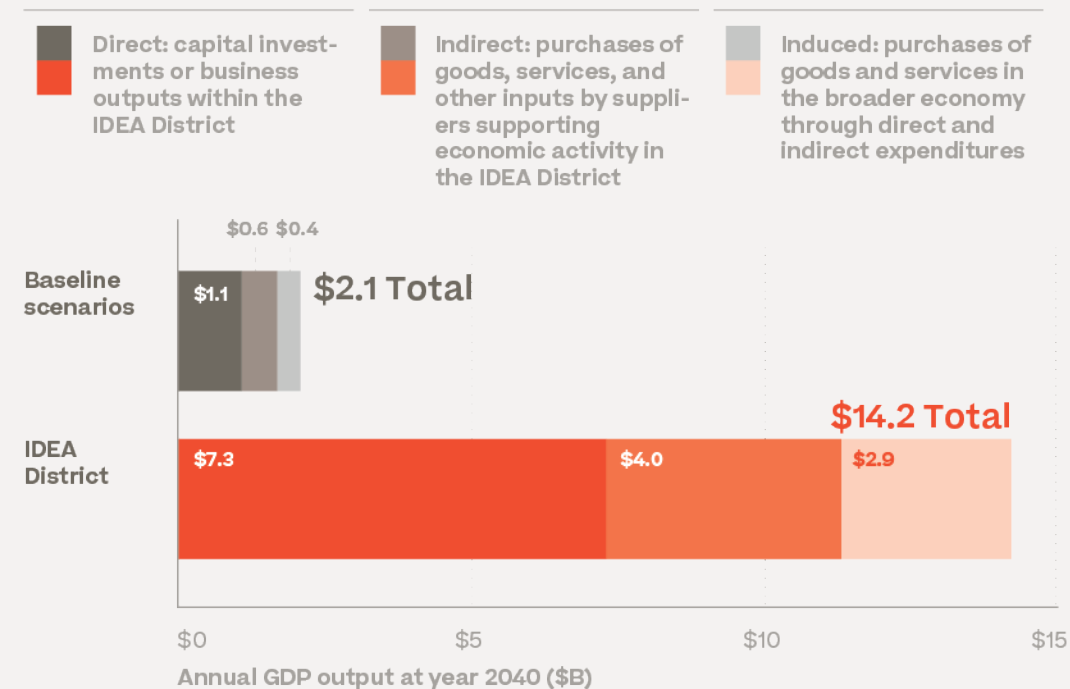
- More than 93,000 total jobs (including 44,000 full-time, permanent jobs)
- Roughly \$14.2 billion in annual GDP output beginning in 2040
- Roughly \$4.3 billion in annual tax revenue (federal, provincial, and municipal) by 2040
- A global hub for urban innovation, anchored by a new Google campus, a new applied-research institute, and a new venture fund for Canadian companies

This growth would enable all three levels of government to maximize the return realized on the \$1.25 billion investment<sup>5</sup> made as part of the Don Mouth Naturalization and Port Lands Flood Protection Project; allow Toronto to realize more than triple the cumulative property tax revenues over the baseline scenario from the area within the same time frame; and deliver both critical public transit infrastructure and thousands of affordable housing units decades earlier than anticipated.

# The IDEA District's significant economic impact on GDP, tax revenue, and jobs by 2040

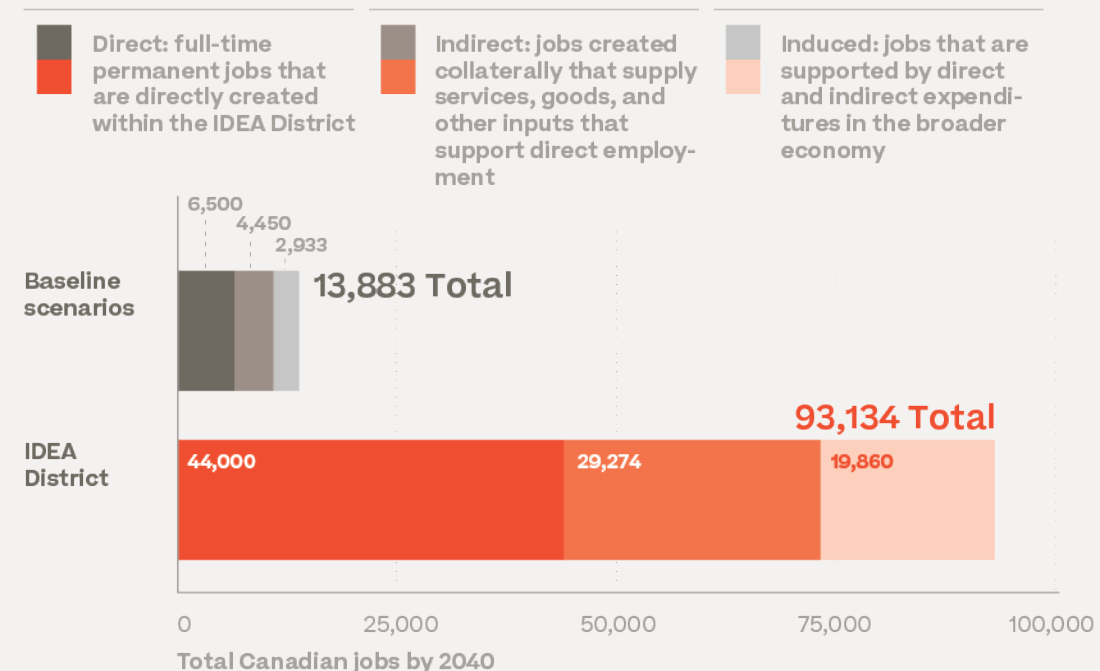
## Nearly seven times the annual GDP contribution by 2040

In its analysis, urbanMetrics estimates that, by 2040, the IDEA District would contribute nearly seven times the value to Canadian GDP annually than would result from existing proposals for the eastern waterfront. Sidewalk Labs recognizes that there are many factors that could contribute to increased value aside from the unique conditions established in the IDEA District, such as a potential increase in commercial and residential density. The baseline scenario assumed the densities as currently considered in existing planning documents.



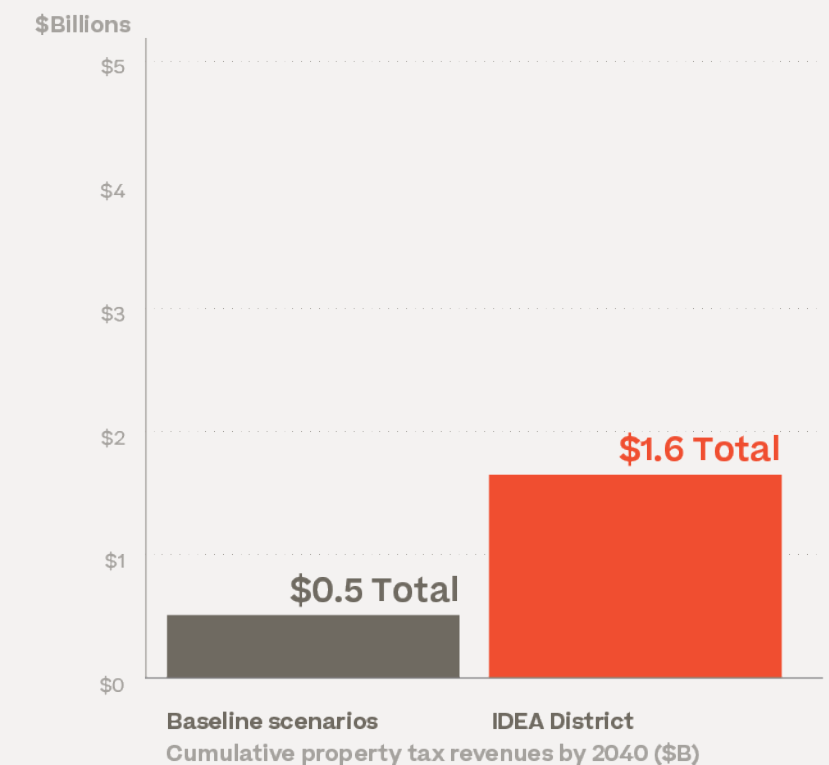
## Nearly seven times as many jobs by 2040

Implementation of Sidewalk Labs' plans for the IDEA District could realize significantly greater permanent employment opportunities, achieved on a faster timeline, than existing proposals. In its analysis, urbanMetrics estimates that, by 2040, the IDEA District would stimulate more than 93,000 jobs — nearly seven times the number of jobs by 2040 that would be realized under the approach currently envisioned in the Port Lands Planning Framework.



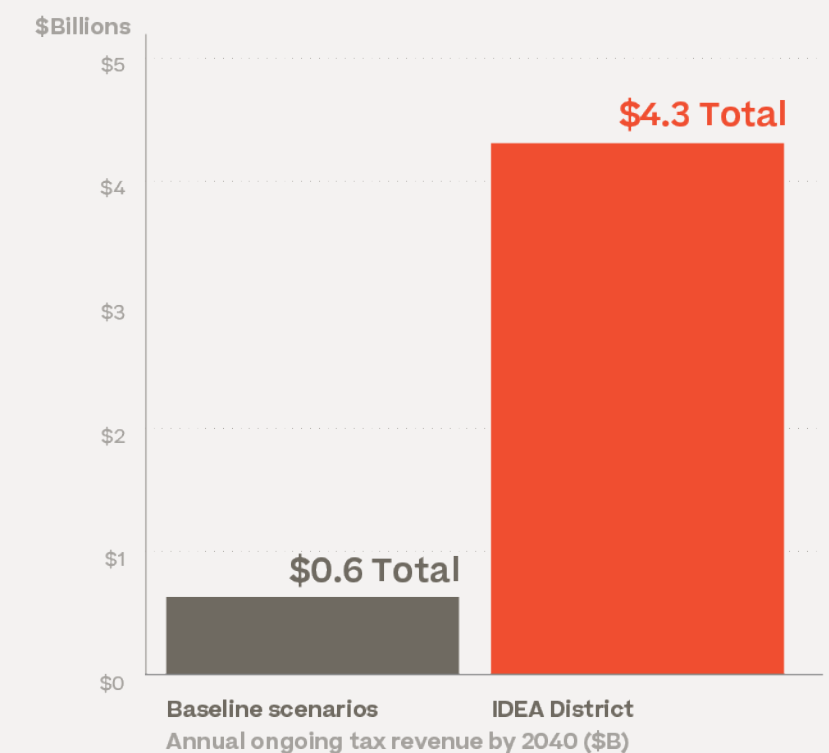
## Three times the cumulative property tax revenue by 2040

Accelerating development of the eastern waterfront would allow for a rapid accumulation of property tax revenues generated upon expedited occupancy. In its analysis, urbanMetrics estimates that, by 2040, full buildout of the IDEA District would accrue more than three times the cumulative property tax revenue of that generated under existing proposals.



## Nearly seven times the annual ongoing tax revenue by 2040

The urbanMetrics analysis also estimates that overall annual tax revenues generated throughout the IDEA District would be realized at a magnitude nearly seven times that of the baseline scenario by 2040. Importantly, a fully developed IDEA District would have the capacity to produce this annual benefit across municipal, provincial, and federal jurisdictions.



The above revenues include personal tax, corporate tax, property tax, and other taxes.

# Accel- erating Develop- ment

By extending public transit, establishing a major jobs anchor, designing complete communities, and supporting new industries, the IDEA District can boost economic growth on a faster timeline than existing plans for the area — and do so in a way that preserves equity for all.

# Introduction



## Strategies

**1**  
Unlock the waterfront through infrastructure investments

**2**  
Anchor waterfront growth with a new Google campus

**3**  
Attract talent and jobs with complete communities

**4**  
Support new and existing industries with an “expanded downtown”

**5**  
Plan for prosperity with equity

Sidewalk Labs’ plans for Quayside and proposed approach for the IDEA District would help the city and Waterfront Toronto unlock the potential of this underutilized area on an accelerated timeline, creating the conditions for significant new economic growth. Part 1 of this chapter outlines the steps necessary to lay that foundation.

Realizing the full potential of the IDEA District begins with early delivery of the planned Waterfront Light Rail Transit extension, which would not only better connect the area with the rest of the city but also with other planned development nearby, including commercial development at East Harbour and the planned expansion of the Film District.

## Realizing the full potential of the IDEA District begins with early delivery of the planned Waterfront Light Rail Transit extension.

As a next step, the relocation of Google’s Canadian headquarters onto Villiers Island as part of a new innovation campus would spark economic activity and draw businesses and talent from around the world. A thoughtful approach to mixed-use development that integrates new innovations to improve sustainability, affordability, and mobility would further attract workers and residents by creating complete communities filled with homes, jobs, shops, community spaces, and parks.

Finally, new affordable housing and workforce development programs help ensure that this approach to prosperity also comes with equity — creating opportunities for Torontonians of all ages, incomes, and abilities, as well as businesses of all sizes.



## Strategy 1

Accelerating Development

# Unlock the waterfront through infrastructure investments

Sidewalk Labs’ holistic planning approach prioritizes (and provides optional financing for) accelerated delivery of district-scale infrastructure systems, setting the necessary foundation to support widespread development by a range of players and providing critical connectivity to and from the city’s existing economic centres.

Waterfront Toronto and all three levels of Canadian government have taken major steps towards reconnecting Torontonians to the waterfront and realizing its immense economic potential. The largest recent example is the \$1.25 billion Don Mouth Naturalization and Port Lands Flood Protection Project announced in 2017.<sup>6</sup> Yet this commitment is only one component of the infrastructure necessary to truly capture the enormous potential of the eastern waterfront.

Sidewalk Labs estimates that the additional utility, energy, and public transit infrastructure needed to enable development of the IDEA District could total upwards of \$3 billion, with these costs reaching upwards of \$4.5 billion across the entire eastern waterfront.<sup>7</sup>

One standard approach to securing this infrastructure is to collect necessary funds through charges levied on developments immediately before they begin

construction. But this process could lead to piecemeal infrastructure expansion and create doubts around the timely construction of core infrastructure, especially the light rail extension.

Accelerating delivery of these infrastructure systems, particularly public transit, would likely have an outsized effect on the pace of economic growth. The benefits of early investments in core infrastructure have been found in cities around the world, from Washington, D.C., to Rotterdam. The stakes in Toronto are just as high. According to a 2019 report prepared for the Waterfront Business Improvement Area (BIA) organization by the engineering and development consultancy Hatch, a delay in light rail development until 2045 would result in over \$20 billion in forgone cumulative tax revenue across all three levels of government and cost more than \$1.8 billion in lost productivity.<sup>8</sup>

Between 2004 and 2016, jobs along the Capitol Riverfront's new metro corridor grew by 94 percent. Credit: Geoff Alexander



(Centre) Since a public transit investment, Kop van Zuid has become one of the densest areas in the Netherlands, known for its economic connections. Credit: Rene Mensen

(Right) Following investment in new transit infrastructure, London's Canary Wharf was able to realize its potential as a core business centre. Credit: Nikada

## The importance of early investment in public transit

Making large infrastructure investments in public transit is a crucial first step in accelerating development, encouraging more sustainable mobility choices, and creating more affordable communities.

Transit provides essential access to growing urban districts and enables cities to realize the economic potential of newly developed areas on a far earlier timeline.

As mentioned on Page 108 of Volume 1 and described in greater detail in the “Mobility” chapter of Volume 2, Sidewalk Labs proposes that the public sector pursue a self-financing approach to transit expansion within the IDEA District *before* development begins in this area.

This approach draws inspiration from several precedents.

### 1. Capitol Riverfront (Washington, D.C.).

The Capitol Riverfront in Washington, D.C., is one of the city's most vibrant areas today, but for years it was inactive and underutilized. To redevelop this former industrial area, the city made an early investment in transit infrastructure, creating two new metro stops in the district that expanded subway service and connected the riverfront directly to the city centre. Like the planned extension of the light rail, the D.C. riverfront's new line connected to the city's primary train station, with access to regional and national rail lines.

The results of this investment were significant. Early provision of transit facilitated the relocation of critical anchor tenants, which in turn attracted jobs and activity to the district, fuelling additional growth and development over time. The Capitol Riverfront metro stops were completed in 1991<sup>9</sup>; between 2004 and 2016, jobs along the corridor grew to 76,000, representing a 94 percent increase.<sup>10</sup>

### 2. Kop van Zuid (Rotterdam).

In Rotterdam, initial efforts to develop the Kop van Zuid historic docklands initially stalled due to the lack of transit infrastructure and connectivity to the rest of the city.<sup>11</sup> Recognizing that private developers were unwilling to invest in the area for these reasons, the central government, the public sector Rotterdam City Development Corporation, and the Rotterdam Transport Company funded<sup>12</sup> the district's first large-scale project: construction of the Erasmus Bridge, with vehicle, pedestrian, and rail access.<sup>13</sup>

Today, Kop van Zuid is one of the densest areas in the Netherlands and is known for the physical, social, and economic connections it has fostered between North and South Rotterdam. For example, South Rotterdam, which was previously disconnected from the economic city centre, now sits adjacent to a strong commercial district with direct access to the rest of the city via the Erasmus Bridge.<sup>14</sup>

### 3. Canary Wharf (London).

As described in more detail in the “Mobility” chapter of Volume 2, the risks of developing an area without robust public transit connection in place include the potential to stifle growth or become locked into expensive road infrastructure that generates traffic congestion.

Take Canary Wharf in London, where the lack of transit connectivity was one of several factors that initially crippled efforts to redevelop the city's deteriorating docklands in the early 1990s.<sup>15</sup> Without a reliable transit system, the area struggled to attract a critical mass of businesses. Following investment in new transit infrastructure, which connected the area to the rest of London, Canary Wharf was able to become a more active, diverse urban neighbourhood and realize its potential as a core business centre.

## Supplementing finite resources to expand light rail

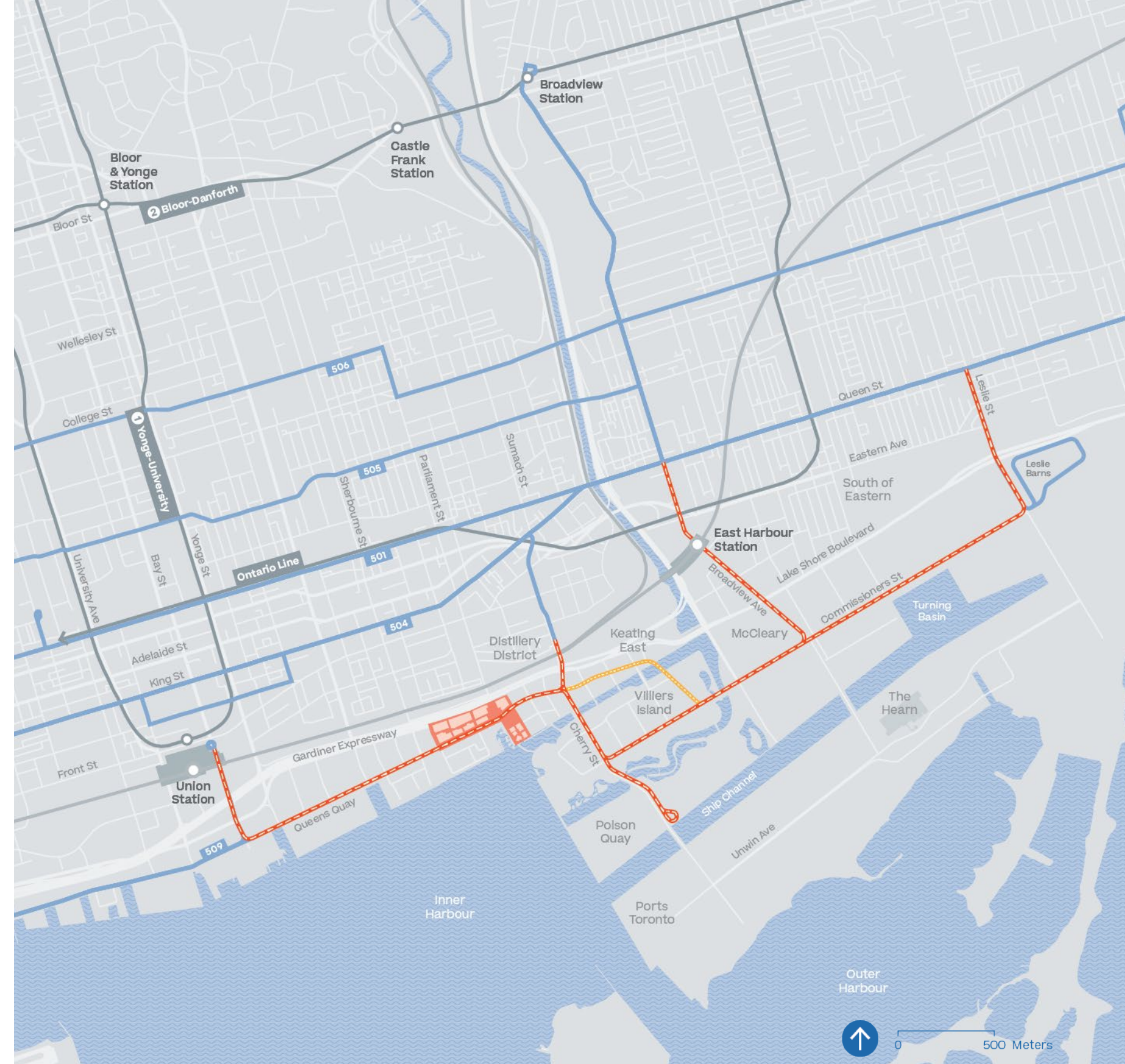
In Toronto, the importance of a connection between the downtown core of Toronto and the eastern waterfront has long been recognized by public and private stakeholders. Numerous municipal planning documents, including Toronto’s 15-Year Rapid Transit Network Plan and the City of Toronto’s Official Plan, as well as industry analysis such as the Waterfront BIA report, all affirm the potential benefit of such an extension by opening up the waterfront for residents and businesses.

Funding for projects of this magnitude can be difficult given the many competing needs of thriving cities. The Toronto Transit Commission (TTC) alone has identified nearly \$24 billion in existing transit needs over the next 10-year planning period<sup>16</sup> (including the Line 2 East Extension, formerly the Scarborough Subway Extension, the Ontario Line, Eglinton East LRT, Sheppard East LRT, and SmartTrack commuter-rail line transformation), \$17.5 billion of which does not have designated funding. Furthermore, city officials often need to prioritize funding for projects that serve an immediate need for existing constituencies over those that supplement long-term development plans, especially in underdeveloped areas.

Sidewalk Labs’ proposal to support early financing of the light rail extension provides an alternate option for the city to relieve funding pressures and enable the delivery of the system on an expedited time frame.

*Sidewalk Labs endorses a \$1.2 billion, 6.5-kilometre light rail extension that would realize the city’s existing plans and position the eastern waterfront for future development. To help accelerate the implementation of this extension, Sidewalk Labs commits to providing financing, which could facilitate the delivery of a significant portion of the system years sooner than currently projected in the TTC 2018 Corporate Plan.<sup>17</sup>*

In addition to providing critical connectivity to Union Station, Quayside, the planned East Harbour transit centre, the West Don Lands, the Distillery District, and neighbourhoods to the east, the expanded light rail would become the transit spine connecting economic hubs across the eastern waterfront.<sup>18</sup> Sidewalk Labs envisions the light rail linking a new economic hub, anchored by Google, at Villiers West, with a film and media cluster concentrated within the Film District and McCleary District, and the GO train and future subway transit hub and commercial core at East Harbour. Mobility across these hubs would contribute to the vitality of each area, allowing convenient and affordable access for residents, workers, and visitors.



**Map**  
**A \$1.2 billion plan to extend light rail along the waterfront**

- GO Transit / SmartTrack
  - Subway (existing and planned)
  - Existing
  - - - Approved extension
  - · · Optional
  - ▭ Quayside
- Light rail



Beyond increasing access, early provision of the light rail extension has the potential to encourage more sustainable choices among travellers. When transit is introduced earlier in an area's development, residents and visitors are more likely to develop commute and travel patterns that prioritize public transit over the use of private car trips, creating a virtuous cycle in which future development also prioritizes more sustainable mobility

infrastructure over parking lots or wide streets designed primarily for vehicle trips. The aforementioned Waterfront BIA report estimates that the extension of the light rail has the potential to prompt a significant mode-share shift — resulting in a 44 percent decrease in automobile use<sup>19</sup> and a 15 percent increase in public transit usership (by incoming workers and residents).

**At full buildout of the light rail extension, Sidewalk Labs estimates that it could support roughly 72,900 daily trips.**

**Sidewalk Labs anticipates the light rail extension would link to the city's expansive existing network, including connections to multiple citywide routes that carry over 250,000 passengers daily.<sup>20</sup> At full buildout of the light rail extension, Sidewalk Labs estimates that it could support roughly 72,900 daily trips and reduce car trips by 16.5 percentage points.**

### Enabling holistic planning and long-term sustainability

Early delivery of the light rail extension would also make investments in other district-scale infrastructure more viable, enabling the City of Toronto and Waterfront Toronto to undertake a holistic approach to planning for development, rather than funding piecemeal solutions that may result in only incremental improvements. A comprehensive approach at a district scale would enable the integration of innovative systems such as a thermal and power grid to support energy efficiency, dynamic street networks, and greener energy and stormwater management systems that support the city's critical sustainability goals and Waterfront Toronto's climate-positive ambitions.

A transit-first approach designed to enable the development of dense, walkable neighbourhoods has the added impact of allowing for more complete communities, connecting a broader diversity of residents and visitors to new jobs and areas of economic activity.

Hong Kong provides a particularly relevant precedent for using a self-financing or value capture model to support the growth of complete communities. The city undertook a strategy of proactively focusing growth in areas close to the city's Mass Transit Railway system,<sup>21</sup> drawing private investment for new revenue sources enabled through the transit system, including publicly owned spaces adjacent to the transit system, the sale of air rights above rail stations, and retail and advertising within stations. With access to these new revenue streams, Hong Kong was able to invest back into its transit system as well as in new community benefits, which included the potential for over 600,000 new public housing units.<sup>22</sup>

Similarly, on the far west side of Manhattan, ongoing development of one of the city's last remaining underdeveloped areas was enabled in large part through an extension of the city's No. 7 train line. The new transit infrastructure, completed in 2015,<sup>23</sup> created a vital lifeline between the west side of Manhattan and the rest of the city, drawing additional investment and encouraging businesses to relocate and contribute to a new centre of activity. **The city's use of a value capture model is expected to produce more than \$21 billion USD in net revenue by 2047, according to a 2019 analysis.<sup>24</sup>**



Strategy 2

Accelerating Development

# Anchor waterfront growth with a new Google campus

Relocating Google’s Canadian headquarters and surrounding it with a new public campus could draw talent and innovators from around the world and amplify the waterfront’s economic potential.

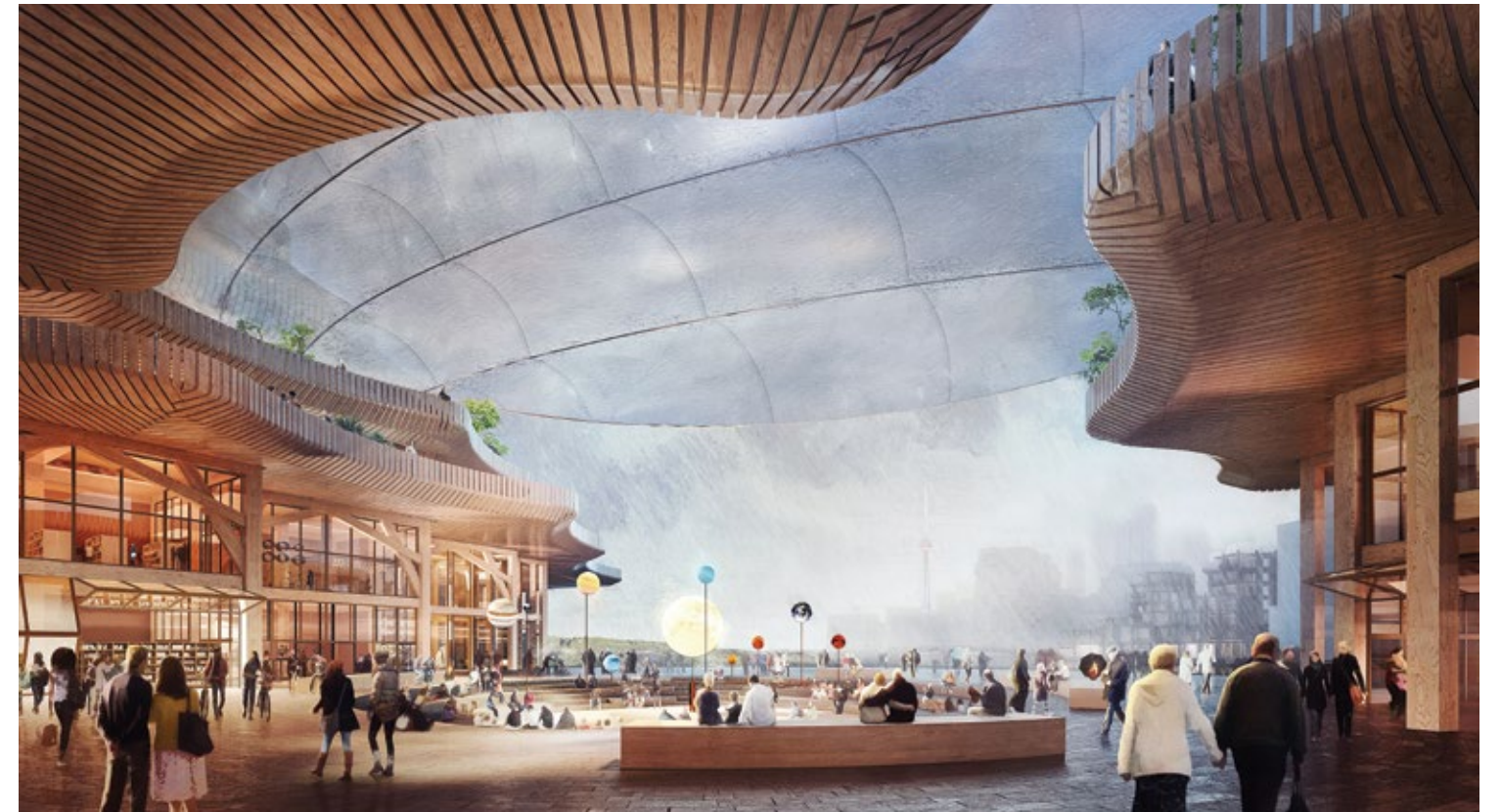


A new Google Canadian headquarters in Villiers West has the potential to serve as a catalyst of economic growth, drawing businesses of all sizes and a diverse workforce for existing and new types of jobs.

To further accelerate the development of a new hub for economic activity and innovation, Alphabet commits to establishing a new Canadian headquarters for Google on the western edge of Villiers Island, as part of an agreed-upon transaction within the IDEA District. Alphabet would target up to 500,000 square feet, which would be sufficient to accommodate as

many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring will depend on market conditions and business requirements).

Based on its impact in other neighbourhoods in cities around the world, described more on Page 441, Google’s arrival on the waterfront has the potential



A view of the western edge of the innovation campus (looking west towards downtown).

to catalyze economic growth, attracting firms of all sizes and a diverse workforce, while contributing to the growth of Toronto’s existing innovation ecosystem.

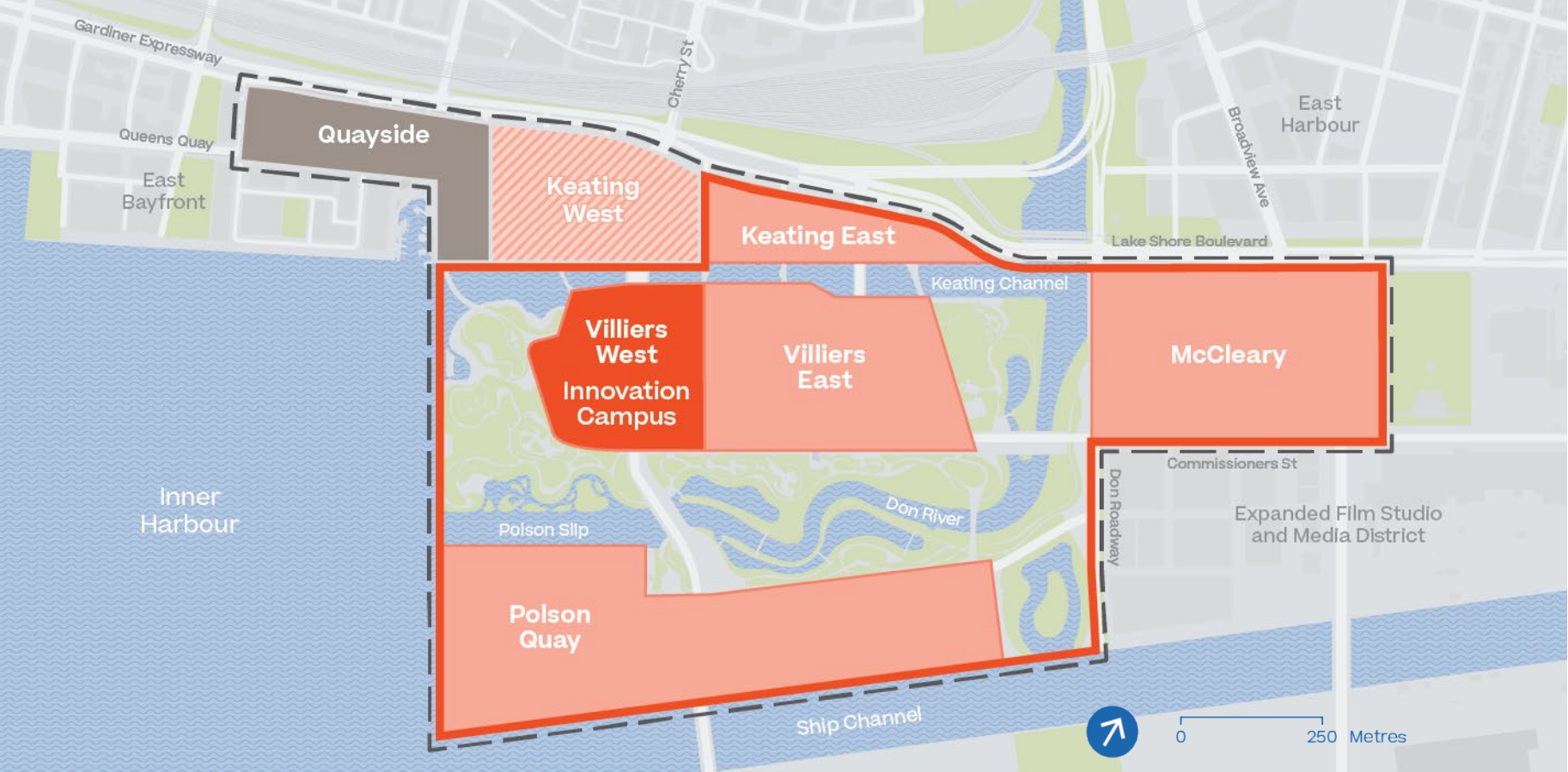
Establishment of large-scale Google campuses in other cities has consistently demonstrated significant impacts in the local real estate market,<sup>25</sup> such as strengthening demand for Class A office space, increasing private-sector activity and investment, and driving retail and residential growth that far outpaces the rest of the city.

In many cases, Google’s arrival has prompted the rapid development of local micro-markets, validating the competitive position of specific neighbourhoods within a city and generating an influx of activity. Critically, Sidewalk Labs’ approach prioritizes equitable access to economic prosperity and opportunity, ensuring Google’s presence at Villiers West spurs inclusive growth and is realized by a broad diversity of Torontonians, as described in greater detail on Page 462.

## An innovation campus to catalyze an ecosystem

Sidewalk Labs’ proposal for an innovation campus on Villiers Island includes approximately 2.7 million square feet of mixed-use development, anchored by the future home of the Urban Innovation Institute and Google office space. The campus would be located on a planned light rail stop and adjacent to the seven-hectare Promontory Park. In this location, the campus would serve as an important connector between the city’s downtown core and the rest of the eastern waterfront.

The urban innovation campus on Villiers Island would be specifically designed as a campus featuring residential spaces integrated with non-residential spaces for business, cultural, retail, and community uses. The Google Canadian headquarters itself would include select areas dedicated as Google workspaces, as well as more flexible spaces to support a range of community uses, with the flexibility to change over time.



**Map**  
**The proposed innovation campus within the broader IDEA District**

The campus for urban innovation envisioned by Sidewalk Labs would be central to the development of Villiers West, creating a bridge between Quayside and the River District and sparking a new network of neighbourhoods.

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- Optional participation in Phase 2

By creating such a campus at Villiers Island, filled with a range of businesses and neighbourhood amenities, Google would help attract a deep talent pool of workers and a range of best-in-class employers, establishing the neighbourhood as one of Canada's premier business and innovation districts. A range of commercial, retail, and community spaces of all sizes would enable businesses large and small to locate within this new economic centre, ensuring that the eastern waterfront is open for business to a broad range of players.

Google's reputation as a leader in innovation is well known: a recent survey of executives at various technology firms<sup>26</sup> as

ranked Google as the top leader in "driving technology innovation," above Apple, Microsoft, Tesla, Alibaba, and Amazon. At the neighbourhood level, Google's campus model, designed to encourage collaboration and knowledge-sharing, has positioned its offices as local hubs for innovation. For example, in Pittsburgh, Google is the largest tenant at Bakery Square,<sup>27</sup> operating alongside departments from Carnegie Mellon University. The co-location of these and other players has fuelled cross-disciplinary collaboration: Google operates a 24-hour shuttle between its offices and CMU,<sup>28</sup> and Google staff participate in student thesis committees. Further, Google's arrival resulted in a rise in commercial growth as

Strategy 2

More than **8,000** jobs were added in Kitchener-Waterloo's tech sector from 2011 to 2016.

well as in startup incubator, accelerator, and co-working spaces; it has also drawn further investment from other major companies throughout the area.<sup>29</sup>

In addition to driving the development of an ecosystem for innovation along the eastern waterfront, the establishment of a larger Google Canadian headquarters on Villiers Island has the potential to strengthen the emerging innovation corridor between Toronto and Kitchener-Waterloo and support the growth of both locations.

Located 110 kilometres west of Toronto, Kitchener-Waterloo is home to a rapidly growing hub for technology,<sup>30</sup> including Google's largest engineering office in Canada.<sup>31</sup> More than 8,000 jobs were added in Kitchener-Waterloo's tech sector from 2011 to 2016,<sup>32</sup> representing the highest growth rate among Canada's top 10 metropolitan areas. The development of a parallel node of activity in the eastern waterfront enables further opportunities for attracting talent at both locations while reinforcing the region's leadership on a global stage. The proposed East Harbour Transit hub would provide a public transit connection between Kitchener-Waterloo and the IDEA District.

While Sidewalk Labs believes that the unique innovations planned for Quayside will draw new residents, workers, and visitors, the role of Google as an anchor tenant has the potential to significantly build on this momentum. As described by economist Enrico Moretti,<sup>33</sup> the presence of anchor corporations like Google have

driven growth of new economic and innovation economies to a greater degree than government initiatives alone. This trend has been demonstrated across a range of innovation clusters in North America, including Kansas City, Boston, San Diego, Seattle, and Vancouver, and has the potential for replication in Toronto as well.

**The catalytic impact of a large Google presence**

Once a critical mass of employees has been reached, Google's impact on local job and real estate markets has been found to support a city's competitive position as an economic engine.

To estimate the potential impact of Google's relocation to the waterfront, Sidewalk Labs conducted extensive research on the impact of Google in cities around the world, focusing on New York, Los Angeles, Chicago, and Austin, Texas, each of which has between 1,000 and 10,000 Google employees, a range that indicated the impact of the proposed new campus. Across these cities, Google's entrance correlated with characteristics of growth within the local district, above and beyond that of the rest of the city. Compared to the years prior to Google's arrival, each of the districts studied exhibited an increase in office value in the five years following Google's occupancy, as well as an uptick in the retail and residential inventory of the area.

Sidewalk Labs believes the establishment of a larger Google campus on the eastern

**Google NY by the numbers:**  
 → Over 7,000 employees in nearly two decades  
 → A 10% post-Google increase in commercial inventory in the Meatpacking District  
 → A 3.3% average quarterly growth in office value in the district

waterfront could catalyze growth similar to that demonstrated in each of these markets — and particularly to that of New York City and Chicago.

**Google New York.**

In New York City, Google has grown to over 7,000 employees in nearly two decades,<sup>34</sup> helping to transform the western edge of Manhattan into a major economic hub that rivals Midtown and the Financial District.

The growth of big tech companies like Google has demonstrated potential to catalyze small business formation, create buyers for the products that startups produce, and encourage skilled workers to apply for tech-related jobs in non-tech industries. Academic research suggests that a high concentration of tech employment can improve wages for a wide range of jobs,<sup>35</sup> including those that do not require a degree. More broadly, the growth of tech jobs is associated with an increase in the overall number of non-tech jobs, amounting to approximately five new non-tech jobs for every new tech job created.

Google's growth in New York City has impacted the commercial interest of surrounding areas as well, validating the competitive position of the Meatpacking District as a core hub of economic activity. In the five years following the arrival of Google, the Meatpacking District experienced a more than 10 percent increase in commercial inventory, and the broader geography of Chelsea (which includes the Meatpacking District) experienced a 30 percent increase. This growth is especially significant in light of the overall stagnation of office inventory in Midtown Manhattan over the same time period.

Further, the value of office space in the Meatpacking District has almost tripled following Google's arrival, again far outpacing that of Midtown Manhattan, which did not demonstrate any meaningful growth over the same time period. While both Chelsea and the Meatpacking District experienced declining office value rates in years prior to Google's arrival, the post-Google years reversed this trend, resulting in 3.3 percent average quarterly growth in the Meatpacking District and 1.7 percent average quarterly growth in Chelsea. Growing demand in these areas has, in turn, changed the character of retail in the area, resulting in more restaurants and amenities available within walking distance for a growing workforce, for residents, and for visitors to the neighbourhood. The new office space drove broader impact throughout the city as well, including by catalyzing the development of lower-cost commercial districts in New York City's outer boroughs, particularly Brooklyn and Queens.

**Google Chicago.**

In Chicago, the Fulton Market neighbourhood, located west of the city's downtown core, was announced as the home to Google's midwestern headquarters in 2013,<sup>36</sup> ultimately opening in 2015.<sup>37</sup> Prior to Google's entrance, the area was largely home to food processors and distributors. Despite the area's proximity to major expressways and the downtown core, the historically industrial area struggled to draw sustained commercial interest. Google's arrival at Fulton Market represented the first move of a large-scale commercial entity, repurposing an existing windowless and formerly industrial warehouse into an office for hundreds of employees.

**Google Chicago by the numbers:**  
 → 100% post-Google increase in office inventory  
 → 5.7% average quarterly increase in office space value  
 → 400% growth in multifamily unit inventory

Today, more than five years after Google announced its move, the Fulton Market area is home to robust a new neighbourhood and business district. New restaurants and retail and lifestyle shops have drawn visitors to the area at a rate that has not been seen in the past. Campus spaces that host a range of creative uses function as a magnet for talent and attract employers seeking to source local workers. Fulton Market is now one of the most in-demand areas for growth and relocation.<sup>38</sup>

Google's arrival at Fulton Market has also led to an increase in office inventory of more than 100 percent, compared to only 19 percent growth throughout the West Loop in the same time period. The value of Fulton Market's office spaces has increased as well — at a rate of 5.7 percent on average quarterly, compared to a rate of 0.9 percent prior to Google's arrival. In addition to expanded commercial space, the Fulton Market area has experienced nearly 400 percent growth in the inventory of multifamily units, compared to an increase of 39 percent in the West Loop over the same time period.

## Growth in commercial space over a five-year period after Google's entrance

An analysis of four U.S. cities found that commercial assets increased in micro-market office value in the five years following Google's opening of an office space, above and beyond the growth exhibited in each city's central business district.

city	Central Business District growth post Google entry	Micro-market growth post Google entry
New York City (Chelsea, 2005-2010)	-0.1%	30.6%
Chicago (Fulton Market, 2013-2018)	19.0%	108.0%
Austin (Shoal Creek, 2015-2018)*	23.6%	64.4%
Los Angeles (Playa Vista, 2012-2017)	0.0%	21.8%

\* Due to Google's presence within Austin beginning in 2015, commercial inventory analysis for this location is based on a three-year period rather than a five-year period.



### Strategy 3

Accelerating Development

# Attract talent and jobs with complete communities

An approach to planning that emphasizes a vibrant mix of homes, offices, shops, and community spaces — initiated in Quayside and expanded across Villiers West — could welcome significant economic opportunity for businesses large and small.

The benefits of compact, walkable, mixed-use neighbourhoods designed for residents are now well-established, including improved public health, a stronger sense of community, reduced pollution, and a greater range of housing and transportation options.

Sidewalk Labs' proposed plans for Quayside and Villiers West, and its larger vision for the IDEA District, would advance existing strategies for creating dense urban neighbourhoods activated by a vibrant streetscape, including through an expanded public realm that draws people outdoors, a street network that prioritizes pedestrians and public transit, adaptable building spaces that accelerate renovations, and a new approach to programming ground floors that expands opportunities for small businesses and community spaces.

This new type of complete community with quality-of-life benefits would be attractive to entrepreneurs and companies of all sizes and establish the eastern waterfront as a magnet for top talent and new jobs while preserving and promoting socioeconomic diversity.

## Mixed-use neighbourhoods as a backdrop for economic opportunity

Twenty years ago, many experts claimed that the rise of email, video-conferencing, and other low-cost digital communications would eliminate the need for workers to meet face-to-face — and, by extension, the competitive advantage of cities. Today, it is clear that the opposite is true. In a knowledge economy increasingly driven by new ideas, the networking effects of urban density are more important than ever. A clear bellwether of this trend is the steady demise of the isolated



The revitalization of the formerly industrial “Two Kings” area has helped establish Toronto as a global leader in mixed-use development.  
Credit: David Pike

suburban office park and the global ascent of mixed-use neighbourhoods in the heart of urban centres.

Cultural, generational, and market changes in urban areas are happening faster than ever before, and cities need to be prepared to be more flexible and responsive to these shifting dynamics. Mixed-use environments provide the necessary integration of resources for talent and companies of all sizes to thrive, serving as a backdrop for the innovation economy.

Throughout Toronto, the reimagining and reinvestment in several older central areas of the city — including Liberty Village, Corktown, and the Distillery District — has resulted in a set of dynamic business districts that contribute to the vitality of

their surrounding neighbourhoods and to the city at large. Each of these areas has attracted leading-edge companies and cultural enterprises, paving the way for new economic opportunity.

Perhaps the best-known examples are at King-Spadina and King-Parliament — the “Two Kings.” There, formerly industrial buildings underwent redevelopment efforts in the mid-1990s to spur the renewal of the surrounding area, which at the time was underdeveloped and largely comprised of surface parking lots. Redevelopment of the two areas was enabled through what was innovative regulation at the time — a zoning bylaw, implemented in 1997,<sup>39</sup> that eliminated antiquated land-use policy restrictions and allowed for a new mixed-use development approach.

The success of these districts is widely lauded in Toronto and beyond and has helped establish Toronto as a global leader in mixed-use planning. Revitalization of the Two Kings has allowed for more than 50,000 new residential units.<sup>40</sup> And while job growth in Toronto increased by 20 percent citywide between 1996 and 2016, job growth in King-Spadina and King-Parliament far outpaced this trend, increasing by nearly 70 percent and 30 percent, respectively. In the two decades since redevelopment efforts were completed, more than 20,000 net new jobs have been created in these districts, nearly 30 percent of which are in the cultural, creative, and tech sectors.

The transition of the Two Kings into thriving mixed-use areas was enabled in large part through the expansion of land uses, which in turn allowed for the entry of larger waves of tenants and businesses. Each new entrant was able to take advantage of the historic spaces in ways that the original architects and city planners never conceived, but given the flexible design, these spaces were able to be repurposed for a range of new uses.

Examples like Two Kings demonstrate how the nature of urban experiences in mixed-use districts represents a marked difference from traditional economic centres, with the capacity to draw new talent and companies, facilitating more diverse economic activity in cities.

## Advancing mixed-use plans with innovation to create a new type of place

Sidewalk Labs' vision for the IDEA District builds on existing best practices for mixed-use planning by integrating a suite of innovations designed to draw more people outdoors, encourage more active transportation choices, help buildings respond to market conditions, and create a livelier mix of homes, offices, shops, social infrastructure, and community uses. The large-scale application of this approach would create a truly dynamic live-work community in which households and businesses of all sizes can find the spaces they need to thrive.

### An expanded public realm that draws people outdoors.

Residents and workers in the IDEA District would benefit from open spaces and sidewalks made comfortable at least 35 percent more of the year thanks to a set of weather-mitigation tools — deployed in real time based on micro-climate data — that provide shade from the sun and shelter from the elements. Open spaces and sidewalks would be integrated closely with the surrounding stoa space, creating the foot traffic and vibrant street life ground-floor retailers depend on.

### A street network that prioritizes pedestrians and public transit.

To further encourage active sidewalk life, the IDEA District would feature a street network designed to expand pedestrian space by up to 91 percent compared with business-as-usual development, enabled by transit, walking, cycling, and



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2.

new mobility options (and, eventually, self-driving vehicles) that reduce the need for vehicle space. This improved walkability and public transit access form the foundation of a complete community that puts homes near work and residents near essential daily services.

### Adaptable building spaces that accelerate renovations.

Adaptable “Loft” spaces designed to accommodate both residential and non-residential uses can ensure an ongoing mix of households and businesses while reducing vacancy time. Loft's flexible interior wall system enables renovations to occur 50 percent faster than in traditional building spaces, ensuring that neighbourhoods can respond to changing market conditions.

## The IDEA District innovations would create a truly dynamic live-work community in which households and businesses of all sizes can thrive.

### A new approach to programming ground floors that expands opportunities.

Adaptable stoa space on the lower two floors of buildings in the IDEA District are designed to accommodate a wide range of retailers, pop-up shops, civic groups, and maker spaces. A digital leasing platform enables these spaces to be leased at a variety of sizes big or small and at lease lengths short or long, as needed, expanding opportunities for small businesses and startup ventures. 

### A range of housing options that improve affordability.

In addition to a 40 percent below-market housing program (described more on Page 463), efficient unit designs can expand housing options for single-person and multi-generational households alike, enabled by advances including access to off-site storage space with on-demand shipping.

### A network of social infrastructure to anchor complete communities.

Ensuring a strong network of social infrastructure, including access to health care and community services, is critical to meeting Waterfront Toronto's objectives for designing complete communities. The city has also noted the need to ensure that appropriate, affordable, and accessible space is available for the delivery of services; to proactively plan for health care service delivery alongside community services and facilities planning; and to co-locate services in central hubs to enhance coordination and resource sharing. In fact, all levels of government have recognized the need for enhanced integration of services.



Strategy 4

Accelerating Development

# Support new and existing industries with an “expanded downtown”

The network of neighbourhoods that emerge from Quayside and Villiers West would connect three anchors of economic activity: the innovation campus on Villiers West, a hub of new office space at East Harbour, and Toronto’s Film District.

Waterfront Toronto and the City of Toronto have played a leading role in sparking new business activity and the development of new communities along the waterfront. Partnerships with the development community in recent projects at East Bayfront, the West Don Lands, Corus Entertainment, George Brown College, and Menkes Developments’ Waterfront Innovation Centre set the stage for a significant concentration of employment extending into the developments of Quayside and the innovation campus on Villiers West.<sup>41</sup>

When combined with two other major economic drivers — First Gulf’s East Harbour project, which will provide necessary expansion relief for the downtown office market,<sup>42</sup> and the current and future activity within the Film District and Media City<sup>43</sup> — the volume and diversity of economic activity would transform the eastern waterfront into a second commercial core for Toronto.

## Embracing the film industry on the eastern waterfront

Toronto is home to a thriving cluster of film-related industries that have helped to establish the city as a global film and television production leader and to boost tourism, including through the promotion of renowned events like the Toronto International Film Festival. Much of the industry’s resources are concentrated on the waterfront, including production, distribution, exhibition, post-production, and radio and television broadcasting functions.<sup>44</sup> The film industry has broad economic impact and is a critical economic driver for Toronto: in 2016 it contributed more than \$2 billion, and each year it has been responsible for approximately 40,000 jobs.<sup>45</sup>

The industry’s growth is now quickly outpacing capacity. Without sufficient studio space to meet local and international

production demands, Toronto’s studios have been forced to turn away multiple projects each year. Other jurisdictions throughout Canada and the U.S. are increasingly bidding for and winning larger pieces of the production pie thanks to some structural advantages over Toronto, such as milder weather and larger production spaces. The value of projects turned away due to lack of studio space cost Ontario potential revenue of \$130 million in 2016 alone,<sup>46</sup> with the potential for greater impact in years to come.

Sidewalk Labs supports the film industry and recognizes the value of dedicating the lands within the Film District and Media City exclusively for film-related uses. This area has deliberately not been included in the geographic boundaries of Sidewalk Labs’ proposed IDEA District. Sidewalk Labs also recognizes that film expansion projects could occur within the boundaries of the proposed IDEA District, such as the McCleary District, and is committed to supporting the inclusion of such projects within precinct plans and other such actions undertaken by Waterfront Toronto or the City of Toronto.

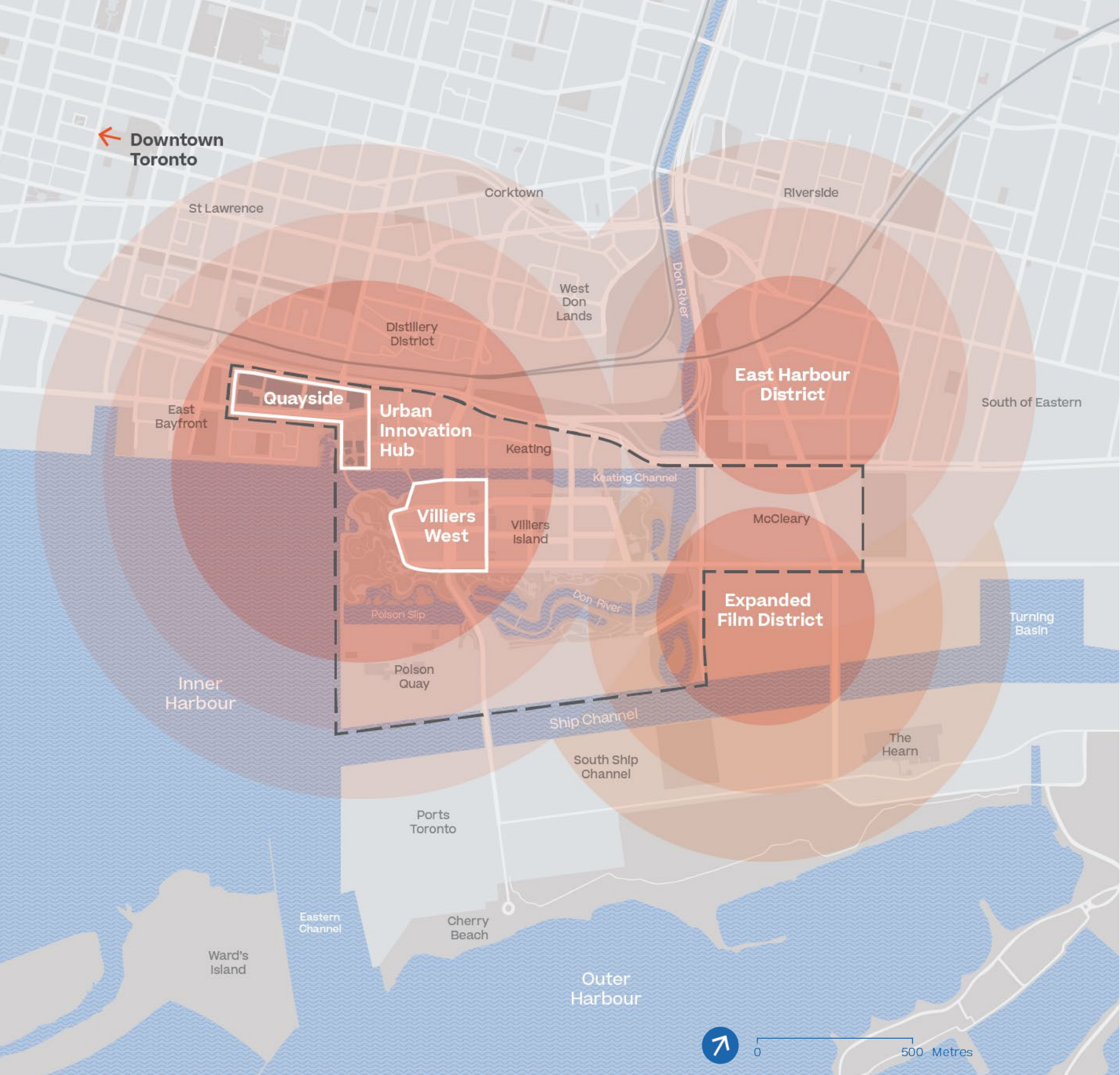
Sidewalk Labs also believes that the aspirations for the IDEA District, the development plans for Quayside and Villiers West, the acceleration of the infrastructure, and the creation of vibrant mixed-use neighbourhoods would boost film industry growth.

The growth of the urban innovation ecosystem along the waterfront can create opportunities for the film industry to participate in and benefit from the physical, digital, and policy innovations unfolding in its backyard. Proximity to mixed-use, affordable neighbourhoods

can result in housing opportunities for film industry employees, help attract talent, and create a vibrant environment around the studios. Transit connections, such as the Waterfront LRT expansion, with a stop at the border of the existing film district, would connect the studios to both Union Station and the planned East Harbour transit hub, greatly facilitating access between the facilities and the rest of the city.

Sidewalk Labs has identified specific opportunities to collaborate directly with the film industry and hopes to explore them as the Sidewalk Toronto project advances. This effort includes the integration of film-supportive design into its plans for the public realm, streets, and buildings in Quayside and Villiers West. For example, access to power sources and internet connectivity within the public realm — provided as part of Sidewalk Labs’ proposals for open space infrastructure and digital innovation — could present new, cost-effective opportunities to support film shoots.

Additionally, film is a technology-driven industry, and Sidewalk Labs believes that opportunities should be explored for the film industry to participate in the ecosystem for urban innovation envisioned at Villiers West. For example, post-production departments could collaborate with graphic design startups to improve film animations or special effects.



Map  
**Three economic hubs connected by the IDEA District**

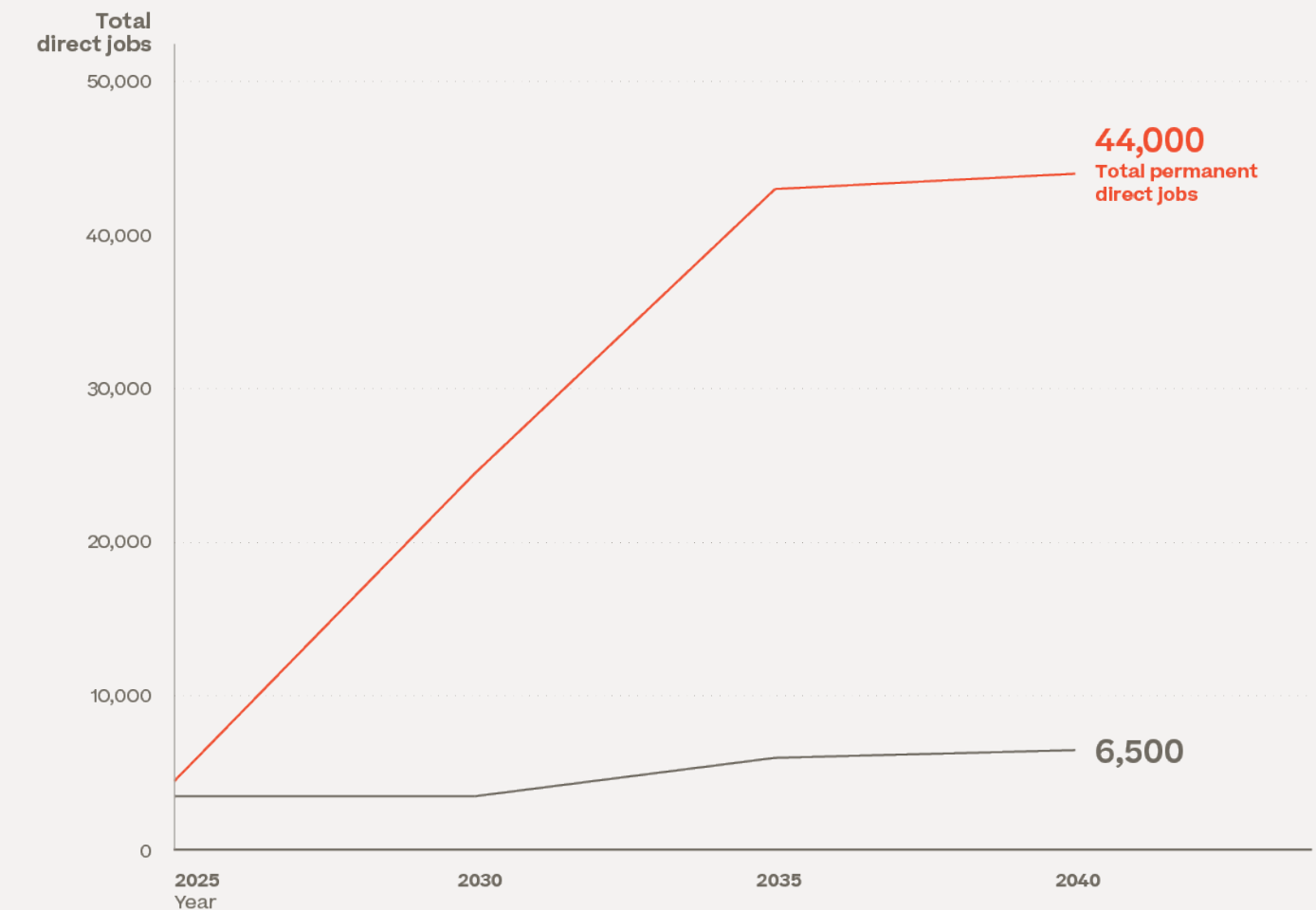
The IDEA District would support three economic hubs that together would transform the eastern waterfront into a second commercial core for Toronto.

----- IDEA District

# The IDEA District: Dramatically accelerating job growth by 2040

The urbanMetrics analysis estimates that the IDEA District would stimulate 44,000 full-time direct jobs by 2040. Within the first 10 years alone, the district would be home to more permanent jobs than the total number predicted for the baseline scenario at full completion, which is not projected to occur until 2050.

■ IDEA District  
 ■ Baseline scenarios







Strategy 5

Accelerating Development

# Plan for prosperity with equity

**Sidewalk Labs is committed to not only spurring sustainable economic development throughout the IDEA District but to doing so in a way that is equitable to all, expanding opportunities for those who have traditionally faced barriers to prosperity.**

Like all growing cities, Toronto faces challenges around equity, affordability, work stability, and income disparity — issues with disproportionate impacts on marginalized and vulnerable groups. Sidewalk Labs’ program for the IDEA District is built on the premise that urban development and technological innovation must advance prosperity for all, particularly those who have been historically excluded from opportunity.

Residents of high-demand cities across North America are increasingly concerned that the economic growth generated by new technology industries will benefit a select few while creating greater affordability challenges for many. In San Francisco, for example,<sup>47</sup> the tech boom increased median income but also led to a widening income-inequality gap, and a lack of new or affordable housing has driven low-income households to relocate elsewhere.

Similar fears of pricing out lower- and middle-income households often arise with new mixed-use developments. For all their benefits in terms of transit access, health, and vibrancy, mixed-use developments have also been found to increase housing prices unless there are explicit commitments to affordability. One recently published study found that the decline in affordability in Toronto between 1991 and 2006 was more severe in mixed-use zones than in the rest of the city.<sup>48</sup>

Despite Canada’s global reputation for inclusion, many sectors fall short on diversifying their workforce — and the tech sector is no exception. A 2017 survey of 900 Canadian tech firms found that women occupy just 5 percent of CEO roles and 13 percent of executive positions.<sup>49</sup> A 2018 study of Toronto’s tech community by MaRS found that nearly two-thirds of black respondents reported experiencing discrimination at their jobs.<sup>50</sup>

To help directly mitigate these consequences, Sidewalk Labs’ approach to driving economic growth starts with an ambitious program for affordable housing and other commitments to diversity, equity, and inclusion. It builds on this foundation with a set of workforce development initiatives designed to help prepare Torontonians for the 21st-century economy.

More broadly, Sidewalk Labs’ vision for growth aims to lower barriers to entry and enable a wide range of innovators to plug into an open platform — with an emphasis on individuals who might not otherwise have access to employment opportunities or the resources to launch a business. Research suggests that clustering industries enhances skills training and non-profit partnerships for employment positions, supporting transitions to higher-skilled jobs. Sidewalk Labs aims to build on this trend by leveraging partnerships with academic institutions, research organizations, and non-profits to support new training and educational opportunities.

By creating the conditions to spur innovation, Sidewalk Labs can enable a range of third parties to discover promising solutions to urban challenges that create brand new career paths for people with a range of backgrounds.

## Affordability and accessibility commitments: Anchored by 40% below-market housing

Sidewalk Labs believes that prosperity must not sacrifice equity — and that thoughtful planning can help both coexist. To help ensure that the IDEA District does not become an elite enclave, Sidewalk Labs has committed to a broad plan for diversity, equity, and inclusion (see Page 82) anchored by a housing program that devotes 40 percent of units to below-market housing.

As described in further detail in the “Buildings and Housing” chapter of Volume 2, Sidewalk Labs’ vision for housing devotes 20 percent of units to traditional affordable housing (a quarter of which would go towards households with “deep” affordability needs) as defined by the City of Toronto. Another 20 percent of units would go towards middle-income households that cannot qualify for affordable housing programs but also cannot afford to pay market rates for rentals or homes.

Additionally, half of all housing units in this program would be purpose-built rentals to improve affordability over the longer term. And 40 percent of units would be “family-sized” at two bedrooms or larger.

In addition to expanding housing affordability, Sidewalk Labs aims to improve the “all-in” affordability of living in the neighbourhood. For example, Sidewalk Labs believes its expanded suite of mobility options — including better walking and cycling infrastructure, public transit expansions, and ride-hail services — would enable households to give up car-ownership without sacrificing their ability to get around. Sidewalk Labs

estimates that a two-person household that gives up a car in exchange for a Sidewalk Toronto [mobility subscription package would save more than \\$4,000 a year.](#)<sup>51</sup>

A complete community must also plan for people of all ages and abilities. To accommodate residents across the lifespan, from seniors wishing to age in place to growing families with young children, Sidewalk Labs plans to incorporate [flexible housing types that can expand or shrink with household needs, co-living units that provide greater community support, and a range of social infrastructure services accessible throughout neighbourhoods.](#) A host of accessibility initiatives would include accessible street features and building entrances for people who use wheelchairs, and new wayfinding tools for people who are visually impaired.

Together these efforts are designed to ensure that the opportunities provided by this economic development plan truly exist for the benefit of everyone — and to demonstrate to cities around the world that prosperity with equity is not just possible but necessary in the digital age.

### Workforce development: Preparing Torontonians for the 21st-century economy

Sidewalk Labs plans to provide workforce development opportunities to ensure the local workforce is equipped with the skills needed to succeed in a 21st-century economy.

[The IDEA District should become a place where more women feel empowered to launch startups and scale prototypes; where workers without college degrees can find apprenticeships in new trades such as mass timber, equipping them not only to complete one-off construction jobs but to launch meaningful careers in an emerging field; where graduate students from other countries can move to conduct research at the Urban Innovation Institute and find a welcoming, affordable community.](#)

By implementing an economic development strategy that is designed specifically to improve access to opportunity, the eastern waterfront and Toronto on the whole could fundamentally redefine development practices, setting a higher standard for economic equity and demonstrating tools and programs that can be replicated around the world.

Sidewalk Labs' economic development strategy has the potential to realize priorities identified by the city, including those articulated in its Official Plan. These include supporting “employment and economic development that meets the objectives of Toronto’s Workforce Development Strategy, including people-based planning and the Vision Statement on Access, Equity and Diversity and promoting infrastructure and support programs to ensure that all Torontonians, particularly equity-seeking groups, such as racialized youth, persons with disabilities, single mothers and newcomers, especially refugees, have equitable access to employment

opportunities”; and recognizing “the full diversity of employment activities that are increasingly taking place in non-traditional employment areas such as homes and public spaces, and strengthening the necessary regulatory frameworks and policies to support this employment.”<sup>52</sup>

Building stronger and more inclusive pathways into both the urban innovation economy and the broader economic opportunities unfolding across the waterfront is critical to ensuring that the wealth created here is broadly shared, as well as to meet growing employer demands for a skilled workforce. Getting into the opportunity pipeline early in life is critical for strengthening economic mobility. At the same time, reskilling mid-career workers to shield them from economic disruption is an increasingly urgent challenge. In Ontario, it is estimated that up to 3 million workers could lose their jobs to automation over the next 20 years.<sup>53</sup>

Increasing worker productivity is also critical in light of Canada’s shifting demographics. In 2016, for the first time in history, seniors over the age of 65 outnumbered children under the age of 14.<sup>54</sup> This has worrying implications for future productivity and the ability of workers to support an expanding population of seniors. The gig economy is also cause for concern. In 2016, for example, nearly all net new job creation in Canada was for part-time roles, according to TD Economics.<sup>55</sup> Developing more permanent, high-quality jobs is essential for promoting broad-based social mobility.

Conceived in close concert with local partners, Sidewalk Labs’ workforce strategy aims to support Torontonians of all ages and backgrounds so that they are trained to compete, and remain competitive in the 21st-century economy. Sidewalk Labs also wants to help employers — from tiny startups to major corporations — fill their talent needs.

[This strategy begins by establishing a proposed non-profit entity, Sidewalk Works, to help those who are currently underrepresented in the tech sector prepare for jobs in the new economy.](#) Working closely with qualified partners, Sidewalk Works would curate and influence skills training to meet real-time employer needs, recruit across the city to broaden workforce participation, and provide access points to the urban innovation economy — all supported by cutting-edge digital tools. It would also champion equity in the tech sector by convening employers in the IDEA District across industries to identify and address common challenges, build their capacity to support and retain diverse candidates, and drive equity through economic opportunity.

This approach continues by opening paths to the skilled trades. Sidewalk Labs plans to ensure that at least 10 percent of hiring goes to those who need these jobs most, with a focus on low-income youths, women, and Indigenous people.

Sidewalk Labs plans to ensure that at least

**10%**

of hiring is reserved for low-income youth, women, and Indigenous people.

Contractors would be required to provide opportunities for mentorships, internships, and other work-integrated learning opportunities, as well as to consider qualified candidates from targeted communities first for professional, administrative, and technical positions — an approach known as “first source” hiring.<sup>56</sup>

Finally, this workforce strategy would be complemented by the rise of a world-leading Canadian industry focused on sustainable mass timber building materials and capable of creating thousands of full-time jobs, including higher-paying jobs in carpentry specialties.

These three main strategies would ensure the IDEA District can support work opportunities for all Torontonians.

# 1

## Expanding opportunity with Sidewalk Works.

Once Quayside is up and running, the workforce development program Sidewalk Works would build an inclusive talent pipeline, support on-site employers in filling real-time needs, and create a culture of inclusion in the workplace. It would work closely with local partners, taking advantage of cutting-edge work in sustainability, mobility, buildings, and technology to build on-ramps into the urban innovation economy.

First, Sidewalk Works would focus on growing and training an inclusive talent pipeline through youth engagement, higher education partnerships, digital recruitment tools, training, and work-integrated learning opportunities. It would work closely with local institutions and community agencies to curate a range of training programs — including boot-camps, online courses, and micro-credentials — that blend the best of face-to-face and online learning and are designed to accommodate students with a variety of schedules, skills, and backgrounds. Sidewalk Works would aim to build strong local collaborations that can help support a diverse workforce, including with the Toronto Public Library and George Brown College to offer skills development courses across the city; with Seneca College to train next-generation building managers and operators; with the CEE Centre for Young Black Professionals and the City of Toronto’s Partnership to Advance Youth Employment program to support training opportunities in tech for youth; and with agencies such as ACCES Employment, Dixon Hall, and Miziwe Biik Aboriginal Employment and Training to build awareness and opportunities for newcomers, low-income people, and Indigenous people.

Sidewalk Works would also work to connect tenant employers with graduates of an entry-level information-technology (IT) certification course called the Google IT Support Professional Certificate, a program developed by Google and Coursera to help non-traditional candidates begin careers in technology. The course is one

component of “Grow with Google,” an initiative to help Canadians acquire the digital skills needed to get jobs or grow businesses. In Canada, approximately 182,000 jobs need to be filled within the IT field in 2019.<sup>57</sup> Many of these jobs do not require a four-year college degree but do require skills and industry-relevant experience. While designed to serve the needs of employers on-site, these and similar partnerships would also pay dividends to the broader tech sector in Toronto by diversifying and accelerating the overall talent pipeline.

Second, Sidewalk Works would aim to ensure that employers can meet their talent needs by gathering information about tenant employer needs through data collection and real-time analysis of current skills gaps as well as direct engagement with human resources executives.

Part of Sidewalk Works would be a service called Talent Connect, a “talent concierge” that can provide curated access to top-tier talent and assistance with navigating government-funded services and post-secondary co-op and work placement programs. Talent Connect would be available to all member firms operating in the IDEA District but would likely be of particular value to small firms that may not have dedicated human resources staff.

Third, Sidewalk Works would work to set a standard for inclusive workplaces and economic equity across the waterfront.

Diversity does not rely only on training and recruitment alone: building an inclusive workplace requires culture change.

An employer consortium would be created to share best practices, convene events, track key metrics, and build the capacity of employers to lead the way in modelling a culture of inclusion.

For its part, Sidewalk Labs is committing to furthering diversity and inclusion in the tech industry by joining RBC, LinkedIn, AutoDesk, and other industry leaders on MaRS’ Inclusion Council. These firms could also join the Sidewalk Works employer consortium if they locate on the eastern waterfront.

Finally, the programs advanced by Sidewalk Works align with the goals of the Future Skills Centre recently announced by the federal government,<sup>58</sup> including developing innovative approaches to help Canadians gain emerging skills in demand now and into the future. While still in the early stages of development, the Future Skills Centre will allocate half of its funding to disadvantaged and underrepresented groups (including up to 20 percent for youth), reinforcing the importance of creating inclusive economic opportunities.

## 2

### Broadening the construction workforce.

The Toronto Board of Trade projects that total construction activity in Toronto in the next 12 years will be 43 percent greater than it was over the past 15 years,<sup>59</sup> with an anticipated 147,000 job openings in 500 construction-related occupations. Development across the full scale of the IDEA District could lead to further shortages in skilled labour, generating ripple effects throughout the regional economy. This demand for labour, combined with a rapidly aging population, creates not just an opportunity but a competitive imperative to build and train Toronto's construction workforce of the future.

In Canada, women account for approximately 13 percent of the construction workforce,<sup>60</sup> and Indigenous people account for roughly 3 percent. Nationwide, just 9 percent of workers in the building trades are visible minorities,<sup>61</sup> despite the fact that visible minorities make up roughly 22 percent of the general population.<sup>62</sup> To help address this imbalance, Sidewalk Labs plans to build on the Waterfront Toronto Employment Initiative, working with Construction Connections (a unique construction-sector workforce development program managed by the city and the province) and Toronto Employment and Social Services, to target at least 10 percent of construction hours for racialized youth, women, and Indigenous people.

Sidewalk Labs also plans to work with other partners in the employment and labour sectors to support training opportunities for women, racialized youth, and Indigenous people; these groups include the College of Carpenters and Allied Trades, Building Up, Dixon Hall, and Miziwe Biik Aboriginal Employment and Training. Sidewalk Labs proposes to require that contractors provide opportunities for mentorships, internships, and other work-integrated learning opportunities and implement a first-source hiring approach for professional, administrative, and technical positions.

## 3

### Catalyzing the mass timber industry.

Canada owns about 37 percent of the world's certified forests, defined by the international Forest Stewardship Council as areas that can be harvested for wood in a sustainable way, with proper spacing to regrow trees and with access to existing railways or roads to transport supplies. Canada is also a world leader when it comes to ensuring innovative and sustainable forestry management practices that safeguard our wood resources for future generations.

But while Canada harvests nearly 800,000 hectares of timber per year, the majority of that supply is devoted to framing lumber, such as simple two-by-fours or plywood. As a result, Canada

Factory-based construction of mass timber building parts could ultimately lead to higher-paying factory jobs for new advanced carpentry work.



currently imports mass timber parts from Austria and other production centres instead of producing them itself.

**A new Ontario-based mass timber factory would support 2,500 person-years of full-time employment over 20 years.**

**In Quayside, Sidewalk Labs intends for the entirety of the planned 2.6 million-square-foot neighbourhood to be built from mass timber,** demonstrating beyond previous efforts the viability of this sustainable building material for a variety of uses and forms. The hope is that this proof of concept would spur a more rapid adoption of this material, enabling Canadian industry growth commensurate with its natural resources.

With a commitment for the proposed development scale of the River District, Sidewalk Labs is prepared to catalyze industry growth with an investment to create a new Ontario-based factory for modular mass timber construction. To be opened prior to the construction of Quayside, this factory would ensure the delivery of a mass timber supply chain for building construction along the eastern waterfront and beyond.

Sidewalk Labs believes that the domestic supply of mass timber products produced in such a factory would support an estimated 2,500 person-years of full-time employment over a 20-year period.

The launch of this factory would have additional benefits for local workers. As described more in the “Buildings and Housing” chapter of Volume 2, an enhanced mass timber industry could ultimately lead to higher-paying factory jobs for new advanced carpentry work and bring about new local suppliers of timber as well as competing factories over time. Finally, by accelerating development across the IDEA District, a factory would catalyze an estimated 5.2 million total work hours for all factory-related trades.

# Sparkling a Cluster in Urban Innovation

By building on Toronto's existing innovation ecosystem, creating the conditions for innovation, launching a new applied research institute, and establishing a new venture fund for local companies, Sidewalk Labs' plan for the IDEA District can catalyze a cluster focused on urban innovation — and establish an economic engine that drives growth far beyond the eastern waterfront.

# Introduction



## Strategies

- 1 Invest in a cluster-based approach
- 2 Build on Toronto's existing innovation ecosystem to grow the field
- 3 Create the physical, digital, and policy conditions for urban innovation
- 4 Launch an Urban Innovation Institute as a portal for learning and research
- 5 Establish a new venture fund for local, early-stage enterprises
- 6 Benefit Toronto companies and catalyze new ones

The city's Official Plan articulates the potential for a cluster-based approach to drive meaningful impact in Toronto: "Today, the real competitive advantage for urban economies lies in the foundations that support growth in economic clusters that bring new wealth to the region: a well-educated, highly-skilled labour force; research and development leading to innovation; access to financial capital; adequate infrastructure, including advanced information and communications networks; a dynamic business climate; an enviable quality of life; and safe, cohesive, congenial and inclusive neighbourhoods."<sup>63</sup>

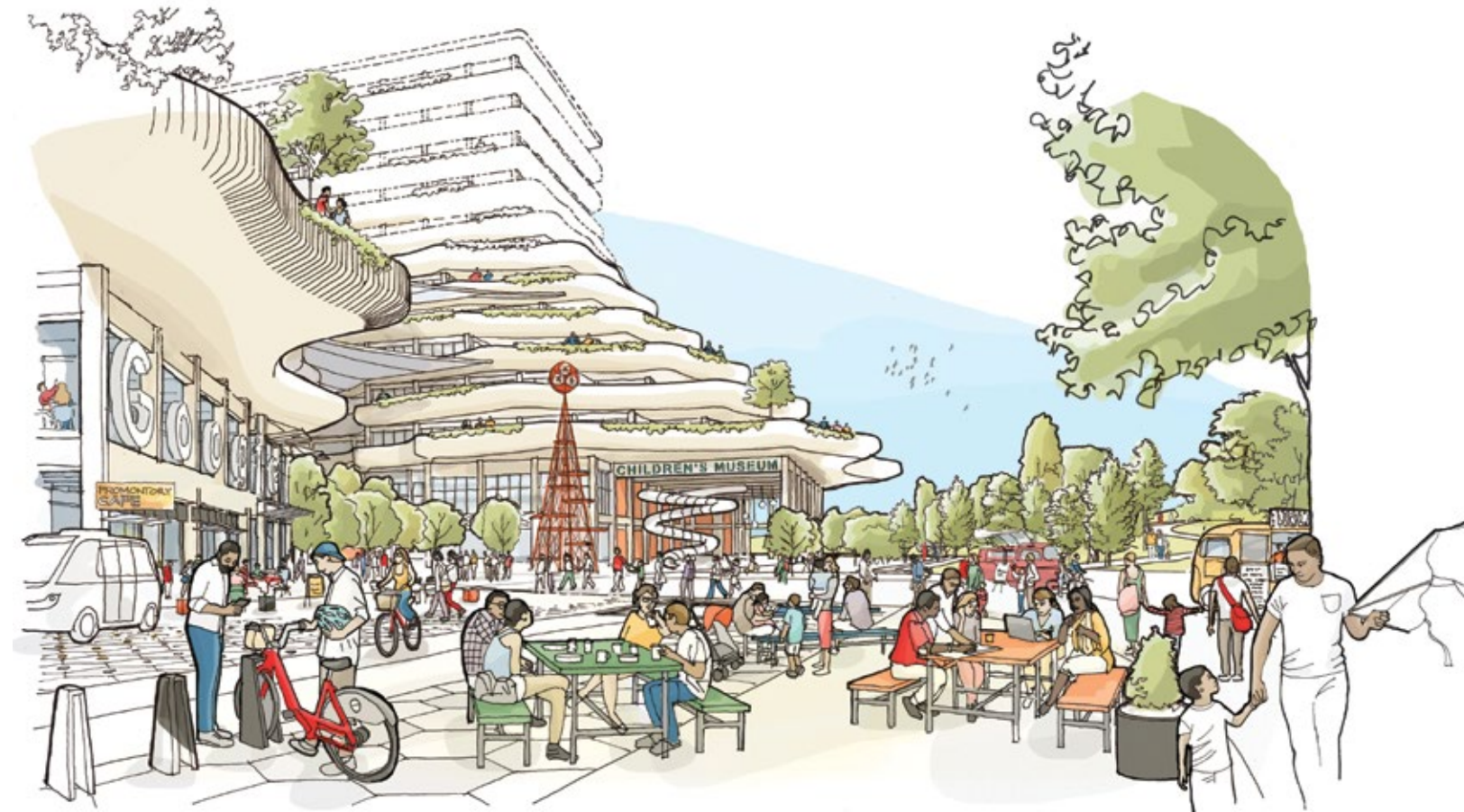
Consistent with these objectives, Sidewalk Labs' approach to sparking a new cluster for urban innovation along the waterfront draws inspiration from global examples of successful clusters but is specifically designed to address the challenges to improving life in cities today. This approach can shape the future of the field, create thousands of jobs, and drive economic opportunity well beyond the waterfront. Part 2 of this chapter outlines the steps necessary to catalyze such a cluster.

First, this cluster would be designed to build on top of Toronto's existing innovation ecosystem, including its world-class academic and research institutions and its support from all levels of government, towards promoting related technology industries.

To build on that foundation, Sidewalk Labs would integrate the unique physical, digital, and policy conditions — found nowhere else at scale throughout the world — necessary to help researchers, entrepreneurs, startups, civic organizations, government agencies, and all third parties tackle difficult urban challenges.

Beyond these unique conditions, Sidewalk Labs plans to further spark this cluster through seed funding for a new Urban Innovation Institute focused on applied research for urban innovation as well as a new venture fund to support local, early-stage enterprises.

*Sidewalk Labs believes the combination of these ingredients will create the conditions for innovation, catalyzing economic activity in Toronto, driving meaningful contributions to the field of urban innovation globally, and drawing innovators from around the world to research, invest, explore, build, and scale ideas that can improve the quality of life in cities.*



Villiers West has the potential to catalyze economic development across the region, anchored by the new Google Canadian headquarters and an Urban Innovation Institute designed to connect seamlessly with the new Promontory Park.

## A new urban innovation cluster would build on and expand Toronto's already robust startup and innovation ecosystem.



## Defining the field of urban innovation

Sidewalk Labs was established with the belief that integrating forward-thinking urban design and technological solutions can address big urban challenges and improve quality of life in cities around the world. This set of solutions informs [Sidewalk Labs' definition of urban innovation, broadly described as the interdisciplinary approach to integrating innovations that address all aspects of life in cities into the urban fabric.](#)

By some measures, the field of urban innovation is now the biggest tech sector on the planet, attracting more venture capital investment than high-growth fields like biotech and artificial intelligence. After all, [urban innovation sits at the intersection of two of the defining trends of the 21st century: global urbanization and technological change.](#)

Much more than just the pursuit of urban efficiencies associated with “smart cities,” urban innovation is a diversified set of industries — from mobility to waste management to construction and beyond — in the process of being redefined by capabilities such as ubiquitous connectivity, machine learning, sensing technology, and digital fabrication. Between 2016 and 2017, urban tech's share of global VC funding surged from 13 percent to 22 percent.<sup>64</sup> And this is just the start: as mentioned in the chapter introduction, by 2025, the sector's market value is projected to grow to over \$2 trillion USD.

Just as Sidewalk Labs has employed a comprehensive approach to urban planning that integrates innovations across its core focus areas, advancements in the emerging field of urban innovation often require bringing together players, expertise, and disciplines that might not otherwise intersect in traditional planning practices. The new technologies or solutions that emerge out of this approach are driven by interdisciplinary collaboration and reflect coordination across many stakeholders — public, private, and non-profit sectors alike. They reflect iteration and testing enabled through access to a large-scale, real-world urban environment. And they fall along a broad design spectrum: from highly technical solutions like mobility management systems to more systemic solutions like enabling a new pipeline for mass timber construction.

For example, consider the various players and resources that need to be in place today to make meaningful improvements in housing affordability. Government agencies, financial institutions, private and non-profit developers and operators, housing experts, residents, and community stakeholders all play a part. Developing affordable units today often looks like a series of handoffs between these players, ranging from governmental approvals to redesign processes.

The process of driving affordable housing innovation could be fundamentally different within an urban innovation cluster. Sidewalk Labs' own strategy creates new financial tools for below-market housing programs, including factory-driven land value, condo resale fees, and affordability by design. It also drives meaningful public-private partnerships, as with the proposed Waterfront Housing Trust and collaboration model with the non-profit sector. These proposed approaches mobilize governments,

developers, academics, and non-profits to work together — and thus more powerfully — to solve a major challenge in Toronto.

Housing affordability is just one aspect of urban life that could benefit from advancements in the field of urban innovation. [Establishing a cluster for urban innovation could provide the necessary conditions and resources to significantly accelerate the pace and frequency of developing innovative solutions to address a wide range of urban issues — from traffic congestion to building design to greenspace access — and further the development of the field overall.](#)

**An urban innovation cluster could accelerate the pace of developing innovation solutions for a wide range of issues, from traffic congestion to greenspace access.**



## Strategy 1

Sparking a Cluster  
in Urban Innovation

# Invest in a cluster-based approach

Economic clusters are dense ecosystems of companies, researchers, investors, suppliers, and anchor institutions working together in a similar field. As theorized by economist Michael Porter, clusters boost firm productivity in three ways.

First, the sharing of suppliers, facilities, and infrastructure creates economies of scale that can be realized by firms of all sizes and maturities. Second, clusters enable the pooling of workers with relevant skills and experience, often supported them through specialized degree programs. Finally, clusters accelerate learning driven by physical proximity, vigorous competition, and advanced research by anchor institutions with industry-relevant expertise.

Co-location thus creates outsized gains for cluster participants and accelerates the pace of industry innovation, boosting regional economic performance (including through higher levels of wage and employment growth as well as spillover benefits to related economic sectors) and serving as a critical lever for foreign investment. Across a range of industries, as clusters grow and become more specialized, efficiency and productivity have been demonstrated to increase at an average of 4 to 5 percent.<sup>65</sup>

The benefits of cluster growth apply to fields far beyond computers and technology. In industries as varied as health care, manufacturing, agtech, and more, the cluster model has demonstrated potential for driving transformational impact within a given municipality or economy.

Sidewalk Labs' own approach draws inspiration from several precedents, including cities that are comparable to Toronto in quality of life, innovation culture, and concentration of tech workers, such as Seattle, Boston, and Stockholm, as well as global examples of clusters in other industries, such as Houston's health care hub or the growing agtech hub in St. Louis.

Cities best able to realize the benefits of the cluster are those designed as open systems — with structures and resources in place to not only allow for co-location but to encourage collaboration between firms, institutions, academics, and the public.

In addition to improving regional employment growth over time, economic clusters have the added benefit of improving resilience against potential downturns, contributing to higher rates of employment growth during recessions as compared to economies of other cities as well as faster than average growth rates in the wake of a recession.

Core to the economic resilience of a cluster or economy is the number and vitality of small firms that make up a cluster. While a single company or institution may serve a catalytic role in the creation of a cluster, larger firms may be more vulnerable to external events. Over time, the growth of startups and spin-off businesses is crucial to improving the economic resilience within a given industry or geographic area.

Take Seattle, where major players like Boeing and Microsoft were instrumental in the city's emergence as a globally significant leader in both tech and aerospace. The concentration of talent and expertise drawn to Seattle by these two anchor firms has since spurred the spin-off of over 4,000 companies. The growth of smaller, earlier-stage enterprises has contributed both to the resiliency and overall growth of the tech industry — which rose over 33 percent between 2011 and 2016.<sup>67</sup>

Canadian policy-makers are already focused on the critical importance of traded clusters for economic growth. The federal government's recently announced Innovation Superclusters Initiative, for example, commits close to \$1 billion to support five new innovation "superclusters," from ocean-based industries in Atlantic Canada to digital technology in British Columbia.<sup>68</sup> There is a concerted regional effort to transform the 110-kilometre Toronto-Waterloo Innovation Corridor into one of the world's leading technology clusters. Local planners and

## Best practice spotlight

# Houston: A health-care cluster that generates \$20 billion USD annually

In Houston, over 60 member institutions make up a health-care cluster, anchored by the Texas Medical Center Corporation, that employs over 110,000 people and contributes \$20 billion USD annually to the regional economy.

Mixed-use facilities throughout the cluster, all connected by a privately operated transit system, encourage collaboration on shared research priorities that are both relevant to individual members and strategically important to the promotion of Houston's competitiveness on a global scale. Making collaboration across industries more convenient and more valuable has been critical to advancing these goals, spawning groundbreaking work in new fields such as genomics and regenerative medicine, and raising Houston's global profile in health care.

The cluster's success has prompted plans for a new innovation centre, TM3, a 12-hectare campus to support commercialization of research and attract new venture capital entrants. TM3 alone is expected to add an additional \$5.2 billion USD and nearly 30,000 jobs to the local economy, a testament to the virtuous economic cycle created by the cluster's success in supporting an open ecosystem for innovation.<sup>66</sup>



The Texas Medical Center Corporation anchors Houston's health-care cluster. Credit: Monica and Michael Sweet via Getty Images



policy-makers are also leveraging the cluster model to drive economic growth. The Port Lands Planning Framework speaks to the benefits of economic clusters, including the “live-work synergies that will be created with the diversity of employment clusters and uses proposed both in proximity to the new communities, but also in the communities themselves.”

But despite the impressive growth in the field of urban innovation, no city or region has come to dominate the market. Some cities are focusing on subsets of urban technology such as self-driving vehicles (in Detroit), drones (in Calgary), or modular construction (in Singapore). Many more are changing their regulations to accommodate disruptive outsiders such as Uber or Airbnb or are developing “smart city” master plans to incorporate technology into municipal operations. But very few have seized on urban innovation, broadly defined, as an industry in and of itself.

*Sidewalk Labs believes that the conditions it plans to help create within the IDEA District will position Toronto to be that place, growing a world-leading cluster in urban innovation that delivers outsized economic benefits to the region.*

## The challenges facing urban innovators

Clusters are difficult to create in their own right. But for many reasons, the creation and expansion of a cluster in urban innovation poses an even greater set of challenges.

First, urban innovation often requires integration with the built environment, increasing the cost of prototyping, requiring greater coordination among more stakeholders, and making it difficult to test and commercialize early-stage concepts. It can be far more difficult to prototype a new system for flexible, rearrangeable walls in ground-floor retail space, than it is to test a new app on iOS.

Second, urban innovation often requires close coordination with government and existing policy. Take an innovation that is focused on creating more sustainable and cost-efficient street lights that provide brighter and safer night-time environments while using less power. Innovators often must coordinate with formal or informal authorities, even for early testing, to secure necessary input, buy-in, authorization, or permits. Coordination becomes more complicated and time-intensive as innovators move from testing to scale and as new stakeholders introduce additional constraints or complexities.

Finally, unlike other disciplines where innovators are encouraged to fail fast, urban innovation can have higher stakes. Changes to construction technologies

that inadvertently compromise structural integrity are not acceptable — unsafe buildings have significant real-world consequences. The same holds true for self-driving vehicle testing and other innovations that operate in public space.

To help potential innovators overcome these challenges, Sidewalk Labs’ approach to creating an urban innovation cluster on the waterfront is focused on creating the core physical, digital, and policy conditions — in coordination with government. Together these conditions safely minimize and mitigate barriers to urban innovation, increase the ability for a diverse set of entrepreneurs and companies to explore new ideas, encourage the sharing of lessons learned, and accelerate the potential for breakthroughs.

**Sidewalk Labs would work to mitigate barriers to urban innovation, support a diverse set of entrepreneurs and companies, encourage lesson-sharing, and accelerate potential breakthroughs.**

*Sidewalk Labs believes an urban innovation cluster would be even more diversified and resilient than a normal economic cluster, spanning a wide range of sectors, building on Toronto’s competitive strengths, and responding to a global demand for city life that is only expected to grow in the coming years. Seeding the urban innovation economy in Toronto would significantly contribute to local efforts to catapult the Toronto-Waterloo Innovation Corridor onto the global stage, generating a wave of new startups and creating strong incentives for Canadian innovators to stay at home.*



Strategy 2

Sparking a Cluster in Urban Innovation

# Build on Toronto's existing innovation ecosystem to grow the field

Toronto has many of the necessary assets to drive urban innovation: a network of world-class education and research institutions focused on urban issues, demonstrated commitment from government partners, and the fastest-growing technology economy of any city in the world.

Toronto's overall population growth is an asset in and of itself, supporting economic activity citywide and a diversity of residents and visitors. Combined with a growing startup ecosystem and ongoing government commitments, the city's innovation ecosystem is positioned for continued growth and advancements in urban innovation.

The economic engine Sidewalk Labs envisioned for the IDEA District would build on these assets — leveraging partnerships with academic institutions, government partners, and innovators of all types, and creating a physical space and network for experimentation and collaboration.

## Leading talent and universities

Toronto is home to a wide network of world-class academic and research institutions, which have consistently placed the city as a global leader in higher education. At the provincial level, Ontario is planning a 25 percent increase in the number of science, tech, engineering, and math graduates over the next five years.<sup>69</sup>

A technology ecosystem is a core component of growing capabilities and expertise in urban innovation. And while Toronto's academic network already embraces technology and other related fields, recent commitments demonstrate a newfound focus on urban innovation. Leading institutions have invested in expanded departments, new curricula, graduate programs, and research opportunities in urban innovation-related fields.

The University of Toronto alone now has more than 200 faculty and researchers devoted to teaching and research in urban innovation and related disciplines.<sup>70</sup>

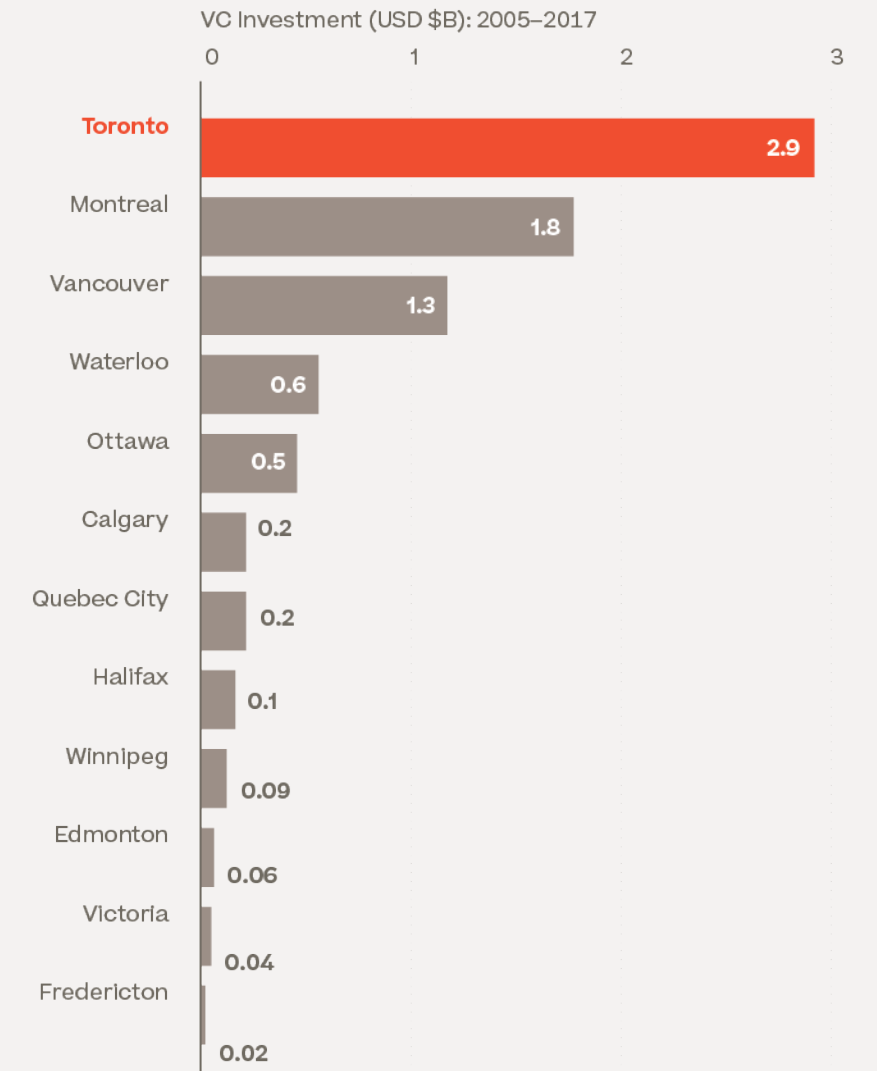
Further, designated departments like Ryerson University's Centre for Urban Innovation and the University of Toronto's School of Cities, among others, have emerged to drive local thought leadership.

The result of Toronto's growing leadership in urban innovation is the establishment of a robust talent pipeline. These institutions and others have supported a dramatic increase in the number of graduates in technology-related fields — up 35 percent from 2011 to 2015.<sup>71</sup>

Not only does Toronto's academic network produce top talent, it also draws top academics, researchers, and students from around the globe, in part enabled through Canada's progressive policies that promote inclusion and make it easier

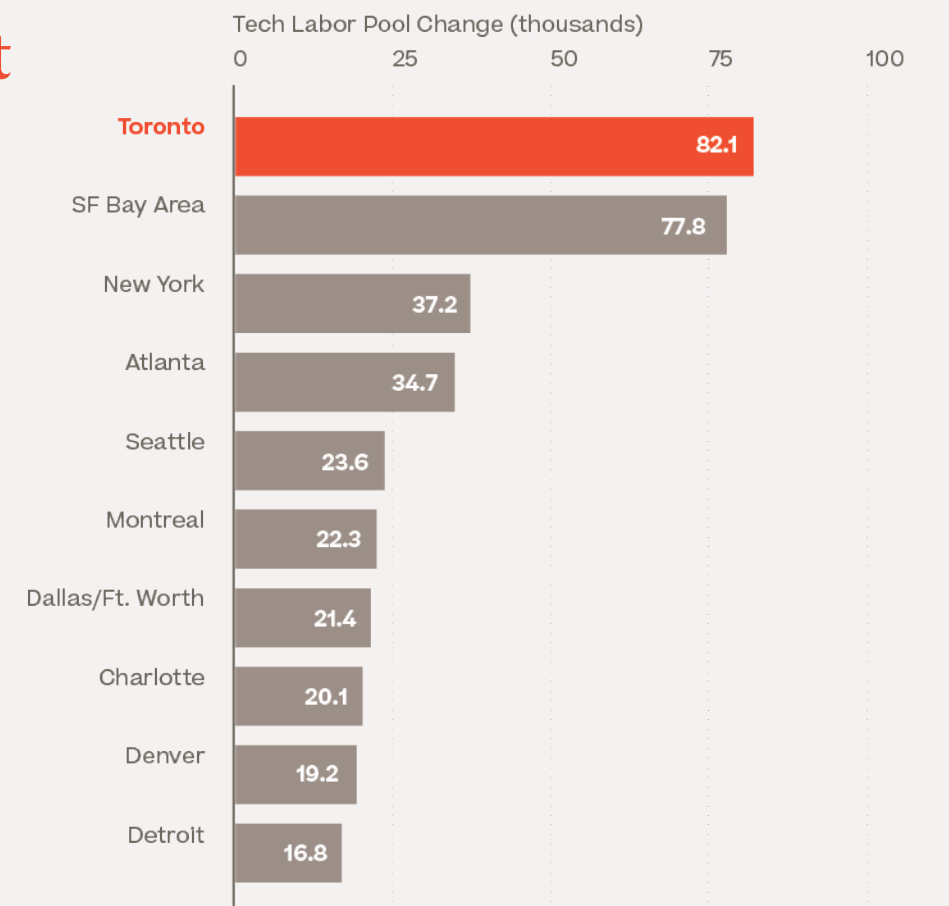
## Toronto is home to nearly 40% of all VC investment in Canada

Between 2005 and 2017, enterprises in Toronto received nearly \$3 billion USD in VC funding, representing nearly 40 percent of all VC investment in Canada over that time period.



## Toronto's tech talent pool has outpaced all North American cities since 2012

Since 2012, the growth of tech talent in Toronto has outpaced that of all other North American cities with leading technology industries, supporting a range of occupation areas, including software development and programming; computer support, databases and systems; engineering; and computer and information system management.



for innovators from around the world to study, live, and work in Toronto (particularly compared to the U.S.).

As a result, Toronto is home to one of the most diverse talent pools in the world, which in turn, makes Toronto's talent pool more attractive to a wider range of employers local and international alike.

## Toronto's growing tech and startup ecosystem

The rapid growth of Toronto's tech and innovation ecosystem has created a gravitational pull drawing top talent and further investment to the region, which provides an important foundation for the growth of urban innovation as a field. In 2017 alone, Toronto added over 28,000 tech jobs, and it is now home to over 240,000 tech workers, representing an increase of more than 50 percent over the past five years.<sup>72</sup>

Toronto's tech sector has demonstrated growth among firms large and small. Several major tech companies — including Shopify, Microsoft, Uber, Pinterest, LG, and Instacart — have established or expanded their footprints in Toronto in the past three years.<sup>73</sup> These and other players have increasingly sought to invest in local talent and innovation projects, announcing more than \$1.4 billion of new investments in September 2018 alone.

As a result of these investments and other factors, Toronto boasts a robust ecosystem for local startups and is home to an estimated 2,500 to 4,100 of them.<sup>74</sup>

Based on trends in 2018, Toronto-based companies attract about half of venture capital funding in Canada.<sup>75</sup> These startups are supported by an ever-growing network of incubators and accelerators, with the ecosystem anchored by large local players such as the MaRS Discovery District, the Vector Institute, and OneEleven, as well as by new entrants such as Techstars.

## Government support and funding

Engaged partners at all three levels of government who are committed to promoting the success of high-growth industries, including tech, have made significant investments to grow a culture of innovation. Government support focuses primarily on a specific pain point unique to the Canadian innovation ecosystem: while Canada produces startups in comparable numbers to other cities, small enterprises struggle to evolve into major companies backed by outside capital with global presence, in part due to a lack of access to large customers (such as governments or larger companies) that would create sufficient demand to grow the business.

As a result, governments have prioritized investments in improving access to capital and customers. For example, the Canadian government recently contributed over \$400 million to the Venture Capital Catalyst Initiative,<sup>76</sup> which provides funding for local cleantech firms, and \$1.1 billion to the new Trade Diversification Strategy, a federal program to help Canadian businesses export to new markets.<sup>77</sup> Further, Canada has seen a rise in the number and variety of innovation “sandboxes” — interdisciplinary

accelerators that are created by design and technology firms (with support from governmental partners) to enable regulatory innovation and experimentation.<sup>78</sup> Each of these investments demonstrates prioritization of the tech ecosystem among government leaders and the potential for Sidewalk Labs' own efforts to leverage partnerships in support of shared values.

**Since 2012, the growth of tech talent in Toronto has outpaced that of all other North American cities.**

Toronto's tech ecosystem by the numbers:  
 → Over 240,000 tech workers  
 → 50% job growth in the past five years  
 → Up to 4,100 startups  
 → \$1.4 billion of investments in September 2018 alone



### Strategy 3

Sparking a Cluster  
in Urban Innovation

# Create the physical, digital, and policy conditions for urban innovation

Although Toronto has many of the assets needed to grow a cluster in urban innovation, the IDEA District envisioned in Sidewalk Labs' proposal would provide a unique environment that allows these raw materials to reach new levels of output.

The district would provide an integrated set of specific physical, digital, and policy conditions that together form a platform for urban innovation on which others can act and experiment, creating a magnet for innovators from around the world.

## 1

### Physical conditions.

In its plans for Quayside and proposed approach to the broader IDEA District, Sidewalk Labs has emphasized flexibility and adaptability in the built environment to create the conditions for rapid innovation. Spaces across buildings, mobility networks, and the public realm are designed to meet the needs of the community today, adapt to the changing needs of the community over time in a less costly and disruptive manner, and create opportunities to explore new ideas.

For example, in Quayside, Sidewalk Labs plans to prototype two new types of building space, stoa and Loft, specifically designed to enable buildings to change uses over time. As described on Page 160, stoa is flexibly designed lower-floor space that can make it easier for businesses of all sizes to meet their needs. The easy ability to reconfigure the space provides an opportunity for innovators to prototype new products and services that leverage this flexibility, such as apps that could manage leasing at a micro-scale, or flexible-panel and furniture systems that allow businesses to affordably change their layouts for one-off events.

Beyond the walls of any individual building, dynamic pavement and curbless streets enable greater flexibility in the way roads can be managed, providing not only space for mobility innovators to rethink urban transportation but a canvas for all residents to rethink how the community can re-use space that today is dedicated to parking or vehicle traffic.

Beneath the street, open access channels would house a full range of utilities, from fibre-optic cable to pneumatic waste tubes, in shared space. Locating these systems under removable pavers allows for easy access and greater flexibility to incorporate new systems as they are developed over time.



See the "Digital Innovation" chapter in Volume 2 for more details on the proposed responsible data use process.

## 2

### Digital conditions.

Sidewalk Labs firmly believes that the success of the IDEA District as the hub of an urban innovation cluster should be measured not by the number of Sidewalk Labs' technologies deployed within the district but by the number of innovations created by others. But just like with ecosystems, such as the World Wide Web and the iPhone, third parties depend on open hardware and software as well as on an agreed-upon set of standards and protocols to successfully deploy their ideas.

Sidewalk Labs understands that setting the right governance standards for data and privacy is not the role of a private company — that is why it has proposed the idea of an independent Urban Data Trust to oversee responsible data use in the IDEA District and why it encourages strong action on the part of the Canadian government. But Sidewalk Labs also recognizes its role in creating the right conditions for digital innovation. That is why it has prioritized core digital infrastructure, published standards, and a limited set of launch services.

This proposed infrastructure includes a powerful ubiquitous connectivity network that leverages new advances to improve speed and security, as well as a standardized mount system that reduces the cost of deploying innovations and eliminates vendor lock-in. A set of published

standards around open-data architecture, access, and sources enables third parties to build upon a shared foundation, supported by a common set of security, formatting, and communication standards. Data generated by the launch services would be made publicly accessible (with the proper protections, including de-identification), further catalyzing third-party creation.

## 3

### Policy conditions.

Core to the premise of the IDEA District is an empowered and forward-thinking public administrator that can prioritize innovation and new approaches without compromising the public interest. Many existing urban regulations and policies — such as zoning, building code, and automobile regulations — were designed in an earlier era, when the primary way to achieve necessary public policy outcomes involved sweeping, one-size-fits-all regulations.

These policies — designed around important objectives, such as protecting the public from industrial hazards or over-developing attractive residential areas — now sometimes limit the ability to find creative solutions to the very same problems they attempted to mitigate. Today's digital capabilities enable these policies to achieve their intended outcomes in more flexible ways.

For instance, advanced modelling can help ensure that neighbourhoods and buildings are designed to get adequate greenspace and sunlight without rigid built-form bylaws. Similarly, real-time building sensors that monitor for noise can mitigate the potential downsides of a mixed-use district that accommodates production and light manufacturing, enabling more fluid zoning.

Sidewalk Labs is committed to working with policy-makers and to demonstrating the enormous opportunity available to innovators to create positive outcomes when they work hand in hand with government.

### Accelerating the pace of innovation

Together, these three conditions would create a platform for urban innovation that accelerates the development speed and magnifies the impact of new services, tools, and products in the IDEA District.

Consider the various people and organizations that are needed to collaborate on a meaningful solution to traffic congestion: infrastructure and construction companies, municipal regulators and public safety officials, public or private financiers, automotive manufacturers, and technology companies with data or modelling tools to forecast traffic patterns, among many others.

Convening and enabling collaboration among such a wide array of stakeholders tend to occur when the right people meet the right experts, champions, or partners in different fields; when collectively they see the mutual value of collaboration to deliver new breakthroughs; and when they have a physical environment that enables their ideas to be implemented.

The cluster for urban innovation that Sidewalk Labs envisions for the IDEA District would provide exactly this forum: the unparalleled physical space and common conditions required to spur the collisions necessary to drive urban innovation, out-sized economic growth, and better outcomes for residents, workers, and visitors.



#### Strategy 4

Sparking a Cluster  
in Urban Innovation

## Launch an Urban Innovation Institute as a portal for learning and research

Urban innovation is a field in which applied research, commercial product development, policy development, and new skills development all play a role. To focus all these areas around the most pressing issues facing cities, Sidewalk Labs proposes the creation of an Urban Innovation Institute: an applied research centre focused on urban innovation, uniquely located within a broader environment designed to enable the iterative development of new solutions to urban challenges. Sidewalk Labs believes that, over time, the institute could become perhaps the most critical anchor within the IDEA District for a cluster of economic activity focused on urban innovation.

*The Urban Innovation Institute would be the vehicle through which academics, industry leaders, entrepreneurs, and civic actors could access, contribute to, and export the learning made possible throughout Quayside and the IDEA District.*

In an ecosystem filled with world-class educational institutions engaged in directly relevant subject areas, the Urban Innovation Institute can become the epicentre of integrated, applied research focused on innovative solutions to urban issues. As urbanization increases worldwide, such a knowledge centre in Toronto would have global relevance, building the field of urban innovation, attracting talent from around the world, exporting replicable solutions, and cementing Toronto's leadership profile.

The Toronto institutions collectively focused on urban issues are engaged in critical work and study around health, cleantech, fintech, infrastructure, economic development, policy, hardware and software engineering, and any number of other fields with relevance to urban innovation. Embedded within the IDEA District, the institute can be the venue through which researchers, students and entrepreneurs from the vast array of universities and colleges throughout Toronto and Ontario — the University of Toronto, Ryerson, George Brown, OCAD, the University of Waterloo, as well as stakeholders such as MaRS and Evergreen — can research, test, develop and scale concepts that fundamentally require the integration of all of these areas.

*Sidewalk Labs envisions the Urban Innovation Institute as an independent, non-profit, applied research centre with degree-granting accreditation, and believes it should be designed in collaboration with local academic institutions and stakeholders, both for research purposes and for participation in collaborative degree programs.* Once established, the institute could become a critical resource for all of the actors within the Toronto urban innovation ecosystem, providing a unique research and commercialization venue, generating new insights to inform curriculums across

#### Key Term

### Urban Innovation Institute

A proposed independent, non-profit, applied research centre focused on urban innovation, designed in collaboration with local academic institutions and stakeholders.

traditional boundaries of discipline, and serving as a canvas for new areas of study to emerge.

Based on engagement and inquiries to date, Sidewalk Labs believes that the Urban Innovation Institute would also attract the participation of premier educational institutions from around the world. Sidewalk Labs plans to provide upfront financial and convening support to catalyze the creation of the institute, and is committed to helping facilitate the institute's long-term growth, but does not expect to play any role in its governance or operations once established.


## The role of the Urban Innovation Institute

The institute would play several roles within the district's urban innovation cluster and the broader Toronto innovation ecosystem, as a unique hub of applied research, innovation commercialization and policy acceleration, and skills training for entrepreneurs and workers of the future.



### Applied research.

The Urban Innovation Institute would be an organizing mechanism to enable flexible research partnerships across boundaries — whether disciplines, institutions, sectors, or funders — and the development of curriculum to complement those of other institutions. The IDEA District would provide numerous opportunities for the Urban Innovation Institute to be the vehicle through which to structure third-party access and collaborations.

For example, the opportunity for data collection within the IDEA District may have value for research purposes. Through a formal arrangement between the Urban Innovation Institute and the Urban Data Trust, appropriate guidelines, policies, and protocols could be established and enforced to facilitate approved research endeavours. Working in concert with civic organizations and the public and private sectors, the Urban Innovation Institute could conduct research that contributes to the development of replicable operating models that unlock the value of data to address urban issues. 

The expertise in conducting research with urban data sets developed within the Urban Innovation Institute would likely make it a sought-after venue for the trusted evaluation of relevant research data sets beyond those generated within the boundaries of the project.

For example, Quayside could provide the full set of tools needed to understand the linkages between the built environment and community well-being. If a public health researcher wishes to study the impact of local air quality on student learning, such an effort is often hampered by the availability of and access to local urban data. The urban data collection made possible by the IDEA District's infrastructure and data governance model would provide ongoing access to data streams, enabling this type of information to be applied for purposes such as research, predictive analytics, and resource allocation.

Moreover, the proposed Urban Innovation Institute would enable cross-cutting research that could bring together public health, health service delivery, urban planning, environmental, and data analytics expertise to advance this field of research and practice. Sidewalk Labs has begun conversations with the public health community and proposes developing a framework for these cross-disciplinary collaborations and pilots that can inform health research and public health planning and response.



### Product research and development.

The Urban Innovation Institute can serve as the mechanism through which entrepreneurs, companies large and small, and organizations can develop prototypes, test new concepts, or connect with others to realize combined value.

As described above, the IDEA District creates the conditions for rapid prototyping — complete with digital infrastructure, a defined approvals process, ubiquitous high-speed connectivity, modular pavement with heating or lighting capabilities, dynamic curbs, and buildings with energy optimization systems, among other features. As ideas proven out in Quayside and Villiers West are adopted throughout the IDEA District, the number of new prototypes being developed on top of these initial services, tools, and products only stands to increase.

In collaboration with Toronto's rich array of innovation-oriented incubators, the Urban Innovation Institute can help match entrepreneurial research and development with practical applications.

For example, it is currently extremely difficult to test the early-stage commercialization of concepts for urban infrastructure; by definition, infrastructure has to perform as required, with little tolerance for risk. Quayside's core conditions would make it possible to test whether new devices for urban infrastructure — new traffic-management devices, new types of sidewalk furniture, even new network utilities — work with the reliability and accuracy that urban hardware requires in a safe way.

Similarly, the last decade has seen an explosion of new tools that operate in public space, from e-scooters to smart garbage cans. Early deployments of these ideas tend to rely on trial and error, with both new uses and negative consequences slow to be noted and documented. The IDEA District's infrastructure, management, and population make it the perfect setting to understand interactions between pedestrians and self-driving vehicles; new wayfinding techniques; new accessibility designs; and new on-demand businesses that might make use of the neighbourhood's freight system.



**Policy research and development.**

The research and development surrounding urban innovation is not limited to those with commercial intentions. Equally important are opportunities for policy makers, public sector entities, civic institutions, academics, and non-profit organizations to undertake research and participate in product research and development.

*Developing effective governance and policy approaches to enable innovation in cities is critical, and the effective adoption and management of urban innovation requires new public and civic tools, skills, processes, and approaches. Playing a role in such civic dialogue would be a critical element of the mission for the Urban Innovation Institute, which can potentially also be relied on by the public sector to monitor and evaluate the outcomes achieved within the IDEA District.*

The Urban Innovation Institute can connect multiple elements of the ecosystem required to enable practical product development and to undertake research. As the middle point between entrepreneurs, academics, funders, policy-makers, and government administrators — as well as the array of innovation incubators such as MaRS — the Urban Innovation Institute can make a substantial contribution to the development of Canadian intellectual property.



**New skills development.**

Sidewalk Labs believes that the same conditions within the IDEA District that will foster applied research and product

development could also help inform curriculum throughout all levels of education and academia. *The Urban Innovation Institute could provide an array of coursework to integrate with programs such as those offered by the University of Toronto's School of Cities or its Master of Urban Innovation program, or to enable cross-disciplinary coursework or field work to supplement Ryerson University's Centre for Urban Innovation curriculum.*

Over time, the Urban Innovation Institute could develop a breadth of graduate level coursework and models for cross-disciplinary research to support collaborative degree granting programs. Through these programs, the institute could become an asset to help Toronto's institutions attract and retain faculty and students, building a world-leading brain trust and local network focused on the practical application of urban innovation.

The IDEA District also presents unique opportunities to translate the insights gained across many fields — such as environmental studies, civil and digital engineering, physical and digital design, and the integration thereof — into curriculums, internships, and practicums for pre-university students from a diversity of backgrounds. These same insights can also serve as the basis for training programs for adults seeking new, forward-facing technical skills, potentially in collaboration with Sidewalk Works and the numerous Toronto organizations focused on workforce development.

From inception, the mission of the institute would include this type of knowledge development as a core part of its focus.

**Creating the Urban Innovation Institute**

Sidewalk Labs envisions the Urban Innovation Institute as an independent, non-profit institute with its own self-sustaining governance and business model. Creating a new institution is no small task, however, and requires drive, focus, and dedication, as well as capital. Over time, the institute could become self-sustaining through a combination of research funding, collaborative degree programs, and potentially innovative approaches to technology transfer and intellectual property. For example, Waterfront Toronto and the government could choose to dedicate a portion of the revenues generated from technologies developed within the IDEA District to the institute.

Sidewalk Labs is prepared to provide **\$10 million** in initial seed funding for the Urban Innovation Institute.

**It is of paramount importance that the institute be developed in close collaboration with a consortium of Toronto institutions, as well as stakeholders within the public and private sectors.**

These potential funding strategies would have to be explored in depth within the phase of work to create the institute.

Given the importance of the Urban Innovation Institute to the mission of the overall Sidewalk Toronto project and to the Toronto urban innovation ecosystem, Sidewalk Labs is prepared to provide \$10 million in initial seed funding, to be administered by an entity to be agreed-upon during the planning process, for the first phase of the development of a comprehensive mission, operating structure, and governance model.

It is of paramount importance that the institute be developed in close collaboration with a consortium of Toronto institutions, as well as stakeholders within the public and private sectors. Sidewalk Labs proposes that it work with the aforementioned entity to convene stakeholders; to provide support services that facilitate the development of an institutional mandate, governance structure, operating organization, and business model; and to stand up the initial phase of the institute.

To ensure the realization of the institute thereafter, Sidewalk Labs may provide additional grants in the future alongside partners, linked to project milestones to be agreed in the implementation agreements (including with respect to appropriate government support).

# How applied institutions have catalyzed clusters

Academic and research institutions have historically played an important role in the development of clusters, in particular as an initial anchor that could draw complementary businesses and research institutions to the area.

In St. Louis, for example, BioSTL (a bioscience industry organization), the Danforth Center, and the St. Louis Economic Development Partnership, among other partners, support a cluster for agriculture technology that has embraced a collaborative governance model to prioritize industry input and balance both research and commercialization activities. The cluster has experienced rapid growth in just 10 years, anchored by its proximity to world-class research centres, major food producers with expertise in the industry, and an emerging startup ecosystem.

An urban innovation cluster with an academic institution at its core is positioned to ensure the advancements produced in the district contribute to training and educational opportunities, creating a virtuous cycle that grows human capital and creates a broader ecosystem of resources for testing and deployment of new innovations. An academic or research institution within a cluster could facilitate knowledge exchange and provide a forum for applied research, in turn drawing talent and investment and establishing the area as a hub for thought leadership.

The following case studies demonstrate the potential impact Sidewalk Labs

expects could be realized through the creation of an Urban Innovation Institute in the IDEA District.

## Vector Institute.

The Vector Institute — launched in March 2017 with support from the Government of Canada, the Province of Ontario, and private industry,<sup>79</sup> and in partnership with multiple universities — seeks to “drive excellence and leadership in Canada’s knowledge, creation, and use of artificial intelligence (AI) to foster economic growth and improve the lives of Canadians.”<sup>80</sup>

Specializing in machine and deep learning, the institute retains elite faculty and researchers to lead Ontario’s efforts to build and sustain AI-based innovation across the public and private sectors. An example of this type of collaboration includes the institute’s partnership with the Peter Munk Cardiac Centre and University Health Network to apply machine-learning research towards improvements in cardio-vascular care.<sup>81</sup>

The institute represents a strong model for how Toronto institutions could come together to advance innovation and tech commercialization. Vector is an independent, non-profit, non-degree-conferring entity that works closely with partner universities where institute researchers have existing appointments. The organization’s \$135 million endowment (over its first five years) comes from both public and private sources,<sup>82</sup> and its leadership team reflects representation from both sectors.



Incentivized through the provision of \$100 million USD in funding and free land from the City of New York, Cornell Tech has already developed the first phase of its \$2 billion USD campus, growing to over 30 full-time faculty and over 300 students. Credit: Sidewalk Labs

## Cornell Tech.

In 2011, the City of New York launched an international competition for the establishment of a new graduate campus for applied science and engineering on Roosevelt Island.<sup>83</sup> The city determined that the technology sector within the city’s ecosystem was missing a top-tier applied sciences program that could serve as a source for talent and a long-term anchor for growth. The winning proponent was a partnership between Cornell University and the Technion-Israel Institute of Technology, responsible for the development of the Cornell Tech campus, which opened in 2017.<sup>84</sup>

Incentivized through the provision of \$100 million USD in funding and free land from the City of New York, Cornell Tech has already developed the first phase of its \$2 billion USD campus, growing to over 30 full-time faculty and over 300 students.<sup>85</sup> Cornell Tech’s degree programs (integrating technology, law, business, and design), integration of academia and industry, and emphasis on entrepreneurialism and social impact are already leading to substantial impacts.

As a catalyst for citywide economic growth, Cornell Tech has developed partnerships with companies across tech, finance, media, healthcare, and other industries; engaged in programs throughout the New York City public schools; and catalyzed significant economic activity in neighbouring Long Island City.



# What it means to work in the IDEA District

The urban innovation cluster that emerges throughout the IDEA District is designed to be an open ecosystem, enabling both residents and workers, as well as people from around the world, to take advantage of the unique physical, digital, and policy conditions. The following examples illustrate a few ways innovations can launch, operate, and grow in this environment.

## Launching a Canadian sensor startup.

A Canadian sensor startup, founded by two University of Toronto graduates, has a concept to improve energy management in buildings through the monitoring and optimization of building entrances and design. At a symposium at the Urban Innovation Institute on building efficiency, employees at the startup meet developers who are about to break ground on a new mixed-use building in the IDEA District. The employees pitch their sensor, and the potential for decreased utility costs is attractive to the developers, who decide to run a pilot in their new building. After completing the responsible data use process and gaining approval from the Urban Data Trust, the startup creates prototypes of the new sensors, runs the pilot, and demonstrates the value of their hypothesis.

After the study, the startup accesses investors through the Urban Innovation Institute and raises capital to bring the sensors to market. Simultaneously, the potential for greater building efficiency standards sparks the IDEA District administrator to re-evaluate its standards for future development within the district.



## Keeping residents and visitors informed.

After a summer afternoon in Quay-side, a Toronto resident finds herself excited by the action at a dynamic curb along Queens Quay East but is concerned about the data that is being collected to make that system work. She attends a free workshop on data privacy regulations at the Urban Innovation Institute and

hears from private companies and public officials about how and why data is collected in the IDEA District and about the safeguards that are in place to ensure the data is used responsibly. She also learns that she can go to an online registry overseen by the Urban Data Trust to view the data being collected by the curb system and the location of any digital devices in public space.

**Empowering public-sector improvements.**

An international city manager is facing challenges in monitoring new construction that may pose safety concerns. She finds an Urban Innovation Institute publication about new advanced mapping technologies and plans a trip to the IDEA District to learn best practices. After meeting with Toronto city officials, local developers, and

researchers, she returns to her home city and uses IDEA District best practices to deploy advanced mapping to identify illegal or dangerous building modifications. She shares her implementation data with the Urban Innovation Institute, which updates its open database so that others from around the world can leverage these lessons in their own city.



**Supporting small-business growth.**

A Canadian financial services company wants to bring a new form of flexible small-business loan to market. The company decides that the conditions within the IDEA District — particularly the flexible stoa space, digital credentialing system, and active public oversight — make it the perfect place to pilot this new offering. As a prototype, the company

allows small-business owners in the IDEA District to apply for a seed loan along with their lease application, making the process much easier. Stoa retailers could apply and be approved instantly, and the financial services company knows that applications come from real businesses with real qualifications, thanks to their digital credentials.



## Strategy 5

Sparking a Cluster  
in Urban Innovation

# Establish a new venture fund for local, early-stage enterprises

The rapid growth of Toronto's startup ecosystem in recent years has not come without its challenges. Like many growing industries or sectors, Toronto faces issues of inequality and lack of access to limited resources, especially for smaller players in the market. Compared to startups in other cities, small startups in Toronto face significant challenges to scaling their enterprises. The rate of new startups emerging has far outpaced the amount of VC funding available, forcing entrepreneurs and businesses to slow down development and growth or seek funding elsewhere.

To help tackle these challenges, Sidewalk Labs plans to provide initial capital to establish a new venture fund to support local entrepreneurial activity in urban innovation, designated for Ontario- and Toronto-based entrepreneurs and enterprises. Sidewalk Labs plans to contribute \$10 million to the venture fund and seek additional funding from local partners to increase the size of the overall investment.

The fund could help fuel growth for startups benefiting from the ecosystem created by the digital infrastructure and open standards within Quayside, Villiers West, and the overall IDEA District, or for researchers at the Urban Innovation Institute looking to commercialize new insights. Sidewalk Labs will look to partner with Toronto-based innovation incubators to provide shared services, research

support, and flexible space within Quayside and Villiers West, and to ensure that early-stage portfolio companies are able to tap into the networks, resources, and opportunities generated by the urban innovation cluster.

Sidewalk Labs' venture fund would focus on early-stage investments and be specifically designed to help Canadian ventures and entrepreneurs overcome challenges in Toronto's market, providing the necessary capital for startups and small businesses to become larger-scale enterprises. The fund could help a range of innovators: from recent Waterloo graduates developing a new product, to a team that permanently relocated to Toronto as part of the Startup Visa program, to repeat entrepreneurs looking for a strategic partner to help them develop, iterate, and scale faster.

By prioritizing investments for local ideas and innovators, this fund could help catalyze and support the growth of a new ecosystem for urban innovation in a way that encourages Canadian talent to stay home. The development of a local, targeted investment ecosystem has proven benefits in other global clusters. For example, the agtech cluster in St. Louis was facilitated initially by BioGenerator (the cluster's dedicated investment arm),<sup>86</sup> which helps prepare firms to raise

capital and connect with institutional investors. St. Louis' agtech sector was projected to reach \$90 million USD in VC money in 2018,<sup>87</sup> more than a 440 percent increase over the past four years.

Despite being home to world-class universities and an ever-growing technology and innovation sector, Toronto faces ongoing challenges in ensuring that the talent and expertise developed within the GTA has access to the necessary structures and resources to contribute back into the local innovation ecosystem. Between 2015 and 2016, two-thirds of software engineering students from top programs — including the Universities of Waterloo, British Columbia, and Toronto — accepted positions outside of Canada after graduation.<sup>88</sup> In addition to recent graduates, small businesses and startups

are being drawn to set up or grow their enterprises internationally, resulting in "brain drain" throughout the industry. Businesses and startups with different needs cite a range of factors driving their decisions to relocate: from a lack of local available funding to better commercialization opportunities, to lower-cost office space, to wider networks of resources outside of Canada.

With more advanced options for early-stage venture funding, Sidewalk Labs aims to help contribute to the region's ability to retain talent and IP locally. Sidewalk Labs expects to work collaboratively with other local funders, either as co-investors in the fund or as additional investors in the portfolio of companies supported. By working with existing angel, venture capital, corporate and ecosystem players, Sidewalk Labs aims to help provide a foundation for the development and growth of the urban innovation industry. This approach provides an opportunity for a wider array of players to work with Sidewalk Labs to foster a local system of innovation and investment with the potential to sustain lasting economic opportunity in urban innovation for years to come.

## Sidewalk Labs' venture fund would focus on early-stage investments and be specifically designed to help Canadian ventures and entrepreneurs overcome challenges in Toronto's market.



## Strategy 6

Sparking a Cluster  
in Urban Innovation

# Benefit Toronto companies and catalyze new ones

Sidewalk Labs believes that the combination of the unique conditions of the IDEA District and the catalytic impact of the Urban Innovation Institute could spark a cluster that supports companies, projects, and individuals across a full spectrum of industries, at varying stages of maturity.

For example, Stockholm's emergence as a global tech hub demonstrates a successful approach to supporting a wide range of players and functions. Anchors like Ericsson, Spotify, Skype, and King support a robust and diverse tech sector that is attracting global talent, while also driving a strong startup culture in video game development and music technology. The growth of existing and new capabilities has in turn drawn significant investment, 67 percent of which comes from outside of Sweden.<sup>89</sup> After Silicon Valley, Stockholm is home to the highest number of "unicorn startups" per capita (valued at over \$1 billion USD), and Stockholm's tech companies have generated over \$4 billion USD in funding, creating a robust local ecosystem for innovation and investment for players of all sizes.

Sidewalk Labs anticipates that the waterfront's urban innovation cluster, which would bring together a set of innovators from even more diverse disciplines, could have a similar effect. The cluster would support industries and capabilities where Toronto already plays a leading role, such as AI; provide critical resources to attract growth in emerging industries, such as

self-driving vehicles; and provide the conditions needed to spark growth and scale nascent industries that have yet to take off globally, such as autonomous freight.

Over time, the IDEA District would lead to new discoveries that cannot yet be imagined, but from which wholly new industries may emerge that change the way people live in cities around the world.

### Established fields, poised for rapid growth.

For established fields, the urban innovation cluster could provide physical space for large-scale experimentation and the necessary concentration of talent to enable rapid growth. Toronto is already a leader in AI, for example. Canada was the first country to announce a national strategy for artificial intelligence — the Pan-Canadian Artificial Intelligence Strategy — which came with a commitment of \$125 million over five years by the federal government and has catalyzed investment from other levels of government as well as over \$100 million from the private sector to support the industry's growth.<sup>90</sup>

To build on this momentum, the IDEA District presents an additional asset to support the realization of government objectives: a forum for interdisciplinary collaboration, a concentration of resources and investment, and the ability to test new technologies. Together, these

conditions can enable faster paths to the discovery of new applications and uses of AI to tackle urban challenges, supporting the growth of the larger field.

### Emerging industries building momentum.

For emerging fields, the urban innovation cluster could provide resources to help industries overcome technical challenges, develop new capacities, and gain broader market acceptance and consumer support on an accelerated timeline compared to what might otherwise be possible.

Take the self-driving mobility industry, which is already gaining momentum in Ontario. Both the University of Ontario Institute of Technology's Automotive Centre of Excellence and the Waterloo Centre for Automotive Research (WatCAR) have a history of supporting advancements in automotive technology. Major automotive companies are building innovation and testing facilities, too, including GM's Urban Mobility Campus,<sup>91</sup> located in close proximity to the eastern waterfront, and Uber's engineering research centre.<sup>92</sup> The City of Toronto is also building on this momentum; in partnership with the TTC and Metrolinx, Toronto has secured more than \$1 million in funding from Transport Canada to operate a pilot project for self-driving shuttles, which, if approved, would begin in 2020.<sup>93</sup>

Despite these leading-edge investments, the large-scale market adoption of self-driving vehicles is not around the corner. But by providing the opportunity to responsibly test vehicles in an urban environment, the urban innovation cluster could enable a world-class testing, research, and engineering centre that could make self-driving vehicles a reality at scale at a dramatically accelerated pace.

### Nascent industries seeking scale.

For more nascent fields that might need support or intervention to scale up, the urban innovation cluster could provide greater and more immediate access to all of the tools required for growth. Supporting nascent industries has been a core priority demonstrated through Waterfront Toronto's recent work along the waterfront and a critical objective in its RFP for an Innovation and Funding Partner, which called for "a testbed for Canada's cleantech, building materials and broader innovation-driven sectors to support their growth and competitiveness in global markets." Entrepreneurs and companies that make up nascent industries would be able to share resources and expertise, leveraging opportunities for growth that might not otherwise be available.

The tall timber industry is a prime example of how the cluster could leverage Toronto's unique innovation assets while providing resources and expertise to expand the city's innovation ecosystem. Sidewalk Labs has committed to the widespread adoption of mass

timber-based construction methods, over the use of more traditional building materials like steel and concrete. But despite the significant environmental, financial, and building efficiency benefits of timber-based construction, it has not yet been deployed at scale, particularly in an urban context. An urban innovation cluster at the waterfront, supported by researchers and innovators in building technologies, would provide an opportunity for Toronto to capitalize on the momentum created by building an

entirely timber Quayside and become a global leader in the ongoing development of mass timber and, more broadly, the field of building materials innovation.

**Industries that cannot yet be predicted.**

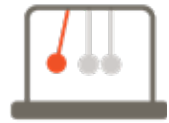
A measure of a successful cluster is not only its ability to support the companies and industries that exist today, but to provide a platform to nurture and catalyze the development of new ideas and capabilities in the future — some of which the world cannot yet anticipate.

**A measure of a successful cluster is its ability to nurture the development of new ideas and capabilities in the future.**

**The unique conditions of the IDEA District and the catalytic impact of the Urban Innovation Institute could spark a new cluster that supports a range of companies and individuals.**

# Measuring Impact

The IDEA District would spur the creation of 93,000 total jobs and generate \$14.2 billion of annual GDP output by 2040 — nearly seven times Toronto’s current projections for the area. It would also generate vast construction tax revenue and roughly 174,000 construction jobs, via the largest building project in North America.



Impact 1

Measuring Impact

# Spurring the creation of 44,000 direct jobs and 93,000 total jobs

Applied across the entirety of the IDEA District, Sidewalk Labs' approach to activating the waterfront has the potential to change the economic development impact of the area, including catalyzing 44,000 direct jobs by 2040. This projected growth represents an increase of approximately 25,000 in direct jobs compared to the baseline scenario at its completion in 2050, as envisioned in the Port Lands Planning Framework and other existing planning documents.

Projected job growth will not just be confined to the boundaries of the IDEA District. The district's development can stimulate the creation of an additional 49,000 indirect and induced jobs across industries, skill levels, and companies throughout Toronto, Ontario, and Canada — creating an aggregate total of over 93,000 jobs.

But it is the composition of these jobs, beyond simply their existence, that could be most impactful for Toronto. The IDEA District's emphasis on innovation, entrepreneurship, and exploration likely means that a higher percentage of jobs would be created in fields such as professional and scientific and technical services (more than five times the baseline total, based on the urbanMetrics report), raising the projected average wage for all jobs in the IDEA District to \$70,000 — a 17 percent increase from the approximately \$60,000 based on the rough proportion of jobs in the Port Lands Planning Framework.

Further, research suggests that high concentrations of employment in tech-related fields have the potential to drive increased wages for a range of other job types, including those that do not require a degree. For every “high-tech” job created, approximately five non-tech jobs are created, across a wider range of functions and industries and accessible to a broader range of people.<sup>94</sup>

The 44,000 permanent, full-time, direct jobs that emerge in the IDEA District would generally fall into three broad categories: industrial, population-based services, and knowledge-based industries.

### Industrial.

First, the district would maintain a small but core mass of industrial jobs in industries such as light manufacturing and transportation. In its analysis, urbanMetrics estimates that this segment could account for 2,500 of the 44,000 jobs within the IDEA District.

### Population-based services.

Second, the district would be home to thousands of jobs in population-based services that are the foundation of all local economies, primarily selling products and services for the local market. This segment includes the professions of teachers, doctors, and retail jobs. These jobs would create economic opportunities for people with a range of educational backgrounds and

# Projected average income in the IDEA District: \$70,000

The IDEA District has the potential to realize substantial job growth across all industries and income levels, in comparison to existing proposals. The district can achieve this growth through a significant amount of commercial and retail space intended for companies of all sizes and missions, allowing for the cultivation of a business community that is accessible to all educational backgrounds. This diversity of jobs and skill levels would bring the average income within the area to an estimated \$70,000.

Industry	Average Industry Income (Toronto Census Metro Area)	Percentage of IDEA District Job Total
Professional, Scientific, and Technical Services	\$73,286	30.0%
Information and Cultural Industries	\$69,376	14.9%
FIRE (Finance, Insurance, and Real Estate)	\$94,428	12.5%
Management of Companies and Enterprises	\$122,377	10.0%
All Other Services	\$48,328	10.0%
Health Care and Social Assistance	\$53,251	5.0%
Accommodation and Food Services	\$22,164	5.0%
Retail, Wholesale, Transportation, and Warehousing	\$45,081	5.0%
Administrative Support, Waste Management and Remediation	\$34,324	5.0%
Goods-Producing Sector	\$56,986	2.4%
<b>Average income across all categories</b>	<b>\$70,422</b>	<b>\$70,422</b>

Note: The table above includes only permanent, direct employment within the IDEA District. It includes neither the indirect and induced jobs catalyzed by this permanent employment, nor the direct, indirect, and induced jobs associated with the project's building and infrastructure construction.

skill sets. In its analysis, urbanMetrics estimates that this segment could account for approximately 12,000 of the 44,000 jobs within the IDEA District.

**Knowledge-based industries.**

Finally, the district would be home to tens of thousands of jobs in knowledge-based industries — such as technology, finance, professional services, and creative fields, including the film industry — drawn to the concentration of talent, new flexible and affordable office spaces, and strong connectivity to the downtown core and regional transit. An initial anchor of this segment would be Google’s Canadian headquarters, with up to 500,000 square feet, which would be sufficient to accommodate as many as 2,500 jobs, the majority of which would be for

Google employees (though actual hiring will depend on market conditions and business requirements). In total, urbanMetrics estimates that knowledge-based industries could account for approximately 29,500 of the 44,000 jobs within the IDEA District.

Over time, Sidewalk Labs predicts that a substantial portion of the jobs created within the knowledge-based industries segment would fall under the umbrella of urban innovation, drawn specifically by the unique conditions created as part of the IDEA District. Sidewalk Labs estimates that more than a third of the 29,500 knowledge-based jobs created in the IDEA District would fall into this emerging field. These 10,500 jobs would be the core of a cluster in urban innovation that has the potential to become a new economic engine for Toronto.

**For every “high-tech” job created, approximately five non-tech jobs are created.**

**Research has found that high concentrations of employment in tech-related fields have the potential to drive increased wages for a range of other job types, including those that do not require a degree.**





# Nearly seven times the potential annual GDP impact

The new economic ecosystem envisioned for the waterfront, with a cluster for urban innovation at its core, has the potential to transform the eastern waterfront into a dynamic, diversified, and inclusive growth engine capable of generating new opportunities in Toronto and beyond. As a significant economic stimulus for the country, the accelerated development of the IDEA District could create many higher-paying direct and indirect jobs, generating billions of dollars in additional tax revenues at all three levels of government and, critically, producing significant GDP gains.

Building on Toronto's competitive strengths, Sidewalk Labs could spark the development of the waterfront and have a broader economic impact through a series of transformative investments, including in district-scale infrastructure, the Urban Innovation Institute, a new Canadian headquarters and a connected campus for Google, a venture fund for local enterprises, and a policy framework designed to encourage experimentation and innovation while protecting health, safety, and privacy.

By embracing a cluster-based model, Sidewalk Labs anticipates supporting a new network of neighbourhoods with unparalleled economic opportunity for

all residents and businesses, whether or not they participate directly in the urban innovation economy. A cluster for urban innovation would improve regional economic growth over time and improve the resilience of the local and broader economies against downturns in the future.


Further, introducing anchor tenants to catalyze the development of the cluster enables the district to attract future investment and talent and position the IDEA District, and Toronto on the whole, as a global leader in urban innovation. Sidewalk Labs believes the benefits of investing resources into the local innovation ecosystem will extend well beyond the waterfront — enabling a virtuous cycle of investment and innovation, and ensuring the sustainability of urban innovation as a core economic sector that can benefit the city and country for decades to come.

The Toronto firm urbanMetrics estimates that the growing global profile of the IDEA District could generate an estimated \$14.2 billion in economic output for Canada each year (GDP), including \$1.8 billion in Toronto, which represents a more than six-fold increase in value added to the Canadian economy compared to status quo development by 2040.

# The IDEA District: \$14.2 billion in economic output and 93,000 jobs


## Nearly seven times as many jobs by 2040

	Baseline scenarios	IDEA District
Toronto	11,601	79,025
Ontario	944	5,945
Canada	1,288	8,164
<b>Total</b>	<b>13,833</b>	<b>93,134</b>



## Nearly seven times the annual GDP contribution by 2040

	Baseline scenarios	IDEA District
Toronto	\$1,723,717,641	\$11,769,431,015
Ontario (not including Toronto)	\$192,885,909	\$1,198,827,313
Canada (not including Ontario)	\$202,173,751	\$1,238,055,343
<b>Total</b>	<b>\$2,118,777,301</b>	<b>\$14,206,313,671</b>





# The largest city building project in North America

The one-time investment in infrastructure and buildings related to the Sidewalk Labs proposal has the potential to generate enormous value. An estimated \$18 billion in new building construction – across the IDEA District – would be a nearly 49 percent increase over the amount spent within the baseline scenario.

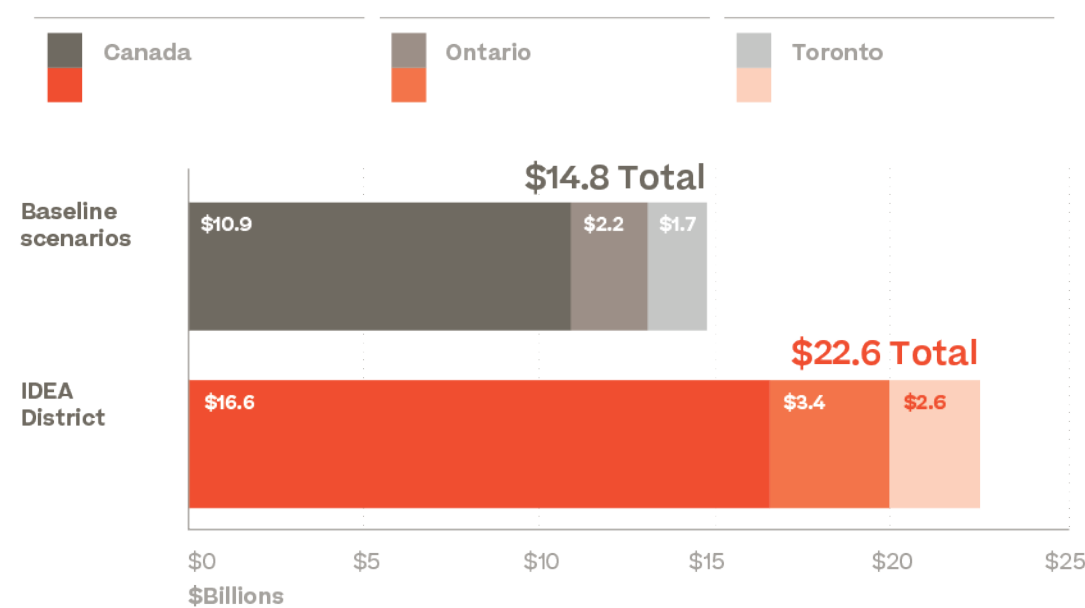
If the Sidewalk Toronto project proceeds at the proposed scale of the IDEA District, it would quickly become one of the largest construction projects in the world, providing an enormous number of jobs and generating tremendous value to a city that already has more cranes dotting its skyline than any other in North America. The urbanMetrics analysis suggests that, all told, between buildings and infrastructure, the project's construction

could add more than \$22.6 billion in value to the Toronto economy and create over 174,000 person-years of full-time employment. In total, the infrastructure and buildings construction represent an 18 times multiplier to the government's initial \$1.25 billion investment in the Don Mouth Naturalization Project.

Sidewalk Labs' proposed development program, if scaled across the IDEA District, would require the annual production of over 55,000 cubic metres of mass timber, enough to require the output from a dedicated factory factories supplying only this project and to support an estimated 2,500 person-years of employment over the next 20 years.

### More than 50% increase in total construction GDP contribution at completion

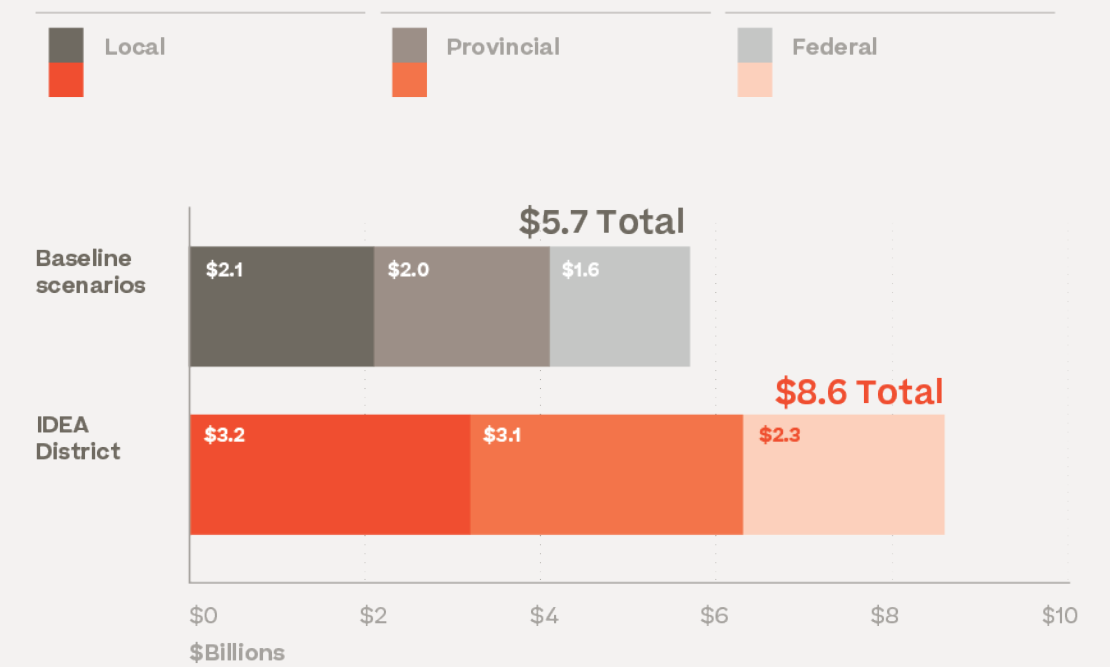
The vertical and infrastructure construction of the IDEA District would contribute an estimated \$22.6 billion to the Canadian economy, approximately \$8 billion more than the baseline scenario. This impact includes a one-time contribution of over \$16 billion to the Toronto economy.



# One-time construction impact: \$22.6 billion in GDP, \$8.6 billion in taxes, and 174,000 jobs by 2040

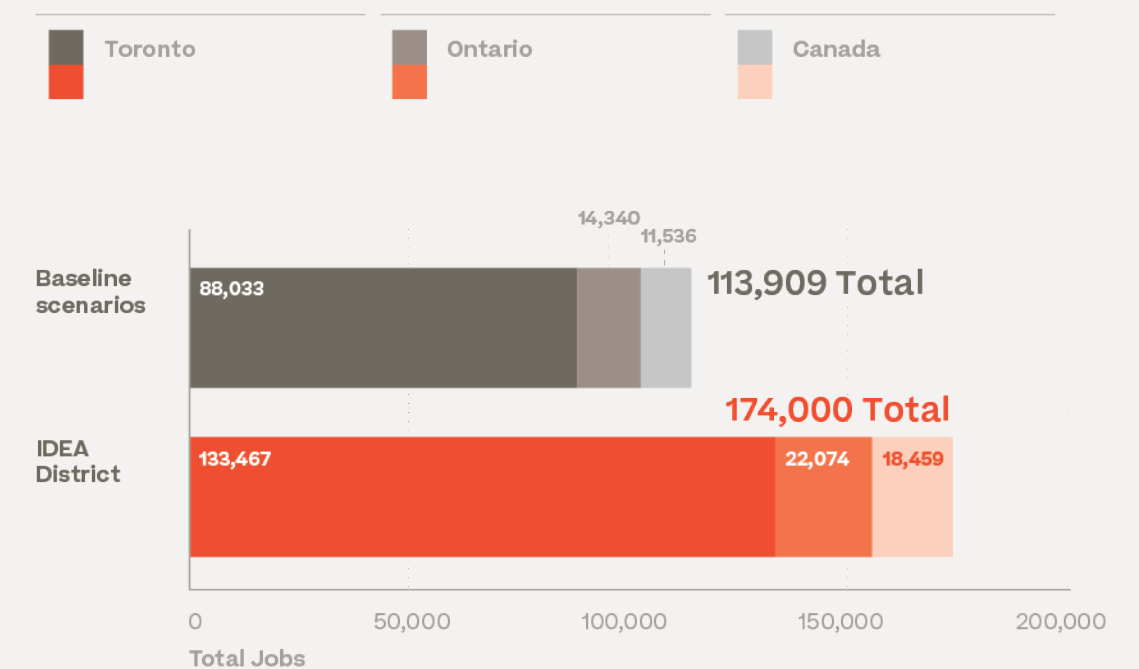
### More than 50% increase in total construction taxes generated at completion

Under Sidewalk Labs' vision for the IDEA District, vertical and infrastructure construction projects would generate roughly \$8.6 billion in taxes by 2040, representing the full potential buildout of the IDEA District. This revenue would be spread across the federal (\$3.2 billion), provincial (\$3.1 billion), and local (\$2.3 billion) levels. In aggregate, this revenue amounts to a more than 50 percent increase in the amount that would be generated under the baseline scenario, according to the urbanMetrics analysis.



### More than 50% increase in total construction jobs at completion

The construction of the IDEA district would create 174,000 person-years of full-time employment within Canada, 60,000 person-years of full-time employment more than the baseline scenario.



Note: All baseline scenario calculations are estimated to have a 2050 completion of construction, while all IDEA District calculations are estimated to have a 2040 completion of construction.

# Exploring Economic Impact Further into the Future

Extending the innovation ecosystem beyond the IDEA District has the potential to create a total of 150,000 jobs, generate \$22.4 billion in ongoing economic output, and produce \$6.8 billion in tax revenues.

# Advancing economic opportunities

The Sidewalk Toronto project proposal involves transforming 77 hectares of the eastern waterfront — less than one third of the total area — into an IDEA District that creates the conditions for urban innovation to thrive, helping to achieve Waterfront Toronto and City of Toronto objectives around affordable housing, economic opportunity, sustainable mobility, and climate positivity.

Sidewalk Labs' proposal does not include any specific plans for nor any Sidewalk Labs role in the development of this area. But the approach taken by the IDEA District could enable Ports Toronto (which owns roughly 35 percent<sup>96</sup> of the land south of the Ship Channel), Waterfront Toronto, and the city to further advance economic opportunities and help achieve priority outcomes around climate-positive development, housing affordability, and sustainable mobility. It could also further complement a significant expansion of the Film District and support the ongoing consolidation of more traditional and large-scale industrial uses into the East Port.

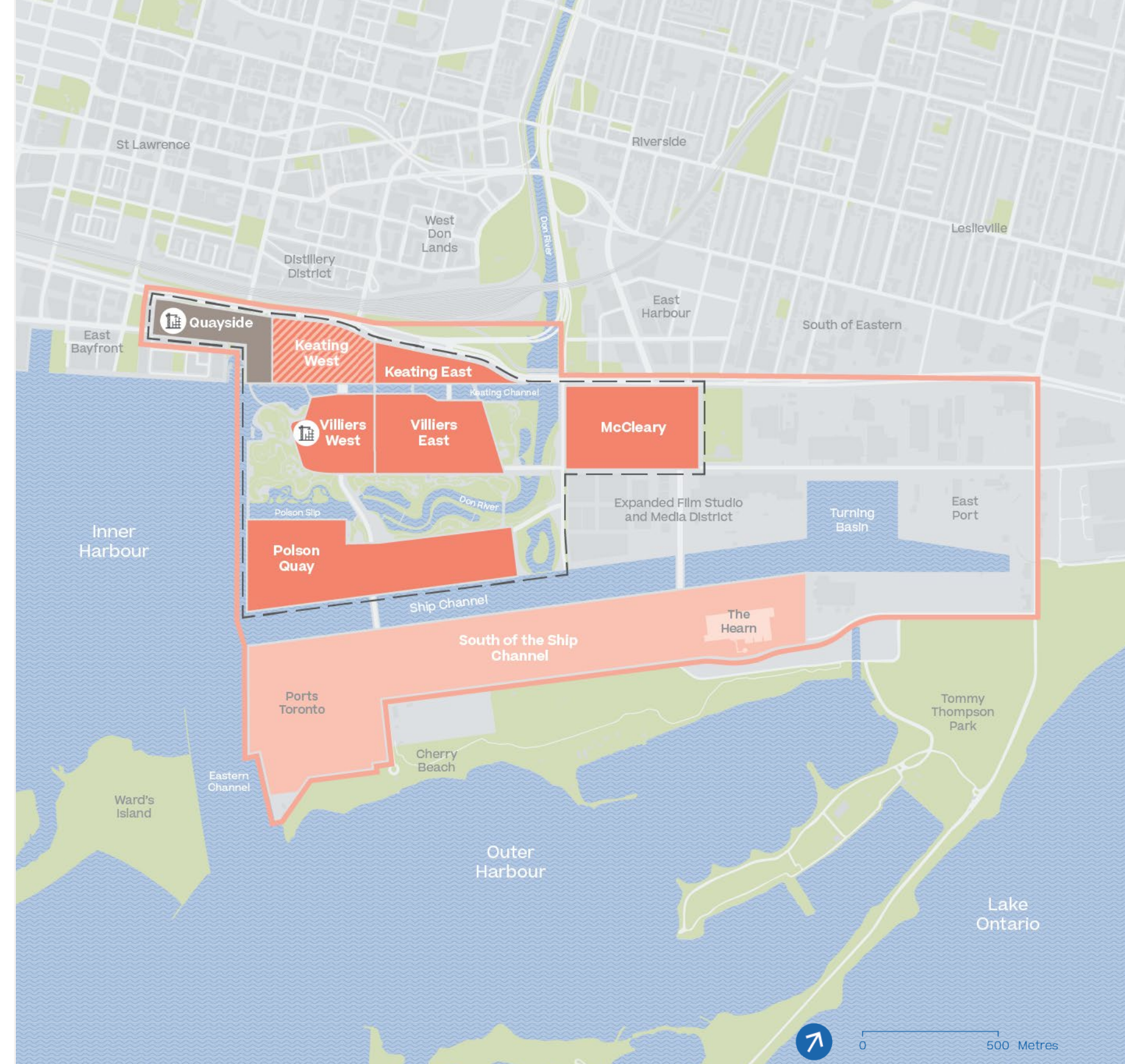
The urbanMetrics analysis found that the development approach initiated in Quayside and the River District — emphasizing innovation, greater densities, and mixed-use development — could realize enormous economic potential south of the Ship Channel, if applied by third parties.

On its own, development south of the Ship Channel could become home to over 26,000 direct jobs, create \$8.1 billion in annual GDP, and generate \$2.5 billion in tax revenues.

The business plan put forward in Volume 3 encompasses only the geography of the IDEA District, which includes Quayside and the River District. Over the long term, if the approach taken in the IDEA District proves successful in advancing and accelerating key public policy goals, it is possible to imagine extending this innovation ecosystem to neighbouring areas, bringing thousands of jobs as well as new public transit connections.

The area south of the Ship Channel is likely to become especially important for consideration of future development. The Port Lands Planning Framework identifies this area as a long-term revitalization opportunity.<sup>95</sup> It is unique in being surrounded by water on three sides and being home to the Hearn Generating Station, a vast decommissioned power plant and heritage structure that could anchor meaningful economic and community growth.

**South of the Ship Channel by the numbers:**  
 → Over 26,000 direct jobs  
 → \$8.1 billion in annual GDP  
 → \$2.5 billion in annual tax revenue



Map  
**Potential South of the Ship Channel geography**

- Eastern waterfront
- - - IDEA District
- Phase 1: Quayside
- Phase 2: River District
- ▨ Optional participation in Phase 2
- South of Ship Channel (future option)
- 🏢 Sidewalk Labs develops real estate and advanced systems

Combined with Quayside and the River District, this expanded innovation ecosystem could be home to over 70,000 direct jobs at the waterfront and support the creation of an additional 77,000 jobs throughout Canada (over 60,000 within Ontario). The economic benefits translate into \$22.4 billion in annual GDP — a 262 percent increase in value added to the Canadian economy compared to status quo development at completion — and \$6.8 billion in tax revenues.

In addition, the construction alone of the entire area could generate over 267,000 person-years of full-time employment, over \$34.7 billion in economic output, and over \$13.1 billion total in taxes throughout Canada.

Sidewalk Labs believes that if the development of the River District proceeds as proposed, it could accelerate development south of the Ship Channel, greatly compressing the time frame during which Canada would realize these benefits.

**Further extending transit infrastructure to realize the waterfront's full potential.**

Just like in the IDEA District, the area south of the Ship Channel area lacks basic infrastructure and connections to the rest of the city, creating significant barriers to realizing potential economic and community benefits for the city.

The area's extraordinary assets lend themselves to a rare mix of nature, jobs, and housing. As a result, in the long-term, an additional public transit extension could support economic growth as well as more integrated live-work-make communities.

The city's approved light rail expansion plans have the line ending in Polson Quay and looping back to the rest of the city. This extension could continue across two new bridges built to carry transit across the Ship Channel. The new route could form a large "U" across the southern edge of the eastern waterfront that would connect to the city's broader transit network, supporting sustainable development and jobs access.

With public transit in place, newly connected neighbourhoods could become major economic drivers, especially the area surrounding the Hearn.

**With public transit in place, newly connected neighbourhoods could become major economic drivers, especially the area surrounding the Hearn.**

Toronto case study

**The Bloor Viaduct: A precedent for visionary infrastructure investments in Toronto**



Toronto's decision to construct the Bloor Viaduct in 1918 proved visionary, as it set the path for the subway system to connect the east end with downtown. Credit: City of Toronto Archives

Investing in a transit expansion south of the Ship Channel, as well as the bridges to support it, would echo the city's ambition when it constructed the Bloor Viaduct in 1918.<sup>97</sup> At the time, there was significant controversy over including support for rail transit along the bottom of the viaduct, when the city had not even secured a rail operator.

This vision proved to be prescient, as the new infrastructure became the path for the Toronto subway, connecting the east end of Toronto with downtown. The expanded subway transformed

neighbourhoods all along the route, making it easy and affordable for thousands of people to reach jobs downtown and fostering new economic anchors all along the corridor.

This extension has become a shining example of the value created for people, jobs, and the environment when ambitious transit infrastructure is embedded into plans from the beginning.



The Hearn is a 400,000-square-foot megastructure that could become a prime site for driving economic development for the eastern waterfront. Credit: DroneBoy

## The Hearn as economic catalyst

One of the most significant economic development opportunities involves the Hearn, a 400,000-square-foot megastructure that opened in 1951 as a coal-fired power plant and was decommissioned in 1983. This extraordinary space has been largely abandoned, but its towering smokestack, visible across the city, stands in silent testimony to the eastern waterfront’s history and the area’s future potential.<sup>98</sup>

The Hearn sits at the middle of Unwin Avenue, right next to a potential light rail stop and bridge that could connect the area south of the Ship Channel up an extended Broadview Avenue through the Film District, McCleary, East Harbour, and Toronto’s revitalizing east end. This location, along with the structure’s unique

architecture, makes the Hearn a prime site for driving economic development for the region.

Recent years have seen glimpses of this potential. In 2002, Studios for America leased space at the Hearn and later bought the building. The iconic smokestack, towering ceilings, vast open space make it appealing as a potential film location, and the Hearn has hosted shoots, including for the Oscar-winning 2018 film, “The Shape of Water.”

The building has also hosted major cultural events, most notably in 2016, when the Luminato Festival used the Hearn for its festival hub.<sup>99</sup> Thousands of people flocked to the Port Lands — many for the first time — demonstrating the Hearn’s ability to draw crowds through innovative public programming and to become a



In 2016, the Luminato Festival drew thousands of people to the Hearn, demonstrating its ability to attract crowds through innovative public programming. Credit: PARTISANS

symbol for urban transformation, cultural expression, public accessibility, and civic celebration.

As Toronto continues to revitalize its eastern waterfront, the Hearn could become a centrepiece of this transformation and a city-wide magnet for arts, culture, production, and innovation. As it once powered the city with electricity, the Hearn can again be a generator — now of post-industrial forms of production, creating jobs and businesses while offering educational, cultural, and recreational resources that complement and catalyze Toronto’s existing strengths across a variety of industries.

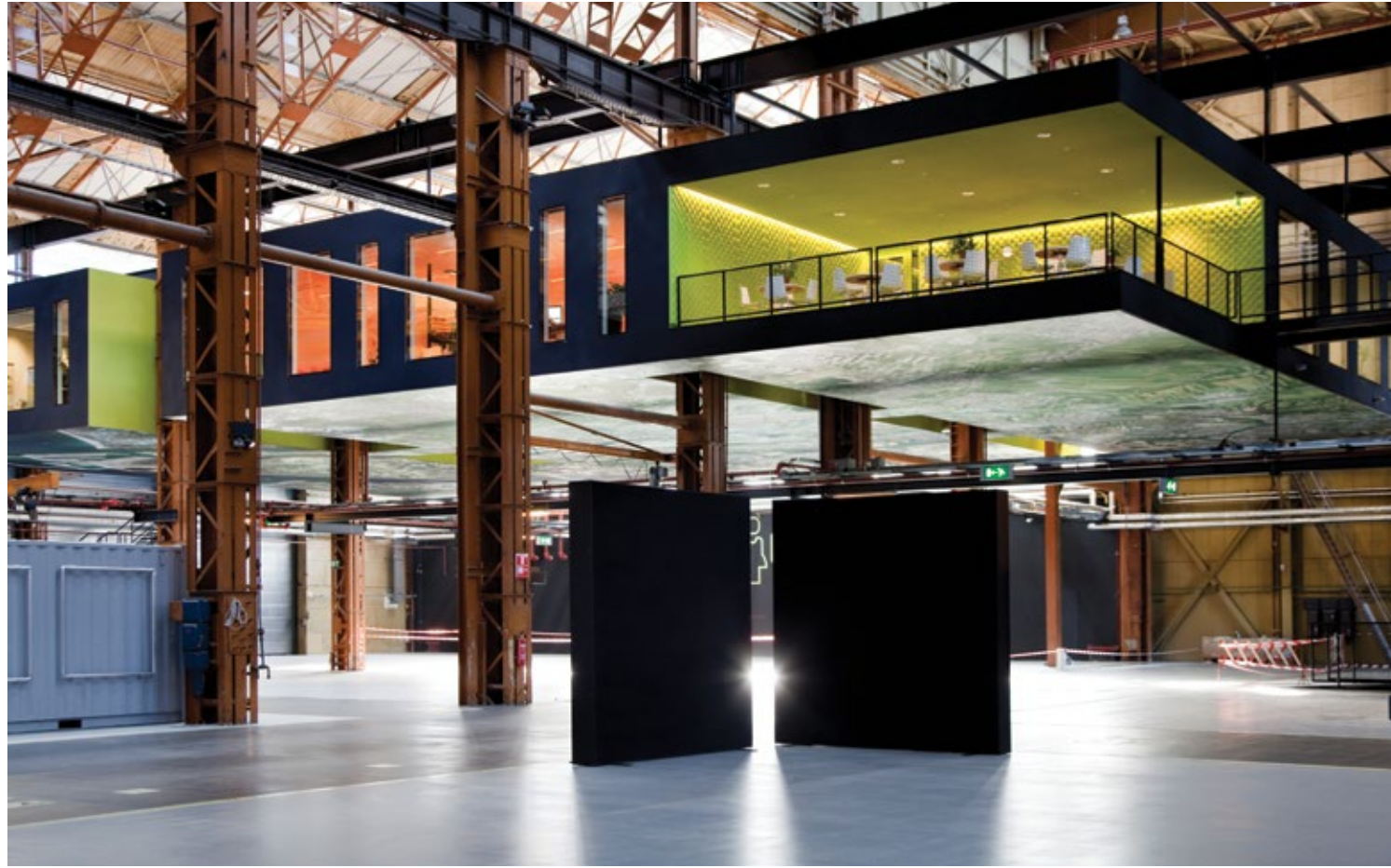
It can support the future of the film industry by bringing together emerging new media businesses, training programs, production spaces, and film screenings. It can be an incubator of new creative

projects, businesses, and institutions through a shared infrastructure that facilitates cross-disciplinary collaborations. The Hearn can become a gathering space, marketplace, and everyday asset for recreation, culture, and learning that will draw local and visiting populations. And it can be a trailhead, adding environmental, recreational, and educational assets to the diverse ecology of the Port Lands, from Lake Ontario to the Don Valley.

**In short, the Hearn can become a microcosm and driver of a rejuvenated Port Lands that is built on the principles of adaptability, innovation, and mixed-use development.**

### **Building on global precedents of post-industrial revitalization.**

The approach to the Hearn as an economic catalyst could draw insight from many global examples of successful



The RDM Rotterdam campus is a six-hectare mixed-use campus on a former shipyard that has started to reactivate the area, including spawning 40 new companies. Credit: Vincent Wegener

revitalization of post-industrial sites. The most successful examples present a set of common characteristics: shared infrastructure, cross-disciplinary programming, resident and visiting populations, educational partnerships, and fabrication spaces. They also act as sparks in transitional districts, invigorating surrounding communities.

One of the most successful and innovative post-industrial catalysts of urban growth is the RDM Rotterdam campus in the Netherlands. (RDM stands for Research, Design, Manufacturing.)

While Rotterdam is still host to the largest port in Europe, a significant stretch of its waterfront had fallen into disuse as shipping activities migrated further downstream the Nieuwe Maas river. This relocation created roughly 1,600 hectares of underutilized land.<sup>100</sup>

In 2007, Rotterdam Port Authority, Rotterdam University of Applied Science, and Albeda College collaborated to develop the RDM project, with an aim to educate talent and foster innovation for the future needs of a sustainable port and city. The result was a six-hectare mixed-use campus on a former shipyard that has started to reactivate the area, including spawning 40 new companies.

The campus centerpiece is the 230,000-square-foot Innovation Dock, a vast machine hall filled with prototyping equipment including robots, 3D metal printers, laser cutters, and an aquatic lab for hydrodynamic testing. Demand has been significant: 100 percent of this space is now leased out. The campus also boasts a “Concept Village” to demonstrate housing prototypes and a cultural platform for concerts, art exhibitions, and commercial events.

The Hearn has similar potential to become an anchor for urban innovation that draws the economic opportunities initiated in the IDEA District further into the eastern waterfront, supporting the area’s position as a global hub for this growing industry and spreading new ideas around the world.

## Coupling economic development with ambitious quality-of-life objectives

As mentioned throughout this chapter, the unique economic opportunity of urban innovation is that it both is a growing, diverse industry that can support tens of thousands of jobs, as well as an industry built around tackling the major urban challenges facing cities today. To that end, in addition to catalyzing economic opportunity, the area south of the Ship Channel has the potential to further advance the waterfront’s priority outcomes of sustainability, housing affordability, and people-first mobility.

Should Waterfront Toronto and the city decide to extend advanced infrastructure systems beyond the IDEA District, these systems would allow for a further reduction of greenhouse gas emissions per capita beyond those achieved in Quay-side and the River District. Sidewalk Labs estimates that a reduction of 92 percent emissions beyond current city levels would be possible.

By expanding a holistic mobility approach south of the Ship Channel — including extensions to public transit, streets designed to encourage safe cycling and walking, pricing models designed to encourage shared trips, and coordinated traffic technology — Sidewalk Labs estimates that only 9.5 percent of trips would be made by private automobile by 2041. The result could be a sustainable model for other cities trying to plan for self-driving technology and the future of urban mobility.

Finally, if a housing vision with 40 percent below-market units were expanded south of the Ship Channel, it could create a cumulative 20,000 units of below-market housing (half affordable housing, half middle-income housing). While such a vision would require significant public-sector contributions, new sources of developer funding — such as greater land value created by factory-driven construction techniques or condo resale fees — could help support ambitious affordability objectives by generating almost \$2 billion through 2050 for below-market housing, at this scale of development.

**Sustainability innovations could reduce GHG emissions by 92% if applied south of the Ship Channel**

**Mobility innovations could result in just 9.5% of trips occurring by private car if applied south of the Ship Channel**

**Affordability innovations could create some 20,000 units of below-market housing if applied south of the Ship Channel**

# Realizing the eastern waterfront's long-held potential

For more than a century, Toronto has tried to unlock the potential of the eastern waterfront as an outlet for inclusive growth. The innovative approach to development described in Volume 1 represents a belief that a powerful moment has arrived for the city to finally realize its long-held vision for this area.

This unique approach can not only meet but exceed Waterfront Toronto's ambitious priority outcomes. It can create new momentum for mixed-income, mixed-use, climate-positive communities along the waterfront. And it can create the conditions for a spirit of exploration to emerge — one that harkens back to the area's industrial past and draws innovators from around the world to a place designed from its core to help improve the lives of people in cities, both now and into the future.



## Endnotes

General note: Unless otherwise noted, all calculations that refer to the full proposed IDEA District scale are inclusive of the entirety of its proposed geography, including all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalk-toronto.ca/midp-appendix](http://www.sidewalk-toronto.ca/midp-appendix).

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# MIDP

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# Toronto Tomorrow

A new approach for  
inclusive growth

SIDE WALK LABS



**The Urban  
Innovations**

# Land Acknowledgement

Sidewalk Labs recognizes that this land we now call Toronto has been the site of human activity for over 15,000 years; we are within the Treaty Lands and claimed Territory of the Mississaugas of the Credit. Toronto is now home to many diverse First Nations, Inuit, and Métis peoples. It is the responsibility of all people to share in wise stewardship and peaceful care of the land and its resources. We are mindful of a history of broken treaties, and of the urgent need to work continuously towards reconciliation, and we are grateful for the opportunity to live and work on this land.



# The Urban Innovations Contents

---

## Introduction

p16

---

## Chapter 1 Mobility

p22



---

## Chapter 2 Public Realm

p118



---

## Chapter 3 Buildings and Housing

p202



---

## Chapter 4 Sustainability

p296



---

## Chapter 5 Digital Innovation

p374



---

## MIDP Acknowledgements

p464

# The Urban Innovations

## Contents

---

### Introduction

p16

---

## Chapter 1 Mobility

### Introduction

p24

Part 1: Expanding Public Transit

p32

Part 2: Enabling Walking and Cycling Year-Round

p42

Part 3: Harnessing New Mobility and Self-Driving Technology

p54

Part 4: Reimagining City Deliveries and Freight

p68

Part 5: Improving Mobility Management

p84

Part 6: Designing People-First Streets

p92

Public Engagement

p108

---

## Chapter 2 Public Realm

### Introduction

p120

Part 1: Creating More Open Space

p126

Part 2: Making Open Space More Usable More of the Time

p150

Part 3: Ensuring Open Space Is More Responsive

p178

Public Engagement

p192

---

## Chapter 3 Buildings and Housing

### Introduction

p204

Part 1: Accelerating Construction Timelines

p208

Part 2: Helping Neighbourhoods and Households Evolve

p236

Part 3: Expanding Tools for Housing Affordability

p262

Public Engagement

p288

---

## Chapter 4 Sustainability

### Introduction

p298

Part 1: Creating Low-Energy Buildings

p304

Part 2: Optimizing Building Energy Systems

p314

Part 3: Making Full Electrification Affordable

p324

Part 4: Using Clean Energy to Heat and Cool Buildings

p334

Part 5: Reducing Waste and Improving Recycling

p344

Part 6: Managing Stormwater Naturally and Actively

p358

Public Engagement

p366

---

## Chapter 5 Digital Innovation

### Introduction

p376

Part 1: Providing More Affordable and Flexible Digital Infrastructure

p384

Part 2: Setting Data Standards That Are Open and Secure

p400

Part 3: Creating a Trusted Process for Responsible Data Use

p414

Part 4: Launching Core Digital Services That Others Can Build On

p442

Public Engagement

p454

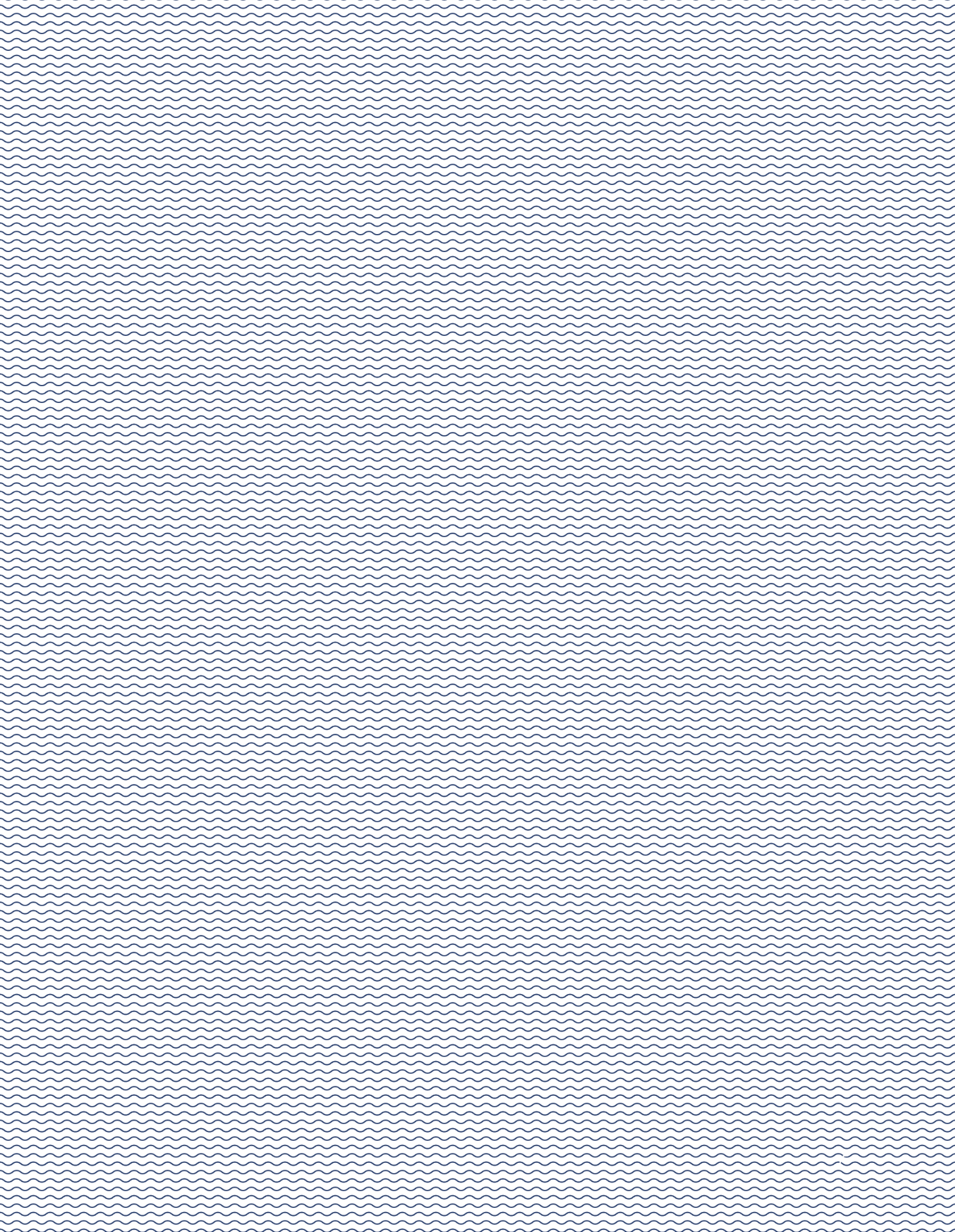
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## MIDP Acknowledgements

p464

Volume 2

# Intro -duction



# A New Set of Capabilities to Address Urban Challenges

Volume 2 describes the emerging physical, digital, and policy innovations that make it possible to improve quality of life in Toronto — and other global cities — at this unique moment in history.

---

Cities have always been humanity's greatest engines of opportunity, invention, and community, through their ability to connect so many diverse people in the same place.

They are where newcomers come for a fair shot or a fresh start. They are the wellsprings of arts, culture, and counter-culture, where creativity sprouts along sidewalks and that next big idea is always around the corner. They are places that nourish both community networks and independent minds. They are global economic anchors and the planet's best hope for a greener future.

But cities have reached a pivotal moment in their development. The quality-of-life challenges facing Toronto are being experienced by rapidly growing metros around the globe, from New York to San Francisco to London and beyond.

Income inequality is growing, with more and more households unable to afford homes near their jobs.

Commuters spend hours a day trapped in traffic congestion.

Energy consumption must get leaner and cleaner to protect the environment.

Downtown neighbourhoods with limited developable space are squeezed for parks, open spaces, schools, health services, and community centres.

The proliferation of data and digital devices in cities has left people rightly concerned about their privacy.

*While every city faces these problems in its own way, the symptoms are consistent: places that are less livable, affordable, and sustainable — with fewer chances for the broadest diversity of residents to thrive.*

As these challenges rise, so too has the opportunity to address them using emerging digital and physical capabilities, such as ubiquitous connectivity, artificial intelligence, and sensing tools, as well as new design and fabrication techniques, including the use of robotics.

This suite of capabilities represents a fourth urban technological revolution of the modern era, potentially every bit as transformative for cities as the steam engine, electric grid, or automobile before it. But as the history of those prior revolutions shows, innovation can have great social benefits or significant drawbacks depending on how thoughtfully it is incorporated into urban life.

The steam engine gave rise to industry and brought new job opportunities, but it led to terrible smog and poor work conditions. Electricity brought cities 24/7 activity, elevators, and skyscrapers, but it furthered reliance on fossil fuels. The automobile made it easier to get people and goods in and out of cities, but it generated enormous congestion and led households to leave cities for the suburbs.

**Applying new technology to cities in a thoughtful way is difficult.**

The urban technologies emerging today face an inflection point.

Self-driving vehicles have the potential to make city streets dramatically safer, but only if they always follow the rules of the road. Factory-based construction can meaningfully improve housing affordability and accelerate development, but these savings must support below-market housing programs and robust public policies to reach their full benefit. Digital connectivity can expand job opportunities and encourage innovation, but it must come with a process that protects privacy and the public good.

*The lesson from history, as well as from the recent smart cities movement, is clear: technology is not a quick fix for complicated urban challenges. Instead, new advances must be incorporated into the city with great care to improve urban life, not undermine it.*

But infusing new capabilities into the urban environment is hard. Cities are complex places. The technologists who produce ambitious solutions do not speak the same language as the urbanists who must find ways to implement them in the public interest — an “urbanist-technologist” divide. These two groups have very different tolerances for risk, different requirements for transparency, and different expectations for how long things take to get things done.

*That is why no single city stands as a new model for a brighter urban future.*

# Developing innovations to improve urban life

Sidewalk Labs was founded in 2015 for the very purpose of delivering dramatic improvements in urban life — on the belief that tackling these challenges is possible with a careful integration of emerging innovations and forward-thinking urban design. To fulfill that mandate, Sidewalk Labs assembled a unique team from across the worlds of urban planning, urban development, and digital technology.

Together, this team has developed a unique approach to “urban innovation,” broadly defined as the integration of physical, digital, and policy advances into the urban fabric to improve quality of life in cities. Much more than just the pursuit of isolated efficiencies associated with “smart cities,” urban innovation requires a thoughtful interdisciplinary approach that sits at the intersection of two of the defining trends of the 21st century: global urbanization and technological change.

Sidewalk Labs team members identify innovations that are beginning to be deployed to improve life in cities, drawing inspiration from the cutting-edge work being done by urban planners and

designers around the world, as well as from the capabilities being developed by leading technologists, ranging from digital infrastructure and geospatial mapping to self-driving vehicles and energy management.

Critically, this approach does not presume that Sidewalk Labs alone would develop all the innovations a city might need. On the contrary, Sidewalk Labs aims to create the open conditions for ongoing improvement — recognizing that the best solutions to urban challenges come not from the top down but rather from the community up.

#### **An innovation toolkit for the future city.**

Volume 2 of the Master Innovation and Development Plan (MIDP) provides greater detail on the physical, digital, and policy innovations that make it possible to address some of the toughest challenges facing cities at this unique moment in time across core areas of urban life. These innovation plans focus on Toronto, but they also represent a general toolkit that could be applied in different ways to other growing cities around the world.

**Key Term**  
**Urban Innovation**  
is the integration of physical, digital, and policy advances to improve urban life.

#### **These core areas include:**



#### **Chapter 1: Mobility.**

A transportation system that reduces the need to own a car by providing safe, convenient, connected, and affordable options for every trip.



#### **Chapter 2: Public Realm.**

A system of streets, parks, plazas, and open spaces that encourages people to spend more time outdoors, together.



#### **Chapter 3: Buildings and Housing.**

Sustainable buildings that can be constructed and adapted far more quickly, and a new set of financial and design tools that help improve affordability and expand options for all households.



#### **Chapter 4: Sustainability.**

A new standard of sustainability that creates a blueprint for truly climate-positive communities.



#### **Chapter 5: Digital Innovation.**

Catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data in cities.

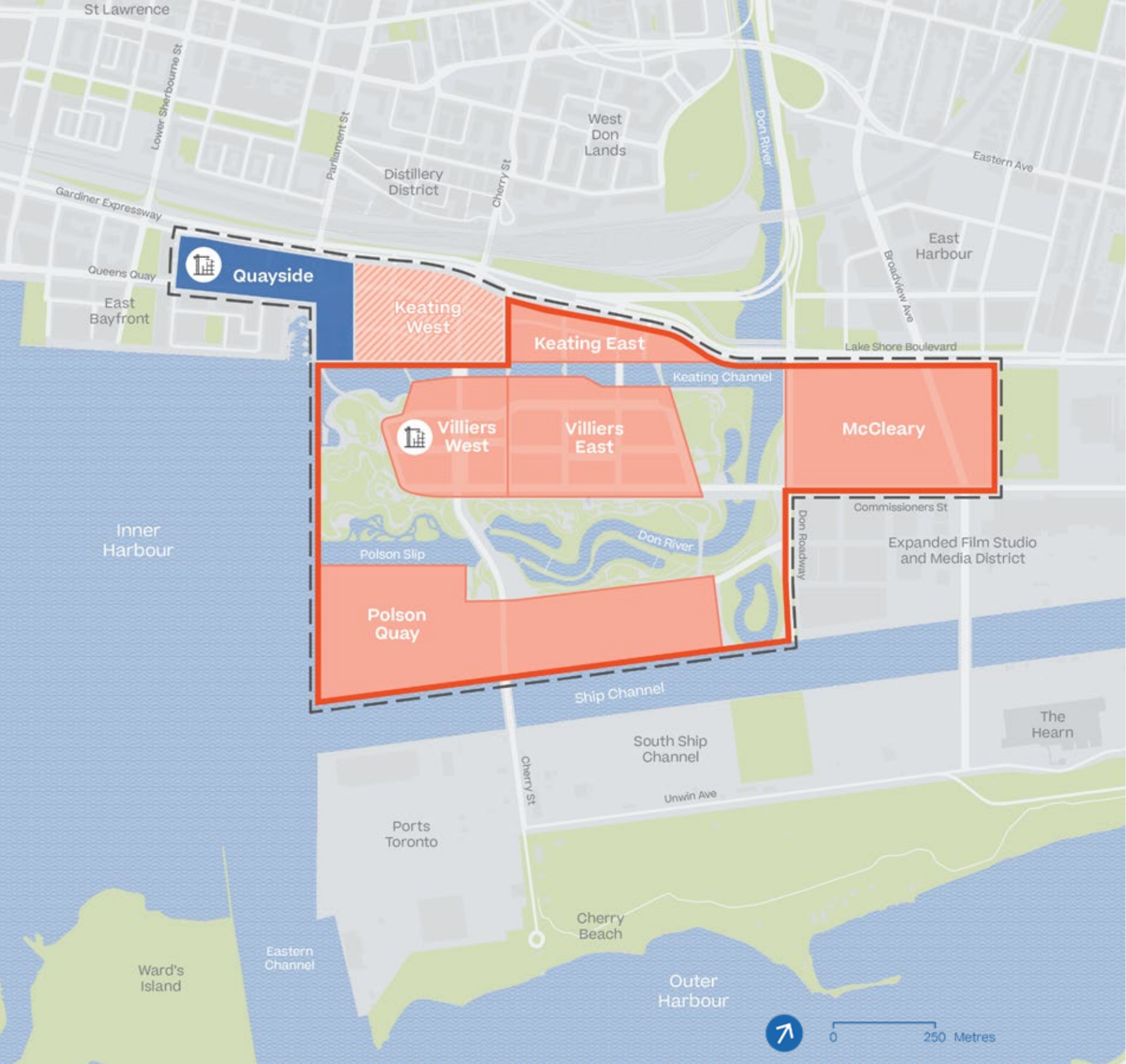
No community is complete with a cross-cutting layer of social infrastructure that could provide support to health, civic life, learning, and workforce initiatives that enable people to thrive. But given its intricate ties to a specific place, social infrastructure is explored in greater detail in the planning sections of the MIDP found in Volume 1.

Still, many general aspects of social infrastructure can be found across the Volume 2 chapters, including the health benefits of walking and cycling infrastructure (on Page 45 of the “Mobility” chapter), new housing types suited to families and seniors (on Page 236 of the “Buildings and Housing” chapter), and new digital tools that can empower community decisions (on Page 444 of the “Digital Innovation” chapter).

#### **Applying urban innovations across the IDEA District.**

Many of the urban innovations described in Volume 2 require a sufficient geographic scale to maximize quality-of-life impact — and to become financially viable in the first place.

To demonstrate the full potential of the innovations included in this volume, their impact has been measured across the entire proposed Innovative Design and Economic Acceleration (IDEA) District: a 77-hectare area that includes Quayside and the River District (as well as private parcels in this geography that would have the option to join the IDEA District, such as Keating West).



## Map The proposed IDEA District geography

The proposed 77-hectare IDEA District provides sufficient scale for urban innovations to realize ambitious quality-of-life outcomes in a financially sustainable way.

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- Optional participation in Phase 2
- Sidewalk Labs develops real estate and advanced systems



See Volume 3 for the proposed governance structure of the IDEA District, including the role of a public administrator in overseeing the district.

The IDEA District also addresses the fact that many of the innovations described in Volume 2 require regulatory or policy changes.

Many existing urban regulations and policies were designed in an earlier era, when the primary way to achieve necessary public policy outcomes involved sweeping, one-size-fits-all regulations. While designed around important objectives, these policies now sometimes limit the ability to find creative solutions to the very same problems they attempted to mitigate.

For example, single-use zoning regulations that separate residential and non-residential uses were intended to protect the public from industrial hazards. But an “outcome-based building code” system with real-time sensors that monitor for nuisances, such as noise, could enable neighbourhoods to incorporate light production uses into residential buildings, creating more vibrant streets and greater economic opportunities while still ensuring safety.

Core to the premise of the IDEA District is an empowered and forward-thinking public administrator that can prioritize innovation and new approaches without compromising the public interest.

With the right physical, digital, and policy conditions in place, and sufficient scale to realize their full quality-of-life benefits, the urban innovations described in Volume 2 can not only show a path forward for Toronto — they can also spark the imagination of cities tackling the challenges of diverse, equitable, and inclusive growth around the world.

# Mobility

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## Introduction

p24

---

## Part 1

Expanding  
Public  
Transit

p32

---

## Part 2

Enabling  
Walking  
and Cycling  
Year-Round

p42

---

## Part 3

Harnessing  
New Mobility  
and Self-Driving  
Technology

p54

---

## Part 4

Reimagining  
City Deliveries  
and Freight

p68

---

## Part 5

Improving  
Mobility  
Management

p84

---

## Part 6

Designing  
People-First  
Streets

p92

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## Public Engagement

p108



# Introduction

## The Vision

A transportation system that **reduces the need to own a car by providing safe, convenient, connected, affordable options for every trip.**

On a typical weekday morning, the familiar challenges of getting around Toronto can be seen and felt across many downtown street corners.

Commuters huddle at transit stops, waiting for a bus snarled in traffic or a streetcar packed with riders. Drivers inch forward in frustration, many already an hour into their trip. Delivery trucks make their way towards a curb or dock to off-load a growing number of packages. Cyclists navigate through narrow lanes or alongside moving traffic, with the added obstacle of slush or snow in the winter. Pedestrians hurry across wide streets before the light turns.

The daily scene captures a fundamental urban tension: the more success that growing cities like Toronto experience, the harder it can be for transportation networks to fulfill their core mission of helping people get around easily, efficiently, and at a price that everyone can afford. The strain extends to local streets and sidewalks, which cannot reach their potential as safe, vibrant spaces for people.

The costs — social, physical, and environmental — are high. Across the Greater Toronto Area (GTA), traffic congestion costs more than \$11 billion a year<sup>1</sup> in lost productivity, according to the C.D. Howe Institute. Sidewalk Labs estimates that, at the household level, Torontonians who live downtown and have a car spend, on average, over \$10,000 a year in car-ownership,<sup>2</sup> a total that reflects monthly payments, parking, gas, insurance, and maintenance. That cost is often the second largest household expense after rent or a mortgage, but unlike owning a home, cars quickly depreciate in value over time.

For many families, there is little choice: on average, Toronto area residents who commute by public transit spend nearly 100 minutes travelling each day,<sup>3</sup> according to Statistics Canada. As a result, roughly 70 percent of households<sup>4</sup> in Toronto, and 84 percent of households across the GTA, own at least one car, according to the 2016 Transportation Tomorrow Survey. Even in downtown neighbourhoods served by public transit, roughly half of all households own a car.<sup>5</sup>

But the need for an effective transportation system is more than just an urban statistic. It can be the difference between making a business meeting or losing an opportunity, spending more time with family or sitting alone on the freeway, forking over money for car payments or using it for savings or vacations. It can be the difference between arriving at work feeling calm and prepared — when the trip has been fast, relaxing, and convenient — or already exhausted, having battled traffic, delays, and breakdowns.



### The innovation plan.

Sidewalk Labs has a comprehensive vision to integrate street design and placemaking, innovative policy, and transportation technologies — new and old — to provide a broad menu of affordable choices for every trip, reducing the need to own a car and setting a bold new course for urban mobility.

The first step towards achieving this vision of balanced mobility is to focus on expanding traditional public transit.

No other transportation mode can carry as many people, as efficiently and affordably, through a dense urban environment. Sidewalk Labs proposes innovative financing mechanisms that do not rely solely on public funding and can accelerate existing plans for light rail expansions.



The next step is to make neighbourhoods like Quayside even more pedestrian- and bike-friendly than comparable downtown areas, stitching the waterfront back into the city and connecting people to a range of jobs and essential daily needs through walking or cycling. Taken together, transit extensions and walking and cycling improvements should allow almost all residents of Quayside to meet their daily travel needs without a car.

The critical third step is to help households make the occasional car trip without owning a car. A new generation of ride-hail services makes it possible to serve these trips at a far lower cost than privately owned cars do today, without adding more vehicles to city streets, through pricing that encourages sharing. These services are poised to become even more convenient and affordable with the prospect of self-driving technology.

Self-driving vehicles could become both widely available and demonstrably safer than today's drivers over the next 15 years.<sup>6</sup> Their ability to operate as fleets or shared services could enable cities to recapture most of the street space once devoted to parking, and to repurpose this space for bike lanes, wider sidewalks, transit services, or pick-ups and drop-offs that would make it easier to live comfortably in the city without owning a car.

Cities all over the world will need to figure out how to adapt to self-driving vehicles, and may defer significant decisions until after the vehicles are widespread. At that point, many cities will look to whatever successes exist. Toronto's leadership in this area of urban policy could make the city a global model and a centre of expertise for generations to come.



## Benefits of implementing the vision

- An affordable set of trip options without the high cost of car-ownership
- A self-financed public transit expansion that connects thousands of people to jobs
- Safer, more vibrant streets that help the city eliminate traffic fatalities
- A global model for integrating self-driving vehicles into street designs

Another set of benefits would come from freight and management innovations. To help keep trucks off local streets, Sidewalk Labs plans to create a logistics hub connected to neighbourhood buildings through underground delivery tunnels.

And to coordinate the entire mobility system, Sidewalk Labs proposes a new public entity that uses real-time traffic management tools, pricing policies, and an integrated mobility package to encourage transit, walking, cycling, and shared trips.

Finally, as a foundation for this entire system, Sidewalk Labs proposes a people-first street network specifically designed to keep traffic moving while enhancing safety, comfort, and street life for pedestrians and cyclists.



### The impact.

Integrated at the scale of a development the size of Quayside, a neighbourhood of roughly five hectares with only a handful of intersections, Sidewalk Labs' mobility plan can lead to measurable but limited improvements to job access, household costs, safety, pollution levels, and public space for residents.

When these concepts are applied across a larger area, transformative change becomes possible. For instance, public transportation is key to making any new development accessible and affordable, but the costs of extending the waterfront transit line have proven prohibitive. Planning for a greater scale of development along the eastern waterfront enables a

self-financed public transit expansion that can unlock the increased densities needed to accommodate population growth, setting an example for other parts of the city.

At this larger scale, a network of streets designed for the comfort, convenience, and safety of pedestrians and cyclists can not only help the city progress its Vision Zero objective of eliminating traffic fatalities and severe injuries, but provide new links between tens of thousands of housing options and jobs. A variety of options for shared mobility services can fill any remaining gaps, enabling visitors, workers, and residents to access much more of the city quickly and easily.

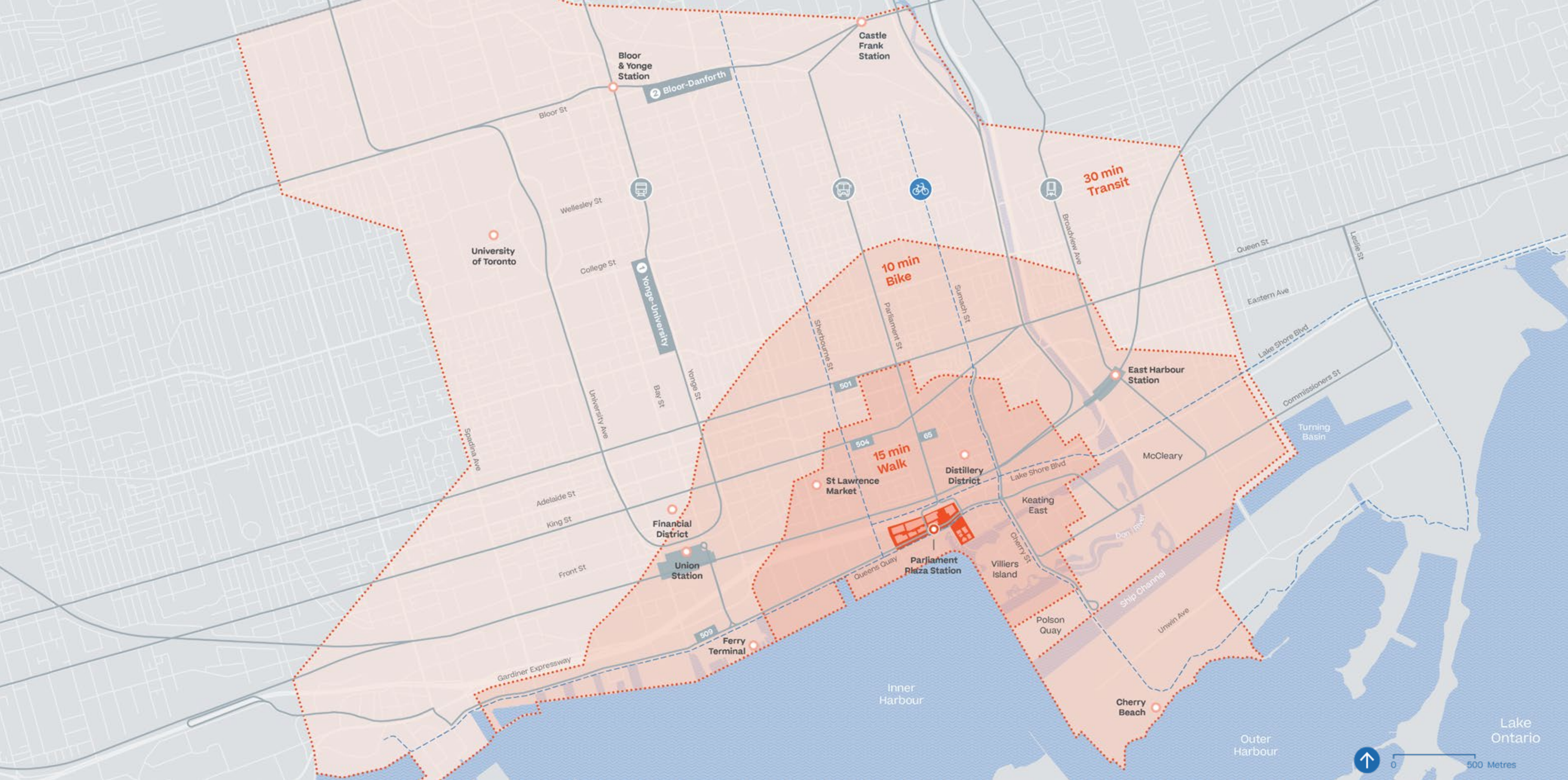
If this integrated vision were implemented across the full proposed IDEA District, Sidewalk Labs projects that just 10.7 percent of all trips would be made by private cars, far below the 27.2 percent made in comparable neighbourhoods, such as Liberty Village. The result would show the way forward for a truly balanced transportation system that helps the city grow and thrive.



### IDEA District

The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.

## This integrated vision would show the way forward for a truly balanced transportation system that helps the city grow and thrive.



Map  
**Creating a balanced transportation network that connects to the city**

- City transit
- Primary bike routes
- Quayside
- Travel times from Parliament Plaza Station (a new light rail station located near the centre of the neighbourhood)

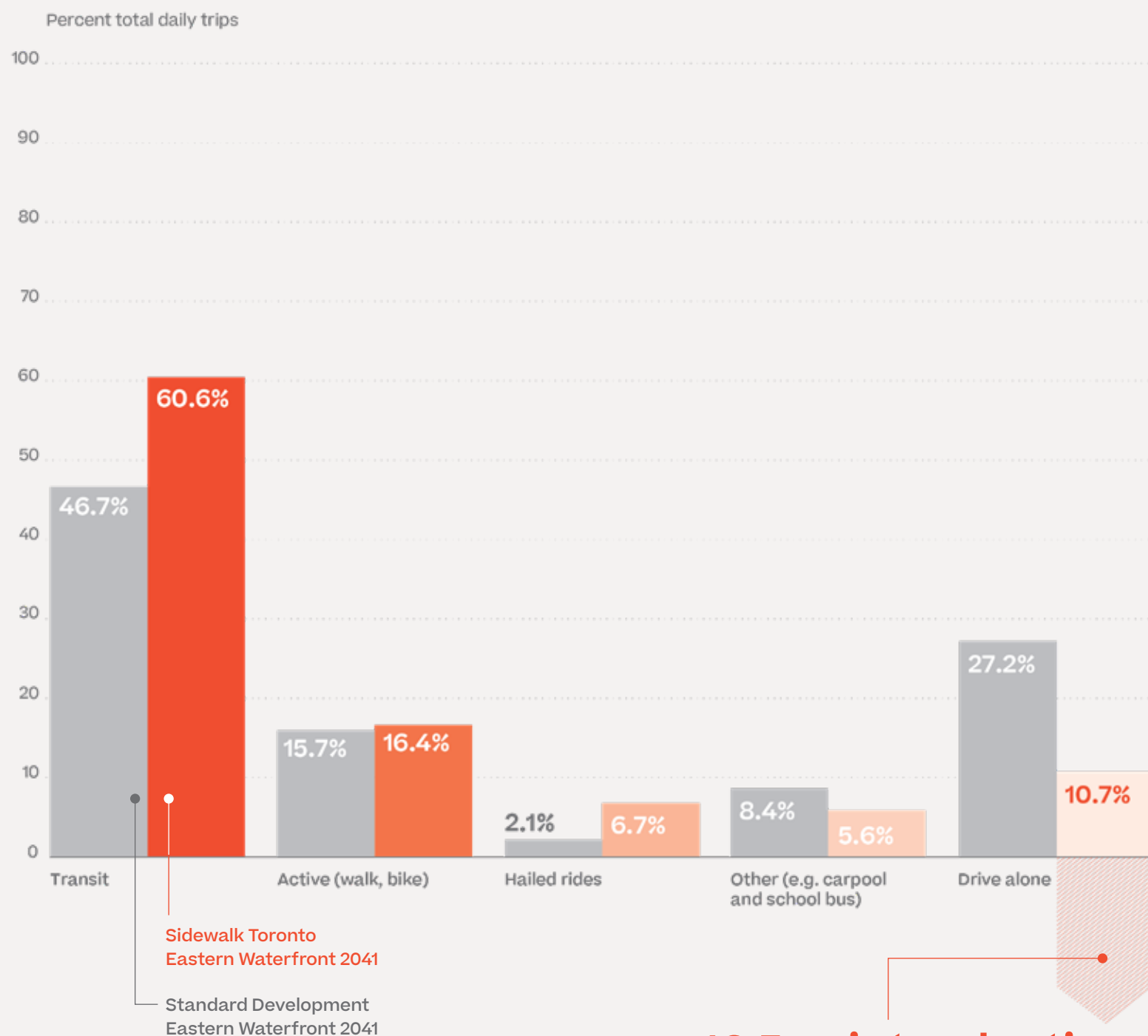
This map shows the time it would take to travel from Quayside to other parts of the city by walking, cycling, and taking transit. The mobility plan presented in this chapter aims to ensure that residents, visitors, and workers have convenient, affordable access to the rest of the city.

Source data:  
 Transit area data from Sidewalk Labs G4ST model  
 Walk and bike area data from Sidewalk Labs

# How the mobility plan reduces private car trips

Taken together, the mobility improvements described in this chapter would reduce the percentage of trips made by private automobiles in Quayside (2025) to 13 percent, and to 10.7 percent in the full proposed IDEA District (2041).

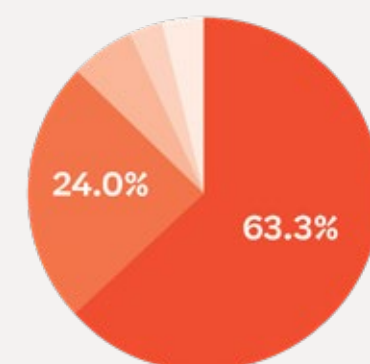
The 2041 figure assumes a fully deployed mobility system, including self-driving fleets, traffic management, and the light rail extension. As a result, Sidewalk Labs would expect very few households in the IDEA District to feel the need to own a car.



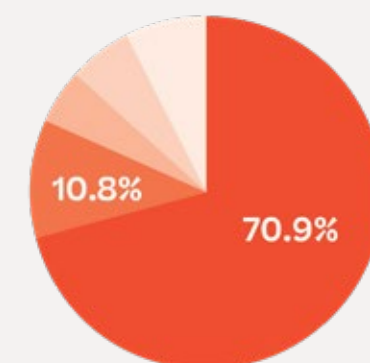
**16.5 point reduction in drive-alone trips**

## % Total daily trips per type of traveller

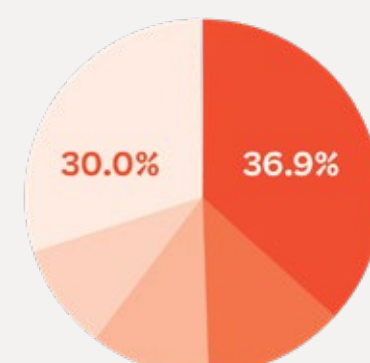
Sidewalk Toronto Eastern Waterfront 2041



Residents



Workers



Visitors

Key

- Transit
- Active (walk, bike)
- Hailed rides
- Other (e.g. carpool and school bus)
- Drive alone

Residents and employees would have the highest use of transit and active transportation, while many visitors would likely arrive by private vehicle.

Sidewalk Labs analysis

## A note on modelling

To help design its transportation network, Sidewalk Labs used a model called the Greater Toronto Area Model 4.0 for Sidewalk Toronto, or G4ST, in addition to more traditional analysis tools. This model builds on the official GTA Model 4.0 developed by the University of Toronto, which is used as the official model of the city to understand how new developments can impact the transportation system.

### How it works.

G4ST uses a representative sample of travel behaviour to simulate the travel patterns of residents, workers, and visitors coming and going from Quayside, including trip modes (such as car, transit, cycling, and walking), routes, and origins and destinations.

### What is new.

On top of these basics, G4ST incorporates some new elements specific to the Sidewalk Toronto project, such as the potential performance of transit service patterns, costs of self-driving fleets, and the effectiveness of parking and curbside pricing.

### Its limitations.

All models are simplifications; for example, no one can predict the impact of new regulations on travel behaviour or the emergence of new technology with full accuracy. The G4ST model is an attempt to represent travel demand and decisions, but Sidewalk Labs recognizes that modelled mode shares and results are best seen as indicators of outcomes rather than perfect projections.

### How it helps.

G4ST has helped inform planning decisions for some essential features of Quayside's mobility network, such as the number of curbside spaces, vehicle lanes, bike lanes, bike-share stations, and bike-parking spots, as well as the layout of roads.

### What it shows.

Based on all these inputs, G4ST shows that private car usage would be 10.7 percent at the full scale of the IDEA District, down 17 percentage points from what would be expected from standard development, enabling the neighbourhood to devote more space to housing, public uses, cycling, and walking.

See the "Modelling and Transportation Analysis" section of the MDP Technical Appendix for more details on G4ST.

# Part 1



## Expanding Public Transit



### Key Goals

1 Design a neighbourhood with transit first

2 Encourage expansion through “self-financing”

The first step to mobility success for any new downtown neighbourhood is to connect into the existing transit system of the surrounding city — ideally before any residents move in.

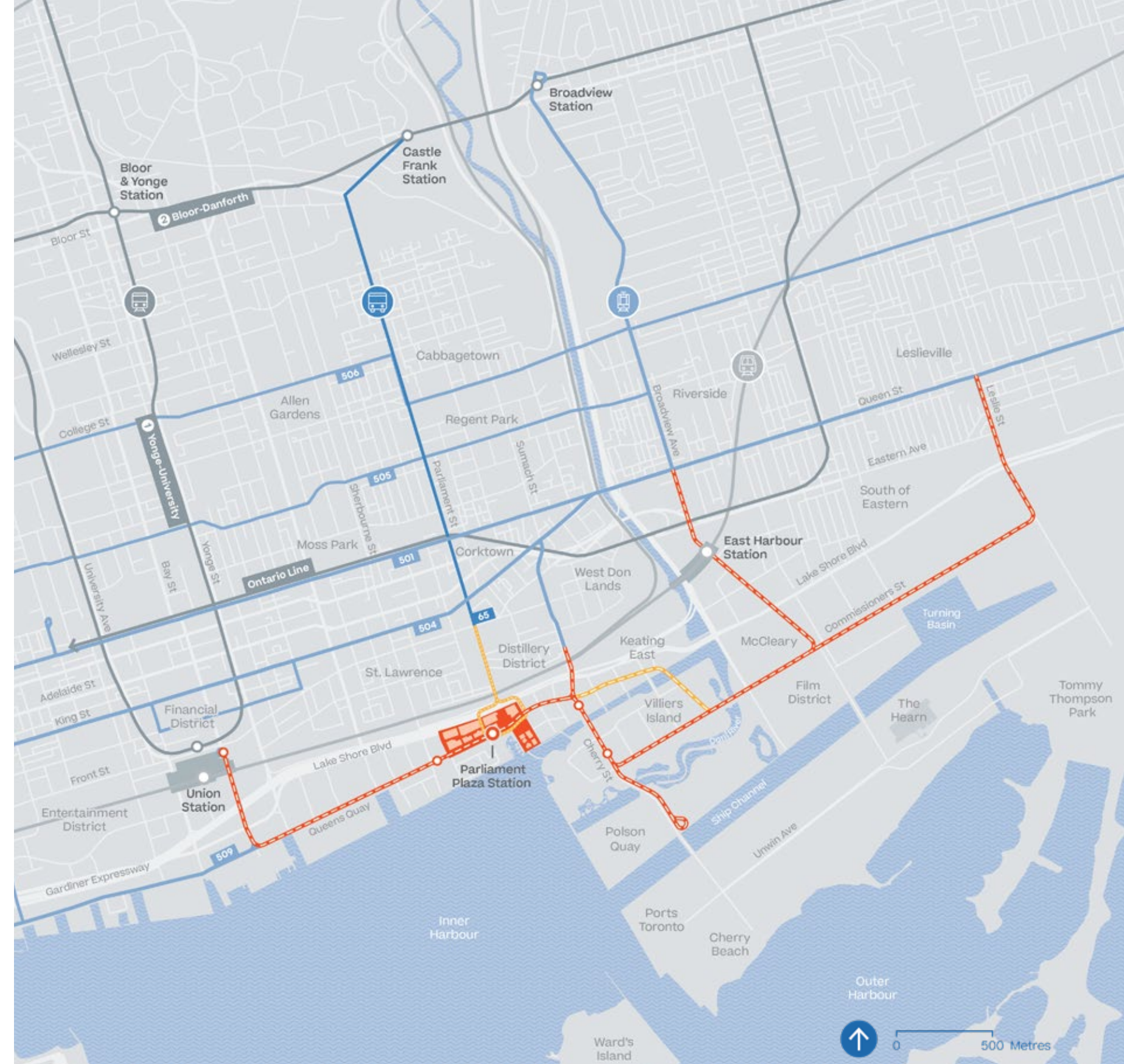
It may seem odd for a 21st-century neighbourhood to embrace 19th-century technologies, such as urban rail transit. But public transportation is unmatched in its ability to carry the most people most efficiently, and at the most affordable price through cities. Those journeys, connecting tens of thousands of strangers every day and linking neighbourhoods across the region, help generate the economic activity and exchange of ideas that make cities great engines of personal prosperity and social advancement.

In Toronto, as in many major cities, the biggest challenge for public transit expansion is funding.<sup>7</sup> Reluctance to incur the debt necessary to offset the cost of new transit projects has bedevilled the GTA for many years. That aversion to spending on new transit poses a particular problem for the eastern waterfront, where a proposed 6.5-kilometre light rail expansion remains unfunded

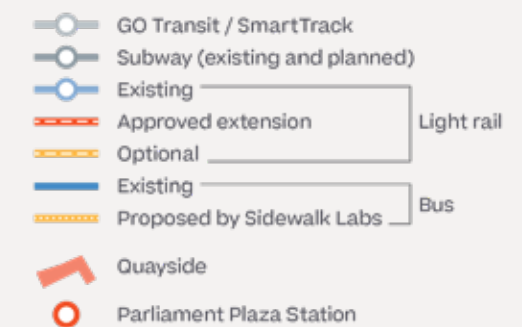
despite being discussed for more than a decade. Finding a way to build this system in advance of development is the key to sustainable growth; without it, the area will face increased traffic congestion and lock residents and workers into the need to own a car.



Sidewalk Labs’ plan to address this challenge begins by advocating the construction of the 6.5 kilometres of light rail transit proposed in the Waterfront Transit Network Plan. A recent report commissioned by the Waterfront Business Improvement Association found that this addition alone would result in a 15 percent increase in public transit use by local workers and residents, and a corresponding 44 percent decrease in automobile use. It also found that accelerating the line’s completion by 20 years would save 100 million hours of commuting time.<sup>8</sup> Beyond the approved plan, Sidewalk Labs further proposes an optional second phase of construction to add light rail infrastructure to the area north of the Keating Channel to serve future development.



Map  
**Extending the public transit network along the waterfront**





See the “Innovation and Funding Partnership Proposal” chapter of Volume 3 for more details on transit financing.

Extending the LRT could generate

**\$22.8 billion**

in additional tax revenue.

By 2041, the LRT extension could serve

**72,900**

riders daily.

The total cost of this investment to the public is approximately \$1.2 billion<sup>9</sup> (see map on Page 38). Given the project’s fundamental importance, Sidewalk Labs is prepared to provide assistance with the financing for the approved plan. As per the Waterfront BIA report, construction of the Eastern Waterfront LRT could provide \$22.8 billion in additional tax revenue to the governments of Toronto, Ontario, and Canada over the 20 years following completion of the project.<sup>10</sup>

Construction of this light rail extension would lead to excellent financial outcomes for the public. These outcomes can be made even better through public use of the innovative funding mechanism of self-financing, sometimes referred to as “value capture,” which would allow the light rail expansion to finance a portion of its own costs. The idea behind self-financing is to impose a future charge on real-estate development, and borrow in

the present against that stream of funds to pay for part of the cost of construction of the transit system. Self-financing requires a large enough development area that real estate values can credibly reach sufficient levels to fund expensive transit projects, which means the government could only employ this tool if development expands east beyond Quayside along the waterfront.

The corresponding benefits would be immense: several new connected neighbourhoods, creating homes for thousands of people who would enjoy quick public transit connections to the rest of the city. The presence of high-quality light rail transit makes it possible to create an IDEA District where people of all incomes choose not to own a car. Sidewalk Labs estimates that by 2041 the light rail would serve roughly 72,900 Torontonians traveling to the IDEA District per day.<sup>11</sup>

## An innovative self-financing mechanism could help build the long-desired LRT extension, unlocking the eastern waterfront’s potential.



Expanding Public Transit

## Design a neighbourhood with transit first

For many years, Torontonians have recognized that the key to unlocking the potential of the eastern waterfront is through public transit access. The existing plans include a series of light rail lines through the area, as well as the proposed downtown relief subway and the construction of the planned East Harbour SmartTrack and Metrolinx commuter rail station. While funding has failed to materialize, there is general consensus on the overall shape of such a system, as articulated in the Port Lands Planning Framework and the Waterfront Transit Reset efforts.

Sidewalk Labs believes this system should operate as light rail service. This service would be interoperable with the wider streetcar network, using the same vehicles on the same rails with the same electrical infrastructure. But it would operate in its own right-of-way, with priority at intersections and stops spaced farther apart than the stop-on-each-corner spacing common elsewhere in the city. These changes elevate the system from streetcar service to light rail service, which is faster and more reliable.

This expansion is vital to the waterfront’s future. The existing plans (Segments 1 through 9) are even more important for the prospect of commercial development in the IDEA District than they are for Quayside. To build on these plans, Sidewalk Labs proposes an optional additional link (Segment 10) to extend the planned network and improve access to and from the IDEA District.

These expanded plans can be pursued at a total estimated cost of approximately \$1.2 billion (roughly \$1.3 billion if the optional Sidewalk Labs link were included). With this infrastructure in place, the full scale of the IDEA District could become home to tens of thousands of residents, jobs, and visitor destinations, while being fully integrated into the rest of the city — all without overloading local roads with traffic.

It is critical to ensure that these segments get built prior to the start of new development. There are many examples from around the world of what happens when a new development fails to link into the city's transit network. Three key lessons stand out:

# 1

## **New transit must connect into a system.**

Sometimes a new development overlooks the need for neighbourhood transit service to connect with a larger existing network. London's Canary Wharf development filed for bankruptcy in 1992, due partly to its highly publicized lack of transit access, which made it impractical for commuters. The project rebounded following improvements to the Docklands Light Railway<sup>12</sup> and, later, after a subway extension to the site. As this case shows, the failure to integrate into an established transit network can isolate a development and stunt its growth.



Toronto's Liberty Village area initially lacked sufficient public transit access, leading to heavy traffic congestion, overcrowded streetcars, and widespread commuter frustration. Credit: David Pike

# 2

## **Ignoring transit worsens congestion.**

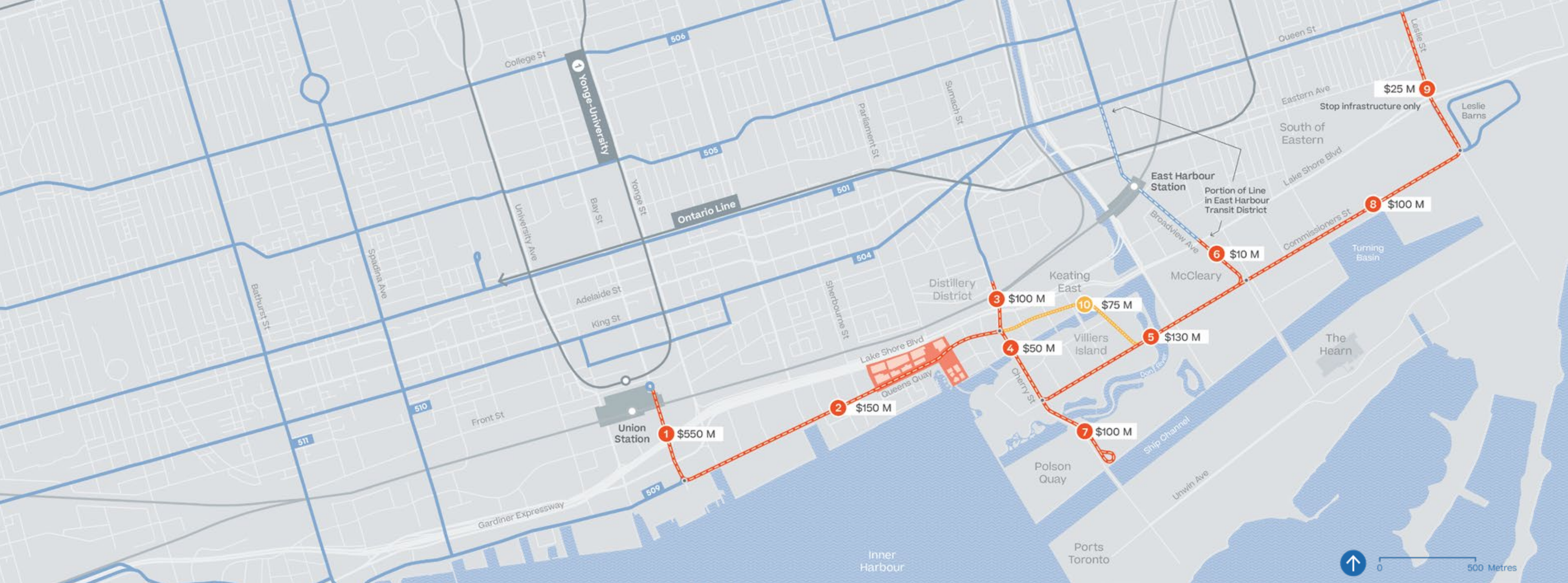
Another oversight is the tendency to build a high-density development without any transit at all. Many fast-growing Asian cities have made this mistake, leading to the traffic gridlock and air pollution that characterize places like Mumbai<sup>13</sup> and Jakarta.<sup>14</sup> Liberty Village,<sup>15</sup> in Toronto, followed a similar path. In such cases, the initial result is absolute gridlock, because cars simply cannot carry the volume of people that a high-density place needs. Governments are then forced to retrofit a public transit system into the neighbourhood, which can often result in significant financial costs and travel disruptions.

# 3

## **Delaying transit expansion locks in car use.**

New developments will sometimes build extensive road and parking capacity to accommodate cars in the near term, while hoping that public transit will eventually arrive. This approach locks the area into a car-first orientation that is difficult to change even over decades. The mobility patterns established when a neighbourhood is first built are very difficult to change, and history has shown time and again that widening roads to relieve congestion is a temporary solution that requires enormous public funding and ultimately worsens the problem.

**This mobility vision integrates street design, innovative policy, and transportation technologies to set a bold new course for urban mobility.**



Map  
**A \$1.2 billion plan to extend light rail along the waterfront**

- GO Transit / SmartTrack
  - Subway (existing and planned)
  - Existing
  - Approved extension
  - Optional
  - Quayside
- Light rail

Toronto's current plan would provide a critical connection between Union Station and Queens Quay **1** and extend the waterfront light rail east beyond Bay Street to reach Quayside and the greater eastern waterfront at Cherry Street **2**.

The plan would create a connection to the King Street transit corridor via Cherry Street, near the Distillery District **3**.

New service would run along Cherry **4**, Commissioners **5**, and the Broadview extension **6** creating an essential connection between Quayside, Villiers, and the East Harbour SmartTrack Station, with the potential to connect to Broadview Station.

The plan would extend service along Cherry **7** to a turnaround on Polson Quay, replacing the current turnaround by the Distillery District.

Finally, to help connect the eastern part of the Port Lands to the greater system, the plan calls for extending the Commissioners line east **8** to Leslie Street, linking the new network to the Leslie Car Barns and to the broader streetcar network via Leslie **9**.

Additionally, as part of the work to rebuild the Cherry underpass to accommodate the light rail, Sidewalk Labs proposes also rebuilding the Parliament underpass, to create a pleasant gateway into Quayside.

As part of a second phase of construction, Sidewalk Labs proposes an optional new connection, not part of the existing approved plan, to extend transit north of Villiers Island along the new extension of Queens Quay east of Cherry **10**.



Expanding  
Public Transit

# Encourage expansion through “self-financing”

Traditionally, transit projects like the waterfront light rail expansion have been funded equally by the federal, provincial, and municipal governments, but no level of government has currently committed to funding new rapid transit in the eastern waterfront. A large-scale development of the area could make a substantial contribution to funding the transit system this area needs via a self-financing approach — and in so doing, set an example for how to finance the essential transit extensions necessary for sustainable urban growth.

Self-financing, through a value-capture approach like the use of special assessments or tax-increment financing, has been used in transit projects around the world, such as London’s Crossrail<sup>16</sup> and Calgary’s Rivers District Community Revitalization Plan.<sup>17</sup> There is precedent for self-financing in Toronto as well: the City of Toronto has approved its use to pay for a portion of the forthcoming SmartTrack project.<sup>18</sup>

The key issue with any self-financing plan is whether the transit expansion will create enough value to meaningfully offset the cost of building that expansion. The strategy is often not viable where new transit will serve existing neighbourhoods, because those areas are already sufficiently valuable, meaning that new transit services do not add much. Likewise, the new construction required in a low-density development plan may

be unable to generate sufficient incremental tax or other revenues to make a meaningful contribution to high transit costs. A small neighbourhood consisting of just a few blocks, like Quayside, cannot generate enough revenue to repay the investment.

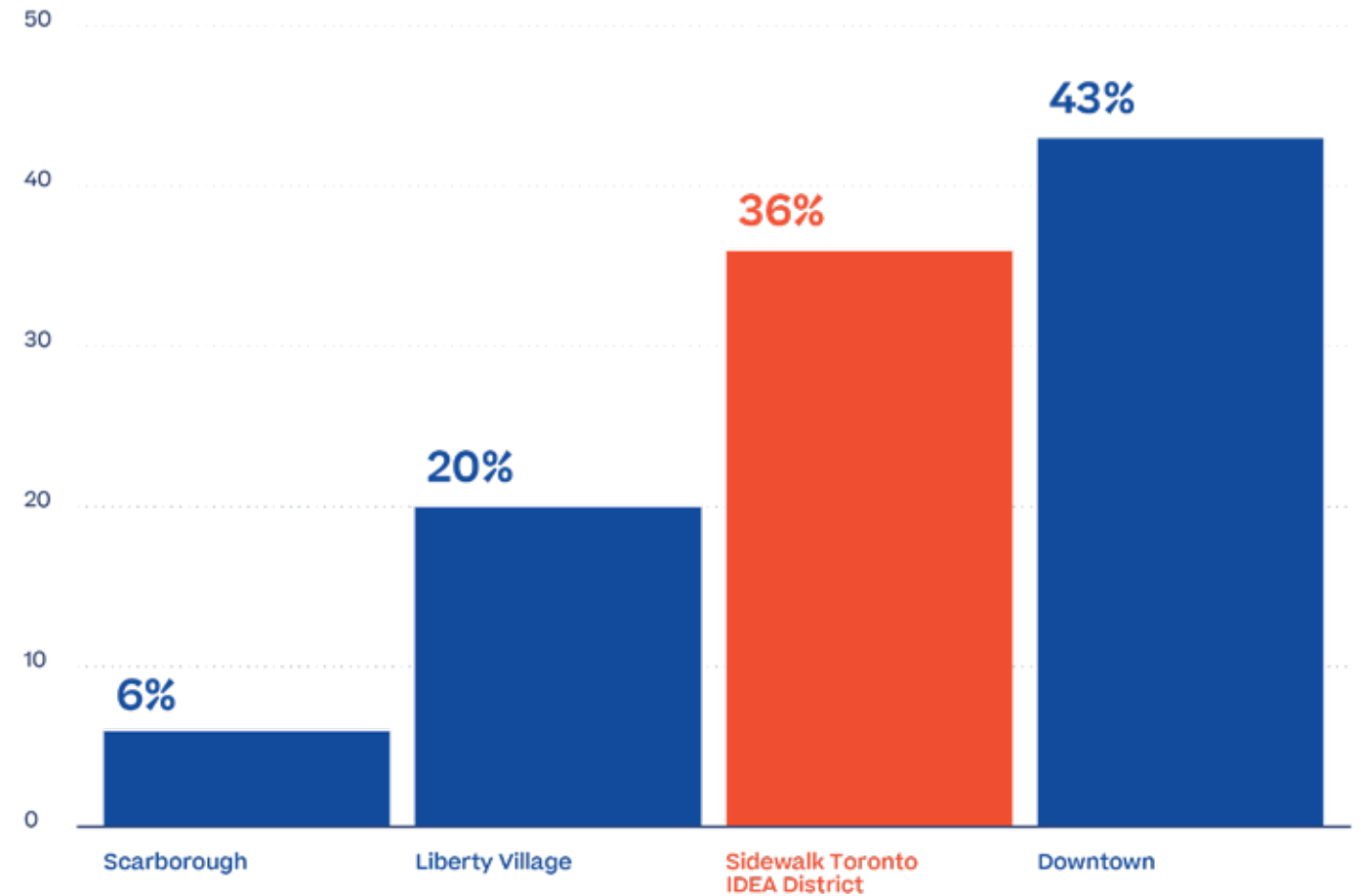
But if the scale of the development is large enough, and that development can feature new construction at a high enough density, then a critical opportunity exists to design and fund a rapid transit system that can nourish a new neighbourhood and support its growth. Such an opportunity exists along the waterfront, where — as per the economic-impact report prepared by the Waterfront BIA for the city’s approved plan — construction of the light rail would generate land value uplift of \$4.5 billion between 2025 and 2045.<sup>19</sup> The feasibility of such a plan requires a commitment for enough new development at high enough densities to design and fund a rapid transit system that can nourish new neighbourhoods and support their growth.

In this event, public and public-private partners would need to finance some or all of the construction of the expanded light rail network, with an expectation that these partners would be paid back by future incremental tax revenues at a rate that is negotiated with the city. Construction of this network could be phased to keep pace with development. The light rail system would remain

## A neighbourhood comparison of job access via public transit

The light rail extension would make 36 percent of Toronto’s jobs accessible to residents of the IDEA District within 30 minutes, making it more transit-friendly than other comparable neighbourhoods and approaching the type of transit access that can be found downtown.

Percent of jobs accessible by transit (within 30 min)



publicly owned and operated by the Toronto Transit Commission. A non-profit or new government entity could be created to oversee the implementation of this self-financing proposal; its role would be to manage the funds raised, which would be required by law to be used exclusively for the light rail expansion.

The light rail could serve more than 72,900 riders and make 36 percent of jobs accessible across Toronto within 30 minutes.<sup>20</sup>

Implemented across the full scale of the IDEA District, the extension —

in conjunction with the other mobility improvements discussed in this chapter — could increase the number of trips taken by transit to 60.6 percent,<sup>21</sup> up from 46.7 percent with standard development.

Above all, extending the light rail via self-financing, beginning in Quayside, would demonstrate a new, financially sustainable way to create critical transit infrastructure with reduced taxpayer funding. Pioneering this approach could give Toronto-area governments a powerful tool to deliver the new transit infrastructure the city and region urgently require.

The LRT extension would increase land value by **\$4.5 billion** between 2025 and 2045.

The LRT extension would increase transit trips by **60%** in the IDEA District.



# Part 2



## Enabling Walking and Cycling Year-Round



### Key Goals

- 1 Plan for a “15-minute neighbourhood”
- 2 Expand safe, comfortable walking and cycling networks
- 3 Provide signal priority for walking and cycling
- 4 Encourage bike-share, e-bike, and other low-speed vehicle options
- 5 Facilitate all-weather walking and cycling with heated pavement

Establishing a strong transit system connected to the wider region is the first step towards ensuring that a neighbourhood provides affordable, accessible alternatives to owning a car. The next step is creating a walking and cycling network that enables people to travel easily and comfortably within their neighbourhood and to adjacent neighbourhoods.

In recent years, Toronto has worked to improve its walking and cycling infrastructure. For example, the redesigned Queens Quay West demonstrates strong demand for protected bike lanes, as it hosts as many as 6,000 cyclists per day.<sup>22</sup>

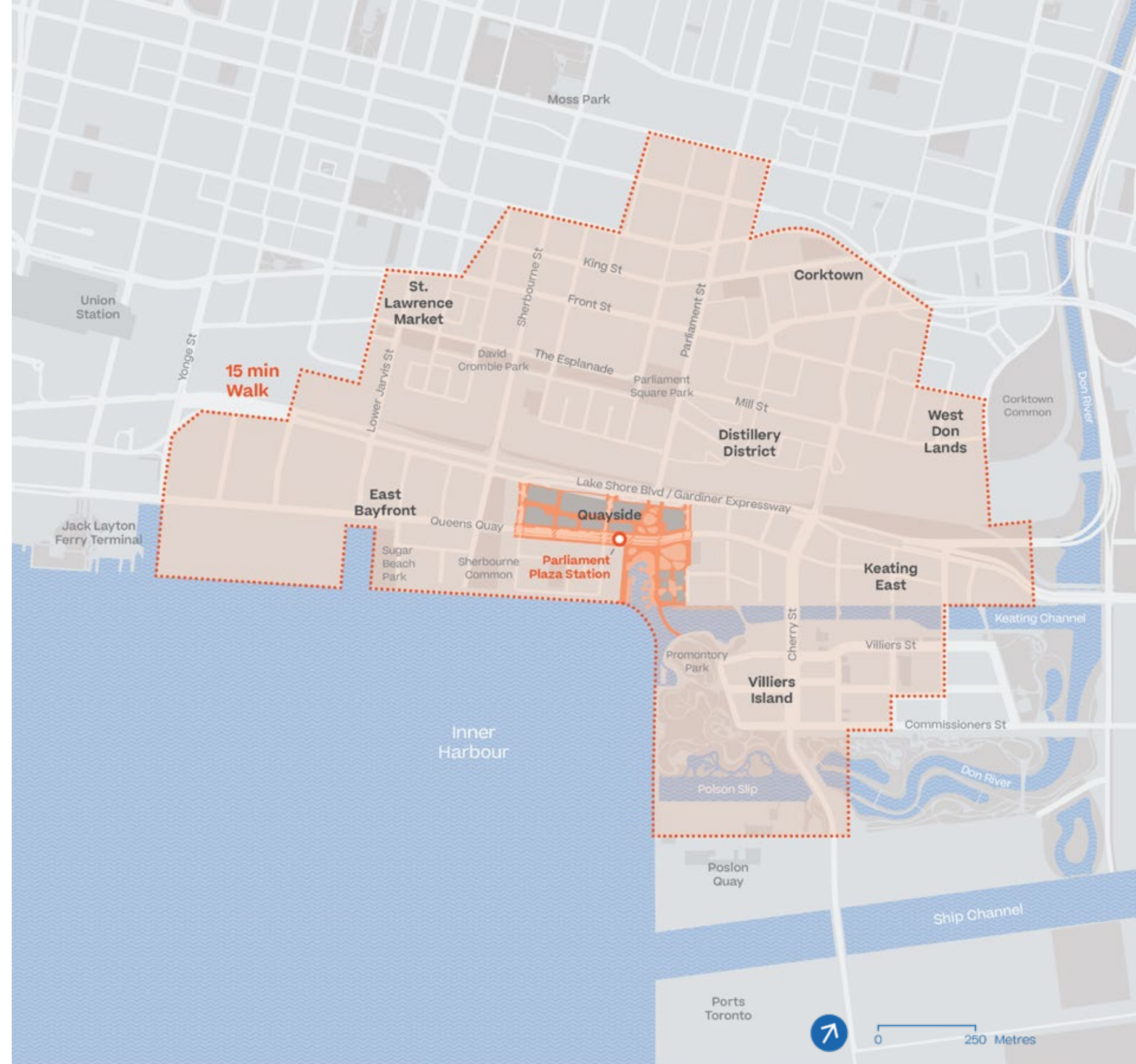
But pedestrians and cyclists along the waterfront face steep challenges in the form of connectivity, safety, and comfort. The elevated Gardiner Expressway and the railway tracks present a barrier to walking or cycling between the waterfront and downtown, especially after dark. A general absence of bike lanes forces cyclists next to vehicle traffic, discouraging many would-be riders. Subfreezing temperatures, piles of snow, icy streets, and winds off the lake make cycling even more harrowing in winter.

Sidewalk Labs’ plan for a comprehensive pedestrian-cyclist network integrates policy, design, and technological advancements that can make it dramatically easier to walk or bike within and around the IDEA District, and can serve as a model for walking and cycling in all types of downtown developments.



This approach would enable residents in the IDEA District to access all of their essential daily needs within a 15-minute walk; expand the walking and cycling network with people-first street designs and stronger links to adjacent neighbourhoods; give cyclists and pedestrians priority at intersections via adaptive traffic signals; encourage bike-share, e-bike share, and other low-speed vehicle options; and install heated pavement for year-round comfort and safety.

At the full scale of the IDEA District, Sidewalk Labs estimates that more than 16 percent of all trips to, from, and within this area would occur by foot, bike, or other low-speed vehicles — enabling households to meet daily needs without owning a car.<sup>23</sup>



Map  
**Neighbourhoods accessible to Quayside within a 15-minute walk**

○ 15-minute walk from Parliament Plaza Station  
■ Quayside pedestrian access



Enabling Walking and  
Cycling Year-Round


# Plan for a “15-minute neighbourhood”

Any strong, active transportation strategy starts with designing a walkable neighbourhood to enliven the streets, fill shops with customers, and create unexpected encounters. People walk even more if they can reach all their daily needs within about 15 minutes, or 1 kilometre.


Building on this insight means planning neighbourhoods where, within a 15-minute walk, an individual can find every service or good they are likely to need more than once a week. These include essential services such as schools, child care, and health care; necessities such as pharmacies and groceries; recreational destinations like restaurants, shops, and parks; and above all, plenty of jobs.

Sidewalk Labs proposes to address this challenge by planning for a far more robust mix of homes, shops, production spaces, and jobs than found in a comparable neighbourhoods, such as Liberty Village. While this approach to planning is holistic in nature, some of the key steps include:

## A mixed development program.

In contrast to conventional downtown developments in Toronto, which devote roughly 90 percent of space to residential use, Quayside’s development program calls for 67 percent of space to be devoted to housing, with roughly 33 percent devoted to office, retail, community, and maker spaces, as well as other non-residential uses. Achieving that balance would create far more jobs and recreational destinations in Quayside than typical of Toronto neighbourhoods, enabling more residents to walk to work or to the store. To support this mixed program, Sidewalk Labs plans to deploy an adaptable building structure called “Loft,” designed with flexible interior configurations to accommodate a range of residential, commercial, and even light industrial uses. 

## All-weather ground floors.

On the lower floors, these adaptable structures can house a variety of short-term, long-term, and seasonal tenants, allowing for a livelier mix of shops, services, community gathering spaces, and other destinations all within walking distance. Some of this “stoa” space would be designed with retractable awnings to invite foot traffic in all weather. 

## Last-mile transit connections.

Sidewalk Labs has paid special attention to ensuring high-quality pedestrian and bicycle connections to light rail and bus stops. As planned, cyclists would access these stations through either dedicated lanes or entire streets prioritized for bicycle travel, with ample bike parking and bike- and scooter-share access adjacent to stations. Pedestrians could access stations along pleasant sidewalks, and access platforms via wide crosswalks that prioritize safe crossing.

## Access to social infrastructure.

To improve walkable access to essential services, Sidewalk Labs plans to provide space in Quayside for an elementary school co-located with a child care facility, health services co-located with supportive care programs, and community space for neighbourhood groups. The care and community spaces would also be included in the first phases of development to improve access from Day One.

In Quayside, the whole neighbourhood would be walkable within 15 minutes. When applied at the full scale of the IDEA District, Sidewalk Labs’ plan to encourage a vibrant mixture of homes, jobs, shops, and public spaces on every block would lead to 9 percent of all trips being made by walking.<sup>24</sup>

## Impact spotlight

# The health benefits of active neighbourhoods

Research shows that life is  
healthier in walkable areas.

The Canadian Physical Activity Guidelines recommends that all adults engage in at least 30 minutes of moderate-to-vigorous physical activity every day.<sup>25</sup> If their neighbourhood is designed for it, they can get that exercise in the course of their normal daily routines, by walking or cycling. And the research shows that people who live in more walkable neighbourhoods get more exercise, and are healthier for it:

### Increased fitness.

People who routinely walk and cycle experience improvements in heart rate, lung capacity, and metabolic health. A study by Statistics Canada found that residents of urban neighbourhoods were more likely to be physically active and to engage in active transportation than residents of inner or outer suburbs.<sup>26</sup>

### Decreased obesity.

A 2015 study by Statistics Canada looked at the prevalence of obesity among urban and suburban Ontario residents. The conclusion: “Residents of highly walkable areas engaged in more utilitarian walking and had a lower prevalence of obesity than did adults in low-walkability areas.” These basic findings — that active transportation correlates with lower obesity rates — are also borne out on a national and international scale.<sup>27</sup>

### Lower blood pressure and heart rate.

A recent study in France found that living in a highly walkable neighbourhood is associated with improved cardiovascular health, including lower blood pressure and a lower resting heart rate.<sup>28</sup>

### Lower disease risk.

A 2014 study cross-referenced a variety of health indicators against the street designs of 24 different California cities. The findings showed that more compact and connected street networks, with fewer lanes on their major roads, are correlated with reduced rates of diabetes and heart disease<sup>29</sup> (as well as lower blood pressure and reduced obesity rates) among residents.



See the “Buildings and Housing” chapter of Volume 2, on Page 202, for more details on adaptable buildings.



See the “Public Realm” chapter of Volume 2, on Page 118, for more details on stoa.



Enabling Walking and Cycling Year-Round

# Expand safe, comfortable walking and cycling networks

Among the main deterrents to walking and biking are the safety concerns and general discomforts that come with travelling beside big cars and trucks. While this concern may be true for any city, it is an increasing one in Toronto, where the number of street fatalities has been trending upwards over the past decade,<sup>30</sup> according to the Toronto Police Service. The vast majority of pedestrians and cyclists who reach their destination safely require vigilance to cross busy streets and to bike on unprotected lanes, which makes for an unpleasant experience, and is a steep barrier to walking or riding, especially with children.

the experience of cycling through a city. Within the IDEA District, cyclists would be able to reach 100 percent of buildings on a dedicated bike lane or roadway designed for bikes, compared to roughly 15 percent in a typical downtown Toronto neighbourhood today.<sup>31</sup>

A strong walking and cycling network does not end at the neighbourhood's limits. While the waterfront has easy walking and cycling proximity to the vibrant neighbourhoods of the Distillery District, Corktown Commons, and St. Lawrence, access to them is cut off by the need to cross under both the Gardiner Expressway and the railway lines leading to Union Station. Pedestrians and cyclists are subjected to loud noises, dark and narrow tunnels, confusing paths, and, occasionally, unknown liquid dripping from above.

To improve these connections, Sidewalk Labs proposes that the Parliament and Cherry underpasses be rebuilt. (The Cherry Street underpass must be rebuilt to accommodate the extension of the light rail line from the Distillery District in any case.) The rebuilt underpasses would separate pedestrians, bikes, cars, and public transit (consistent with the city's existing and planned bike and transit networks) to improve safety, add noise buffers and attractive lighting to enhance comfort and wayfinding, and install temporary display windows and digital art exhibits to make the walk fun and engaging.

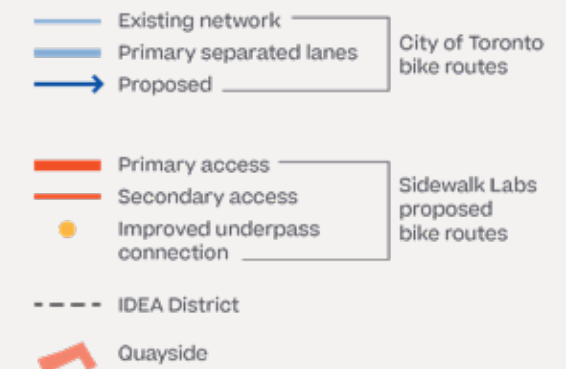
Sidewalk Labs' redesigned street types ensure safe, convenient, and complete paths for people travelling by foot, bike, or other low-speed vehicles. This proposed network of streets would include Lane-ways, where traffic moves at pedestrian speeds, and Accessways, where traffic moves at cycling speeds. On Boulevards and Transitways, where traffic moves at vehicular speeds, the overall sense of safety and comfort for pedestrians and cyclists would be improved through the use of wider sidewalks and dedicated bike spaces. (See Page 92 of this chapter for more details on street types.)

In Quayside, this plan would only affect two streets; therefore, its impact would be limited. But applied across a larger area that covers most or all of a rider's route, this street network could transform

Bike lanes or priority streets could connect to **100%** of IDEA District buildings.



Map  
**How the proposed bike plan expands opportunities for cyclists**





This conceptual sketch of the reconstructed Cherry Street underpass shows decorative lighting, acoustic panels, bike lanes, and tree-lined walkways, which would create an appealing gateway between Toronto's downtown core and its emerging eastern waterfront.

Connections to the city's existing bike network are also critical. The Martin Goodman Trail, which runs through the waterfront, provides a natural cycling link to the rest of the city, and the underpass reconfigurations would provide an additional cycling link for Parliament and Cherry streets. The proposed connection to the existing on-street bicycle lane at Lower Sherbourne would allow riders to transition from a street where today bikes are given only a portion of the street to the bicycle-priority streets designed by Sidewalk Labs. In particular, Sidewalk Labs plans to connect to the existing and planned bicycle routes that would provide last-mile service to the future East Harbour station.

Finally, this emphasis on connections applies to developments along waterways, such as Keating Channel. In such a setting, Sidewalk Labs' approach aims to stitch together both sides of the waterway through a multitude of easily accessible, narrow bridges designed exclusively for pedestrians and cyclists, rather than funneling all types of traffic across one or two large bridges. This tapestry of connections reinforces the broader push for a walkable, "15 minute neighbourhood" and makes the waterway feel like part of the community, instead of a barrier.



Goal 3

This bike lane in Copenhagen uses a "green wave": a signal coordination system, shown here through green pavement lights, that helps cyclists safely maintain higher speeds for longer distances. Credit: SWARCO

Enabling Walking and Cycling Year-Round

## Provide signal priority for walking and cycling



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the "Digital Innovation" chapter of Volume 2, on Page 374.

For trips that take pedestrians and cyclists onto faster-moving streets, Sidewalk Labs plans to help ensure safety and priority for these travellers using new traffic signal technology. These signals have the ability to detect when pedestrians need more time at a crossing and can adjust signals accordingly.

For example, consider an elderly woman with a cane who starts crossing a boulevard, which is designed to handle the most vehicle traffic. A typical crossing signal changes the light when the pre-determined crossing time is up, whether or not this person has made it across safely. But an adaptive traffic signal can detect that the woman remains in the middle of the street — in an anonymous way that preserves privacy — and extend

the crossing time until she is safely on the other side. [📖](#) (See Page 91 of this chapter for more details.)

Sidewalk Labs plans to provide cyclists with similar priority by deploying "green waves," a concept pioneered in Copenhagen that uses signal coordination to help cyclists avoid hitting red lights so long as they maintain a certain speed.<sup>32</sup> (Sidewalk Labs plans to indicate green waves via LED strips on pavement.) These waves not only improve travel time but also increase safety, both because green waves make cyclists more visible to drivers, and because the timing between the waves allows safe crossing opportunities for pedestrians.



Enabling Walking and  
Cycling Year-Round

# Encourage bike-share, e-bike, and other low- speed vehicle options

Some of the barriers to cycling — especially commuting by bicycle — are less about street design and more about access to bike options both at the start of a trip and when parking at a destination. The global trend of bike-sharing, including Toronto Bike Share, has made clear the value of using technology to make vehicles available on demand for one-way trips.

Dockless vehicle shares — a new type of bike-share service that does not require fixed stations — are a recent addition to city streets. To provide this option while also preventing the disorder of bikes parked haphazardly across the public realm, Sidewalk Labs plans to designate parking areas for dockless vehicles.

To accommodate trips made on personal bikes, Sidewalk Labs proposes to require all buildings to create a minimum of one bike space per every two building residents and one bike space for every four employees. Given that studies show that arriving to work sweaty deters many would-be bike commuters, Sidewalk Labs plans to help provide on-site showers through agreements with fitness centres or a dedicated bike centre.

To encourage bike (and other low-speed vehicle) services in Quayside, Sidewalk Labs plans to create parking for nearly 3,800 bikes for residents and employees (20 percent more than required by regulation), 190 bike-share docks, 60 electric bikes, and 190 e-scooters. A neighbourhood of this size would typically have no more than 15 bike-share bikes (as per Toronto Bike Share criteria) and no dedicated space for e-bikes or scooters.<sup>33</sup>

Electric bikes and e-scooters help riders make their trips without the full exertion of traditional pedaling, expanding the distance someone might consider cycling. Both options are still emerging in North American cities, and e-scooters are currently not allowed in Toronto. Given Toronto's mobility objectives, Sidewalk Labs expects that e-scooter use will be adopted by the time Quayside opens; if not, Sidewalk Labs would seek to work with the city to use the neighbourhood to test how e-scooters could be used safely in Toronto.

- Quayside's low-speed vehicle infrastructure would include:
- 3,800 bike parking spaces
  - 190 bike-share docks
  - 60 electric bikes
  - 190 e-scooters

Sidewalk Labs small research grant

## How bike counting tools help cities plan bike infrastructure



Credit: David Edgar

How much road space should new neighbourhoods reserve for bike lanes? What is the best way to balance the needs of cyclists, pedestrians, cars, and other low-speed vehicles? What is the ideal number of bike-share stations, and where should they be located?

Planners can estimate these needs, but bicycle-counting technology can provide the detailed data necessary to ensure the optimal use of road space for all users, and even to encourage cycling. A recent report from the Samuelson-Glushko Canadian Internet Policy and Public Interest Clinic (funded by a Sidewalk Labs' small research grant) laid out the benefits — and the privacy risks — of collecting bicycle data.<sup>34</sup>

A wide variety of technologies are available to count bikes, includ-

ing inductive loops embedded in roadways, that measure the change in the magnetic field when metal passes over them. Some bicycle counters work with video footage, others with infrared light, still others with laser-pulsing LIDAR. And old-fashioned manual counts can help by tallying things like bicycle helmets.

These technologies are often used in tandem, and the information they collect can be stored, analyzed, and retrieved through civic open-data portals. But sequential photo or video counting can reveal individual routes and other sensitive information.

To address this challenge, the report points to counter-measures that de-identify data collection. One such process, known as "k-anonymity,"

reserves the release of bike information until every combination of variables can be matched with at least "k" individuals, allowing cities to set an appropriate threshold. Some technologies, such as sensors that count cyclists via changes in light intensity, preserve anonymity from the outset.

The City of Ottawa has a comprehensive system for bicycle counting that includes algorithm-enabled cameras, and anonymized-at-source technologies such as inductive loops, infrared, and manual counts. Any identifiable data is anonymized before it is made accessible through the city's open data portal: planners can see the number of users on a particular bike lane, but not individual routes.



Goal 5

Enabling Walking and Cycling Year-Round

# Facilitate all-weather walking and cycling with heated pavement

The climate presents a challenge to year-round walking and cycling in cold-weather cities like Toronto.

Many people report being “nine-month cyclists”; a Ryerson study found that only 27 percent of regular cyclists<sup>35</sup> continue to bike to work or school throughout the winter months. Meanwhile, icy or snowy streets can prove big obstacles to walking outside in winter. According to a City of Toronto report from 2016, roughly 3,000 Torontonians go to the emergency room every year after falling on ice or snow, and more than half of city residents over 65 report trouble moving around outdoors in winter, citing slippery sidewalks as their greatest concern.<sup>36</sup>

Sidewalk Labs plans to deploy heated pavement in some sidewalks and bike lanes to make walking and cycling more attractive all year. This pavement relies on modularity for easier access to the heating system, reducing maintenance costs and disruption, and takes advantage of new, efficient heating technologies that require less extensive piping systems to operate.

Sidewalks located near buildings would use hydronic heating, which circulates warm fluid just underneath the pavement surface, and can be powered by clean energy sources used by the neighbourhood’s thermal energy grid. Pavers located towards the centre of the streetscape would rely on conductive heating, which involves embedding a thin film in

or under the pavement, making it easier to maintain than heating that runs through thick pipes. Conductive heating can also run off clean electricity.

To conserve energy, heated pavement would connect to real-time weather forecasts programmed to automatically “power on” three or four hours in advance of a storm. The pavement would reach a maximum temperature of 2 to 4 degrees Celsius, which is capable of melting snow while remaining comfortable to walk on. The system would turn off automatically whenever the pavement is dry and no risk of black ice is present.

In Quayside, Sidewalk Labs plans to deploy 1,200 square metres of heated sidewalk and pedestrian zones and 1,590 square metres of heated bike paths.<sup>37</sup>

The amount of power used to run the heating system would be closely monitored to ensure it supports the community’s sustainability goals. All costs would be tracked to ensure that they meet modelled cost expectations for capital investment, ongoing maintenance, and associated costs.

Wind, rain, and even sun in warmer months can be significant barriers to walking along the waterfront. Sidewalk Labs plans to deploy an outdoor comfort system along sidewalks to shield pedestrians from wind and provide additional cover from rain and snow.

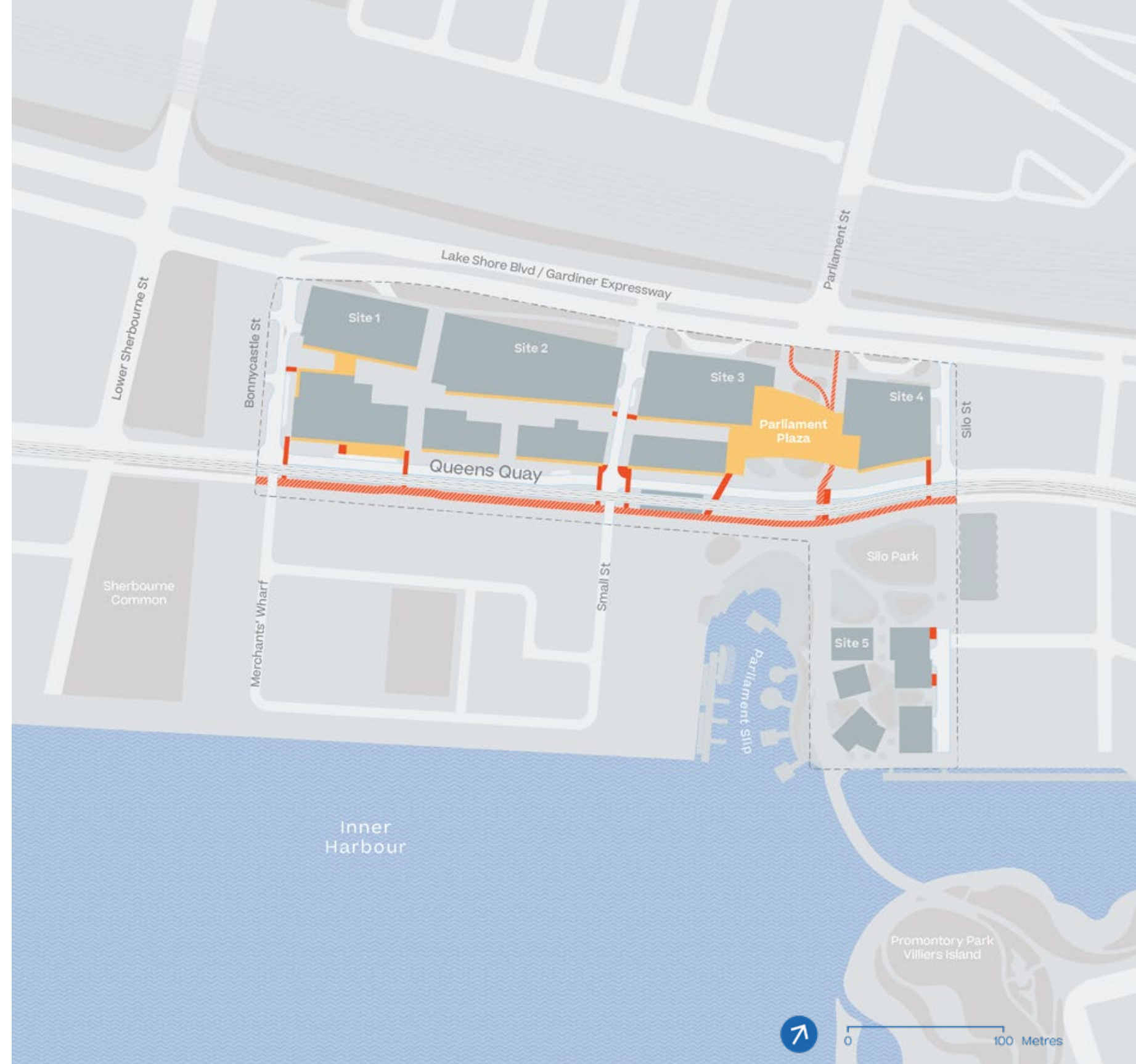


See the “Sustainability” chapter of Volume 2, on Page 296, for more details on the thermal grid.

**Only 27%** of regular cyclists commute by bike in winter.



See the “Public Realm” chapter of Volume 2, on Page 118, for more details on outdoor comfort systems.



## Map Making it safer to walk and cycle year-round with weather mitigation

- Heated bike routes
- Heated pedestrian crossing
- Awnings, raincoats, and canopies
- Plowed streets
- Quayside site

The weather mitigation strategies proposed by Sidewalk Labs include heated pavers that could melt snow and ice on sidewalks and bike lanes, and building Raincoats that could protect adjacent outdoor areas from sun, rain, and snow.

# Part 3



## Harnessing New Mobility and Self-Driving Technology



### Key Goals

1 **Encourage shared use of ride-hail services**

2 **Provide car-share and parking options for the occasional private car trip**

3 **Make all trip options available in discounted mobility packages**

In any major city, there are lots of trips that walking, cycling, and public transit cannot accommodate in a convenient way. The airport trip with lots of luggage. A hospital trip with an elderly parent. The weekend getaway to cottage country. The big shopping trip to the outlet mall. The trip home after a night out, so late that the subway is closed. The trip home of a hospital worker whose shift ends at 3 a.m.

Faced with these occasional needs, nearly half of the households in downtown Toronto choose to own a car. Yet, of these households, roughly half leave their car at home on weekdays, because they walk, bike, or take public transit to work,<sup>38</sup> meaning they pay roughly \$900 a month to own, park, maintain, and insure a car simply for occasional trips. Some save money by parking on the street, but this imposes a cost on their neighbours, as street-parking spots take up space that otherwise could go towards public spaces or bike lanes, and real estate developers are required to create parking spots — a steep cost often passed on to tenants.

Breakthroughs in technology are generating a host of new mobility options that give households the freedom to make an occasional car trip without needing to own a car. These include ride-hail (taxi-like) services, such as Lyft or Uber; “microtransit” (van or shuttle) services; and car-share services that are bookable on demand, such as Zipcar.

These same services will get substantially cheaper and more convenient once self-driving technology becomes widespread. Indeed, no transportation technology holds as much potential to transform car-ownership as the self-driving vehicle.

The potential benefits are substantial. Crash fatalities caused by speeding, drowsiness, and drunk or distracted driving — which accounted for 66 percent of all vehicle fatalities on U.S. roads in 2016,<sup>39</sup> according to the U.S. National Highway Traffic Safety Administration — could largely disappear. Car commuters will be able to use their time more productively, and groups who currently cannot drive, such as people with visual impairments,

may achieve greater mobility. Self-driving vehicles can be programmed to obey all traffic rules and defer to pedestrians. Early commercial operations of self-driving vehicles will likely occur through fleets, giving cities a tool to recapture significant amounts of public space devoted to parking.

Despite these upsides, the impact that self-driving vehicles will have on cities is unclear, and some observers warn about potential drawbacks that cities may need to guard against. These include increases in driving and vehicles on the road, if people overuse the ability to use self-driving cars to conduct errands without them.

Much of this outcome depends not on the technology itself, but on policy for how it is used. If self-driving vehicles are individually owned and free to roam the streets without a driver, then car-ownership — and congestion — might soar. But if self-driving vehicles are integrated into the urban environment and public transit network with thoughtful policies that encourage fleets of shared trips and people-first street designs, they can become part of a next-generation mobility system.



Sidewalk Labs’ new mobility plan integrates policy, design, and technology to harness the potential for fleets of self-driving vehicles and shuttles to provide the convenience of a car trip without the need to own one. This plan includes encouraging the shared use of ride-hail services through designated passenger zones and pricing, providing car-share and parking options for the occasional car trip, and making all trip options available in an integrated mobility package.

**New mobility initiatives could save a two-person household \$4,000 annually.**

One of the Sidewalk Toronto project’s most significant opportunities for innovation is to be the first to demonstrate how existing new mobility options — and the application of self-driving technology to these services — can meaningfully reshape cities for the better. Sidewalk Labs does not plan to operate new mobility services or self-driving vehicle fleets within the IDEA District, nor would it give any special prioritization to Alphabet sibling companies, such as Waymo. Instead, this new mobility plan is meant to lay the groundwork for an open ecosystem of third-party mobility services to operate in ways that benefit urban life, now and in the future.

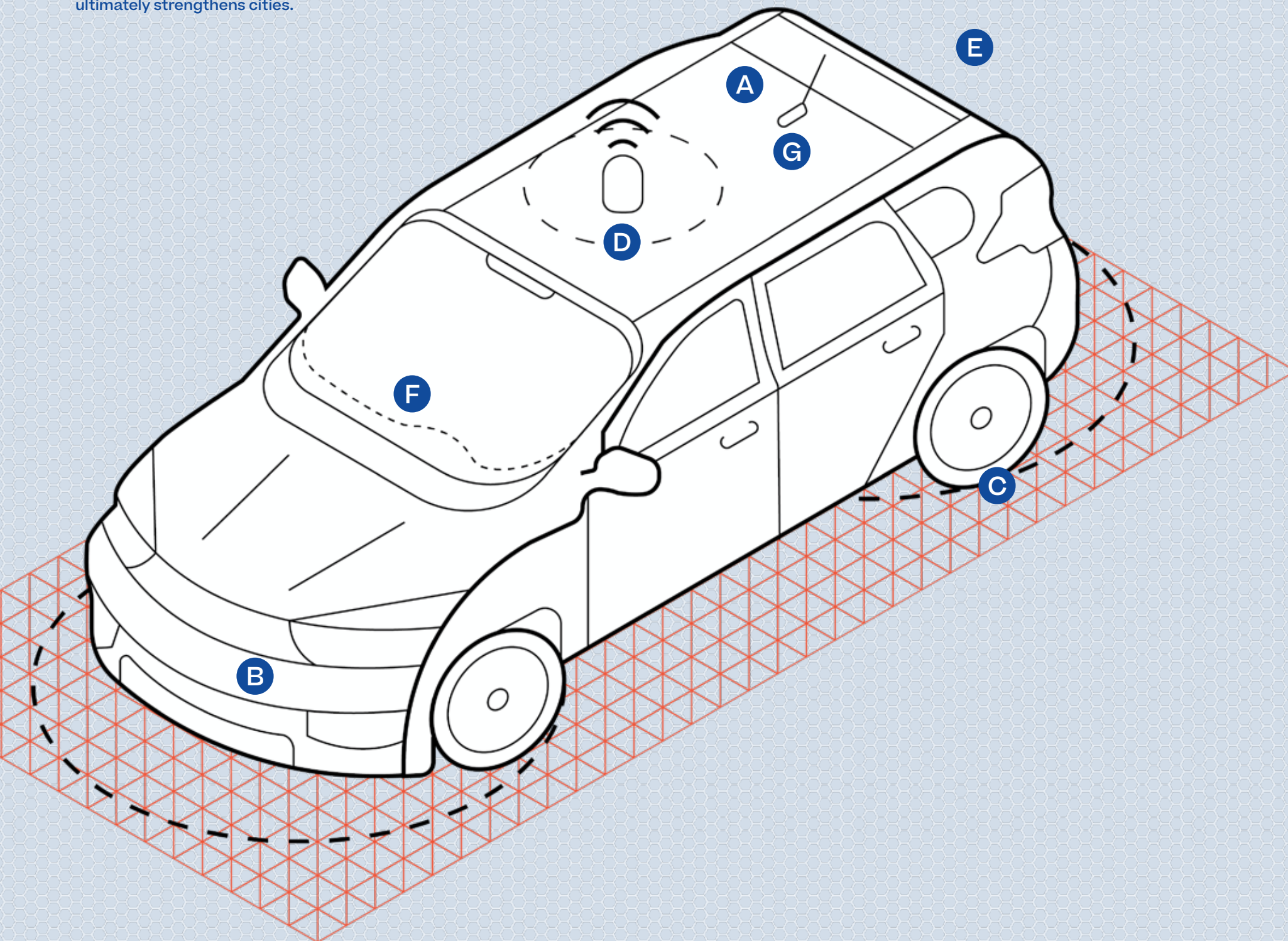
To that end, Sidewalk Labs supports research and stakeholder engagement initiatives that aim to improve the collective understanding of the effects of self-driving vehicles on urban transportation systems and to catalyze the consensus-building process to explore potential regulatory models. Sidewalk Labs was the funding partner of the MaRS Mapping the Autonomous Vehicle Landscape research initiative, which engaged government officials, industry leaders, and civic organizations, and mobility experts to identify regulatory priorities and dissect various governance models for the GTA.

With the arrival of self-driving technology, Sidewalk Labs’ new mobility plan would lead to roughly 7 percent of all trips occurring by ride-hail options if applied at the full scale of the IDEA District and coordinated with the city, further helping households reduce the need to own a car. New mobility options such as self-driving ride-hail — combined with improved transit, cycling, and pedestrian options — form the basis of an integrated mobility package that could save two-person households roughly \$4,000 a year if they choose to go car-free.<sup>40</sup>



# Self-driving vehicles have the potential to reshape cities

Sidewalk Labs believes that self-driving vehicles will become ubiquitous features of urban life within the next two decades. The next few pages explore how the technology works, summarize its evolution over the past half-century, and outline a series of principles to help ensure that self-driving technology ultimately strengthens cities.



## Explainer: How self-driving vehicles drive

A breakdown of the technology behind this promising mobility advance

Roughly two-thirds of all crash fatalities are caused by speeding, falling asleep at the wheel, and drunk or distracted driving — hence the push to build cars that drive themselves. Self-driving vehicles never speed, fall asleep, drink alcohol, or get preoccupied with anything other than safely shuttling passengers to their destinations. Here is a look at how the technology<sup>41</sup> works:

- A Planning a trip**  
Self-driving vehicles plan their route by accessing maps, traffic data, road and weather conditions, toll information, and more. They continuously refresh all that data throughout the trip, in real time, via an internet connection.
- B Eyes on the ground**  
Front- and rear-mounted radar units determine the exact distances between the vehicle and other moving objects. Additional cameras and LIDAR sensors can also be mounted low on the vehicle.
- C A game of inches**  
Existing vehicle GPS systems are typically accurate within one or two metres; a self-driving car requires greater precision than that. Its position estimators, mounted on wheels, can count tire revolutions and sense lateral movements. This data is layered atop detailed digital maps that include road grades, speed bumps, and curb-cut locations to determine the car's exact position.
- D Eyes all around**  
A mini dome mounted on the car houses a LIDAR unit to help the vehicle "see." Using laser beams rather than radar waves, LIDAR generates dynamic, three-dimensional imagery for as far as 60 metres in every direction. The mini-dome also contains video cameras that recognize traffic lights, signage, pedestrians, and cyclists.
- E Back-seat driver**  
In the trunk of the vehicle lies the brains of the operation: the computer that processes all this data through algorithms and converts it into driving decisions (when to stop, back up, accelerate, slow down, change lanes, and more). It is a very powerful computer, akin to a mobile, multi-server data centre.
- F Computer vision**  
A system called "computer vision" processes the combined data from the LIDAR, radar, and camera systems to identify street users; classify them as pedestrians, vehicles, or cyclists; anticipate their movements; incorporate road rules; and make driving decisions.
- G Lessons learned and shared**  
All this data is cumulative, just like years of driving experience. As the car encounters and navigates new or unusual situations, it learns from them for the next time — and shares this learning with every car in its fleet.



## Self-driving vehicle technology: A brief history

1957

### First driverless car on a public road

RCA Labs successfully tests an autonomous vehicle on a 120-metre stretch of highway near Lincoln, Nebraska. The car's steering was controlled via electronic detector circuits embedded in the roadway.<sup>42</sup>

1968

### A proposal for computer control

In a visionary essay, Stanford professor and AI pioneer John McCarthy envisions "automatic chauffeurs" consisting of onboard computers and television cameras. "A fivefold reduction in fatalities is probably required to make the system acceptable," he wrote. "Much better is possible since humans really are rather bad drivers."<sup>43</sup>

1986

### The robot car is born

Munich-based engineer Ernst Dickmanns creates VaMoRs, a Mercedes Benz van with two cameras, eight 16-bit Intel microprocessors, and a dynamic vision program that can recognize features and abnormalities on the road. VaMoRs navigates 20 kilometres of autobahn at speeds of 90 kilometres per hour.<sup>44</sup>

1995

### No hands across America

Carnegie Mellon University researchers build the Navlab 5 self-driving car, which successfully navigates a 5,000-kilometre highway journey from Pittsburgh to San Diego. Navlab 5's guidance system,<sup>45</sup> nicknamed Ralph, steered the car while its passengers controlled acceleration and braking.

2004  
to  
2007

### The original DARPA challenges

In 2004, the U.S. Defense Advanced Research Projects Agency (DARPA) offers a \$1 million USD prize for autonomous vehicles that can navigate a 240-kilometre course in the Mojave Desert. None of the entries are successful, but a year later, with obstacles disclosed in advance, five vehicles succeed. In 2007, DARPA issues an urban challenge: complete a 95-kilometre city course in less than six hours. Four entries succeed.<sup>46</sup>

2009

### Google's autonomous vehicle project

Under the banner of Google X, the company's then-research arm, Google begins developing and testing self-driving technology. In 2016 the project became the company Waymo.<sup>47</sup>

2012

### Google's testing moves to the city

Having tested its driverless technology for more than 480,000 kilometres of highway, Google moves to city streets. While city streets have lower speed limits, their abundance of pedestrians, cyclists, signals and signage<sup>48</sup> makes them a greater challenge for computer-based vision and decision-making.

2016

### Autonomous taxis hit the road

NuTonomy, an MIT spin-off that builds self-driving software systems, begins trials of its driverless technology<sup>49</sup> as a taxi service in Singapore. The following year, NuTonomy partners with Lyft<sup>50</sup> to provide driverless taxi service in Boston (though the service is later discontinued).

around  
2035

### Self-driving taxis become ubiquitous in Toronto

Sidewalk Labs' mobility plan is designed to evolve with the assumption that self-driving vehicles can form the backbone of the ride-hail system by roughly 2035. Self-driving fleets can enable cities to eliminate curbside parking, among other street design changes, reclaiming space for a safe and highly pedestrianized public realm.

## Sidewalk Labs' 10 self-driving principles

Sidewalk Labs has identified a set of core principles and assumptions about the future of urban mobility to guide planning for the Sidewalk Toronto project.

### Technology

- 1 Self-driving vehicles, drones, and robots will likely be commercially feasible and regulatorily viable in the next 10 years. Therefore, Sidewalk Labs' focus is not on fostering the adoption of these technologies but on shaping service patterns to optimize for urban quality of life.
- 2 The marginal cost of transportation will head towards zero as robotics eliminate labour costs associated with mobility. As a result, policies that charge a price for road use will be a powerful tool to shape travel decisions and alleviate congestion.
- 3 As freight vehicles become self-tracking and self-loading, delivery systems will require shipping containers themselves to have advanced capabilities, such as location awareness and security.
- 4 It will be increasingly important to take emerging travel technologies, such as low-powered vehicles, into account when planning a neighbourhood, to ensure they can be accommodated in a way that improves quality of life.

### Design

- 5 Design that improves walking and biking will be especially powerful in a dense urban neighbourhood, given the benefits of active transportation on individual health, the environment, and public space.
- 6 Cars and vans will never be able to replace high-volume transit on key routes in dense areas. In lower-density areas that cannot justify frequent rail and bus transit, the use of low-cost, on-demand systems that encourage shared rides could be prioritized.
- 7 Ride-hail and delivery services will continue to displace vehicle ownership and traditional retail patterns. Because these services thrive on point-to-point operation, managing curb space will be critical to the overall efficiency of the street network.

### Policy

- 8 Personal car ownership will persist, even if self-driving technology radically lowers the cost of hailed rides, because owning a car in a major city is not a decision people make based on a detailed cost-benefit calculation; thus, policy will need to shape car-ownership patterns.
- 9 New vehicle technologies — from scooters to self-driving cars — will challenge existing government policies and infrastructure. Governments need policy tools that give them a measure of control over these technologies.
- 10 Self-driving vehicles will not necessarily be electric or connected when introduced by the market, so policies that encourage these features may be needed to fulfill the overall promise of new urban mobility.



# Encourage shared use of ride-hail services

By many measures, ride-hailing services have been a major advance. By making high-quality taxi service available across the city, even in areas of medium or low density, ride-hailing enables more households to cut car trips or give up a car entirely, eliminates traffic related to searching for a parking spot, and reduces drunk driving. The technology can also match multiple riders along the same route, making it easier to share rides, which saves riders money while reducing environmental and congestion impacts.

But the rise of ride-hailing has been controversial. Many large cities<sup>51</sup> are reporting declines in transit ridership, a trend that some researchers attribute to increased ride-hailing trips. Studies have suggested that the enormous fleet of ride-hail vehicles generate new traffic congestion from the proliferation of pick-ups and drop-offs, creating another problem that cities need to solve. And the promise of sharing rides as an antidote to urban congestion has lagged, because shared-ride users often switch from non-auto modes of transportation.

As self-driving technology improves, the per-trip cost of a taxi service will be no more expensive than the per-trip cost of travelling in a private car, since the largest cost of existing taxi service is paying the driver. While the labour implications of this shift should not be minimized, it also means that people will be able to hail a ride for a much lower

price than they can today and will experience shorter wait times. Researchers in Europe and the U.S. have estimated that self-driving fleet services could cost the equivalent of \$0.23 to \$1.27 per kilometre,<sup>52</sup> making them more affordable than existing ride services. At the same time, cheaper rides could also induce new ride-hail demand at the expense of more sustainable modes of transportation.

Sidewalk Labs seeks to maximize the mobility benefits of ride-hailing through staging areas, pick-up and drop-off zones, and shared-ride pricing.

These initiatives aim to ensure that self-driving technology achieves the goals of expanding access to the city without a car, reducing household costs, and recapturing parking space for more vital public uses.

## Priority pick-up/drop-off zones

Sidewalk Labs' approach to ride-hailing begins by designing staging areas for shared fleets or taxis. By providing a known hub where drivers and passengers can meet, drivers would be discouraged from cruising local streets for hails, without impacting passenger wait times.

As a related effort, Sidewalk Labs plans to design streets with passenger pick-up and drop-off spaces, which would facilitate ride-hailing and minimize the congestion that occurs when for-hire

vehicles block traffic or double-park. These flexible spaces — or “dynamic curbs” — can respond to real-time traffic conditions. For example, during times of heavy traffic, dynamic curbs can be priced high, encouraging travellers to make other trip choices, such as public transit or bike-share. A real-time mobility management system (described on Page 84) can coordinate pick-up and drop-off spaces and set prices based on congestion.

During light traffic, dynamic curbs can be repurposed for community space or gatherings, with these changes indicated via lighted pavement. Lights in pavement are not a new technology. Airports have used lights inserted in their runways<sup>53</sup> to direct plane traffic since the 1940s. More recently, as the price of LEDs has dropped, cities have begun to experiment with how lights can help direct pedestrian<sup>54</sup> and cyclist<sup>55</sup> activity. Pavement lighting enables dynamic curbs to communicate changing street space allocations on-the-fly, helping neighbourhoods recapture flexible street space for public use in a clear and safe way.

These benefits increase with self-driving technology. A self-driving fleet can be directed by a mobility management system to a remote staging area, then summoned in appropriate quantities to meet real-time demand in local pick-up zones. This approach would save valuable space for buildings and the public realm, keep the streets clear of unnecessary traffic, and help eliminate cruising while maintaining a reliable supply of on-demand vehicles.

## Priced to share

The other key piece of Sidewalk Labs' ride-hail strategy is to propose the use of charging and subsidies to encourage alternate trip choices and shared rides. This proposed pricing would take two forms: dynamic curb pricing for all vehicles, and charges and incentives for ride-hail vehicles using the Sidewalk Toronto project's specially designed local streets.

### Technical spotlight

## How Sidewalk Labs plans to encourage electric vehicles

A key part of the Sidewalk Toronto project's sustainability strategy is to shift to electric vehicles for as many trips as possible. The mobility plan would encourage a transition to electric vehicles (EVs) in several ways.

### Electric light rail.

The first and most important is to reduce automobile use overall. The extension of the light rail would ensure that about 60 percent of travel to and from the IDEA District occurs by an all-electric light rail vehicle, which is even less energy-consuming per ride than an electric automobile.

### Shared vehicles.

The second approach is to deploy a fleet of shared automobiles on the site, available to residents and on-site workers who have the neighbourhood's integrated mobility package. Travel models project that up to half of all resident auto use would involve these vehicles. Since the provision of these vehicles would be curated by the proposed Waterfront Transportation Management Association (see Page 86), it could be required that all such vehicles be electric.

### Pricing and charging incentives.

For those residents who still own cars in Quayside, the WTMA could promote EV adoption in several ways. The off-site parking would offer EV charging, which can easily be managed because the lots will have attendants and most vehicles using those lots will not be used every day. Because it would control parking, the WTMA could offer discounts to parking fees for EVs owned by residents and employees, providing an incentive for drivers to switch.

For employees, visitors, and ride-hail vehicles, the WTMA could also use both pricing and charging to encourage EV adoption. In the hourly parking spaces at the mobility hub, 25 percent of all spaces would be equipped with chargers, with the ability to increase that number with demand; most of these charges would be fast chargers (Level 2 and 3). The WTMA could also choose to offer discounts on parking and curbside charges to EVs.





### Self-driving vehicles.

The full scale of the IDEA District offers several additional opportunities to further increase EV adoption. One is the transition to self-driving vehicles, which should be all-electric; as use of these vehicles increases, the number of electric self-driving vehicles should increase as well.

A second opportunity is the area's greater size, which enables the WTMA to encourage changes in the ride-hail vehicles that serve the area. At that scale, WTMA could require that all ride-hail vehicles that want to be part of the mobility subscription package be EVs.

Finally, WTMA could adopt an approach that Waterfront Toronto suggested in the Villiers Island Precinct Plan: to prohibit non-EVs from entering the island.

A key remaining challenge to widespread EV adoption is that chargers themselves are difficult to site. One game-changing solution to charging would be to embed inductive chargers into the pavement, turning streets and parking spaces themselves into charging stations. A future evolution of Sidewalk Labs' paver technology is envisioned to include inductive charging.

# 1

## Dynamic curb pricing.

As proposed, dynamic curb pricing would apply to all vehicle services and vary based on congestion in pick-up or drop-off spaces. These charges would include a low one-time charge to access the curb space and higher time-based charges for vehicles that wait longer than five minutes at the curb.

The goal is to encourage people to consider alternative trip options or to share a ride and split the cost, as well as for vehicles to use the curb quickly and move on. Passengers who prefer not to pay a curb charge could be picked up or dropped off for free at a designated underground drop-off and pick-up area with access to numerous transport options.

# 2

## Per-kilometre pricing.

Sidewalk Labs believes that a public mobility management entity should have the power to impose a per-kilometre charge on ride-hail vehicles using the Sidewalk Toronto project's specially designed local streets, if necessary to encourage people to share rides and to discourage operators from allowing vehicles to cruise streets without passengers.

A public entity that includes representation from the city would be responsible for proposing and administering any fees and would issue exemptions for riders with disabilities, the elderly, and low-income groups. (See Page 86 for more on this entity.) Additionally, the public entity could experiment with tools to ensure that ride-hailing vehicles work to support public transit; possibilities include offering subsidies for rides that begin or end at transit stations.

Sidewalk Labs could partner with the city and the Toronto Transit Commission on their upcoming pilot to design a meaningful test in Quayside. At the full scale of the IDEA District, Sidewalk Labs estimates that the increased convenience and affordability of self-driving fleets would result in nearly 7 percent of trips occurring by hailed rides.<sup>56</sup>



### Goal 2

### Harnessing New Mobility and Self-Driving Technology

# Provide car-share and parking options for the occasional private car trip

From the daylong shopping trip to the long weekend away, there are some trips where even the best public transit systems and a variety of new mobility and ride-hail options are not sufficient. These types of trips are typically infrequent, but they place downtown households in a bind that often leads them to own a car they rarely use.

In Toronto, downtown households drive less on average than Ontarians overall — 5,600 kilometres versus 16,000 per year<sup>57</sup> — but most of the costs of owning a car are fixed regardless of how much a household drives; these include depreciation, insurance, and routine maintenance. The cost of parking is also very high<sup>58</sup> in downtown Toronto, ranging from \$225 to \$400 per month on average, and sometimes more. On the low end, for a family that drives only 5,600 kilometres per year, the cost of driving an owned car works out to roughly \$2 per kilometre, which is about the same as an Uber or Lyft charge.

### Car-share.

To help households use a private car on certain occasions without the need to own one, Sidewalk Labs plans to partner with a variety of on-site car-sharing and car-rental providers. It also plans to encourage a variety of vehicle types, such as minivans (helpful for tasks like buying used furniture) and cars equipped with car seats for children. Sidewalk Labs plans to require these vehicles to be

electric; in exchange, these car-sharing services would have access to some of the few parking spaces within Quayside, making them convenient to residents.

### On- and off-site parking.

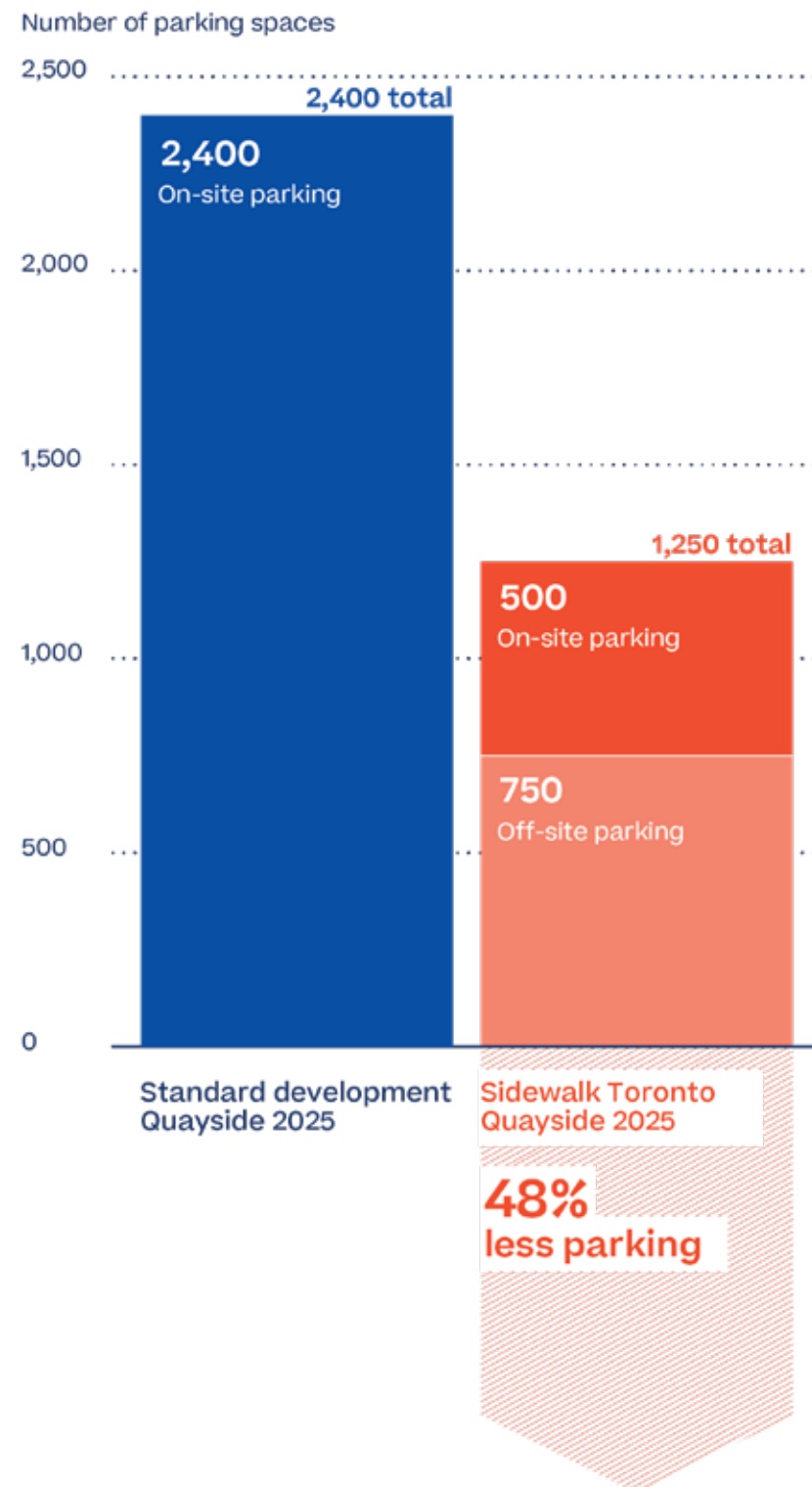
As with any neighbourhood, there will likely be some visitors, employees, and residents who still need to drive private cars into and out of Quayside, including people arriving from parts of the GTA that do not have easy transit connections to the neighbourhood. And while residents in Quayside should be able to meet almost all their daily travel needs without a car, some may have weekend travel needs that lead them to continue owning one.

To meet these needs, Sidewalk Labs proposes two approaches to parking:

In Quayside, short-term parking would be available in a 500-space underground garage. Roughly 100 spaces would be reserved for car-share vehicles; the remaining spaces would be priced to manage demand and discourage long-term use. This short-term garage would provide 15 percent of spaces with Level 3 electric-vehicle charging stations on opening day and would have the infrastructure to increase to 100 percent of spaces over time as electric vehicles become more common in Toronto. This approach stands in contrast to the nearly 2,400 parking spaces that would normally be provided in a residential development of this size.

## 48% less parking in Quayside compared to a typical development

Typical developments require significant on-site parking. By ensuring that Quayside residents, workers, and visitors can make nearly every trip without a private car, Sidewalk Labs can dramatically reduce the amount of parking required and shift the majority of spots to an off-site location.



For longer-term parking for employees and residents, Sidewalk Labs plans that off-site facilities be leased on available parcels very close to Quayside. These facilities would provide about 750 spaces, with on-demand pick-up and drop-off service between the off-site parking facilities and the proposed interchange near the intersection of Queens Quay and Small Street. Residents and employees would need to pay for this parking. The intention of this approach is to make off-site parking a reasonably priced option for people who occasionally use their cars without providing the on-site parking that encourages people to drive every day.

These parking facilities are also part of Sidewalk Labs' electric vehicle strategy. Owners of electric vehicles would pay a significantly discounted rate, and battery chargers would be provided at these off-site facilities. Based on current best practices, Sidewalk Labs' goal is for 30 percent of residents who own cars to switch to electric vehicles.

The switch from private car-ownership to electrified ride-hail fleets would not be meaningful at the Quayside scale; however, Sidewalk Labs expects personal car-ownership to be reduced significantly at the larger IDEA District scale. At such a scale, both of these parking facilities would be converted to accommodate the maintenance and staging of self-driving ride-hail vehicles.

The benefits to neighbourhoods would also be substantial, as off-site parking would dramatically reduce or eliminate the number of spaces normally located in buildings, freeing up space for housing or shared amenities.



Harnessing New Mobility and Self-Driving Technology

## Make all trip options available in discounted mobility packages

Urban mobility services tend to be operated by a patchwork of public agencies and private companies, but city residents just want to get around. On any given week, a typical household in downtown Toronto uses a mixture of streetcar, subway, taxi, ride-hail, bike-share, and other services.

Some cities have started to tackle this fractured system with integrated fare technologies that enable people to pay for a variety of trip types. For example, Toronto's Presto card works on both GO commuter trains and TTC subways, streetcars, and buses, while in Tokyo, travellers can use a Suica card<sup>59</sup> to pay for a subway fare and a taxi (as well as purchase goods from station shops). Meanwhile, some digital navigation apps have started to display scheduling or purchasing options across many services, from bike-share to buses.

Sidewalk Labs' mobility vision includes ensuring that people see all their trip options at any given moment and pay for them using the same service. One component of this goal would be an integrated mobility package that includes a monthly subscription covering a wide range of services — a concept often called "mobility as a service" — including a TTC monthly pass, an unlimited Bike Share Toronto membership, access to electric scooters and other low-speed vehicles, and credits for rides with ride-hail or car-share providers. Sidewalk Labs expects a version of this package to be available to residents at a cost of \$270 per month.<sup>60</sup>

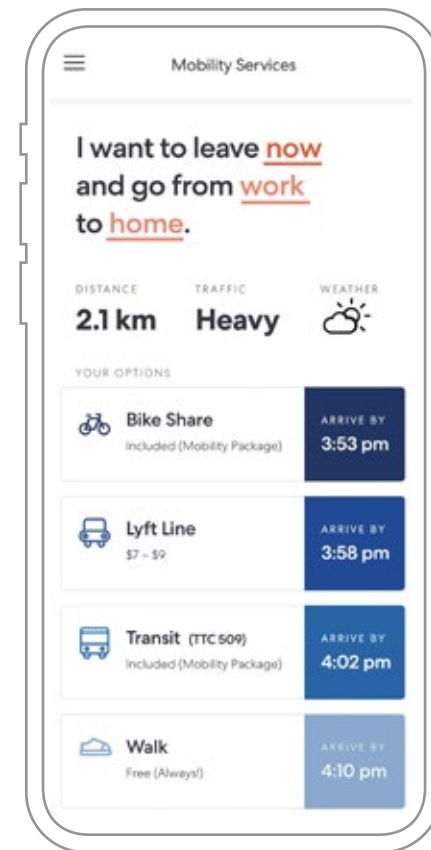
Sidewalk Labs' mobility vision includes ensuring that people see all their trip options at any given moment and pay for them using the same service.

Another key component is making real-time information about mobility services and the transportation system available in open, standardized formats. This approach could result in a new integrated mobility app created specifically for the IDEA District that features all mobility choices in one place. Or, it could encourage existing third-party apps (such as Transit App or Citymapper) to offer their users services based on much more accurate and relevant information. 

Critically, Sidewalk Labs' data integrations would allow third-party mobility apps to understand the real-time price for each service. For example, residents with an integrated mobility package could see a light rail trip as "free," instead of showing the standard fare. The result would be a personalized, accurate representation of transportation options that encourages people to make trips that do not require a private car.

A development the scale of Quayside could help test and refine the capabilities of an integrated mobility service — and more importantly, present Quayside residents with an attractive new mobility package during move-in, a transition period when studies have found people are most open to new travel behaviours.

When deployed across the full scale of the IDEA District, an integrated mobility service would provide access to all the new and traditional mobility options that make it far easier for households to avoid owning a car in a downtown neighbourhood, and the more than \$10,000-a-year cost associated with it.



The integrated mobility package could be used through a new mobility app that shows travellers all their options in real time (above, an illustrative interface).

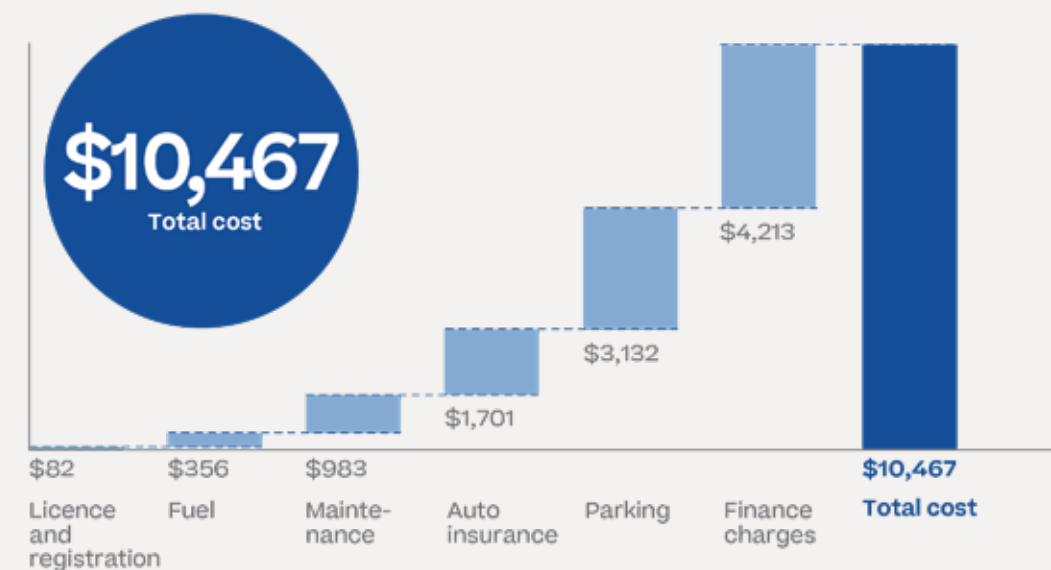


All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the "Digital Innovation" chapter of Volume 2, on Page 374.

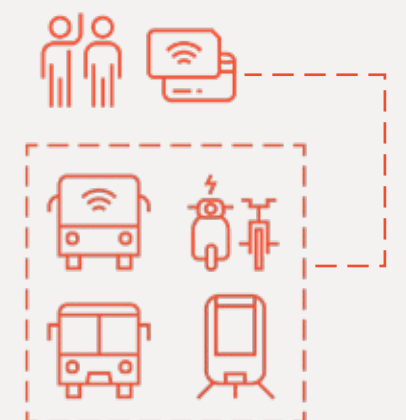
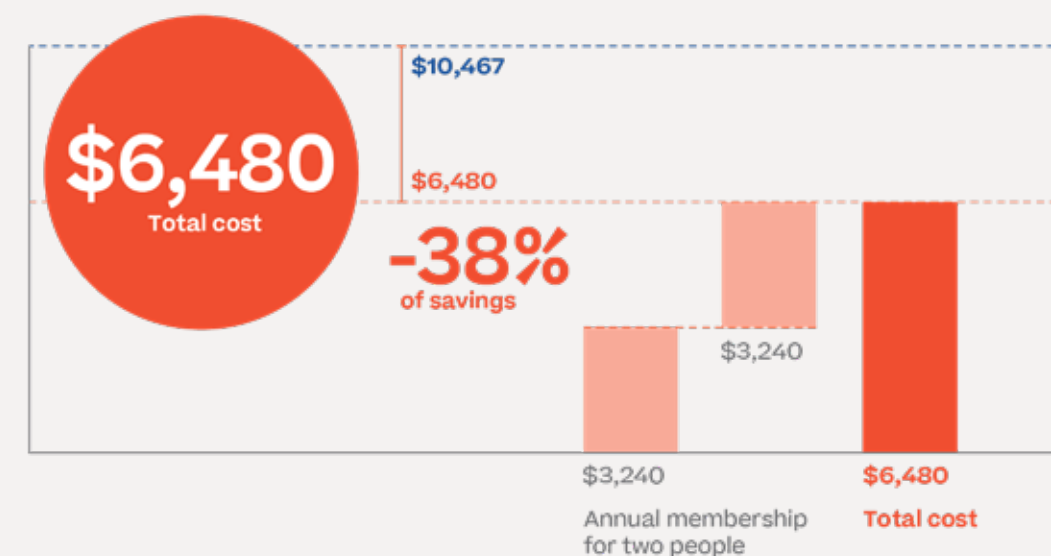
# Saving \$4,000 a year with new mobility options

Sidewalk Labs' proposed integrated mobility package includes a discounted TTC pass, unlimited bike share, ride-hail credits, and other options for \$270 a month. A two-person household that switched from owning a car to subscribing to this mobility package would save at least 40 percent on annual transportation spending, or roughly \$4,000 per year — while still meeting projected travel needs. The actual savings would likely be greater, as households that own a car in downtown Toronto also currently consume some additional mobility services, such as public transit and hailed rides.

Annual cost for a two-person household that owns one car



Annual cost for a two-person household that owns zero cars and subscribes to the integrated mobility package



The integrated mobility package includes a discounted TTC pass (trains and buses), an unlimited Bike Share Toronto membership, access to e-scooters and other low-speed vehicles, and credits for rides with ride-hail or car-share providers for \$270 a month.

# Part 4



## Reimagining City Deliveries and Freight



### Key Goals

- 1 **Establish a neighbourhood logistics hub for delivery, waste, storage, and borrowing services**
- 2 **Design a smart container for last-mile shipping**
- 3 **Deploy electric, self-driving delivery dollies**
- 4 **Connect underground delivery tunnels into buildings**

The ability to have goods delivered quickly and reliably is an essential component of urban living — especially for households that do not own a car or have much storage space. And this ability is getting easier every day in cities like Toronto, thanks largely to online shopping. But the result is that there are now far more trucks on city streets. Canada Post’s total domestic parcel volumes<sup>61</sup> rose 63 percent from 2007 to 2017, jumping 22 percent from 2016 to 2017 alone.

While delivery feels easier than ever to consumers, the delivery system itself is anything but simple. It is very difficult and expensive for shipments to go from a distribution centre to someone’s door — a challenge often known as the “last mile” problem. These deliveries are almost exclusively made by trucks, many of which are too big for narrow city streets. Daytime customer demand means delivery trucks cannot simply travel overnight, but adding these vehicles to the road during peak travel times leads to traffic congestion and delayed deliveries, as trucks spend time looking for curb space. When no space is available and delivery

timing is tight, they often double-park and incur a ticket.

Often, the least efficient part of the last mile is the final 50 feet. In urban areas, this final 50 feet covers the distance and time it takes for a truck driver to unload goods and complete the final handoff. Depending on where the delivery vehicle is parked, the last 50 feet can include the movement of goods by hand cart across a city’s streets and sidewalks and can also involve elevator rides to a variety of recipients in tall buildings.

For all that trouble, people living in buildings without mailrooms or door service often miss deliveries — resulting in failed first, second, and even third delivery attempts, with the traffic congestion, pollution, and inconvenience that comes with them.

Sidewalk Labs has a comprehensive plan to address the “last-mile” challenges of urban logistics by creating a 24-hour neighbourhood freight system that dramatically reduces the negative impact of goods movement on city streets.



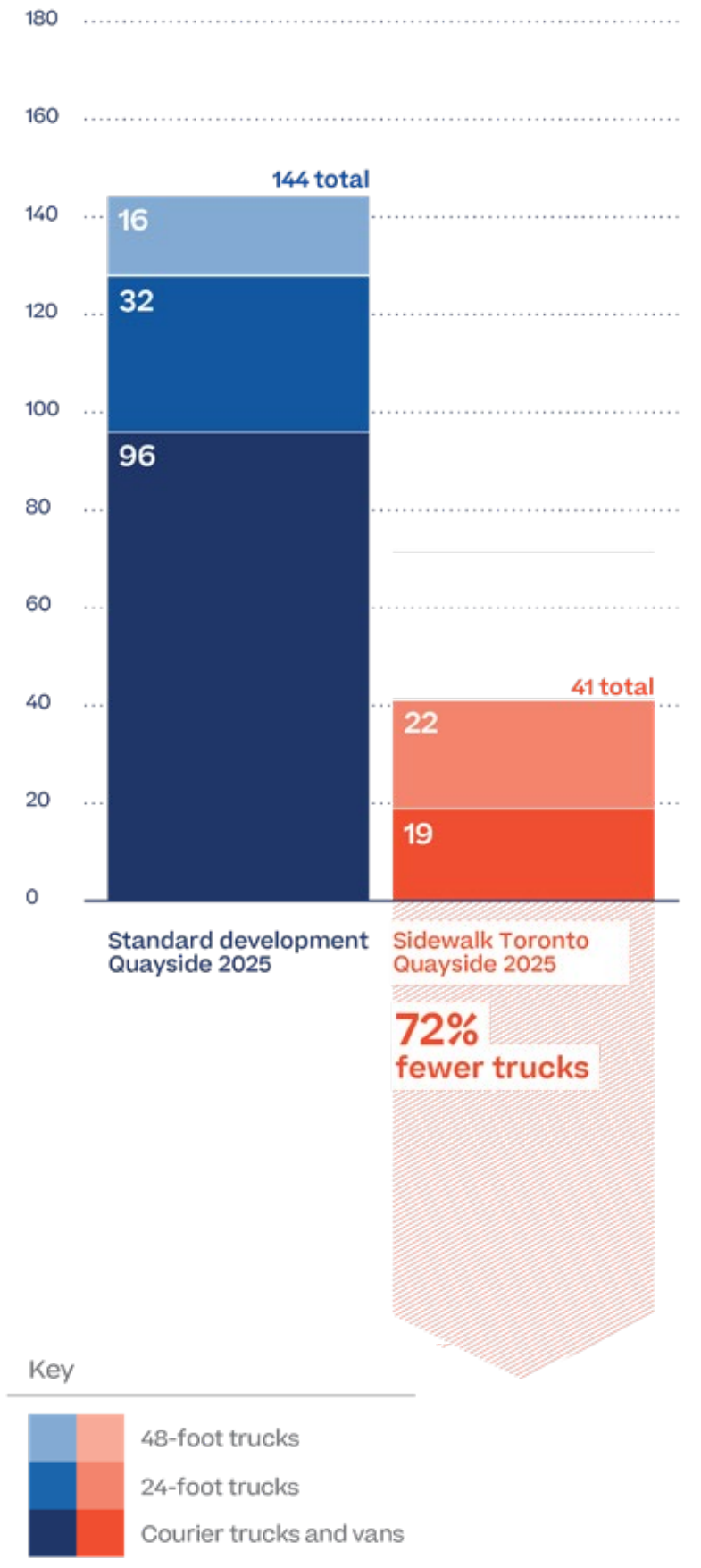
The plan begins by proposing to coordinate all deliveries (along with waste, storage, and borrowing services) at a new logistics hub on the perimeter of a neighbourhood to reduce unnecessary truck traffic on local streets. At this hub, nearly all packages would be transferred into new “smart containers” designed specifically for last-mile shipping, with these containers then travelling via electric, self-driving delivery dollies in a system of underground tunnels. This approach would enable all-hour delivery that avoids street disruptions and improves customer convenience at a lower cost to carriers, thanks to less time spent looking for parking, fewer tickets, and the opportunity to deliver full truck loads to the hub.

In Quayside, Sidewalk Labs proposes to implement several aspects of this system, including a local logistics hub, smart containers, and a tunnel network. But the neighbourhood’s size prevents the system from generating enough revenue to sustain itself. Implemented at the full scale of the IDEA District, the system could become financially self-sustaining through a combination of shipment, storage, and waste-related hauling charges.

In Quayside alone, this system would reduce truck trips into the neighbourhood by 72 percent, along with reducing disruption to local roads and surrounding areas. These savings are achieved primarily through the consolidation of shipments into a single neighbourhood location. The beneficial impact would only get bigger when deployed at the full scale of the IDEA District.

## An underground freight delivery system could reduce truck traffic by 72%

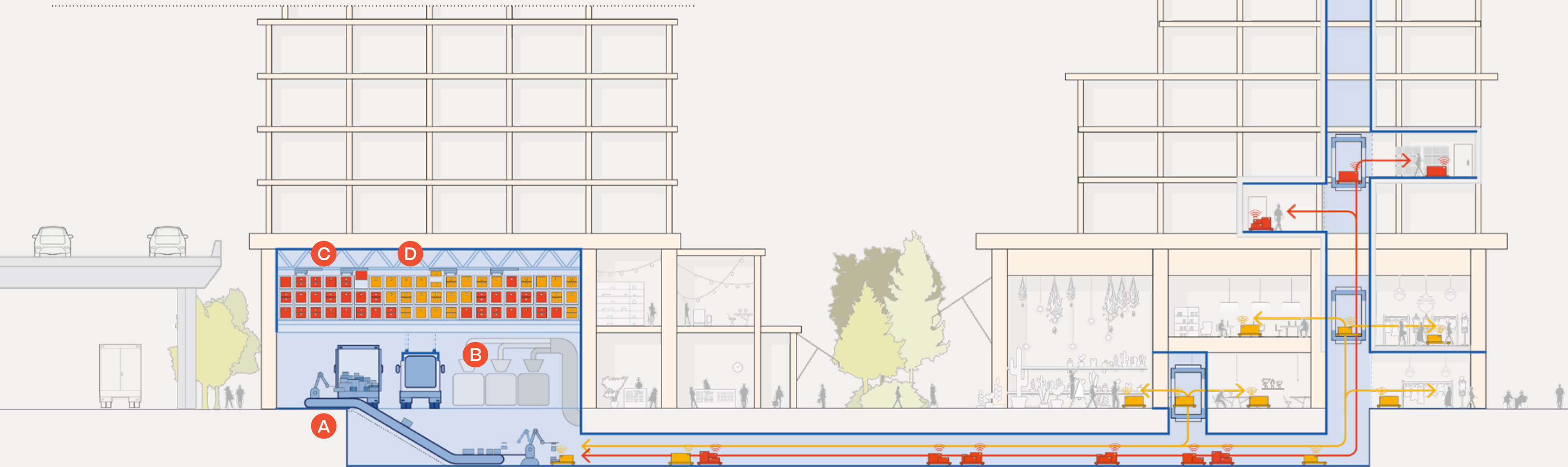
Number of daily delivery truck trips



# How it works: The neighbourhood logistics hub

Centralizing inbound and outbound deliveries — along with coordinating waste, off-site storage, and borrowing — would dramatically reduce truck traffic on local streets.

Smart containers filled with parcels, storage, or borrowing items would be placed on self-driving delivery dollies and delivered to their final destinations via underground tunnels. Smart containers could be dropped off without fear of theft: they are trackable and unlockable only by way of a digital code shared solely with a recipient.



**A** The hub's **urban consolidation centre** would collect deliveries and prepare them for last-mile transport via underground tunnels that connect into buildings.

**B** **Waste** from three streams (organics, recycling, and landfill) would be transported via pneumatic tubes to the hub, making it the only neighbourhood stop for garbage trucks.

**C** **Off-site storage space** enables residents and businesses to store goods (such as seasonal items or inventories) and have them delivered on demand.

**D** A **borrowing library** of helpful items (such as power tools or sound systems) would be available for delivery across the neighbourhood.

# The many ways to use a smart container

## Delivery lockers



An efficient delivery locker system would act as a mailroom, offering a space where tenants could easily access mail and packages.

## Off-site storage



Residents could use storage facilities for things such as seasonal clothing and equipment, with smart containers retrieving and delivering stored items on demand.

## Door-to-door convenience



For people with accessibility needs, or for items that are large or heavy, smart containers could travel directly to a door for drop off or pick up.





Goal 1

Reimagining City Deliveries and Freight

# Establish a neighbourhood logistics hub for delivery, waste, storage, and borrowing services

Sidewalk Labs' proposed freight system begins with a neighbourhood logistics hub for deliveries, waste, storage, and borrowing services.

A neighbourhood hub allows for carriers to bundle deliveries and drop them off at one neighbourhood location, saving time and reducing the impact of truck trips on local streets. A 2017 study of a delivery consolidation centre<sup>62</sup> in Copenhagen found that it reduced truck kilometres by roughly 65 percent and emissions by 70 percent. These systems also help small retailers compete with larger ones by reducing the cost of last-mile distribution through savings related to time, fuel, and parking tickets.

To date, many such centres have failed to generate sustainable revenue. One exception is in the Dutch city of Nijmegen, which has succeeded by becoming a logistics hub that offers additional paid services on top of freight consolidation, including storage,<sup>63</sup> home-delivery, online-order fulfillment, and clean waste collection. Building on this successful example, [Sidewalk Labs' hub plans to house four types of freight-related facilities.](#)

## 1

### Urban consolidation centre.

Sidewalk Labs' proposed logistics hub would feature an "urban consolidation centre" that consolidates inbound and outbound deliveries in a single place, just as the mailroom at a large university campus might serve multiple buildings.

The urban consolidation centre would allow delivery carriers, such as UPS, to deliver to one location instead of to each door in the neighbourhood. All inbound parcels would be received at the centre and then, as in a traditional distribution centre, sorted by address. Finally, items would be placed into smart containers and sent to their final destination within the neighbourhood. The same would be true for inbound smart containers transporting parcels for pickup by carriers.

This centralization would significantly reduce the number of trucks coming into the neighbourhood because carriers would be able to consolidate all of their deliveries into fewer trucks. It would also improve conditions in and around the neighbourhood: no more trucks looking for parking, failed delivery attempts, excess fuel burning, or lost time. And with consolidation centres, carriers can

## 3

### Off-site storage.

The logistics hub would also provide an on-demand storage service for residents who prefer not to keep certain items at home. Residents can store items at the storage facility just as they would in traditional city storage units, but they can order their items for immediate delivery using a digital app — with a standard of responsiveness that no current service offers. The app would allow users to see what items they have in storage by providing a personalized inventory list with photos or accessible audio descriptions for easy retrieval. This service could include short-term storage for bulky cookware, luggage, and other items used occasionally and longer-term storage for items used seasonally, such as winter clothes or skating equipment.

Businesses looking to reduce stockroom clutter can use this storage service as well. As a result, retail stores can act more like showrooms, with limited items inside the store and excess products stored off site. Because the storage facility would be co-located with the shipping centre, products can be immediately shipped out to customers who live in Quayside (via underground tunnels) or to those who live elsewhere (via trucks). That means people can shop throughout the neighbourhood without having to carry their purchases with them, freeing them to arrive via transit or bike instead of a car.

unload an entire vehicle and collect multiple outbound deliveries, ensuring that trucks are moving as efficiently as possible and not driving empty.

In Quayside, roughly 95 percent of all residential and commercial deliveries could be handled by this facility.<sup>64</sup> Oversized and overweight cargo, such as a sofa or something requiring special handling, would be delivered directly to the destination. Sidewalk Labs proposes to require traditional trucks to pay for a special permit to enter Quayside, with discounts for making deliveries during the night, operating electric vehicles, and using loading docks instead of the curb. (A new public entity would manage these payments; see Page 86 for details.)

## 2

### Waste.

The proposed neighbourhood logistics hub would also serve as the neighbourhood's waste consolidation site. Waste would arrive through a number of routes. Landfill, organics, and metal/glass/plastic would arrive via underground vacuum tubes. Recyclable cardboard and other items that do not travel through the vacuum tube system would arrive through the neighbourhood freight system. Providing a one-stop pick-up for waste would reduce the presence of garbage trucks on local streets. As with exceptional deliveries, oversized waste would require direct pick-up, triggering a permitting process. [\[i\]](#)




See the "Sustainability" chapter of Volume 2, on Page 296, for more details on waste.

# 4

## Borrowing library.

Finally, the logistics hub would contain a peer-to-peer “Library of Things” service for neighbourhood residents and small businesses who prefer to borrow or rent items rather than buy them. Similar services that exist today, such as the Sharing Depot, often rent out items that are expensive, bulky, or infrequently needed, such as power tools, sound systems, and grills. The library could house these items and rent them out for a fee. A true sharing economy would allow the IDEA District to be more convenient, sustainable, and affordable, enabling people to live comfortably in apartments with less storage space (and thus lower rent).

In Quayside, the entire logistics hub is planned to be 200,000 usable square feet, capable of accommodating over 18,000 daily parcels, with all activity other than loading docks located underground. The hub would be underneath the buildings on the northwest side of the neighbourhood. By having all the logistics activities take place below ground, the hub would seamlessly integrate into the neighbourhood, with a ground floor that features active “stoa” spaces. At the proposed full scale of the IDEA District, such a hub could be located at the northern edge of the Keating Channel area to facilitate access to other geographies. 



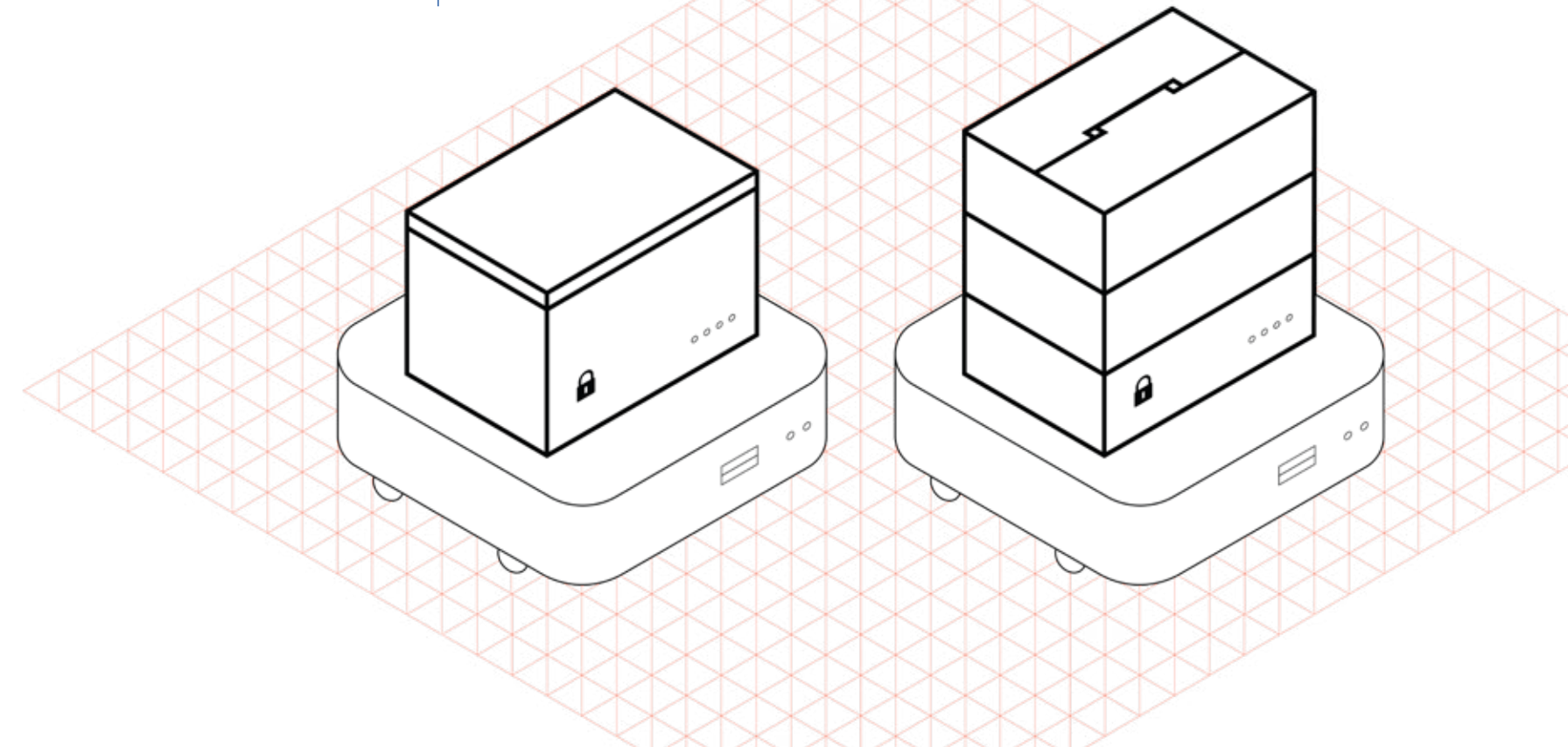
See the “Public Realm” chapter of Volume 2, on Page 118, for more details on stoa.

# In Quayside, the entire logistics hub would be capable of accommodating over 18,000 daily parcels, with nearly all activity occurring underground.



Reimagining City Deliveries and Freight

## Design a “smart container” for last-mile shipping



In the 20th century, the intermodal shipping container transformed the movement of global goods by standardizing the shape and size of an otherwise infinite variety of goods being shipped and by separating the cargo container from the vehicle itself. As a result, shipping containers can now travel around the world by truck, boat, or rail without unloading their contents.

While the shipping container solved many problems associated with long-haul freight, last-mile delivery still relies on the cardboard box. Various innovations are currently being tested, ranging from van-sized, self-driving trucks to robots that travel on sidewalks. But all of these ideas have incorporated the cargo into the vehicle itself, which misses the core insight of the long-haul shipping con-

tainer: that the storage compartment should be separate from the vehicle, freeing each to evolve independently over time.

*Inspired by the shipping container, Sidewalk Labs plans to develop standardized “smart containers” as the 21st-century urban equivalent for last-mile delivery.*

At the neighbourhood logistics hub, goods would be scanned and sorted into smart containers, while still in their original packaging (nothing is opened). The smart containers would be designed to be able to carry the vast majority of standard-size packages. They can be filled with a single package or filled with several packages, depending on the destination and delivery urgency. If a receiver has multiple packages arriving in one day,

the container would wait until it is filled up before making its way out of the logistics hub in order to be as efficient as possible. For urgent delivery of an item that may be perishable or that has other immediate delivery needs, a smart container would leave as soon as the package is placed inside.

Smart containers could be handled by a variety of delivery vehicles — from cargo bikes to traditional trucks to self-driving vehicles — so that cities that have not yet embraced self-driving transportation can still use them. These durable containers would be stackable, enabling them to function as lockers and to be placed easily onto delivery vehicles. They would also be embedded with location-based capabilities to track movements.

A smart container is not only for mail and package delivery; it can be used to move other items within the logistics hub, including waste, storage, and borrowing items. After a smart container delivers a parcel or stored item, recipients can send back the container filled with a new type of cargo; for example, after receiving a package, residents can then send out their storage items in the same container. This makes for a highly efficient “backhauling” system, which reduces the amount of time containers travel while empty. The design of these containers would allow for the safe and healthy handling of multiple types of cargo through the use of liners, inserts, and innovative cleaning methods.

In addition to improving package logistics, the smart container has a number of features that would empower residents and businesses to receive shipments on their own terms, thereby eliminating missed deliveries.

#### Flexible scheduling.

Using an associated delivery app, recipients can reroute containers if they prefer to have their items delivered to a location other than the one it has been scheduled to arrive at, all the while knowing exactly what is inside and where the container is located. The app also allows recipients to provide container access to approved friends, family, or associates, in case they need items to be received while they are unavailable. With an integrated app, users can also request a container for pick-up when outbound items are ready to go to waste, borrowing, storage, or delivery facilities.

#### Delivery security.

The smart container’s digital lock enables it to be safely left in a building’s mailroom or locker system — or even at a recipient’s door. Instead of needing someone to be present for a delivery, the container acts as a permanent receiver; all it requires is a space where it can be placed.

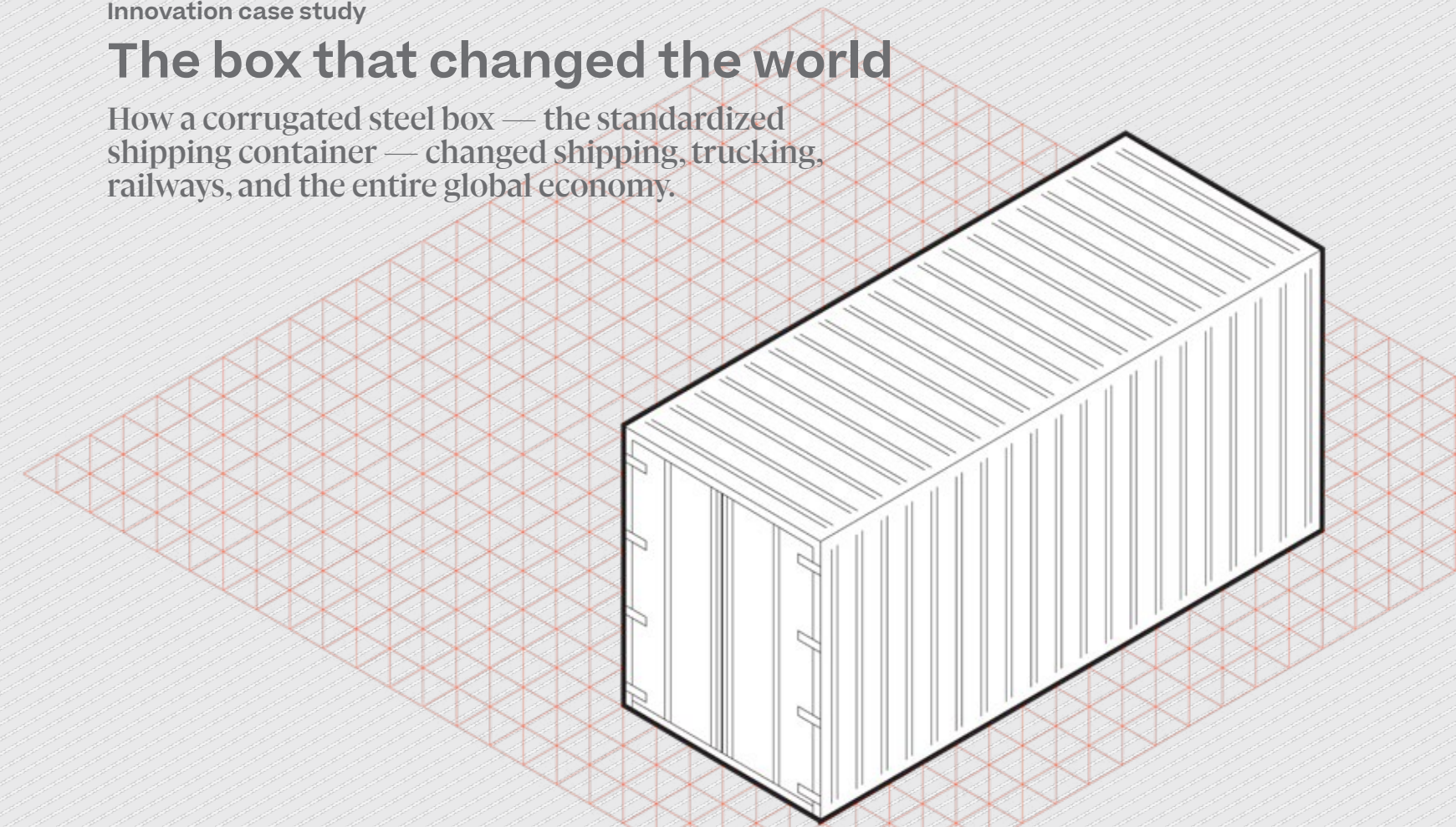
#### Package tracking.

Mail and package tracking would be managed through software that integrates with existing carrier software so receivers can track their items from origin to final destination. Confirmation signatures and other delivery requirements would be handled through a profile set up by the recipient. Package recipients can unlock the container with a code. And if the container makes an unauthorized movement, suggesting a theft, its location transmissions would alert the system.

#### Innovation case study

## The box that changed the world

How a corrugated steel box — the standardized shipping container — changed shipping, trucking, railways, and the entire global economy.



Standardized shipping containers — corrugated steel boxes measuring 2.44 metres (8 feet) wide, 2.74 metres (9 feet) high and 12.19 metres (40 feet) long — can be seen everyday on highways, waterways, and railways. As unremarkable as they might seem today, shipping containers revolutionized global trade and the movement of goods, creating economies of scale like few other innovations ever have.

As late as the post-World War II period, freight arriving by ship into city ports was packed in barrels and crates and still had to be handled manually: shipments were first unloaded into dry dock and then loaded back onto trucks or trains (in appropriately named “boxcars”). The process required lots of people, time, and space (warehousing) to complete. And it was open to many forms of abuse. Theft was rampant. Bribery was also a problem, as firms

paid operators under the table to make sure their cargo was first on the trucks.

The standardized container, introduced in 1956<sup>65</sup> by North Carolina trucking entrepreneur Malcom McLean, made it possible to move whole containers between sea, road, and rail simply by using a crane. No container ever needs to be unpacked until it reaches its final destination. The result has been a steep cost reduction and efficiency gain. McLean’s first container ship cost just \$0.16 USD per tonne to load compared with roughly \$5.83 per tonne for a ship loaded by hand. In 1965, dock workers typically<sup>66</sup> transferred some 1.7 tonnes of freight per hour onto ships; within five years they were loading 30 tonnes per hour.

The containers ensured that freight always moved as fast as its vessels

could carry it; with minimal slow-down for transfer, the need for warehousing, especially dockside, was dramatically reduced. The sight of dozens of trucks carrying standardized containers is really the sight of the economy’s rolling, decentralized warehouse-on-wheels.

Ironically, the standardized container also represents the origin of the “last-mile problem,” the challenge of efficiently dispersing individual packages to their final destinations, currently the most costly step. Containerization successfully solved all the middle-mile challenges. If containerization principles were applied on a neighbourhood scale, they have the potential to help fix the “last-mile problem” as well.



## Deploy electric, self-driving delivery dollies

Today, there are a growing number of electric vans and cargo bikes in urban areas, but these vehicles make up a small fraction of delivery fleets. Some companies have started to explore delivery robots, but as noted on Page 77, these vehicles are typically designed to act as a container on wheels — functioning as a single unit.

To transport its smart containers between the logistics hub and buildings, Sidewalk Labs plans to deploy electric self-driving delivery dollies that resemble a large Roomba. These dollies can transport individual smart containers or a set of containers stacked to form a mobile locker system.

The self-driving delivery dollies must have communication capabilities that help them navigate from Point A to Point B, reroute when necessary, and “call for help” if any issues arise. Like the smart container itself, the self-driving delivery dollies are connected to the recipient’s user interface for tracking the location of a container, scheduling pick-ups, and more.

Sidewalk Labs does not plan to create self-driving delivery dollies itself but rather plans to work with third-party vendors to identify or develop a design that meets the container’s specifications.

In Quayside, self-driving delivery dollies would transport smart containers via underground tunnels (described more on Page 82). The beauty of separating the container from the delivery vehicle is that the container can be left at its destination safely and securely without the receiver being present.



**A 24-hour underground  
neighbourhood  
freight system would  
dramatically reduce  
truck trips and  
pollution — while  
maintaining customer  
convenience.**

# Connect underground delivery tunnels into buildings

To help improve the last 50 feet of urban freight, Sidewalk Labs plans to create an underground delivery network linking the logistics hub with the basements of residential and commercial buildings.

The tunnel network would allow for 24/7 delivery activity and would help people and businesses get their shipments fast, without having a negative impact on neighbourhood street life.

In Quayside, as planned, these delivery tunnels would be two metres in diameter, allowing for multiple self-driving delivery dollies with a variety of smart container configurations to travel to and from the logistics hub. This system would help solve some of the biggest hurdles facing delivery robots today, such as bad weather conditions, uneven surfaces, and road or sidewalk congestion.

Sidewalk Labs proposes to require that each building be designed to connect with the tunnel system so self-driving delivery dollies carrying smart containers can enter. These dollies would have the ability to take freight elevators to common spaces, including first-floor lockers for package delivery.

In first-floor mailrooms, self-driving delivery dollies could stack smart containers together to form a type of delivery locker system. Receivers could collect or ship items at their convenience by removing or placing deliveries into the containers. In common refuse rooms, self-driving

delivery dollies could collect smart containers with outbound waste not capable of using the pneumatic tube system. For deliveries that require direct-to-door transportation (for reasons such as weight, accessibility concerns, or type), as well as for storage and borrowed items, self-driving delivery dollies would be able to transport containers via freight elevator to a recipient's door.

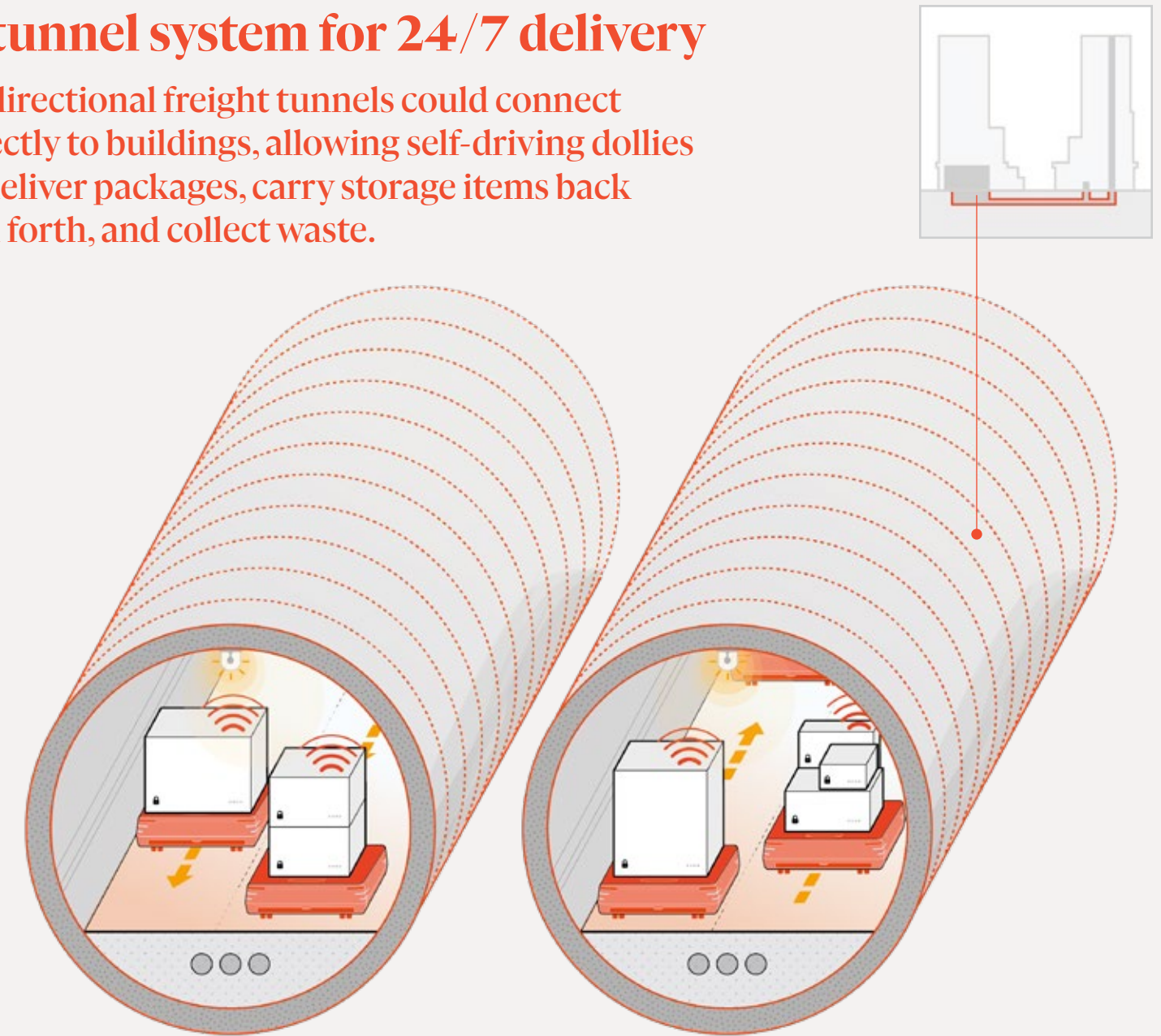
In addition to freight tunnel access, all buildings would have a traditional loading dock, which would only be used in occasional circumstances to allow exceptions for standard delivery trucks. As noted on Page 75, these exceptions would require a special permit.

### Drone delivery.

The most radical change to delivery services over the next decades is likely to be the use of drones for local deliveries, which is already showing promise for high-value deliveries in low-density areas. In dense downtown areas like Quayside, drones raise a number of issues, from noise to collisions to interference with flight paths (such as those of the planes coming in and out of Toronto's Billy Bishop Airport). It is likely that over time these issues will be addressed, although given the novelty of this innovation, the time frame is impossible to predict. To make it possible to use this technology when it is safe and ready, Sidewalk Labs proposes to require that each building rooftop be designed with landing pads for drones,

## A tunnel system for 24/7 delivery

Bi-directional freight tunnels could connect directly to buildings, allowing self-driving dollies to deliver packages, carry storage items back and forth, and collect waste.



making sure the designs are flexible so they can evolve along with drone technology. When they are ready for use in Quayside, drones could be incorporated into the delivery system for urgent or premium deliveries.

### Management and economics.

Making a neighbourhood logistics system work is not just a technological challenge but also a managerial one. The freight service would need to be managed as an integrated system, operating the urban consolidation centre, vehicle fleets, and storage facilities. The proposed freight system would obtain revenues from several sources: residents would pay to use its off-site storage; building managers would pay for any

waste removal using its services; local retailers would pay it to make deliveries and store inventory; and, at the full scale of the IDEA District, shippers would also pay it to make deliveries because it would save them the cost of the last mile.

The freight-system manager would need to pay building owners rent for the space used (such as the logistics hub or mailroom space), although that rent would take into account the overall value the system creates for the neighbourhood, including both convenience and reductions in truck traffic. The proposed freight system would operate under a contract to the entity that would oversee overall mobility management for the neighbourhood.

# Part 5



## Improving Mobility Management



### Key Goals

1 **Establish a new entity to coordinate the entire mobility system**

2 **Deploy a real-time mobility management system**

The initiatives described so far in this chapter outline fast, comfortable, and affordable ways of traveling without a private car for nearly every trip. In practice, however, things can play out very differently, with small disruptions having the potential to multiply into systems-wide upheaval.

A concert or event might flood transit with additional passengers for a single hour, leading to overcrowding and delays that impact rides throughout the evening. A fierce storm might cause some bike commuters to choose ride-hail options, creating a sudden influx of users. Extending a “walk” signal so a pedestrian can safely cross the street in one location might cause traffic congestion somewhere else.

Cities typically struggle to tackle these daily challenges because each trip mode is controlled by a different agency or company, each with its own data and priorities. City transportation departments are in charge of the streets; a separate mass transit agency usually runs the subways, buses, and streetcars;

and private companies might operate bike-share programs, taxi fleets, or ride-hail services.

To add to the challenge, the decision to implement policy tools that might improve coordination, such as curb pricing, often rests with yet another agency. New infrastructure advances that could also help, such as adaptive traffic signals, are often beyond an agency’s budgetary reach.

The result is that in cities around the world, fundamentally interdependent systems have become fragmented, leading to widespread frustrations and costs. For all of the mobility initiatives laid out in this chapter to succeed in reducing car trips and providing safe, convenient, and affordable options, they must work in concert.



Sidewalk Labs proposes that a new public entity called a Waterfront Transportation Management Association (WTMA) coordinate the transportation system in

### Key Term WTMA

**Waterfront Transportation Management Association**

A public entity coordinating the transportation system in the IDEA District.

the IDEA District by deploying a mobility management system.

In a small neighbourhood the size of Quayside, holistic management can have a meaningful but modest impact on mobility goals. Responsive traffic signals can hold a crossing signal for pedestrians or cyclists at isolated intersections. Trip data can inform traffic decisions, such as giving green priority on Queens Quay for the light rail. Curb pricing can encourage people onto vehicle alternatives, such as bike-shares.

But to ensure that people have convenient and reliable alternatives to private cars, a mobility management system must be able to evaluate a substantial number of routing and trip options. For example, if a street is clogged, a real-time mobility management system can direct vehicles to an emptier parallel street. These small variations in route can add up to big time savings. Such improve-

ments could increase further with the arrival of self-driving vehicles, which can receive information directly from mobility management systems.

As a result, in Quayside, the effect of management would be limited, as there are simply not enough intersections to balance safety, congestion and trip choices. But when deployed at the full scale of the IDEA District, this comprehensive mobility management system can process travellers with greater efficiency. The benefits include processing six times as many curbside pick-ups and drop-offs as a typical one-hour metered curb, managing adaptable pavement to create an expandable network of bike lanes to meet year-round demand, and setting parking prices that decrease the number of private car trips.

## A comprehensive mobility management system could balance safety, congestion, and trip choices to ensure that people have convenient alternatives to private cars.



# Establish a new entity to coordinate the entire mobility system

To help Toronto's waterfront achieve its mobility goals around safety, affordability, and convenience, Sidewalk Labs proposes establishing the WTMA as a public entity tasked with coordinating the transportation system in the special innovation zone.

- The WTMA would:
- **Implement objectives**
- **Oversee planning, operations, and maintenance**
- **Manage daily movement patterns**

In keeping with Sidewalk Labs' objective of undertaking new approaches to urban problems, the WTMA would allow the overall mobility performance of a neighbourhood to be managed in an integrated way. In Toronto, as in most cities, this management is done piecemeal: one entity oversees parking, another manages traffic signals, and yet another sets the price of transit rides. But these efforts are all highly integrated, and all shape the way people are able to get to and from the neighbourhood.

### The WTMA would be responsible for delivering mobility services and innovations in the IDEA District, including:

- **Creating** a mobility subscription package
- **Deploying** a holistic mobility management system
- **Managing and setting** prices for the curbside and parking systems

→ **Procuring and operating** new technologies, such as adaptive traffic signals, dynamic pavement, freight and deliveries, or other third-party systems and apps

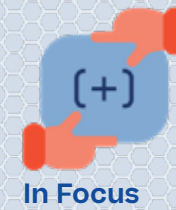
→ **Integrating** systems with third-party navigation apps

→ **Allocating** space across the needs of mobility, access, safety, and the public realm

→ **Reporting** on performance targets related to congestion, mode share, and customer service

Sidewalk Labs proposes that the WTMA's operations be financed by fees in a way that ensures the entity is self-sustaining. Potential sources of revenue include parking fees, curbside pick-up/drop-off fees, road user fees for ride-hail vehicles using the Sidewalk Toronto project's specially designed local streets, and charges for mobility services to residents and employees (which could be paid by individuals or included in rents and home owner association fees).

Sidewalk Labs proposes that the WTMA have three primary tasks: implement the guiding objectives of the transportation system; oversee planning, operations, and maintenance; and manage the movement of people and goods on a daily basis using data about the system.



# The three roles played by the WTMA

By incorporating policy, planning, and daily management within a single entity, the proposed WTMA would enable the IDEA District to achieve Toronto's mobility goals around safety, affordability, and convenience.

## 1 Implementing policy objectives

Clear policy objectives are critical to a well-functioning transportation system, because the coordination of such a complex system inevitably requires numerous trade-offs at every moment. The WTMA would be tasked with determining transportation policy objectives, guided by the city, local agencies, large employers, and community groups. These policy objectives would be used to guide the mobility management system for the IDEA District.

Sidewalk Labs proposes that the WTMA apply several guiding principles to the system to achieve the objectives of a safer, more convenient transportation system that provides a range of options for all trips:

### Vision Zero.

A Vision Zero safety policy prioritizes the safety of people over the movement of vehicles, consistent with the policy adopted by the City of Toronto.

### Shared mobility.

Shared mobility prioritizes high-occupancy vehicles over single-occupancy car use. In practice, this type of approach could be implemented through road-pricing mechanisms, such as a subsidy applied to shared trips or through a congestion charge.

### Person throughput.

Transportation experts refer to the total number of people going through an intersection as "person throughput." An objective based on person throughput could prioritize moving as many people as possible, agnostic of any particular mode. For example, a single packed transit vehicle would get signal priority at a traffic light over a line of empty taxis.



# 2

## Overseeing planning, operations, and maintenance

The WTMA would handle a range of duties, such as administrative tasks (e.g. contracting with a microtransit shuttle operator and issuing fare subsidies to those who qualify), operations (such as operating traffic signals), and maintenance (such as replacing pavement or coordinating utility work).

The WTMA's essential duties include:

- **Maintaining and replacing** the modular pavement system (including heating or lighting)
- **Providing** travel credits or subsidies across all modes, including bike-share or ride-hail services
- **Operating** hardware and software for parking, curb, and traffic management
- **Setting and enforcing** parking, curbside, and road-usage fees
- **Setting** speed limits for speed-separated streets

Additional management duties that could be performed by the WTMA or covered via agreements with public-sector agencies or third-party contractors include:

- **Managing** street closures for construction or events
- **Handling** data in accordance with all applicable laws, and subject to the authority of the Urban Data Trust proposed for the area
- **Creating** a user interface or app for trip planning and subsidies (or integrating into third-party tools)
- **Clearing** snow and debris (beyond heated pavements)
- **Constructing and financing** roads or parking facilities

# 3

## Managing the system

The WTMA's third primary role would involve using an advanced mobility management system to coordinate mobility across the waterfront in line with its policy objectives. The required capabilities of this system are described more in the following section.



Improving Mobility Management

# Deploy a real-time mobility management system

To achieve core mobility goals of safety, affordability, opportunity, and convenience, the WTMA would need to deploy a mobility management system capable of coordinating all streets, signals, lanes, and trip options in line with local objectives. The essential functions of such a system would include:

- **Understanding** how people are using the entire system in real time via data on things like traffic volume, vehicle speed, transit delays, emergency dispatches, and even weather patterns
- **Analyzing** these travel patterns in real time to help the system coordinate operations of signals and curbs in line with core policy objectives, such as prioritizing safety and transit use
- **Informing** trip choices by providing real-time information to travellers and mobility services on things like pricing, scheduling, and route closures

To procure this system, the WTMA would publish its technical requirements in detail and survey the market for potential vendors. There are a number of local Canadian and global companies that might respond, including Miovision, Siemens, and GridSmart. If no vendors meet the comprehensive requirements for such a system, Sidewalk Labs would develop one, potentially in partnership with one or more existing companies.

### Understanding real-time use.

Cities have started to manage their streets and mobility systems with data-driven tools, from adaptive traffic signals to real-time bus trackers. In Toronto, the King Street pilot program<sup>67</sup> collected information on streetcar delays, car volume, and pedestrian activity to inform new traffic rules that have improved streetcar travel times for 65,000 weekday travellers.

To manage the streets in the neighbourhood well, the mobility management system for the Sidewalk Toronto project would need to be able to gather data on pedestrian and traffic flows as well as transit boarding patterns to understand how all travellers (not just vehicle traffic) are using the transportation system.

This new level of understanding should stretch across all aspects of the transportation system and across all trip modes, from the amount of available space in a loading zone, to the light rail schedule, to the routes of ride-hail vehicles, to the number of pedestrians waiting to cross a street. With a complete portrait of mobility activity, the WTMA would be able to manage the mobility performance in line with its objectives.



### Analyzing real-time patterns.

The mobility management system for the Sidewalk Toronto project should use real-time modelling tools to respond to trip patterns, potentially deploying an advanced form of data analysis called “machine learning” to improve those responses over time.

Consider traffic at a typical intersection. The mobility management system would need to know the total number of pedestrians trying to cross, the schedule of light rail vehicles approaching the intersection, and the volume of ride-hail services routed in that direction. Based on that real-time activity, the system’s modelling tools would tell the intersection what to prioritize in line with the WTMA’s policy objectives. In this case, the pedestrian crossing would be prioritized and given the greatest amount of signal time, followed by light rail vehicles, followed by private cars or ride-hail vehicles.


Afterwards, the system would evaluate how it did in that scenario: How many pedestrians got stranded waiting? How much delay time did the light rail experience? How was the travel time of ride-hail vehicles impacted? If the system performed in line with objectives, it would apply the same response to similar scenarios in the future. If something should be tweaked — maybe the crossing signal needs to be held even longer — the system would make that adjustment and learn to improve.

### Informing trip choices.

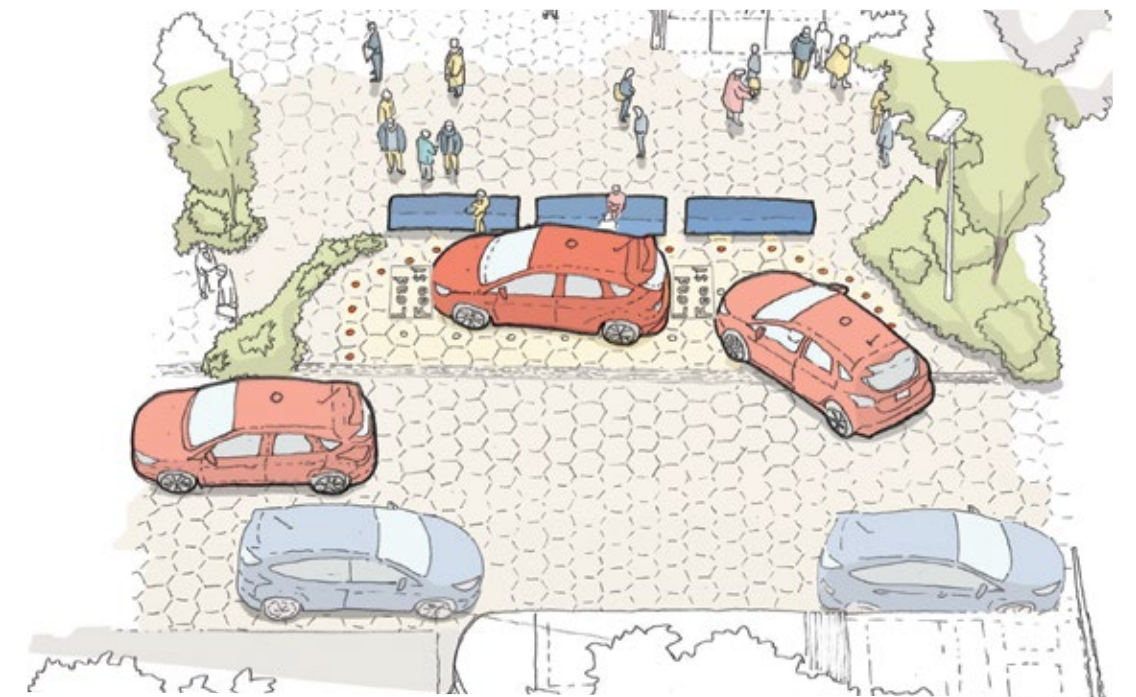
With full knowledge of transportation conditions, a mobility management system would need to provide travellers — and the services they use — with the information needed to make trip choices or adjust travel behaviour. That information might include things like street closures, lane reallocations, public transit arrival times, ride-hail wait times, bike-share availability, or curb prices. The system would need to provide that information to physical infrastructure, such as traffic signals and pavement, and to digital tools, such as third-party trip apps or ride-hail services.

For example, consider a street that is being closed down on a weekday afternoon for a community gathering. A responsive traffic signal could hold a green cycle longer on the next street over to avoid congestion. Lighted pavement and dynamic signs could be used to indicate that a bike lane is temporarily closed. Ride-hail services could consume information from the system to route vehicles around the closure, and navigation tools could use that information to provide travellers with accurate trip time estimates.

As part of its ability to inform trip choices, the WTMA would build on best practices for demand-based pricing to manage its parking garage and curbside spaces, raising and lowering rates to ensure that spaces are available and used.

In addition to these high-level capabilities, Sidewalk Labs believes there are two core tools that can help enable this coordinated mobility system to flourish: adaptive traffic signals and dynamic curbs. 

The dynamic curb (shown here) can be designated as a passenger pick-up or drop-off zone through lighted pavement, then easily converted into pedestrian space during low-traffic periods.



### Adaptive traffic signals.

Adaptive traffic signals leverage privacy-preserving sensing and analysis to ensure that intersections are efficiently managing the pedestrians, cyclists, and vehicle traffic in a neighbourhood.

Adaptive traffic signals typically incorporate mounted devices capable of identifying the number, speed, and trajectory of vehicles, pedestrians, and cyclists. Consistent with the proposed approach to responsible data use for the Sidewalk Toronto project, this data would need to be de-identified at the source by default — meaning that any counts or calculations would be processed on the device, deleting any raw footage and retaining only the aggregated numbers for analysis.

Adaptive traffic signals would then optimize signal timing to maximize person throughput at a given intersection, while giving priority to one mode versus another (for example, pedestrians over cars) based on the WTMA’s policy objectives. The signals would communicate their status and imminent timing changes to connected vehicles or self-driving vehicles via short-range communication systems, and would make this data available via API to third-party navigation tools.

### Dynamic curb.

The WTMA’s approach to curb management would leverage real-time data and policies set by the WTMA to make the most efficient use of curb space based on actual demand — a concept that Sidewalk Labs calls the “dynamic curb.”

As described earlier (on Page 61), the dynamic curb uses physical infrastructure, such as lighted pavement or signs, to designate available space for passenger pick-ups and drop-offs along streets — including at times when this space is not available to vehicles because it is being repurposed, such as for pop-up street fairs or sidewalk expansions.

The dynamic curb must also publish information about its availability, pricing, and scheduling to third-party trip apps or mobility services, so users can factor this information into their transportation decisions, make reservations, and be alerted to any changes or issues, such as a driver incurring a higher fee for waiting too long at the curb. This ability would reduce the negative impact of curb congestion and double-parking in cities today.



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2, on Page 374.

# Part 6



## Designing People-First Streets



### Key Goals

**1**  
Create four new types of streets to move people and make places

Many shortcomings of current city streets stem from a one-size-fits-all approach to their design. A typical downtown street has wide lanes for cars that want to drive at high speeds, and more lanes than necessary to accommodate rush-hour traffic. Curb space is dedicated to parked vehicles or delivery trucks. Cyclists typically ride in close proximity to these faster and larger vehicles. Pedestrians wait for their brief window to cross.

This general pattern leads to discomfort for pedestrians and cyclists at best and to dangerous conflicts at worst.

Rather than designing all streets for all uses at all times, Sidewalk Labs plans to create four street types designed for different speeds and primary uses. Two faster street types (Boulevards and Transitways) would move people and goods through vehicles and public transit and feature separated paths for cyclists and sidewalks for pedestrians. Slower street types (Accessways and Laneways) would provide a safe and comfortable environment for cycling and pedestrian activity.



*This people-first street network would serve as a foundation for the mobility options and innovations described in the rest of this chapter to flourish – creating safe, convenient choices for getting around the city without the need to own a car. Sidewalk Labs' streets are also designed to be part of the public realm, with benefits to open space, public health, economic vitality, and social interaction. The network is designed to work on Day One of a neighbourhood like Quay-side but reaches transformative potential with safe, reliable self-driving vehicles that can be programmed to follow the rules of the road.*

The four street types share some fundamental principles. Each is tailored towards a specific mode. Each prioritizes safety either through speed restrictions or separated lanes. Each incorporates flexibility to make the most of limited street space, enabling quick conversions between transportation and public space purposes. Each reclaims space for pedestrians, buildings, and public uses.

**This people-first street network would serve as a foundation for the mobility options and innovations described in the rest of this chapter to flourish.**

What makes this approach to street design possible now is a combination of policy innovations, design advances, and new digital tools. These advances enable some key street design changes:

# 1

## Tailor streets for different modes.

Typical streets aim to accommodate all uses at all times, even though each transportation mode is very different in size, top speed, and the vulnerability of the traveller. Harnessing navigation tools, adaptive traffic signals, and other new capabilities, [Sidewalk Labs has designed four types of streets — each prioritizing a particular mode.](#)

Laneways prioritize pedestrians. Accessways prioritize cyclists. Transitways prioritize public transit through dedicated lanes and signal priority. Boulevards are intended for all modes but primarily for vehicles.

These streets are narrower overall and tailored to the size and speed of their priority mode, with the goal of improving safety and comfort. This approach is consistent with “complete streets” principles, as space is provided on each street for every mode — except for traditional vehicles driven by people, which are restricted to streets specifically designed for their movement.

Mode-tailored streets become even safer with self-driving vehicles, which can be programmed to pursue the optimal route based on their destination.

# 2

## Separate streets by speed.

On most streets, the difference in speeds among vehicles, cyclists, and pedestrians leads to discomfort or safety hazards. By integrating policy, design practices, and digital tools, [Sidewalk Labs can safely separate streets by speed — enabling the network to move people in vehicles while making designated places for pedestrians.](#)

On faster streets that permit vehicles, physical separations can provide comfort and safety for cars, bikes, and pedestrians. Navigation tools can guide faster traffic onto these streets and away from narrower streets meant for slower vehicles and pedestrian street life. Adaptive traffic signals can detect all types of travellers and hold crossing lights to ensure safety.

On slower streets, traditional vehicle access would be restricted; vehicles that must use these streets for accessibility purposes would have to travel at cycling or walking speeds. This approach would advance the principles of “shared streets,” which shows that pedestrians, cyclists, and vehicles can coexist safely<sup>68</sup> so long as they are all going the same low speed.

Shared streets would also stand to get safer with self-driving vehicles, which can be programmed to defer to pedestrians and cyclists and to obey speed limits.

# 3

## Incorporate flexibility into street space.

In order to handle rush hour, city streets often have more car lanes than they regularly need. During off-peak periods, these static lanes cannot easily be used for other purposes.

[Sidewalk Labs plans to design lanes that are flexible throughout the day, enabling cities to make the most of existing street space.](#) A morning rush-hour car lane could quickly become a bike lane by day and a loading zone by night. Curbside lanes typically devoted to street parking can become dynamic curbs that coordinate pick-ups, drop-offs, and deliveries — adjusting prices for curb access based on congestion.

This flexibility is possible thanks lighted pavement, digital signage, and to the ability to send vehicles information about new lane designations or street closures. Speed separation allows the safe elimination of raised curbs, which enables greater flexibility, allowing for the potential expansion of sidewalk space at off-peak periods.

(Sidewalk Labs also plans to explore better approaches to traditional street designs, such as intersections, using roundabouts instead of traffic lights.)

Flexibility could also improve dramatically with self-driving vehicles, which would automatically know which lanes are closed and would re-route accordingly.

# 4

## Recapture street space for other uses.

By designing streets around shared mobility fleets instead of private car ownership, [Sidewalk Labs can recapture curbside parking for wider sidewalks, new bike lanes, and passenger and freight loading zones.](#) This design change is further made possible because expanded transit service and cycling options leads to fewer overall car trips. Remote parking facilities mean that remaining private cars can park off the street.

As self-driving vehicles become widely available, streets can recapture even more space through narrower lanes, since these vehicles can be programmed to stay reliably in the centre of lanes without veering.

[All told, these designs can help capture at least 91 percent more pedestrian open space on major boulevards.](#) 



See the “Public Realm” chapter of Volume 2, on Page 118, for more details on reclaiming pedestrian space.



Designing  
People-First Streets

# Create four new types of streets to move people and make places

Based on these principles, Sidewalk Labs has designed four street types that together create a complete mobility network that balances the need to get people places with the needs for pedestrian safety and street life.

This network would be the first to be designed by leveraging the eventual capabilities of self-driving vehicles, with the knowledge that this technology must be thoughtfully integrated into future cities to improve — and not undermine — urban mobility.

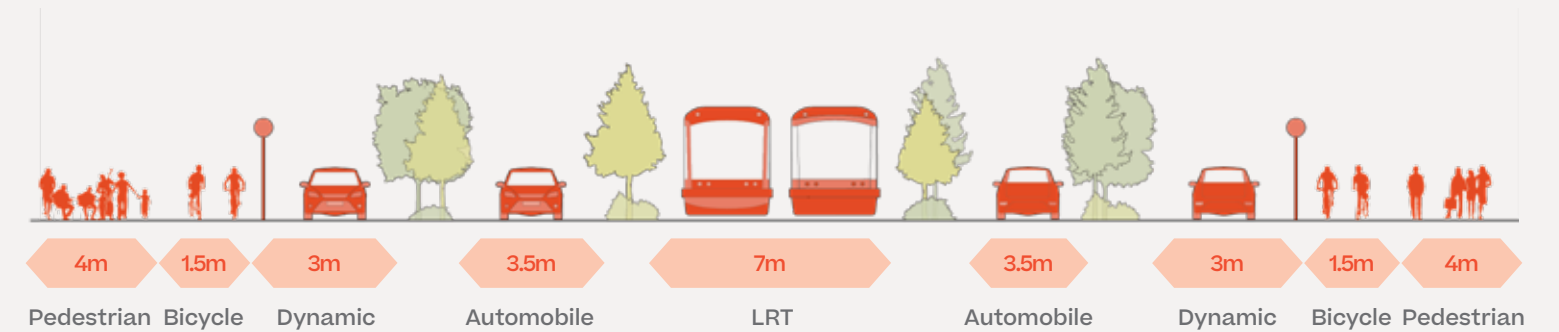
These street types are designed to operate safely and effectively in existing cities with traditional vehicles but reach their peak potential in a world of self-driving vehicles that can be programmed to follow traffic rules, rerouted by a mobility management system, programmed to defer to pedestrians.

These street types are: Boulevards, Transitways, Accessways, and Laneways.

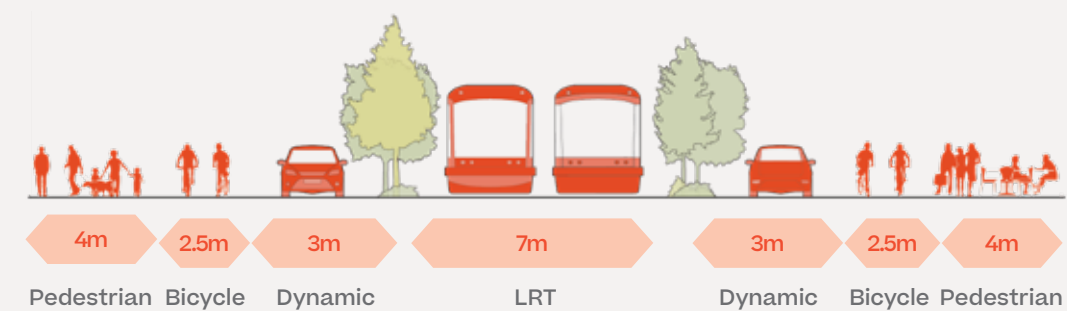
# This network would be the first to be designed by leveraging the capabilities of self-driving vehicles.

# Street type section views

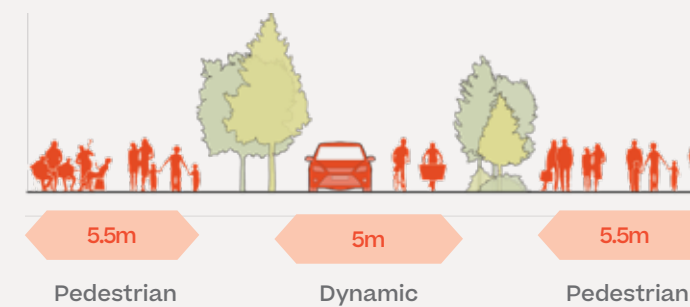
Together these streets can be combined to create a complete mobility network.



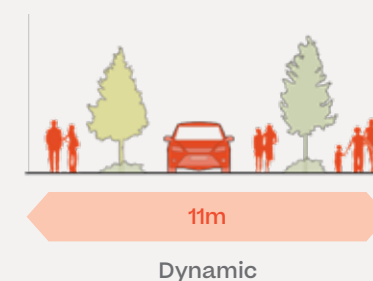
**Boulevard: 31 metres**  
**Priority mode: All modes**  
**Priority speed: 40 km/h**  
Boulevards are designed primarily to accommodate longer-distance car trips and faster traffic. In the IDEA District, they could account for 10 percent of the total road network length.



**Transitway: 26 metres**  
**Priority mode: Public transit**  
**Priority speed: 40 km/h**  
Transitways are designed to prioritize public transportation in designated lanes. In the IDEA District, they could make up roughly 6 percent of the total street network length.



**Accessway: 16 metres**  
**Priority mode: Cyclists**  
**Priority speed: 22 km/h**  
Accessways are designed primarily for cyclists, with traffic moving at bike speeds. In the IDEA District, they could make up a third of all street types.

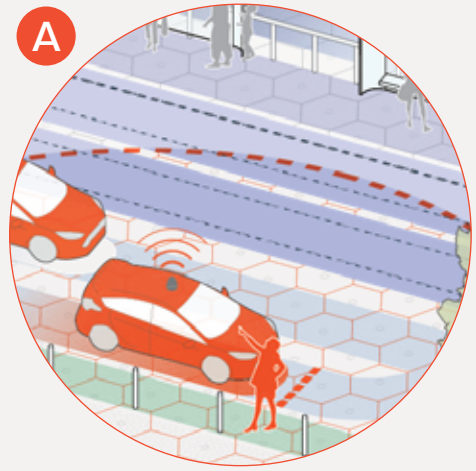
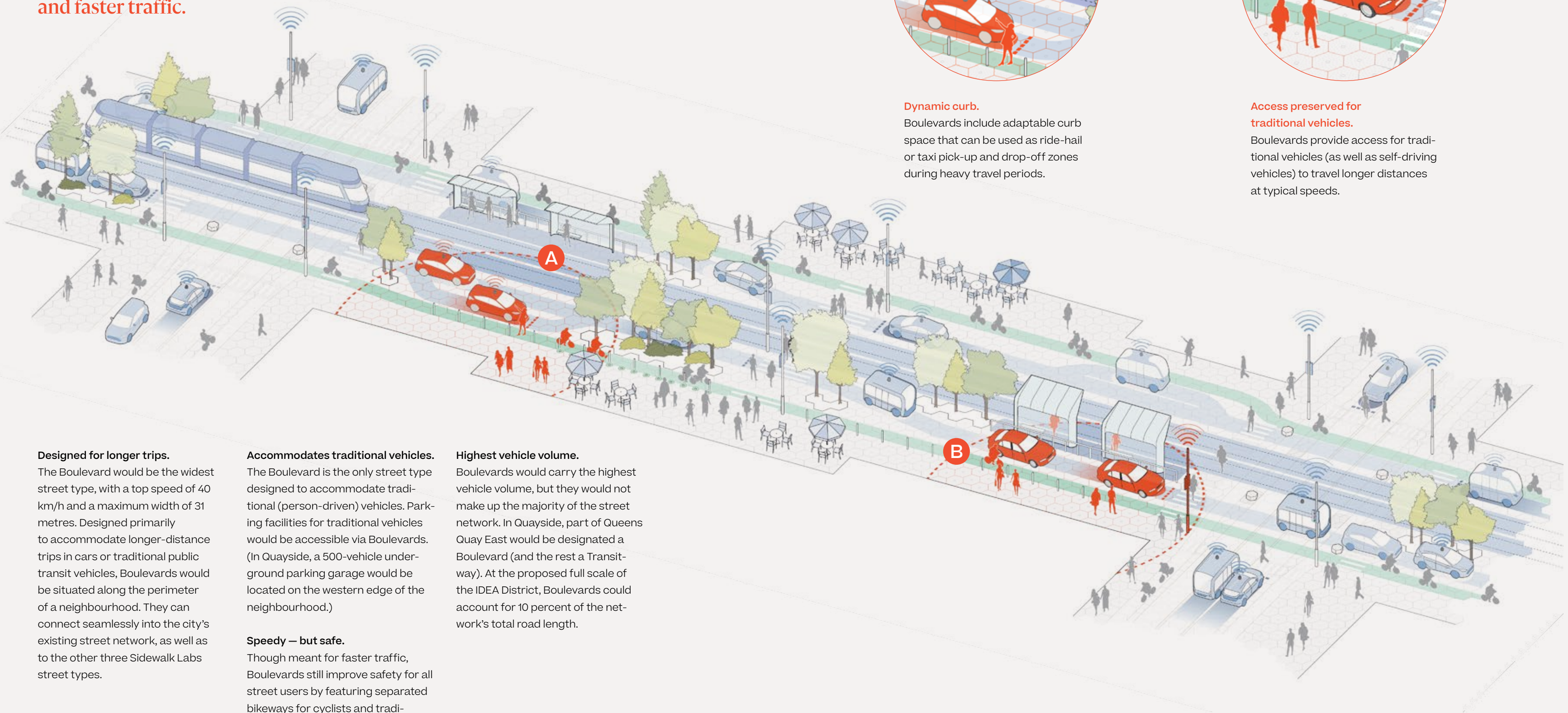


**Laneway: 11 metres**  
**Priority mode: Pedestrians**  
**Priority speed: 8 km/h**  
Laneways form the foundation of the pedestrian network. In the IDEA District, they would be the most common street type.

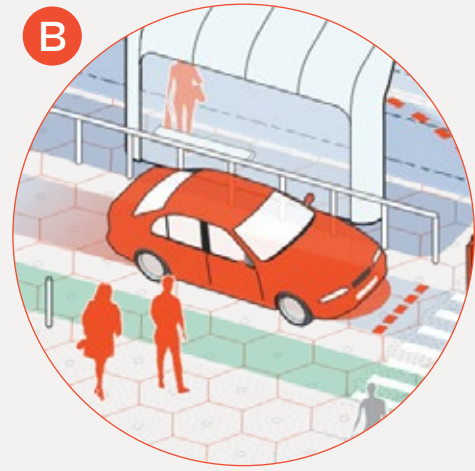
# Boulevard



Boulevards are designed primarily to accommodate longer-distance car trips and faster traffic.



**Dynamic curb.**  
Boulevards include adaptable curb space that can be used as ride-hail or taxi pick-up and drop-off zones during heavy travel periods.



**Access preserved for traditional vehicles.**  
Boulevards provide access for traditional vehicles (as well as self-driving vehicles) to travel longer distances at typical speeds.

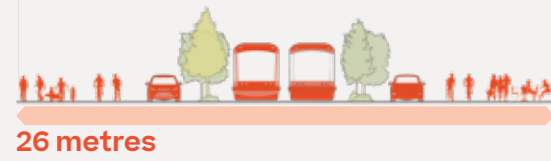
**Designed for longer trips.**  
The Boulevard would be the widest street type, with a top speed of 40 km/h and a maximum width of 31 metres. Designed primarily to accommodate longer-distance trips in cars or traditional public transit vehicles, Boulevards would be situated along the perimeter of a neighbourhood. They can connect seamlessly into the city's existing street network, as well as to the other three Sidewalk Labs street types.

**Accommodates traditional vehicles.**  
The Boulevard is the only street type designed to accommodate traditional (person-driven) vehicles. Parking facilities for traditional vehicles would be accessible via Boulevards. (In Quayside, a 500-vehicle underground parking garage would be located on the western edge of the neighbourhood.)

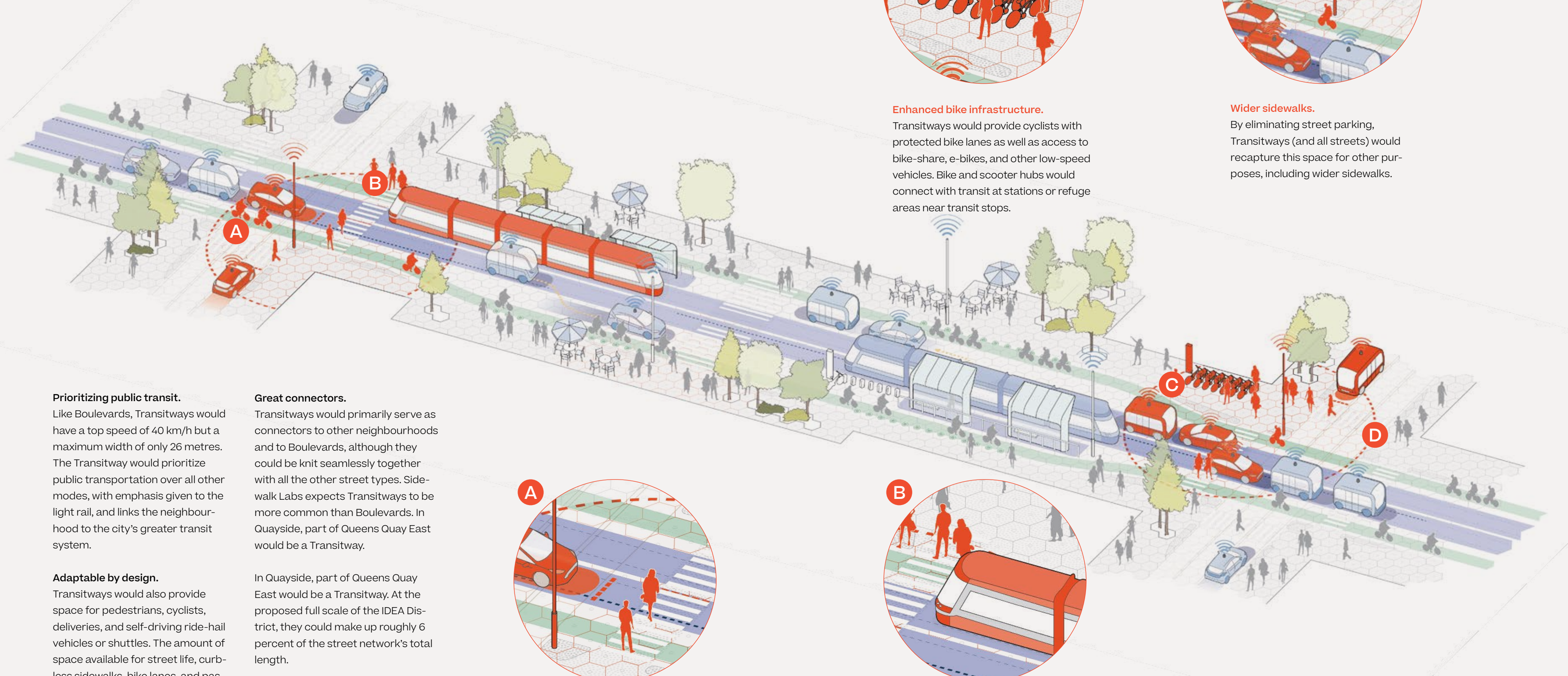
**Speedy — but safe.**  
Though meant for faster traffic, Boulevards still improve safety for all street users by featuring separated bikeways for cyclists and traditional (though curbless) sidewalks for pedestrians. At intersections, responsive traffic signals can detect safety risks and adjust lights to protect pedestrians accordingly.

**Highest vehicle volume.**  
Boulevards would carry the highest vehicle volume, but they would not make up the majority of the street network. In Quayside, part of Queens Quay East would be designated a Boulevard (and the rest a Transitway). At the proposed full scale of the IDEA District, Boulevards could account for 10 percent of the network's total road length.

# Transitway



Transitways are designed to prioritize public transportation in designated lanes.



**Prioritizing public transit.**

Like Boulevards, Transitways would have a top speed of 40 km/h but a maximum width of only 26 metres. The Transitway would prioritize public transportation over all other modes, with emphasis given to the light rail, and links the neighbourhood to the city's greater transit system.

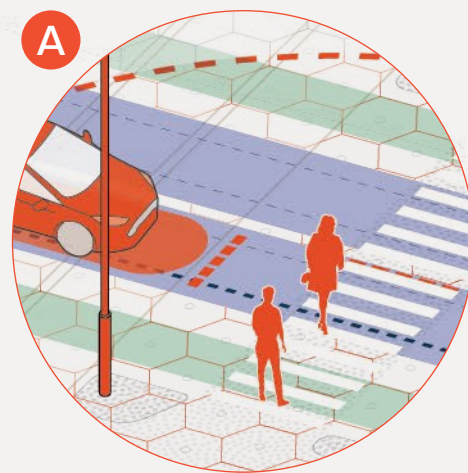
**Adaptable by design.**

Transitways would also provide space for pedestrians, cyclists, deliveries, and self-driving ride-hail vehicles or shuttles. The amount of space available for street life, curbless sidewalks, bike lanes, and passenger loading zones can contract or expand based on demand thanks to dynamic curbs. These changes could be communicated to travellers through digital signage, navigation tools, or lighted pavement.

**Great connectors.**

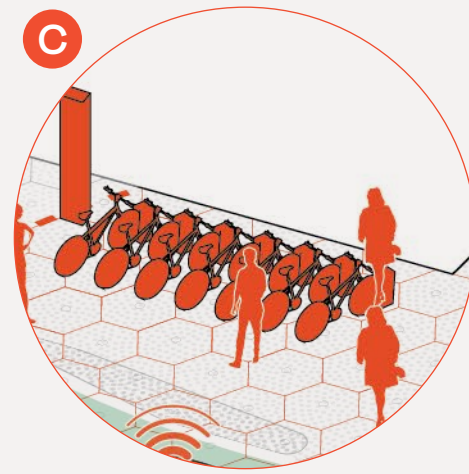
Transitways would primarily serve as connectors to other neighbourhoods and to Boulevards, although they could be knit seamlessly together with all the other street types. Sidewalk Labs expects Transitways to be more common than Boulevards. In Quayside, part of Queens Quay East would be a Transitway.

In Quayside, part of Queens Quay East would be a Transitway. At the proposed full scale of the IDEA District, they could make up roughly 6 percent of the street network's total length.



**Shorter, safer crosswalks.**

Adaptive traffic signals can prioritize pedestrians at crossings that are now shorter due to narrower roadways and wider sidewalks.



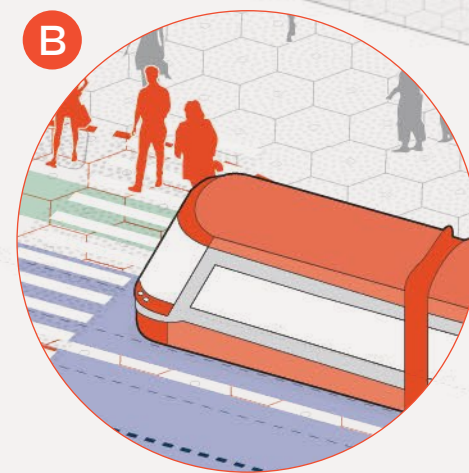
**Enhanced bike infrastructure.**

Transitways would provide cyclists with protected bike lanes as well as access to bike-share, e-bikes, and other low-speed vehicles. Bike and scooter hubs would connect with transit at stations or refuge areas near transit stops.



**Wider sidewalks.**

By eliminating street parking, Transitways (and all streets) would recapture this space for other purposes, including wider sidewalks.



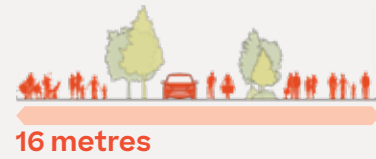
**Transit priority.**

Public transportation vehicles would get priority on Transitways through adaptive traffic signals that give them the green light and lanes where self-driving vehicles can pull off to

let transit vehicles pass. A two-stage crossing that uses dynamic pavement technology would allow pedestrians to cross unimpeded when the light rail is not present and would pause

pedestrians in a refuge area when the light rail has received priority.

# Accessway



Accessways are designed primarily for cyclists, with traffic moving at bike speeds.

### Designed for cycling.

Accessways would be narrower streets that make up a core part of the pedestrian-cyclist network and are intended for traffic moving no faster than cycling speeds. The streets would be designed for top speeds of 22 km/h with a maximum width of 16 metres. Self-driving vehicles (including delivery vehicles) would be permitted on Accessways if travelling at bike speed.

### Protected streets.

Accessways would provide more than a protected bike lane — they would provide a protected bike street. Sidewalk Labs expects Accessways to be more common than Boulevards or Transitways. This expanded bike network would mean that cyclists no longer have to look at maps for routes that go as close as possible to where they want to go. Applied to a street network at the full scale of the IDEA District, Accessways (and protected bike lanes on Boulevards or Transitways) would enable cyclists to reach 100 percent of buildings on a dedicated bike lane or roadway designed for bikes. Accessways would not have separated sidewalks, instead guiding cyclists and pedestrians via lighted pavement or digital signs.

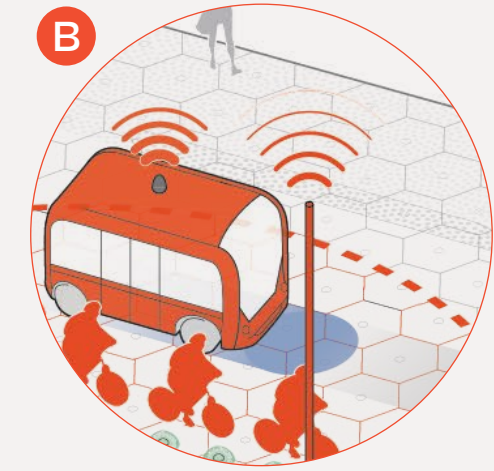
### Comfort and safety.

Accessways would be designed to grant cyclists a wave of relief from roadways considered less safe, encouraging veteran cyclists to make more bike trips and drawing new riders as well. New rules for interactions between self-driving vehicles and people ensures safety, comfort, and pedestrian priority. In Quayside, there would be two Accessways. At the full scale of the IDEA District, they could make up roughly one third of the street network's total length.



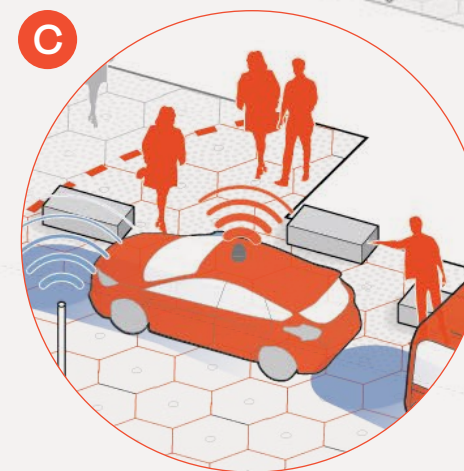
### Abundant bike options.

Accessways would be designed to put cyclists first. This expanded cycling network would feature bike-share options and green waves, which help cyclists maintain a certain speed to avoid being stopped at intersections.



### Low-speed access.

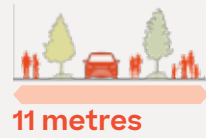
To ensure accessibility without compromising comfort for pedestrians and cyclists, Accessways would permit self-driving vehicles as long as they are travelling at cycling speeds.



### Reinforcing safety.

Movable street furniture can be used to reinforce safe site zones in a mixed curbless environment.

# Laneway



Laneways form the foundation of the pedestrian network. In the IDEA District, they would be the most common street type.



**Pedestrian priority.**  
Laneways enable pedestrians to rule the streets, since most vehicles would prefer to travel on Boulevards and Transitways and self-driving vehicles could be routed there by real-time navigation systems. Vehicles travelling at pedestrian speeds can still use Laneways to ensure accessibility for the elderly, people in wheelchairs, or others who need it.

**Pedways.**  
A subset of Laneways — pedestrian-only pedways — would not allow any vehicle traffic at all, adding yet another dimension to the walking network.

**Designed for walking.**

Laneways would form the foundation of the pedestrian network and would be the most common type of street.

These streets would be designed for pedestrian speeds, with a top speed of 8 km/h and a maximum width of 11 metres. Bikes and low-speed, self-driving vehicles for people with accessibility needs would be permitted on laneways if travelling at the proper speed.

**Streets as places.**

Laneways would help people get places, but also to be places unto themselves, filled with pop-up shops, street fairs, and other types of community gatherings.

All space on the Laneway would be shared. Heated pavement would create a welcoming pedestrian atmosphere year-round, and moveable street furniture would encourage a vibrant and ever-changing streetscape.

**The most common street type.**

In Quayside, there would be one Laneway. At the full scale of the IDEA District, Laneways and pedways could make up roughly half of the street network's total length.



**Maintaining pedestrian speeds.**  
Street furniture and landscaping design would encourage cyclists to walk bikes especially when streets are filled with pedestrians.

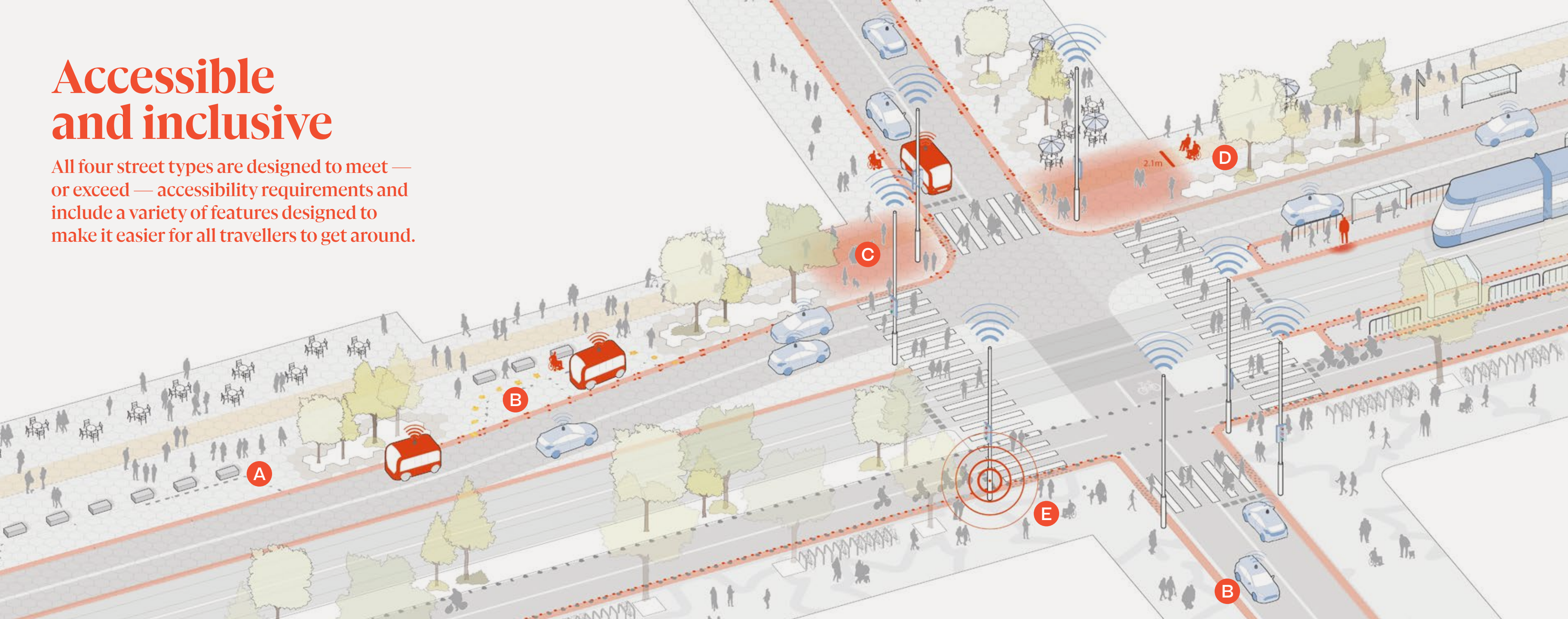


**Active street life.**  
A suite of street amenities, such as heated pavement and moveable furniture, would help people use Laneways for shops, gatherings, fairs, and other lively uses.



# Accessible and inclusive

All four street types are designed to meet — or exceed — accessibility requirements and include a variety of features designed to make it easier for all travellers to get around.



Travelling freely and safely at street level is a cornerstone of an accessible city. With this goal in mind, Sidewalk Labs would design streets that put people first, including those using wheelchairs and other mobility devices, those travelling with service animals, and those with varying levels of sensory perception and attention. Every street would be designed to meet all the requirements of the 2005 Accessibility for Ontarians with Disabilities Act (AODA), including low-to-no curbs, textured pavement

at pick-up and drop-off points, and pedestrian crossing controls. Wherever possible, Sidewalk Labs would aim to exceed these requirements. Emergency vehicles would be able to access every building, in accordance with the City of Toronto's Roadway Design Considerations Summary Memo. The aim is to be fully accessible across all aspects of daily life.

**A Curbless streets.** In Quayside, instead of a vertical step separating the vehicle right-of-way from pedestrian paths, tactile indicators will indicate the line between pedestrian-only areas and spaces shared between pedestrians, bikes, and low-speed vehicles.

**B Accessible vehicles.** Self-driving vehicles promise a revolution in personal mobility, with particular benefits for people experiencing different levels of mobility and sensory perception. Sidewalk Labs plans to strongly promote end-to-end accessibility for self-driving and ride-hailing vehicle services.

**C Modular heated pavement.** Sidewalk and road maintenance can be a common impediment to accessibility. In Quayside, pavers would be modular, meaning that if one cracks or breaks, it can be quickly replaced. Pavers at key street crossings and intersections would include heating elements that can help to prevent snow and ice buildup on pedestrian thoroughways. Heated pavers coupled with building awnings that protect from rain and snow would make streets more passable for people using wheeled mobility devices and more comfortable for service animals year-round.

**D Sidewalk width.** All thoroughfares in Quayside would have at least enough room for two people using mobility devices (such as wheelchairs, scooters, and white canes) to ride or travel side by side in each direction, or for two people to sign while walking. Even more room will be provided wherever possible.

**E Wayfinding beacons.** Wayfinding beacons can broadcast information about the environment to people who are blind or partially sighted to help them navigate the area. In Quayside, beacons would enable the use of BlindSquare and other wayfinding apps as part of the default street-level experience.

# Public Engagement

The following summary describes feedback related to **mobility** and how Sidewalk Labs has responded in its proposed plans.



As part of its public engagement process, members of Sidewalk Labs' planning and innovation teams talked to thousands of Torontonians — including members of the public, expert advisors, civic organizations, and local leaders — about their thoughts, ideas, and needs across a number of topics.

## 1 Put pedestrians and cyclists first

### What we heard

From the very beginning of Sidewalk Labs' public engagement process, one mobility note kept coming up time and again across workshops, advisory working groups, and special reports: prioritize pedestrians and cyclists. Safety and the management of conflicts among road users were top of mind. As one roundtable participant put it: "Greater access to pedestrian laneways and safer bike lanes would make me more likely to even bike — and not think I may turn into roadkill!"

The Mobility Advisory Working Group pushed Sidewalk Labs to innovate when it came to road design, speed limits, and curb space, stressing the need to consider the unpredictability of shared streets; where and how pedestrians cross the street; and cycling infrastructure (for bikes as well as e-bikes and scooters) that is accessible in all conditions. The Sidewalk Toronto Fellows similarly advocated for safe, all-weather active transportation.

Participants at Roundtable 4 supported the decision to restrict vehicles, especially in Parliament Plaza, and were enthusiastic about water transportation modes, such as kayaks. Roundtable participants, as well as participants in co-design sessions pushed Sidewalk Labs to meet and surpass AODA compliance when designing for pedestrians and cyclists.



307 is home to the very first Bike Share Toronto station in Quayside. Credit: David Pike

### How we responded

#### Designing people-first streets.

Sidewalk Labs proposes a people-first street network designed to enhance safety, comfort, and street life for pedestrians and cyclists. Lower-speed streets would require vehicles to travel at pedestrian or cyclist speeds, and boulevards that permit higher-speed traffic (up to 40 km/h) would contain dedicated bike lanes with physical separations (see Page 92).

#### Providing mobility choices.

Sidewalk Labs proposes a cost-effective, integrated mobility package that makes cycling and walking easier and more convenient. For example, a monthly subscription could cover a discounted TTC pass, an unlimited Bike Share Toronto membership, access to e-scooters and other low-speed vehicles, and credits for rides with ride-hail or car-share providers (see Page 65).

#### Improving bike infrastructure.

Sidewalk Labs proposes to include bicycle "green waves," which use signal coordination to help cyclists maintaining a certain speed avoid stopping at red lights, improving travel time and increase safety (see Page 49).

#### Creating all-weather infrastructure.

Sidewalk Labs proposes heated pavement in sidewalks and bike lanes, as well as an outdoor comfort system to shield pedestrians and cyclists from wind, rain, ice, and snow (see Page 52).

## 2 Improve transit, expand it, and make it inclusive

### What we heard

Participants expressed frustration with the current transportation system, particularly traffic congestion, and excitement about the opportunity to rethink mobility in Toronto.

Torontonians felt strongly that public transit must be a central focus of any mobility plan, especially if the project aims to reduce levels of private vehicle ownership, and that the transit experience in Quayside must be efficient and easy to use. As one roundtable participant explained: “Personally, if transit were more accessible and affordable, I would use my car less.”

The inclusivity of transit was also a key theme. The Mobility Advisory Working Group and the Sidewalk Toronto Residents Reference Panel encouraged the Sidewalk Labs mobility team to apply a user-experience lens to its plan, while co-design participants emphasized design and signage that would be accessible across visual, auditory, and cognitive abilities.

But public transit cannot be efficient, convenient, or inclusive if it is isolated from Toronto’s greater systems. The Mobility Advisory Working Group encouraged Sidewalk Labs to build on the city’s existing plans and research. This need to integrate public transit in Quayside into city and regional transit — and to plan in step with the city — was particularly important to Roundtable 4 participants and to those on the Residents Reference Panel.

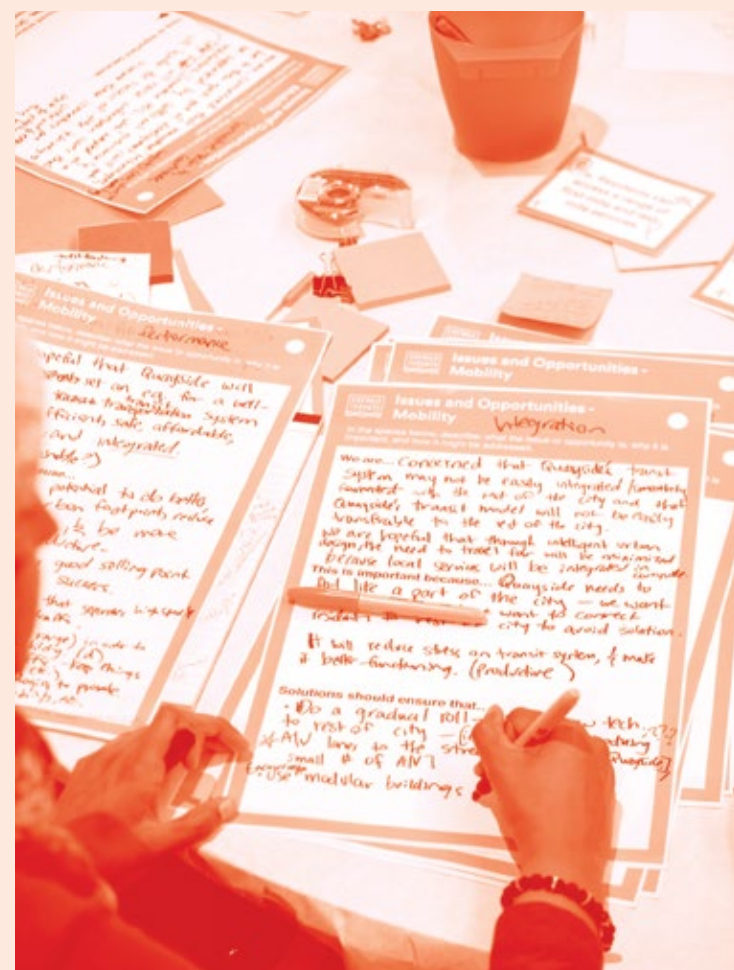
A member of the public provides feedback on mobility “issues and opportunities” during a Sidewalk Toronto Public Roundtable. Credit: David Pike

#### Planning walkable neighbourhoods.

Sidewalk Labs proposes a truly walkable neighbourhood, where residents and workers can access jobs, homes, and daily goods or services within a 15-minute walk (see Page 44).

#### Ensuring accessibility.

Sidewalk Labs commits to physical and digital accessibility principles that require streets to be accessible for people of varying abilities. This plan would include curbside streets with sidewalks wide enough to accommodate pedestrians moving side by side in wheeled devices or walking and signing; consistent visual, auditory, and tactile cues to guide people through spaces; and special vehicle permissions for accessible ride-hail vehicles (see Page 106).



### How we responded

#### Expanding transit.

Sidewalk Labs proposes connecting Quayside with Toronto’s existing transit system before any residents move in and accelerating the financing of a light rail expansion that builds on the extensions identified as critical by existing planning initiatives, such as the Port Lands Planning Framework and Waterfront Toronto’s Transit Reset efforts (see Page 40).

#### Designing transit-friendly streets.

Sidewalk Labs proposes street designs with speed limits that encourage pedestrian travel, electric bikes, and other low-speed vehicles as attractive commuting options, improving last-mile connections and making public transit more attractive (see Page 92).

#### Offering integrated mobility options.

Sidewalk Labs proposes an integrated mobility package that would give residents and workers a real-time understanding of the real price of each transportation option, encouraging the choice of public transit via discounts and credits (see Page 65).

#### Ensuring accessibility.

The TTC’s stated policy is to create step-free transit stops for streetcars and buses, and to provide the most updated, accessible vehicles available at present to serve Quayside. Sidewalk Labs plans to collaborate with city transit partners and commit to ensuring this reality (see Page 106).

#### Coordinating bus service.

Sidewalk Labs plans to ensure that bus service is well-integrated into other modes, making it easier and more convenient for riders to transfer across mobility options (see Page 45).

## 3 Be ambitious — but allow for transition

### What we heard

“We’ve been designing roads the same way for 100 years. Maybe it’s time to rethink how we do that, so that roads are more responsive and fluid,” said one of the Reference Panel residents. Other engagement participants agreed. At Roundtable 3, when Sidewalk Labs presented five types of potential Quayside streets, Torontonians pushed for ambition in the plan’s mobility aspirations.

At the same time, participants noted that any new technology must be introduced carefully. On this topic, no subject generated more excitement — and concern — than self-driving vehicles.

Roundtable participants and the Mobility Advisory Working Group were vocal about the potential upsides of this technology. The Advisory Working Group was not only intrigued by the ability of self-driving fleets to reclaim street space typically devoted to curbside parking, but they also saw self-driving vehicles as an exciting solution to the challenge of first- and last-mile trips — for people as well as for the delivery of goods.

Many Torontonians also expressed concern with the cost, safety, and accessibility of self-driving vehicles, as well as their relationship with public transit.

Both the Mobility Advisory Working Group and the Residents Reference Panel emphasized the need to learn from leading experts; to take time to transition to self-driving vehicles; and to ensure that alternative transportation options are available, the public is educated, and proper regulation is in place. Reference Panel and Roundtable 4 participants cautioned that some parking and vehicle access in Quayside could be necessary to prevent the community's isolation from the GTA and to allow for TTC WheelTrans (an accessible paratransit service in Toronto) and emergency vehicles.

### How we responded

#### Designing streets for the future.

Sidewalk Labs proposes streets that anticipate self-driving vehicles but that can also be successful without them. The streets in Quayside can easily adapt to “make room” for these vehicles as they become more commonplace (see Page 96).

#### Providing occasional car access.

Sidewalk Labs proposes to provide access to a variety of on-site car-sharing and car-rental providers, helping residents make the occasional car trip while relying less on traditional private vehicle ownership (see Page 63).

#### Ensuring accessibility.

Sidewalk Labs proposes special permissions so accessible ride-hail, WheelTrans, and emergency vehicles can access any street (see Page 106).

#### Offering parking.

Sidewalk Labs' plans include an underground on-site parking garage offering 500 spaces to private vehicles using demand-based pricing. The plan also would include off-site parking facilities that feature charging stations to encourage use of electric vehicles (see Page 64).

#### Working with regulatory experts.

Sidewalk Labs has collaborated with MaRS, one of the world's largest urban innovation hubs, and is working with various branches of the Canadian government to determine a regulatory framework for self-driving vehicles that would ensure public safety. Sidewalk Labs is also pursuing future pilots that would incorporate a public focus (see Page 55).

## 4 Infrastructure and transportation systems that stand the test of time

### What we heard

The importance of infrastructure, and the importance of maintaining aging infrastructure in particular, came up frequently in public engagement events.

Participants of Roundtable 4 wanted to know more about the nature of the funding and governance models for Quayside's infrastructure, and the Mobility Advisory Working Group stressed the importance of plans that are financially feasible over the long term. While the group supported a private-public mobility governance model — provided jurisdiction is clear — they also cautioned Sidewalk Labs to be practical about what the city could provide in terms of infrastructure development and maintenance. Roundtable 4 participants similarly echoed this governance concern, particularly in relation to extending the light rail system and working with the TTC. The Mobility Advisory Working Group also recommended that any mobility management system oversee both design and operations.

### How we responded

#### Financing responsibly.

To pay for some of the significant transportation infrastructure needs of Quayside, including the expansion of the light rail and upgrades to the Parliament Street and Cherry Street underpasses, Sidewalk Labs proposes a self-financing system that pays for part of the costs of construction by borrowing capital against funds generated by a future tax on real estate development (see Page 40).

#### Working with the TTC.

Sidewalk Labs proposes that light rail infrastructure, vehicles, and service remain publicly owned and operated by the TTC, and that a non-profit or government entity manage funds and transfer them to the TTC (see Page 40).

#### Using parking fees for maintenance.

Sidewalk Labs proposes that demand-based parking fees contribute to the maintenance of infrastructure (see Page 86).

#### Proposing holistic transportation management.

In accordance with the recommendation that a mobility management system oversee design and operations in Quayside, Sidewalk Labs proposes that a public entity called the Waterfront Transportation Management Association coordinate the transportation system (see Page 86).



Torontonians explore the 307 main hall exhibits — including the modular pavement demonstration — during the first Open Sidewalk, on June 16, 2018. Credit: David Pike

# Engagement spotlight



When the Sidewalk Toronto Fellows presented their findings at the end of 2018, Sidewalk Labs Director for Streets Willa Ng was in the audience, paying close attention. As the Fellows discussed their many takeaways from their travels around the world, they began talking about Amsterdam and Copenhagen, cities that make cycling not only safe, but easy and delightful. They showed one small example: a foot railing that cyclists could rest upon at red lights.

The idea of having foot railing had also come up a few weeks before, at a project design jam focused on the theme of “People on Wheels.” Willa had heard that feedback, too.

“It’s so beautiful in its simplicity,” she says. “It just goes to show that ideas don’t always have to be technological — innovation comes in a lot of forms.” Sidewalk Labs intends to include foot railings in future street designs, and these simple amenities will hopefully be a daily reminder that, in Quayside, cyclists and pedestrians come first.

The Sidewalk Toronto Fellows suggested that the project use the type of bike path foot rests they found during a research trip to Copenhagen, Denmark. Credit: Sidewalk Labs

**By providing a broad menu of affordable options for every trip, this comprehensive plan reduces the need to own a car and sets a bold new course for urban mobility.**

# Acknowledgements

Sidewalk Labs would like to extend special thanks to the participants of the Sidewalk Toronto Mobility Advisory Working Group, and to the staffs of the City of Toronto, Province of Ontario, and Government of Canada for their time and guidance.

## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full proposed IDEA District scale are inclusive of the entirety of its proposed geography, including all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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# Public Realm

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## Introduction

p120

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## Part 1

Creating More Open Space

p126

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## Part 2

Making Open Space More Usable More of the Time

p150

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## Part 3

Ensuring Open Space Is More Responsive

p178

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## Public Engagement

p192



# Introduction

## The Vision

A system of **streets, parks, plazas, and open spaces that encourages people to spend more time outdoors, together.**

An expansive open space network is vital to creating a neighbourhood culture and forming community bonds. That is a big reason why the United Nations has embraced “access to safe, inclusive and accessible” open spaces as part of its Sustainable Development Goals and why Toronto has been developing a new open space plan for downtown.

Decades of research have substantiated the tie between urban nature and well-being, and yet only 40 percent of Canadians say they get outside every day.<sup>1</sup> Time spent inside is increasingly spent alone; solo living is by far the most common household type in Toronto.<sup>2</sup> Loneliness has become such a public health problem that it is comparable to smoking as a risk factor for illness.<sup>3</sup>

This growing sense of urban isolation threatens the social fabric of vibrant neighbourhoods. Research from the Center for Active Design has found that more responsive programming,

operations, and maintenance can increase neighbourhood interactions by 10 percent and community pride by as much as 15 percent.<sup>4</sup> An “everyday” public realm is not meant to be an escape from the city, but instead to be a fundamental shaper of the community — filled with civic engagement, exploration, and connections to people and place.

Sidewalk Labs believes that plentiful, accessible, and exciting public space filled with people all day and all year is a fundamental element of urban life, not an exclusive amenity. This approach to the public realm incorporates new design practices and emerging digital tools to provide more open space, to activate that space more of the time, and to enable it to be more responsive to the community. This three-part strategy aims to help people spend more time outdoors, together.



### The innovation plan.

**First, Sidewalk Labs plans to deliver more space.**

Increased walking, cycling, and transit options — coupled with ride-hail services and eventually self-driving vehicles — create an opportunity to reclaim street space for the public realm. This expansion of open space not only enables more public activity but also creates more room for green landscaping and urban nature. To make the most of this space, Sidewalk Labs plans to design flexibility into parks and plazas and to use a digital planning and evaluation tool that can help maximize access to open space while preserving the dense downtown development that creates housing and jobs.

**Second, Sidewalk Labs plans to enable open space to be activated more of the time.** Adaptable ground-floor spaces could evolve throughout the days, seasons, or years and accommodate a much wider variety of uses than conventional developments — from traditional retail, to social or community initiatives, to production work. A digital leasing and operations system would enable easier set-up for short-term pop-ups and co-tenancy arrangements among businesses with diverse operating hours. A carefully engineered outdoor comfort system could respond to real-time weather patterns to provide shade on sunny days and protection on rainy or snowy ones.

**Finally, Sidewalk Labs plans to make space more responsive to the needs of the community.**

Shared physical infrastructure (such as communal access to projectors or power) would empower the community to program public spaces, making it easy to stage events, such as art installations or local gatherings. A real-time map of park assets — from drinking fountains to garbage bins to utility pipes — would help managers operate and maintain these spaces in ways that keep them active and detect infrastructure issues early.




### The impact.

In a neighbourhood the size of Quayside, these initiatives would lead to streets with up to 91 percent more pedestrian space and nearly twice the number of trees; ground-floor space that is activated for 33 percent more time each day; and outdoor spaces that are comfortable for 35 percent more hours throughout the year — all compared with conventional development.<sup>5</sup> The expanded availability of the public realm, activated by commu-



nity-driven programs and better maintenance, would create shared spaces that encourage exploration and provide new opportunities for small business.

In Quayside, Sidewalk Labs proposes that the administration of these innovations be handled by a new non-profit entity called the Open Space Alliance that would bring together government, residents, landowners, and tenants. 

Deployed at the full scale of the IDEA District, this holistic approach would result in a seamless network of spaces unlike any in the world. Sidewalk Labs estimates that the IDEA District could become home to more open space than previously planned, with a greater variety of spaces and double the number of comfortable outdoor hours for key spaces. People would be able to comfortably walk for kilometres through lively streets that open onto intimate plazas full of busy cafés, passing through an array of parks that weave together rolling gardens with renewed post-industrial structures. That variety of uses would draw ever more people into the public realm, which would act as the backbone of local civic life and a backyard for families.

Additionally, as jobs are increasingly attracted to dense neighbourhoods, a diverse network of open spaces would be a key driver for fostering economic growth and opportunity. Flexible, affordable ground-floor spaces could support the growth of urban production and become both community incubators and regional attractions.

A great public realm should serve as the foundation of a great community, where people spend more of their time outdoors, together — improving health and happiness and strengthening social ties.



### Benefits of implementing the vision

- Nearly twice the number of sidewalk trees as on typical boulevards
- A community empowered to program its public spaces
- New opportunities for small businesses through flexible ground floors
- Outdoor spaces that are comfortable year-round



### IDEA District

The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.



The proposed Open Space Alliance is detailed on Page 178 of this chapter and in Volume 3.

# More time outdoors, together

Sidewalk Labs has proposed a public realm vision that would create more space for more people, more of the time. The plans outlined in this chapter achieve the following impacts:

## More space



91% more pedestrian open space on major boulevards

## More time



Street life that is activated for 33% more time each day



Outdoor spaces that are comfortable for at least 35% more of the year

## More responsive



Programming, operations, and maintenance that is up to 15% more responsive to community needs than it is today

## Six lessons from user research on designing inclusive public spaces

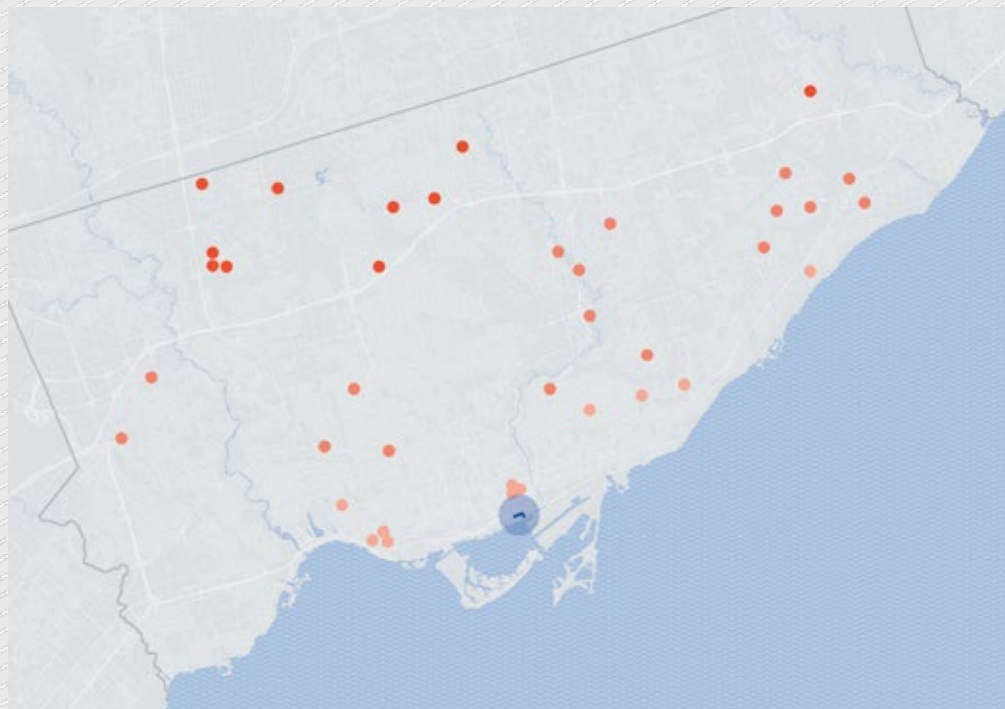
Toronto is ahead of the pack when it comes to using data to study public space. In 2016, the City Planning Department worked with national charity Park People and consulting firm Gehl Architects to conduct a comprehensive study of downtown public spaces as part of TOCore, the city's long-term planning vision.<sup>6</sup> Waterfront Toronto has also conducted extensive outreach on public space, including its "How to Make a Great Park" survey.<sup>7</sup>

To build on that data-driven work during the planning of Quayside, Sidewalk Labs collaborated with Park People and Doblin, Deloitte's human-centred design and innovation practice, on a research study to help inform people-first park design. The partners carefully screened and selected 40 people from across the city to participate in a qualitative research exercise focused on the question: What factors create a sense of belonging and ownership in public space?

Researchers spent an afternoon with participants in their homes or went on walks with participants in public spaces in different neighbourhoods to help answer this question. Most of the participants came from outside of the downtown core, and they had never previously participated in a public consultation process.

In addition to the input heard during the broader public consultation process described on Page 192, the results from this user research effort helped shape Sidewalk Labs' public realm plan and provide a general playbook for how to think about designing inclusive public spaces in diverse cities. (Initial results from the Doblin and Park People study were also shared as part of the broader public consultation process.) Six of the lessons are described on the following page.

## Seeking a diversity of voices from across the city



Sidewalk Labs, Doblin, and Park People collaborated on a study exploring how Torontonians use public space, with a focus on reaching out to people normally not included in public consultations. The research participants included a diverse mix of roughly 40 respondents from across the city, weighted towards respondents who live more than 30 minutes from the waterfront by public transit.

### Key

- Quayside development
- 0-30 min by public transit
- 30-60 min by public transit
- 60+ min by public transit

### A Design a living room, not a sitting room.

One of the core lessons from this user research was that people want the opportunity to help shape their public spaces. People are motivated to interact when there is evidence that a place has been used by others. While it is important for public spaces to be well maintained, small imperfections — even a bit of patina or grit — add a human quality that helps people understand that they are invited to contribute.

### B Foster small interactions.

People crave face-to-face interactions and opportunities for personal connection, however brief. The job of urban design is to encourage people to meet, dwell, and share a moment together in public space. That means integrating interactive features that prompt conversation: public art installations, communal picnic tables, or playgrounds with activities for parents, such as adjacent food and beverage stalls.

### C Promote unique but not unapproachable.

The best public spaces include recognizable features but still manage to surprise and delight. The job of design is to strike that balance, helping people orient themselves while still delivering a unique experience. That involves placing the known in the unknown (familiar elements in a new context), as well as the unknown in the known (new elements in a familiar context).

### D Build in sensory variety.

Variety in public space is far more than what a person can see. The job of urban design is to give people the full spectrum of sensory experiences. Smells, sounds, tastes, and textures — these are the traits people remember about a space, and during the design process they risk being overlooked in favour of exterior architectural variety. But sensory variety helps people experience a single space in a personalized context, increasing the appeal to a more diverse community.

### E Set positive rules.

Signs filled with lists of *don'ts* are stifling, but spaces governed by rules that are hard to decipher are just as problematic. The job of urban design is to create accessible rules that lead with positivity and inclusion. Setting positive rules includes subtle cues, like lights that indicate a space is still open, as well as explicit encouragement — rules that lead by telling community members what they can do, not what they cannot do.

### F Celebrating slowing down.

Part of the beauty of public space is its ability to help people escape from the speed of everyday life. The job of design is to help celebrate cherished moments of pause, which are increasingly lost to the on-demand nature of society. Striving for a perfectly planned experience eliminates the magic of chance — the chance to see an old friend or stumble onto a new treat. Public spaces are actually better when there is a bit of friction.

# Part 1



## Creating More Open Space



### Key Goals

- 1 Reclaim street space for people
- 2 Make the most of new parks, plazas, and open spaces

The shores of Lake Ontario have been outdoor gathering places for centuries. The indigenous communities that first inhabited these lands treated the shoreline and the water itself as integral to their daily lives.

As Toronto has grown into a metropolitan area of six million people<sup>8</sup> with a dense urban core, the desire for abundant public space has remained constant. Toronto has done a lot to preserve access to the water and waterfront space amidst this growth, leading to iconic public spaces like the Islands, new parks like Sugar Beach and Corktown Common, and the ravine network. But in parts of the city, including the downtown core, the provision of open space per capita has shrunk dramatically in the past 10 years with the rise of new residential developments.<sup>9</sup>

According to Toronto's Parkland Strategy, the city's standardized tool for measuring park supply, per capita park space has fallen across the city. In pre-amalgamation Toronto and East York, where it

was already scarcest by far, park space declined from roughly 25 square metres per person to 21 square metres from 2006 to 2016. The city's analysis shows that if Toronto adds the 500,000 people projected by 2032, average downtown park space would decline another 4 to 5 square metres per person, unless new space is created.



The challenge of preserving or expanding public space amidst downtown growth is familiar to high-demand cities around the world. To help address it, Sidewalk Labs proposes a new approach to street design that would reclaim space for people, and new physical and digital innovations that would help maximize public space in dense neighbourhoods.

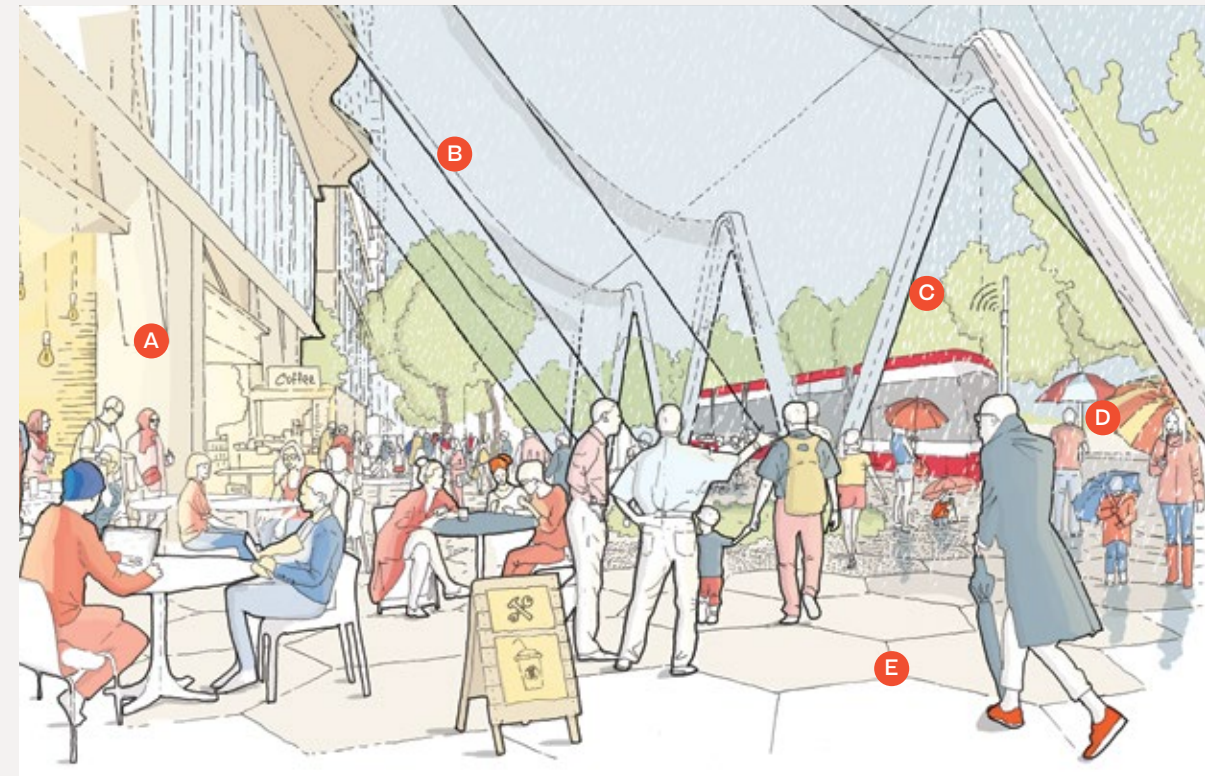
# Lively streets past and future

Yonge Street – 1902



A celebration on Yonge Street circa 1902.<sup>10</sup> Crowds of people mingle under storefront awnings and spill out into the street, surrounding the light rail transit. Cycling had grown in popularity throughout the city in the late 19th century, and a few cyclists can be seen walking their bikes in the foreground of the photo. Credit: City of Toronto Archives

Queens Quay East



A hypothetical afternoon on Queens Quay East. By then, streets in Quayside could resemble those designed in the pre-automobile era, which provide room for all travel modes.

- A Indoor-outdoor space
- B Building Raincoats
- C Dramatic increase in greenery
- D Dedicated bike lanes
- E Below-ground smart utilities



Creating More Space

# Reclaim street space for people

The term “public realm” can conjure up images of a leafy green park. But streets are the type of public space that people use most often in cities, acting as the spines of a connected public realm network. In Toronto, roughly 27 percent of space is devoted to the street network (approximately 5,617 kilometres),<sup>11</sup> while only about 13 percent of space (approximately 8,000 hectares) is devoted to parks.<sup>12</sup>

As in most major North American cities, many streets in Toronto were planned or retrofitted with the private vehicle as the priority. They have narrow sidewalks and rigid crosswalks, making pedestrians feel like second-class street users. Cars parked at the curb take up space that might otherwise be used for trees, bikes, or street furniture. Parents with strollers, elderly people using canes, and people using wheelchairs often struggle to navigate cracked pavement or slippery winter sidewalks. Loud utility work ties up streets for days. There is no easy way to transform a street into true public space.

Toronto has been a leader in progressive street design, including innovative “complete streets” and “green streets” policies. For example, Waterfront Toronto’s revitalization of Queens Quay West turned a previously scant sidewalk into a generous promenade and bike path now used by thousands of people daily.<sup>13</sup> But only select streets realize these ambitious policies. The Sidewalk Toronto project offers an opportunity to advance the city’s

vision and demonstrate what is possible when such policies are integrated into the foundation of the neighbourhood from the outset.

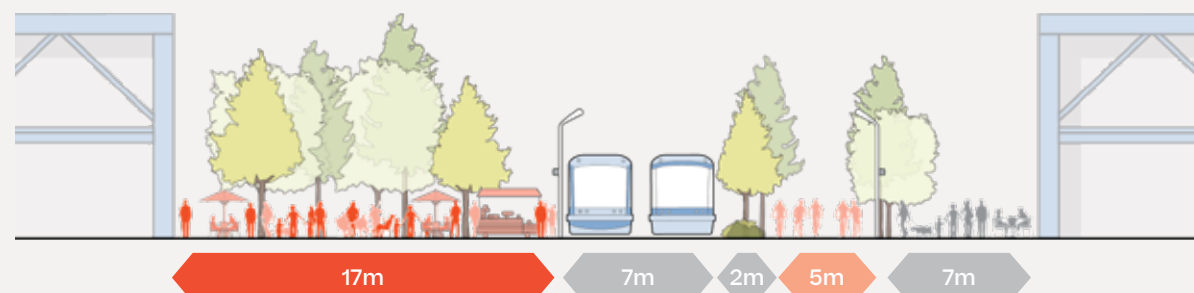
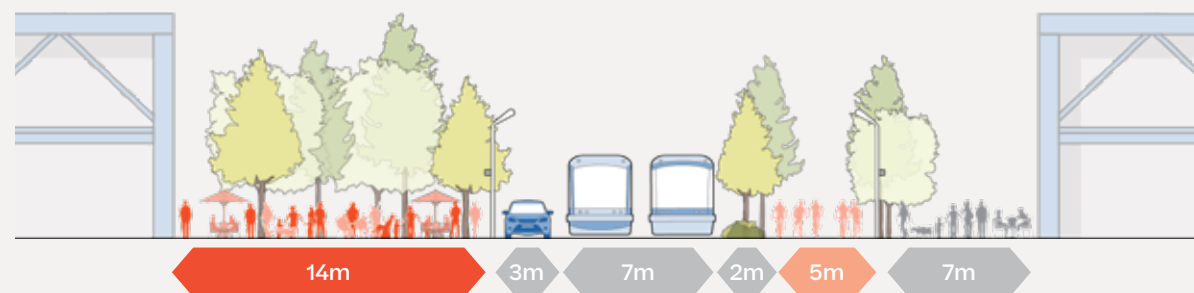
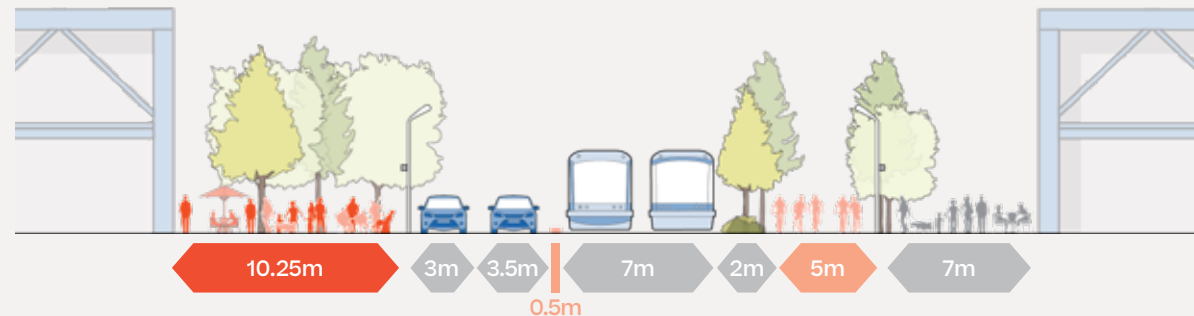
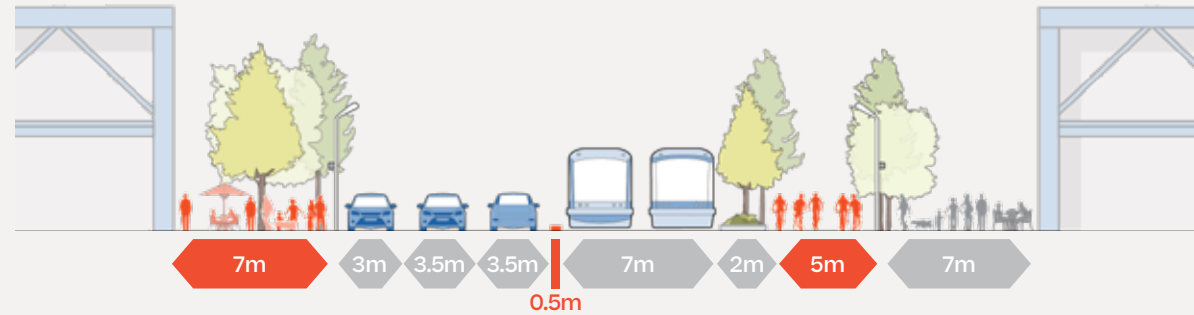
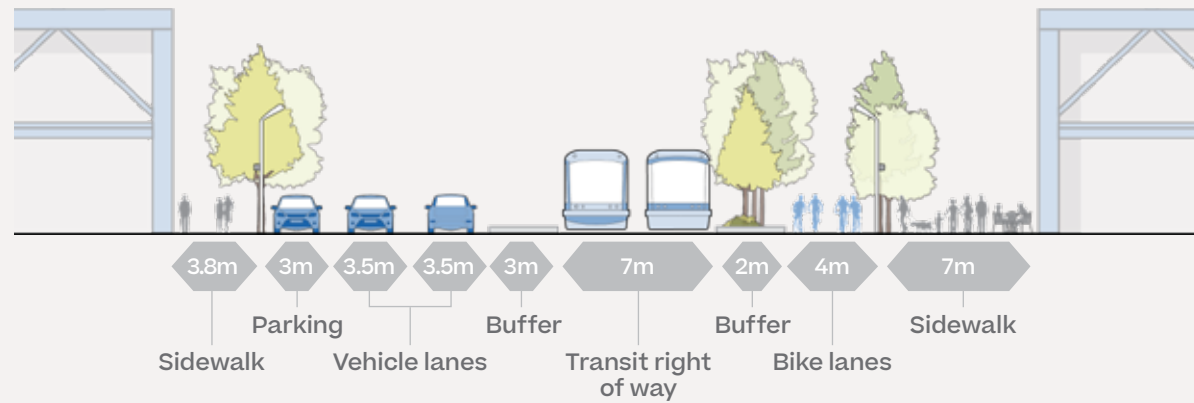
Building on new street designs emerging across the city, Sidewalk Labs plans to reclaim city streets for people, turning streets into lush environments that are truly integrated with parks, plazas, and the water — creating a vibrant, safe network of open spaces for everyone.

By designing streets around a comprehensive mobility system that prioritizes shared (and eventually self-driving) vehicles, Sidewalk Labs could dramatically shrink the amount of street space needed for parking or vehicle travel, while still enabling people to get around the city conveniently and affordably. And by implementing more flexible and resilient pavement and green infrastructure, Sidewalk Labs could advance the aims of complete and green streets policies.

On boulevards in a neighbourhood like Quayside or elsewhere in the IDEA District, this approach would enable street design to include up to 91 percent more space devoted to people and room for nearly twice as many trees compared to the existing precinct plans for Quayside, creating a new norm where space to play and linger is right outside everyone’s door.

**A vibrant and safe network of open spaces can be created by reclaiming street space from parking and vehicles.**

# Four street design innovations that together create at least 91% more pedestrian space



Through a series of measures, Sidewalk Labs plans to capture the potential upside of a shift towards ride-hail and self-driving vehicle services to create more space for people and nature.<sup>14</sup>

Applied in Quayside, the impact of these measures would stretch across all streets, but they would be most visible on Queens Quay — a busy 38-metre boulevard that is typical of most major cities, with all forms of transit and street life.

**1** Narrowing lanes and buffers. Achieving this new balance starts by narrowing the width of vehicular lanes and reducing the adjacent buffer space.

Wide lanes and buffers are planned into boulevards designed for cars travelling at fast speeds, but by prioritizing public transit, cycling, and walking, it is natural to strip back vehicular maneuvering space. European streets are already planned this way, prompting drivers to travel slower and exercise caution, while leaving more space for more sustainable travel modes. With widespread adoption of self-driving vehicles, streets with narrow lanes and buffer areas would become even more safe, because self-driving vehicles would be even more reliable drivers than people are, and could be programmed to stay within a lane's boundaries.

By applying this approach to Queens Quay East, it would be possible to safely reduce both vehicular lanes from 3.5 metres to 3.2 metres and to reduce the total amount of buffer space by 3.5 metres. With this newly created space, a bike lane could be increased by 25 percent and pedestrian space could be increased by 28 percent, over a business-as-usual scenario.

**2** Reducing vehicle lanes. Next, it is possible to regain space by reducing the number of lanes devoted to vehicle traffic.

This design is enabled by reductions in private vehicle travel that would result from public transit expansions, improved cycling infrastructure, and new mobility options, such as ride-hail services that would eventually become self-driving vehicles. A coordinated mobility system that routes drivers (or self-driving vehicles) around heavy-traffic areas would also support this design shift.

By applying this approach to Queens Quay East, it could be possible to reduce a vehicle lane over time, leading to a cumulative 57 percent increase in pedestrian space over a business-as-usual scenario.

**3** Sharing rights-of-way. Lastly, Sidewalk Labs plans to encourage the sharing of rights-of-way among public transit vehicles (such as light-rail vehicles) and self-driving vehicles, once those become ubiquitous.

While sharing lanes today usually results in slower transit times because cars travel at variable speeds and may get into collisions, Sidewalk Labs is studying the potential for self-driving vehicles to share the right-of-way without hindering transit efficiency. This approach would become possible because self-driving cars could be programmed to travel at the same consistent speed as a public transit vehicle and stay in a narrow lane. These capabilities would support the priority of public transit and keep service flowing smoothly, while freeing up additional space for pedestrians.

Applied to Queens Quay East, the ability to have public transit share a right-of-way with self-driving vehicles would enable the closure of another vehicular lane, leading to a cumulative 91 percent increase in pedestrian space over business as usual.

**4** Eliminating curbside parking. Additional, temporary space gains could come through the ability to eliminate fixed curbside parking and replace it with flexible drop-off and pick-up zones that would be actively managed throughout the day — a concept called the “dynamic curb” that is fully compliant with the Accessibility for Ontarians with Disabilities Act (AODA).

Shared or self-driving vehicles help make this design possible, since they move immediately from one passenger to the next without needing to wait for long periods at the curb. To further discourage standing vehicles and reduce traffic congestion, Sidewalk Labs proposes to apply curbside pricing.

Applied on Queens Quay East, 3 metres of width would be reserved for flexible pick-up and drop-off zones. As demand for pick-up and drop-off declines based on time of day, those spaces could be individually reprogrammed as expansions of the sidewalk for uses like more café tables during lunch. When a space is open for pedestrians, it would be clearly marked as unavailable for vehicles through digital signage, lighting, and movable street furniture arranged to form a physical barrier.

When all dynamic curb spaces are open to pedestrians, which would occur during very low pick-up and drop-off periods (such as late evening), there would be a 118 percent increase in pedestrian space over a business-as-usual scenario.



See the “Mobility” chapter of Volume 2, on Page 22, for more information on pricing.



New Road in Brighton & Hove on the South coast of England was converted to the U.K.'s first shared street in 2007. The street was redesigned as a flat surface without curbs or crossings, giving pedestrians priority over other types of transit. Credit: Gehl

#### Going curbless.

To facilitate the expansion and contraction of public space throughout the day, Sidewalk Labs proposes to design a fully curbless street. Unlike a typical street with a hard curb separating street from sidewalk, the entire street would be at one consistent grade, enabling the sidewalk to grow or shrink quickly and easily.

The notion of a curbless street builds on a design innovation used for years by Europeans, particularly the Dutch. A curbless street is shared by pedestrians, cyclists, and slow-moving vehicles. Though it may seem counterintuitive at first, much like narrower lanes, this shared-streets design has been found to increase safety, because it forces drivers to be hyper-vigilant at very low speeds. There is growing global momentum around shared streets, with popularity growing in Toronto, where the first shared street opened in 2015 in the West Don Lands, shortly followed by a revamped Market Street in the St. Lawrence neighbourhood.<sup>15</sup>

Ensuring these streets remain inviting for people who are visually impaired is essential and could be accomplished through responsive sounds and tactile pavement.

A curbless street enables the quick and easy expansion and contraction of public space throughout the day.

# Adaptable streets in action: Future evolution of Queens Quay



**At 8 a.m., this dynamic curb space could open to vehicles dropping off commuters at work.**



**After 8 p.m., as commuter traffic slows, select pick-up and drop-off zones could be used for mobile food pop-ups or movie screenings.**

A future Queens Quay could have **95 trees per hectare** almost doubling the number of trees relative to Queens Quay West today.



See the “Sustainability” chapter of Volume 2, on Page 296, for more details on stormwater management.

## Thinking of streets as parks: Programmed and green

Taking full advantage of curbless streets and expanded sidewalks means thinking of streets more as parks — deserving of their own programming and flush with greenery. As more cities push to reimagine streets for public uses, this approach can be emulated on wide boulevards as well as smaller local streets.

Queens Quay West significantly advanced the design of tree-rich urban boulevards in Toronto and North America. In Quay-side, on Queens Quay East, Sidewalk Labs proposes to advance this goal even further and demonstrate a world-leading model for greening a major boulevard. Over time, the result would be a roughly 5,486-square-metre linear park in Quay-side, with movable tables and seats set beneath clusters of trees.

For Queens Quay East, Sidewalk Labs is proposing a forest model successional planting strategy, where a mix of understory and canopy species are clustered together and share soil in large beds. This approach to street-greening would deliver streetscapes that not only feel like parks but create the conditions to support increased biodiversity and improve the resiliency of the urban forest. It would also result in more apartments and offices having sightlines to green space than comparable downtown areas.

Additionally, all of these trees would have the 30-cubic-metre soil volume set out in the Toronto Green Standard, resulting in healthier trees.

In addition to these ecological benefits, on Queens Quay East in 2025, it would be possible to plant trees at a concentration of 59 trees per hectare, a 20 percent increase over the concentration of 49 trees per hectare achieved on Queens Quay West today. In a future Queens Quay East, when vehicle lanes could be closed thanks to self-driving vehicles and additional trees could be planted, it would be possible to achieve 95 trees per hectare,<sup>16</sup> almost doubling the number of trees relative to Queens Quay West today.

These measures are good for the environment, because a green landscape sequesters carbon, absorbs particulates, helps mitigate the urban heat island effect, and reduces the risk of flooding.<sup>17</sup> Green infrastructure in streets is also a key component of advanced approaches to stormwater management that design cities in concert with nature. [\[1\]](#)

Extensive behavioural evidence has found that greenery promotes the health and happiness of residents and workers more generally.<sup>18</sup> For example, a 2015 study of Toronto found that having just 10 more trees on a block was comparable, on average, to being seven years younger in terms of self-reported health outcomes, controlling for other socio-economic factors.<sup>19</sup>

# Heated, lighted, green pavement

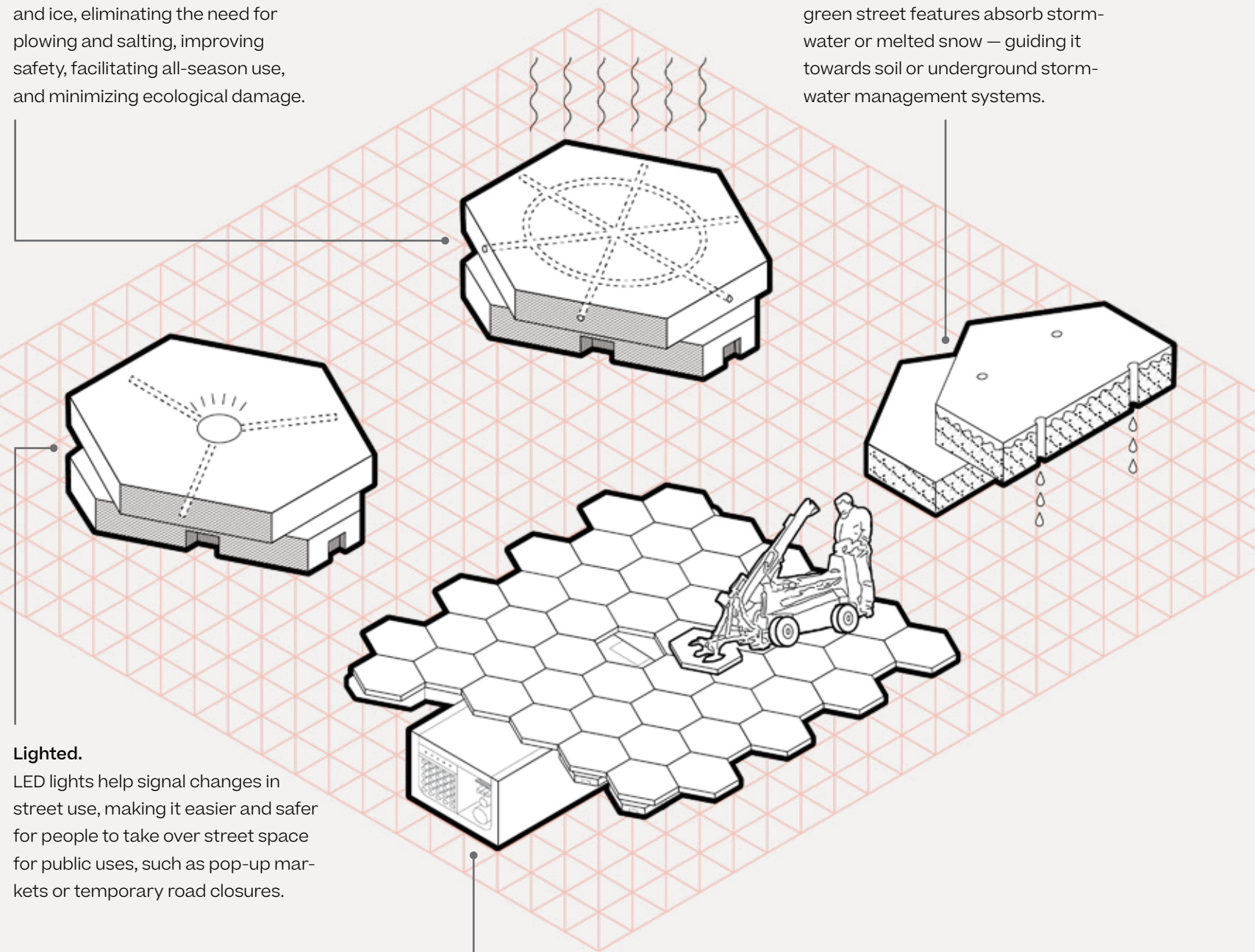
Throughout the MIDP, there are a number of references to advanced pavement capabilities, such as heating, lighting, and permeability. Sidewalk Labs proposes to bake all these facets into its modular pavement, forming an ambitious pavement combination that has not yet been achieved.

## Heated.

Heating capabilities clear snow and ice, eliminating the need for plowing and salting, improving safety, facilitating all-season use, and minimizing ecological damage.

## Green.

Permeable pavement and other green street features absorb storm-water or melted snow — guiding it towards soil or underground storm-water management systems.



## Lighted.

LED lights help signal changes in street use, making it easier and safer for people to take over street space for public uses, such as pop-up markets or temporary road closures.

Modular pavement and open access channels could work as a pair to increase the ease of utility work.

**Modular pavers could be easily removed or replaced in less than half a day.**

## Deploying modular pavement to facilitate utility access and street repairs

Reclaiming streets for people involves more than just filling space left over by vehicles. It also requires reconsidering how streets are paved, and the role that streets play in providing access to underground utilities.

Traditional streets are constructed with rigid pavement that degrades over time, especially as the street is cut up to repair and install new underground utilities. Utility-related street cuts in Toronto have nearly tripled since 2000,<sup>20</sup> and the city now evaluates more than 50,000 utility work permits annually.<sup>21</sup> Each cut is a time- and cost-intensive endeavour that discourages rapid innovation and investment in new infrastructure, such as fibre-optic cables that have become a basic need for homes and businesses.

To tackle this challenge, Sidewalk Labs plans to implement a modular pavement solution coupled with open access channels consisting of precast concrete sections, enabling streets and the infrastructure they house to evolve as technology changes.

Sidewalk Labs has prototyped this new approach to street design at its Toronto-based office, 307, inspired by a pilot project in Nantes, France, to address disruptive street and utility maintenance in cities. In the mid-2000s, the French Institute of Science and Technology for Transport, Development, and Networks (IFSTTAR) designed a modular paver system, consisting of hexagons that are easy to remove and replace. In IFSTTAR's sys-

tem, one person can perform a standard utility cut in less than half a day using a small hand-operated machine featuring suction cups or levers. After testing at its research facility, IFSTTAR installed pilot streets, including one in Nantes that has endured 10 years of heavy truck traffic while remaining stable and requiring no maintenance.<sup>22</sup>

Building on the Nantes design, Sidewalk Labs has prototyped a modular pavement system consisting of thick concrete slabs with interlocking lap joints that would provide equal or better performance as a traditional road. The sub-base would consist of a bed of granular material specifically engineered as part of the pavement section based on anticipated traffic volumes, vehicle loads, soil sub-grade characteristics, and climate.

Sidewalk Labs recognizes that this new approach to street systems would require changes to existing regulations and operations. In 2019, Sidewalk Labs plans to work with local universities and regulators to refine the prototype and develop a pavement that would work in a Toronto context.

Further, Sidewalk Labs proposes to couple modular pavement with open access channels that provide easy access to utilities. Each channel would be about 1 metre deep by 2 metres wide, with a removable lid built into the modular pavement. These channels would house “dry utilities” distribution, including power, street lighting, and information communications technologies, such as fibre optics. The channels would be fitted with spare conduits (protective tubes for electrical wiring) and would include additional capacity for the expansion of existing utilities or the emergence of new ones.



Modular pavement coupled with open access channels would have a number of important advantages over traditional pavement and buried utility systems.



**Fewer disruptions.**

A conventional utility street cut typically takes a full crew of road workers and trucks several days to remove and restore pavement — a disruptive, noisy process that impacts street life. With modular pavement, an equivalent utility street cut could be made by one person removing and replacing the pavers in less than half a day. The addition of open access channels further reduces the amount of time that would normally be dedicated to trench excavation and backfill, lessening the disruption to businesses, residents, visitors, and traffic. Modular pavement would also eliminate the patching that results from utility work, improving the aesthetic and texture of the street. About 20 percent of the total street surface in Toronto is cut and patched to access underground utilities over a given 30-year period.<sup>23</sup>



**Greater flexibility.**

The inherent flexibility of modular pavers and open access channels would provide greater access for routine maintenance and enable streets to change over time. With conventional pavement and buried utilities, transformations to street and underground infrastructures can be cost-prohibitive, creating a significant barrier to advancements. Sidewalk Labs' proposed system would make infrastructure transformations possible in days at a fraction of the current costs. Suddenly, it becomes fast and affordable to swap out a dozen sidewalk pavers for a community garden, or lay out a new communications infrastructure network with higher performance capabilities.



**Less cracking.**

In 2017, Toronto city staff received requests to fix 214,253 potholes.<sup>24</sup> Cracking in typical roadway pavement tends to occur at the sharp, 90-degree angles of rectangular slabs. Sidewalk Labs' modular pavement prototype has a greater ability to resist wear and tear, because a hexagon's 120-degree angles distribute vehicle weight more evenly than rectangles do, and the smaller dimension of the modular paver allows for subtle movements that reduce cracking overall. Additionally, heating capabilities (described further in the "Mobility" chapter) would reduce damage from the seasonal freeze-and-thaw cycle.



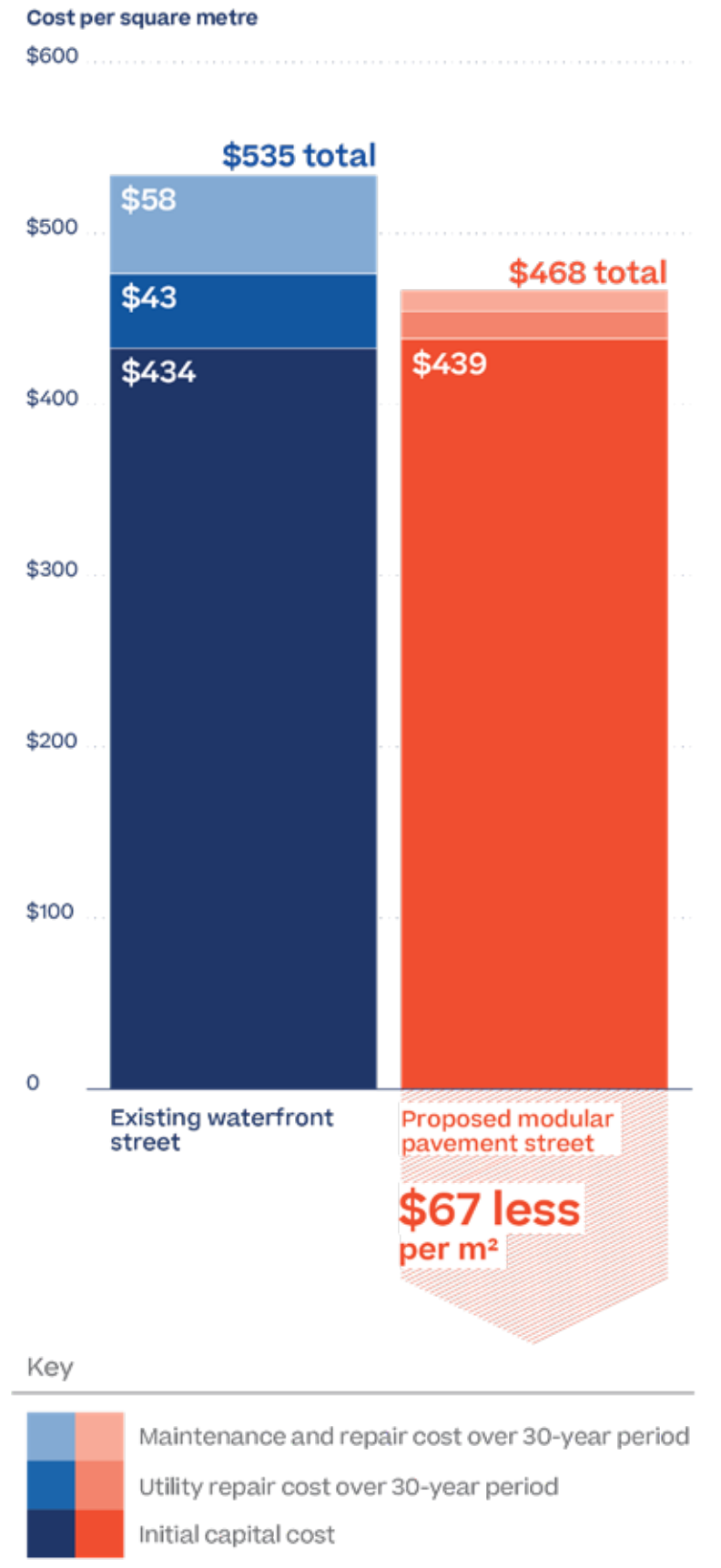
**Lower long-term cost.**

Sidewalk Labs estimates that over a 30-year period — the standard unit of time used to analyze road performance — modular pavement coupled with an open access channel system would be 13 percent less expensive per square metre than the standard waterfront streetscape in Toronto today. Installation costs for pavement construction would be similar, as would the cost of constructing the open access channels (relative to burying utilities). But savings would accrue over time due to significantly lower maintenance and repair costs (\$12 per square metre versus \$58) and the lower cost of utility repair that results from easier access and accelerated road work (\$17 per square metre versus \$43).<sup>25</sup>

**In addition to being less costly to maintain and repair, modular pavement makes it fast and affordable to use street space in new ways.**

**Modular: 13% less costly than standard pavement**

Modular pavement coupled with open access channels can create savings driven by lower maintenance and repair costs, as well as the lower cost of utility repair.





Creating More Space

# Make the most of new parks, plazas, and open spaces

Reclaiming streets for people is a critical step in creating more public space in downtown neighbourhoods, but wider sidewalks are not a replacement for traditional parks, plazas, and open spaces. In fast-growing cities like Toronto, population and market pressures can lead new developments to devote as much space as possible to buildings. That density is critical, but if it comes at the expense of a vibrant network of open space, the quality of life suffers.

Toronto is ahead of the curve in planning a proactive response. The city's Parkland Strategy includes a robust tool for mapping priority areas for new parks, and its 20-year Facilities Master Plan outlines a sound, future-looking strategy for delivering recreation outposts.<sup>26</sup>

Sidewalk Labs plans to build on such efforts to ensure access to high-quality open spaces that meet the needs of a community in two key ways. First, it has developed a **data-driven planning and evaluation tool called "generative design" to identify opportunities for more open spaces that complement a city's existing park network**. Second, Sidewalk Labs plans to embrace multi-use, flexible public space design to deliver parks, plazas, and open spaces that are better able to accommodate the diverse needs of an expanding population.

## Maximizing open spaces using "generative design"

Urban planning involves navigating a series of tradeoffs. For example, achieving one development objective (such as access to sunlight in public spaces) might impact the ability to achieve another (such as building higher for population density).

To help inform that decision-making process, Sidewalk Labs has developed a generative design tool that uses computational design, machine learning, and improved simulations to show urban planners many possible choices and their impacts, often producing surprising results. Planners could then use these insights to evaluate key decisions, with increased confidence in how their plans would play out in real life. They could also use the tool to show stakeholders how their concerns would be represented in a development.

For the Sidewalk Toronto project, Sidewalk Labs plans to use the tool to explore this outcome in areas across the IDEA District, such as Villiers Island.

### Planning for more courtyards.

Villiers Island is already planned to be encircled by one of the world's most extraordinary new parks through the naturalization of the Don River. This 16-hectare park will be a destination for the entire region.<sup>27</sup>

In Villiers East, a new pedestrian-first street network could be designed to create a series of intimate walkways and courtyards.



Because there is so much park space dedicated to the island's perimeter, there are no dedicated parks in the neighbourhood's interior.

Generative design could be used in the Villiers development process to enhance the amount of quality open space in the neighbourhood's interior, while still increasing density and thus important access to housing and jobs. The existing Villiers Precinct Plan contemplates the idea of breaking down the development blocks into series of small buildings with pedestrian courtyards, creating more intimate environments where residents can mingle. As planning proceeds in Villiers, the generative design tool could help evaluate the performance of different courtyard options by running thousands of simulations that weigh factors such as building massing, lighting, and wind.

To test the tool's capabilities, Sidewalk Labs conducted a preliminary study of possible courtyard configurations for a two-by-two block area of Villiers, aiming to optimize for three variables: percentage of open space, sunlight access in the courtyard, and density (gross floor

area). In an initial run, the tool generated and analyzed thousands of permutations and surfaced roughly 400 plans that outperformed the precinct plan on these three specific variables (see Page 142). For example, one scenario (Run #01140) demonstrated the ability to increase open space by 12.6 percent, while still increasing daylight access by 8.6 percent and density by 496,781 square feet.<sup>28</sup>

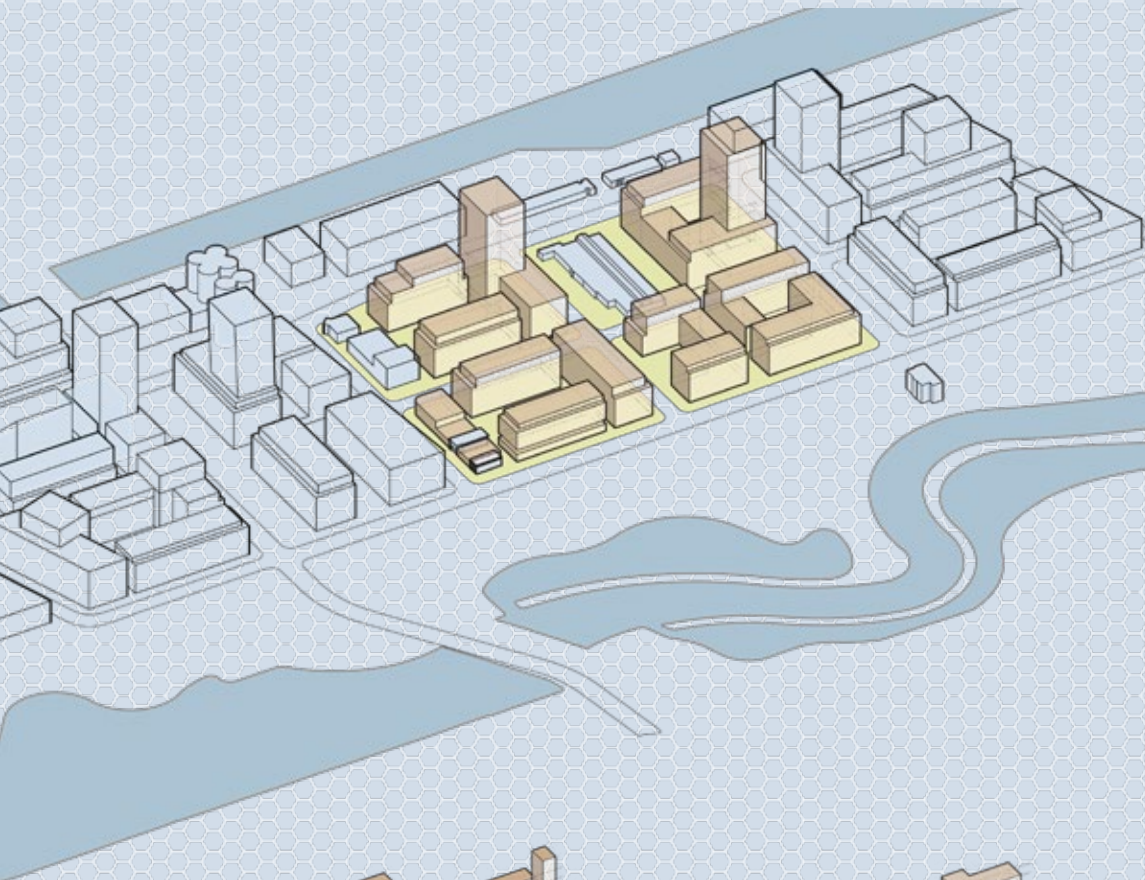
The resulting interior spaces would play an important role in supplementing the city's park network as intimate neighbourhood spaces, each distinct from the other. These spaces would create important pedestrian connections across the island and provide residents and workers with access to open space right outside their door. They could resemble, for example, the open areas that link certain housing blocks in Helsinki, or the alleys and courtyards that link Hutongs in Beijing.<sup>29</sup>

Through applying this planning and evaluation tool across development areas such as Villiers, planners could finesse buildings and street grids to carve out these pocket-sized, quality open spaces, creating forums for community bonding.

**Generative design can help planners:**

- Increase open space
- Increase daylight access
- Increase density

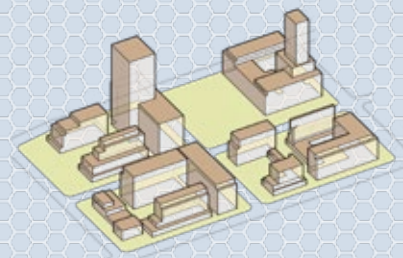
# Helping planners analyze thousands of options



A generative design analysis of a two-by-two block in Villiers Island produced roughly 400 plans (out of thousands of permutations) that outperformed the existing precinct plan on open space, daylight access, and density.

## Precinct plan

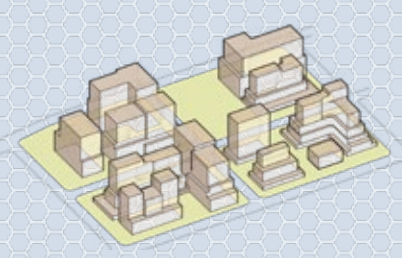
Open space	45.3%
Daylight access	49%
Total GFA	1,513,144 ft <sup>2</sup>



### Generative design #00530

Open space	5.2% increase
Daylight access	13.6% increase
Total GFA	+24,243 ft <sup>2</sup>

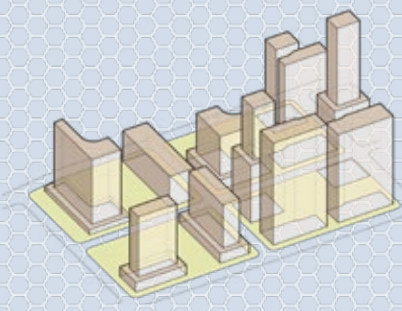
This run was created through making marginal changes to the precinct plan; it has small increases in open space and density, and a large increase in daylight access.



### Generative design #00469

Open space	3.31% increase
Daylight access	20.61% increase
Total GFA	+196,710 ft <sup>2</sup>

This run was created through making moderate changes to the precinct plan; it has a small increase in open space, a medium increase in density, and a large increase in daylight access.



### Generative design #01140

Open space	12.6% increase
Daylight access	8.6% increase
Total GFA	+496,781 ft <sup>2</sup>

This run was created through making significant changes to the precinct plan; it has a medium increase in daylight access, and a large increase in open space and density.

**Flexible open spaces can be quickly reconfigured by day or by season.**

## Designing flexibility into parks, plazas, and water spaces

A generative design tool could help urban planners map out the distribution of open spaces to ensure equitable access across a given development area. Another way to ensure access is to design facilities that are more flexible, enabling them to cater to the widest possible variety of people.

The traditional approach to designing open spaces is to plan them with a fairly prescribed purpose in mind. A swingset here, a baseball diamond there, a basketball court in another corner. Once the space opens, the community is expected to use it in those very specific ways. But such inflexible designs often struggle to meet the diverse needs of a growing population and accommodate evolving preferences.

Like many cities, Toronto built a lot of its parks and recreational facilities decades ago; its average rec centre is nearly 40 years old.<sup>30</sup> Many favourite activities from back then have lost their appeal: the number of youth enrolling in hockey has shrunk, while sports like soccer have become more popular. Demographics have shifted; walking tracks and pickleball courts are now big hits with the city's growing elderly population. New trends and technologies arrive. Community kitchens are all the rage, and Wi-Fi has become a necessity when delivering new public space.

This shift underscores a larger insight: Given the constraints on open land in dense urban cores, it is critical for these types of spaces to be designed in ways that are flexible, and therefore more usable, by more people over time.

To create a network of open spaces that can be shaped and reshaped in response to community needs, Sidewalk Labs plans to infuse its parks, plazas, and water spaces with significant flexibility from the start. Using design practices focused on multi-use spaces and technology advances around movable infrastructure, Sidewalk Labs proposes to create multi-purpose parks that could serve a host of different users, flexible plazas that could be quickly reconfigured by day or by season, and adaptable water spaces that could draw people to the lake year-round.

# Flexible principles such as play features and movable furniture can help maximize the diversity of uses within urban parks.

## Multi-purpose parks.

Cities around the world have started to make better use of their limited park space through multi-purpose design and new technology tools.

The Athletic Exploratorium in Odense, Denmark, has a topography designed to facilitate a multitude of different sporting events.<sup>31</sup> Klyde Warren Park in Dallas brings together diverse residents from across the city and is able to fit a stage, a splash pad, an outdoor reading and games room, a dog run, food, and community art in a 2.1 hectares park on top of a freeway.<sup>32</sup>

Low-cost lighting makes it possible to imagine a single court embedded with lights that could redefine its space for basketball or street hockey at the push of a button.

Sidewalk Labs plans to work with Waterfront Toronto and the City of Toronto to maximize the diversity of uses within urban parks, with a number of flexible principles in mind.



# Designing Silo Park using multi-purpose planning principles

By incorporating flexibility into its foundation, Silo Park can become a lively public space that brings together people of all ages across all seasons.

In Quayside, Sidewalk Labs hopes to work with Waterfront Toronto and Toronto Parks, Forestry, and Recreation to build multi-purpose recreational infrastructure into Silo Park by applying the following principles:

- A** All courts and fields must be designed to accommodate at least three sports in the same space.
- B** All recreational spaces must be designed to be active and accessible year-round.
- C** At least one “play” feature must be incorporated that has activities designed for users of all ages.
- D** At least 90 percent of furniture must be easily movable.
- E** There must be a space for regular food and beverage.

Initially, these principles could inform the approach to Silo Park in Quayside and, based on their success there, potentially be adopted elsewhere.

Campo de' Fiori, in Rome, uses flexible plaza design to shift uses throughout the day. Credit: iStock



### Flexible plazas.

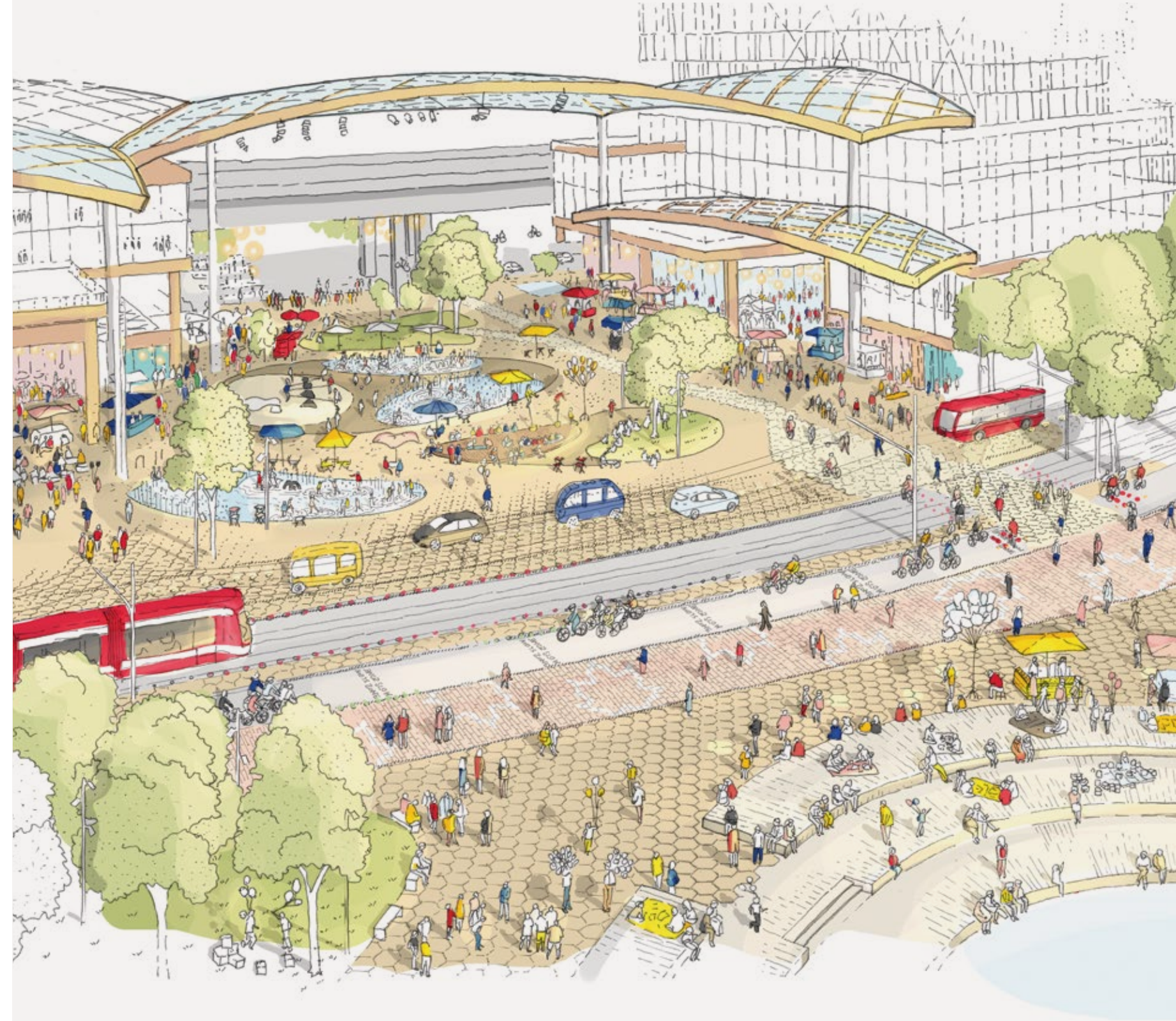
The world's best plazas are naturally flexible, giving the same space many different lives. Often this goal is achieved with simple, lightweight, adjustable street furniture that people can move around to meet their needs. In Utrecht, for example, visitors can “pop-up” a series of benches and other street furniture elements on demand.<sup>33</sup> In Rome, the Campo de' Fiori transforms from market to nightlife destination by shifting around stalls and seating throughout the day.<sup>34</sup>

Drawing from these precedents, Sidewalk Labs plans to design flexible plazas that balance the stability of permanent features with the spaces that are open to ongoing community programming.

For example, in Quayside, Sidewalk Labs plans to design Parliament Plaza with convertible capabilities in mind. On a Saturday in summer, the plaza could be totally flat. Children could play in a splash pad while parents stroll through the markets spilling out from the stoa. In the evening, the splash pad could convert into mist machines that form a public art installation when mixed with movable lighting from a nearby canopy, turning the whole space into an interactive public theatre. In winter, that same flat splash pad surface could be turned into a free skating area.

# Parliament Plaza

At the heart of Quayside, Parliament Plaza would be a flexible space well-suited for markets, public art installations, all-ages play, and events that integrate with surrounding buildings.

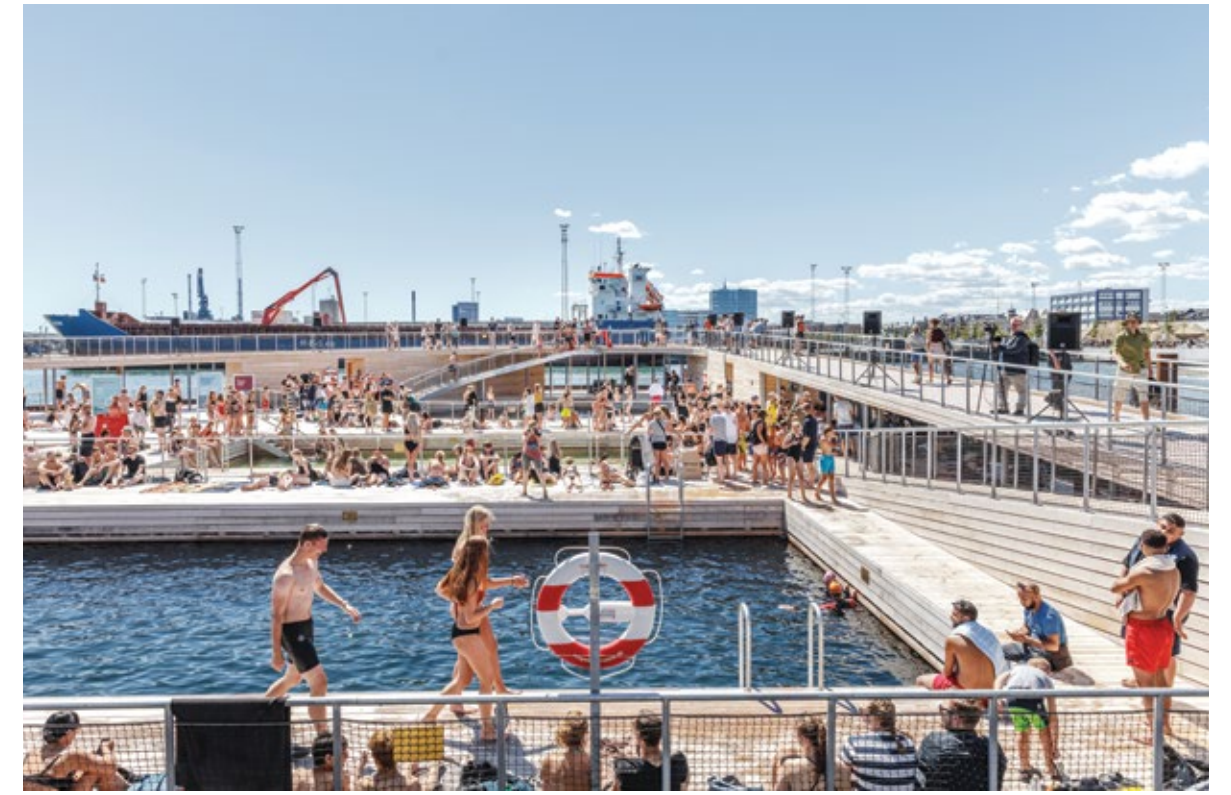


# Parliament Slip

At the 6,000-square-metre Parliament Slip, residents, workers, and visitors could connect directly with the water via a new “cove” feature (Parliament Cove), as well as a stretch of dedicated parkland running along the slip’s eastern edge.



The Islands Brygge Harbour Bath, in Copenhagen, helps to connect people to the water for recreation or travel. Credit: Rasmus Hjortshøj for Bjarke Ingels Group



## Water-bound spaces.

Water-bound spaces often struggle to make room for all the community groups who hope to use the water in different ways, from water rituals to kayaking to fishing to sailing. But many cities have made progress improving the use of their waterfront spaces through a variety of means.

In Toronto, the Port Lands Flood Protection work includes a plan to increase water access through a naturalized Don River mouth. This new park will provide beaches, kayak launches, and wetlands, all features that do not currently exist on the central waterfront today. In Copenhagen, the harbour baths carve out space for lounging and swimming in the middle of downtown; public harbour buses, recreational motor boats, and even bookable floating hot tubs all share the waterway.<sup>35</sup> More than 200 *splavs* — Serbian for “floating lounges” — anchor themselves in Belgrade’s rivers, appealing to a diverse crowd.<sup>36</sup>

Inspired by these precedents, Sidewalk Labs proposes to deploy a series of barges in Lake Ontario that are designed for community water-based programming across the seasons. At Quayside’s Parliament Slip and throughout Keating Channel, a series of five-by-five-metre barges would be designed to accommodate a range of rotating uses: a research field station to study local ecology, a waterfront classroom, food growing on water (a progressive technique known as “aquaponics”), bars and cafés, or more. Every season would present a new programming opportunity for all ages.



# Making Open Space More Usable More of the Time



## Key Goals

1 **Reinvent the role of the ground floor**

2 **Design an outdoor comfort system for all seasons**

Reclaiming street space and maximizing access to parks and plazas is the start of bringing more people together in the public realm. The next step is creating the conditions to ensure that those spaces remain active throughout the day, across the seasons, and over the decades as neighbourhoods evolve.

Promoting vibrant street life is a challenge that continues to vex many cities around the world, including Toronto. The separation of 9-to-5 business districts from the places where people live leaves parts of the city vacant at night, a challenge Toronto is trying to address through its Complete Streets Guidelines. Harsh winters empty out public spaces,<sup>37</sup> and the shift to an online, on-demand economy threatens to uproot the role of ground-floor retail.

To help tackle that challenge, Sidewalk Labs has a two-part strategy that integrates new digital and design capabilities to make public space more usable more of the time.



The first part of the strategy leverages adaptable building structures and flexible leasing tools to create ground-floor spaces that would be far more diverse, active, and inviting than traditional ground-floor retail strips. The second part uses real-time climate data and a set of deployable weather-mitigation fixtures — such as retractable awnings and inflatable shelters — to create an outdoor comfort system that would dramatically expand the amount of time the public realm is usable.



## Goal 1

# Reinvent the role of the ground floor

There is a long history of street-level markets serving as vibrant public spaces. One of the most iconic examples is the agora of Ancient Greece.<sup>38</sup> These central squares were not just places for merchants to sell things, but also civic centres meant for general community engagement. They were framed by covered walkways called “stoa,” where vendors sold goods and the public gathered to debate new ideas — from the Hippocratic Oath, to the Pythagorean Theorem, to the practice of democracy itself.

Modern cities often reserve the ground floor for retail or expansive office lobbies, but those spaces tend to be closed off from the street and built largely for commercial purposes. As a result, the ground floor plays a limited role in promoting street life, and is constrained in its ability to accommodate other community uses.

The past decade has also seen traditional retailers dying off, as the meteoric rise of e-commerce, the rigidity of long-term lease agreements, and soaring rents that incentivize landlords to hold out for high-value chains have led to papered storefronts. The retailers who have performed best amid these shifts are those who recognize that their stores are less about selling things and more about creating memorable experiences.<sup>39</sup>

Toronto’s retail corridors have fared better than retail corridors in other major cities, like New York and London, in part because Canadians have been slower to adopt online shopping, with per capita annual online spending in Canada roughly half that in America (\$2,319 to \$4,552).<sup>40</sup> But Toronto has seen a few high-profile closures, including the 2018 shuttering of Sears Canada.<sup>41</sup> As online shopping continues to grow, the future of brick and mortar remains unknown.

These conditions set the stage for the next evolution of the ground floor: a return to the public markets of an earlier time, blending an assortment of uses from maker spaces to community meeting spots to food stalls, as well as traditional retail stores.

To catalyze this shift, Sidewalk Labs plans to devote its ground floors to a 21st-century stoa structure — with a flexible, bare bones core and shell system that opens to the street, supplemented by a digitally managed leasing and operations platform. These tools would allow a supply of ground floor space to stay in lock-step with the market forces increasingly driving towards experience-based consumption. As in Ancient Greece, the stoa would enable ground floors to be about far more than just selling goods: they would feel like a bustling marketplace that spills onto the street, where people could converge to exchange ideas.

**Ground floors should be about more than retail. They should be forums for civic exchange.**

# Ground-floor space that is activated 33% more time each day

A typical street in Quayside would have a more diverse program mix and more flexible co-tenancy options, leading to three hours more daily activity relative to the weighted average of Toronto street activity today.

**9hrs**

10am - 7pm

Average street activity today across destination, local, and downtown streets

**12hrs**

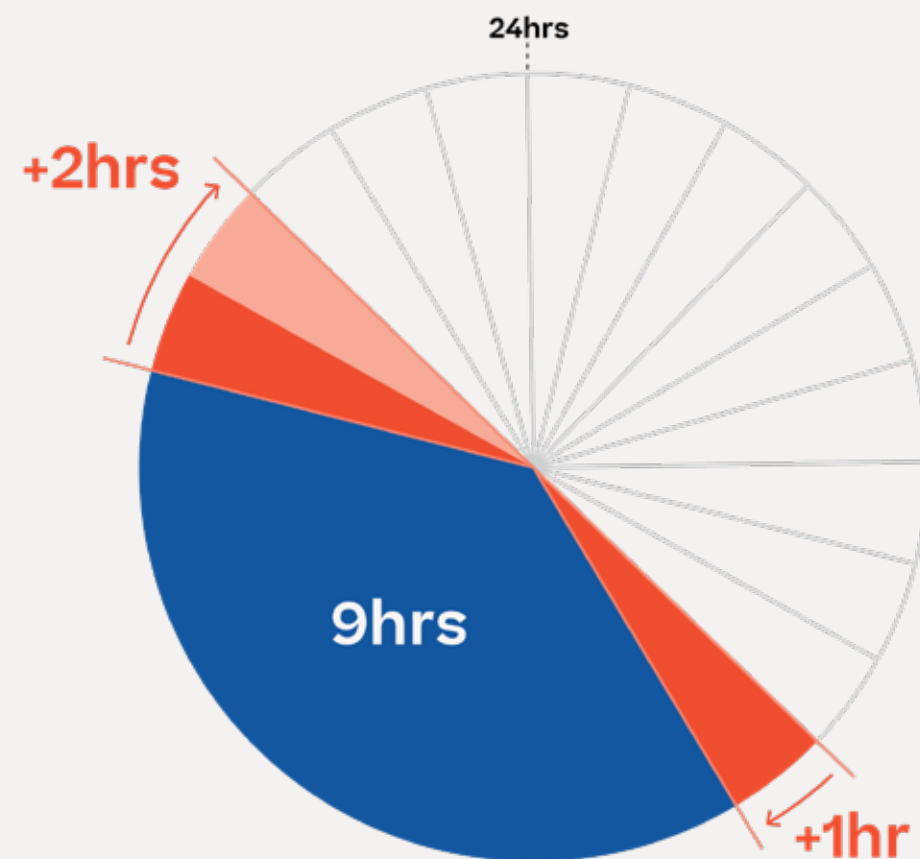
9am - 9pm

Average street activity for the Sidewalk Toronto project

**+33%**

More street activity

\* A street is considered active when one-third of businesses or more are open.



Diverse program mix



Quayside's stoa space is designed to accommodate a more diverse program than ground-floor spaces on typical downtown, local, and destination streets elsewhere in Toronto, enabling an ongoing mix of traditional retailers, pop-ups, community spaces, light production, and other uses.

Co-tenancy options



Tenants with complementary opening hours (such as a retailer and a bar) would be able to share a lease, and Sidewalk Labs estimates that 20 percent of tenants would use this co-tenancy option, extending the projected street activity even more. Stoa naturally encourages the sharing of space by different types of tenants, and co-tenancy would be further encouraged through Sidewalk Labs' proposed digital leasing and operations platform.

At the neighbourhood scale of Quayside, the planned diverse mix of ground-floor tenants would help expand the amount of time the street is active by two hours a day, relative to other Toronto retail corridors. In addition, a new digital platform designed to encourage co-tenancy and use of space during off-peak hours could increase activity by an additional hour a day. Together these advances would produce a 33 percent increase in the amount of time the street is active.<sup>42</sup>

At a greater development scale across the IDEA District, ground floors could become diverse micro-neighbourhoods unto themselves. Keating Channel could become the new heart of an integrated neighbourhood that spans the canal, with both sides brought to life through small retail stalls on the water's edge that could be connected to large, open-air market spaces. Within the heart of Villiers Island, stoa could spill into neighbourhood plazas at key intersections. In old industrial buildings, large caverns could become hubs of activity, from markets to light manufacturing to community services.

Reimagining ground-floor space in this way would bring the public realm that much closer to the goal of getting people to spend more time outdoors together.

## Providing a flexible shell for exploration

Today, most ground floors are constructed to meet the needs of a new tenant that is expected to move in on Day One. If a building is intended for a restaurant, the developer would design the ground floor with servicing for a kitchen and a dining area. If a building is intended for an industrial user, the developer would design a factory floor. The rigidity of these fit-outs means accommodating a new layout in the future may be cost-prohibitive.

Sidewalk Labs small research grant

## The changing face of street-level commerce

In 1970, Toronto pioneered the now-common concept of business improvement districts to revitalize neighbourhood shopping (the Bloor West Village BIA was the first in North America).<sup>43</sup> Today, new trends reshape the urban retail landscape, and Toronto continues to push urban retail innovation. A report by Ryerson University's School of Urban and Regional Planning, commissioned by Sidewalk Labs,<sup>44</sup> pulled out a few of these innovative retail concepts:



Credit: Vince Talotta via Getty Images

### Market 707.

Repurposed shipping containers on the grounds of the Scadding Court Community Centre, filled with pop-up retail concepts, from food vendors to tattoo parlors.<sup>45</sup> First established in 2011, the containers not only offer short-term leases, but Scadding Court also provides wrap-around entrepreneurship programs for first-time business owners.

### The Nooks.

Located on Danforth at Woodbine, the Nooks is an incubator for artisans and producers of hand-made goods. As many as 120 entrepreneurs sell their goods in exchange for a membership fee. Like Market 707, the Nooks also offers business coaching and workshops for its members.

Concepts such as these have key ingredients in common that respond to the realities of urban retailing today: affordable spaces, shorter lease terms, shared services, and entrepreneurial supports.



# Stoa: Designed to create flexible ground floors

A series of architectural choices enable stoa space to change inexpensively over time, accommodate a range of uses, and support businesses as they grow.



**A** Double-storey ceiling heights create sufficient vertical space for a variety of interior uses.

**B** Spacious column bays make it easier to subdivide the same space for new uses.

**C** Deconstructable partitions (50 percent of walls) are designed for faster renovations, reducing vacancy times.

**D** Utilities wired through flexible baseboards — instead of being embedded into walls — enable flexible walls to be moved or removed with far less demolition work.

**E** Retractable facades open to the outdoors for all-season programming.

**F** Building Raincoats protect sidewalks adjacent to stoa spaces in from rain or snow.

**G** Movable kiosks can be easily moved outside for a livelier market experience.

**H** Exposed timber walls support the greater integration of nature into the urban environment.

**I** Modular ceiling grids, with lighting and AV plug-ins, further support accelerated renovation.

To address this challenge, stoa would be built with a flexible interior to easily allow for a wide array of reconfigurations. The structural bones of stoa would consist of an open floor plate with high ceiling height and spacious column bays, offering a shell in which tenants can experiment with a variety of layouts and store concepts using a new system of flexible interior walls. Designed with “plug and play” utility connections that make mechanical, plumbing, and electrical systems far more versatile, these walls would enable operators to safely renovate interiors much faster than usual. In addition, the ceiling would host a modular grid that would allow for easy lighting and audio-visual customization. The finishings could be warm and neutral — for example, a polished concrete floor and an exposed timber structure — providing a durable framework for each tenant’s fit out.



See the “Buildings and Housing” chapter of Volume 2, on Page 202, for more details on adaptable buildings.

At key locations, the stoa would have double-height ceilings and retractable facades that could be opened to the outdoors, enabling them to be populated with stalls that could be moved outside to act as kiosks for a true market experience.

In practice, these features mean that the stoa could, with relatively minimal intervention, support uses ranging from a grocery store with broad aisles to a small network of art studios. Similarly, a 10-person startup could rent out a small, shared temporary space within the stoa, then take over larger and larger spaces as it balloons to 100 people, rather than having to endure the cost of relocating.

Of course, some fit-outs — like creating a commercial kitchen, which requires unique servicing — would still be challenging. But Sidewalk Labs estimates that costs associated with structural and mechanical elements of renovation, such as moving walls and electrical wiring, would decline by roughly 50 percent. So if it would typically take a landlord \$40 per square foot to conduct these aspects of a renovation, it would instead only take \$20 per square foot.

In addition, tenants who choose to take full advantage of Sidewalk Labs’ prefabricated components and finishings could reap additional cost savings.

## Stoa can support a range of uses, from a grocery store with broad aisles to a small network of art studios.

## Enabling an all-day ground floor

Stoa's flexible physical and digital infrastructure enables ground-floor space to evolve over time: from day to night, across seasons, and over long-term economic cycles.

### Day to night.

Traditional ground-floor spaces are leased and designed by an individual tenant. If that tenant chooses to stay open just for five hours at night, street life suffers for the rest of the day.

Many developers and planners strive for roughly 18 hours of street life, but they struggle to find tenants to help them realize this ambition.

A fleet of startups are starting to show how tenants with different peak hours can more effectively share spaces. In Toronto, Flexday converts restaurants into co-working spaces during the morning and early afternoon, before dinner prep commences.<sup>46</sup>

Sidewalk Labs proposes to make this type of sharing easier through a digital leasing and operations service (see Page 164), which would help to co-locate symbiotic businesses or organizations that have different service hours, such as a retail space and a coffee shop.

### Season to season.

Business demand and community needs often fluctuate seasonally.<sup>47</sup> Large, garage door-style systems in some stoa spaces would make it easy to move stalls out into open spaces, helping tenants stay active over the course of the year, and blend into bustling street life.

Along these indoor-outdoor spaces, retractable canopies and deployable building “Raincoats” attached to facades would enable stoa to be open-air in warmer months (see Page 170 for more details). In cooler months, building Raincoats would help protect stoa from rain, snow, and wind, in response to real-time weather data. These weather-protection capabilities would make it easy for stoa spaces to change uses to fit the temperature. For example, the stoa could play host to an open-air cinema during the summer and close off to become a space for students to study in the winter.

### Long-term.

While buildings can be built to last centuries, the industries and uses that dominate the ground floor tend to shift over decade-long cycles. The rise of e-commerce is accelerating these natural fluctuations, even transforming sectors that are typically known for their stability, like grocery.<sup>48</sup> In today's on-demand world, brands and up-and-coming retailers want flexibility — a brick-and-mortar arrangement as easy to adjust as a website.<sup>49</sup>

Stoa can go where the economy is headed. For example, as stores become less about on-site purchases and more about experience, retailers might opt to ship more items directly from an off-site warehouse to customers' homes. In this scenario, a stoa retail tenant could start with a business-as-usual amount of inventory in store, and scale it back as the store moves towards this new model of commerce.

Similarly, as self-driving vehicles become more common, a two-storey ground-floor car dealership could shrink down to a one-storey showroom, and eventually down to a micro stall for on-demand rentals.

Retractable facades enable stoa to be open-air in warmer months.

**Sidewalk Labs estimates that costs associated with renovation, such as moving walls and electrical wiring, would decline by roughly 50 percent.**

# How stoa enables multiple uses across the same day

The flexibility of the space makes it possible for a morning flower shop to become an evening jazz club.

A flower shop could stay open from 9 a.m. to 5 p.m., before closing to receive a nighttime jazz club.





When the flower market closes, it could go through a quick clean-up and furniture could be shifted around to prepare for opening as a jazz club in the evening.



This same stoa space could be occupied by a jazz club from 7 p.m. to midnight.

## Helping businesses open and grow with a digital platform

Ground-floor tenants increasingly want their physical sites to be as easy to open and evolve as their digital sites. Stoa's structural shell provides a baseline of flexibility. Another key innovation is a digital leasing and operations platform — a concept Sidewalk Labs is calling Seed Space — which would provide services that make it easier for businesses to establish a physical presence, and test out new store concepts in Quayside.

Today, there are lots of barriers to opening up a new physical retail footprint, especially for first timers. In Toronto, a typical commercial lease ranges from five to 10 years, and landlords often do not want to take on the risk of a short-term (or uncredited) tenant.<sup>50</sup> From the tenant perspective, opening a business requires not only locating the right space, but also having the capital to pay for it, finding staff to do everything from check-out to cleaning, and doing enough market research to make smart decisions on questions like branding and hours.<sup>51</sup>

These challenges are magnified for young businesses, like mom-and-pop startups that add character and opportunity to a neighbourhood, as well as online businesses that may want to try out a physical presence without a long-term commitment. But they also affect more established retailers each time they open a new storefront.

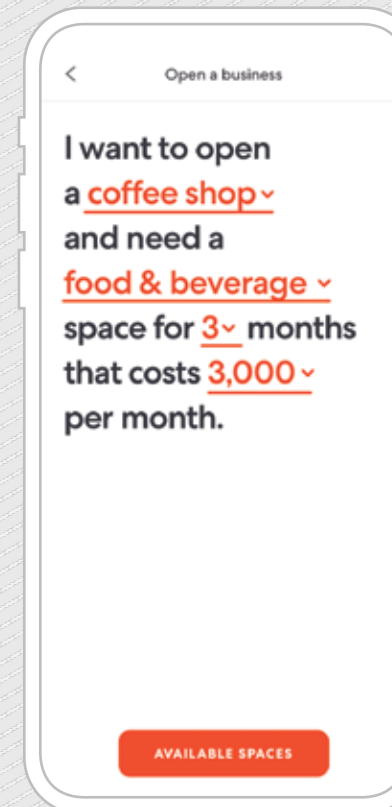
Companies such as Appear Here, Storefront, and Toronto-based UpperCase are helping to de-risk brick and mortar for emerging retailers by providing short-term space commitments, and, in some cases, starting to offer fit-out services and even ongoing operational support. They are also de-risking these short-term spaces by creating online marketplaces that can match property owners to a ready population of potential tenants from around the world.

In Quayside, Sidewalk Labs plans to build on these best-in-class concepts, offering a suite of services ranging from on-demand leasing to help with permitting to opt-in customer analytics.

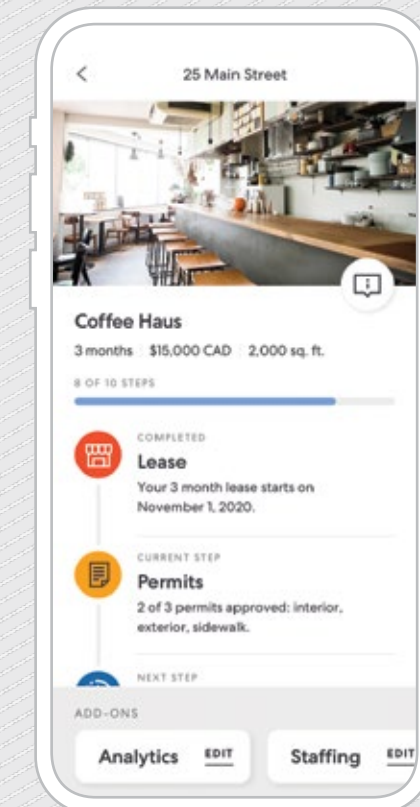
These tools — which are intended to supplement, not replace, brokers — can help tenants by moving some of the big, upfront costs that are normally associated with real estate into more manageable variable costs. For landlords, these innovations provide a marketplace, and reduce short-term space vacancies and downtime between leases. Seed Space services would make it possible for neighbourhoods to keep the street more active, and for landlords to take risks on more dynamic tenants, who might not be equipped or willing to sign up for a five- or 10-year contract.

### Innovation spotlight

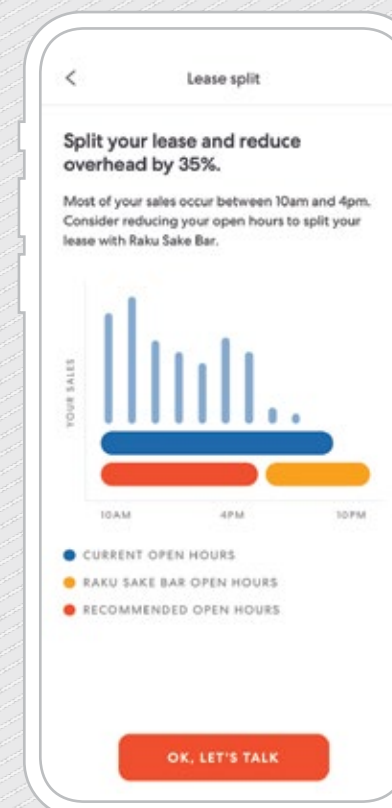
## How Seed Space empowers businesses



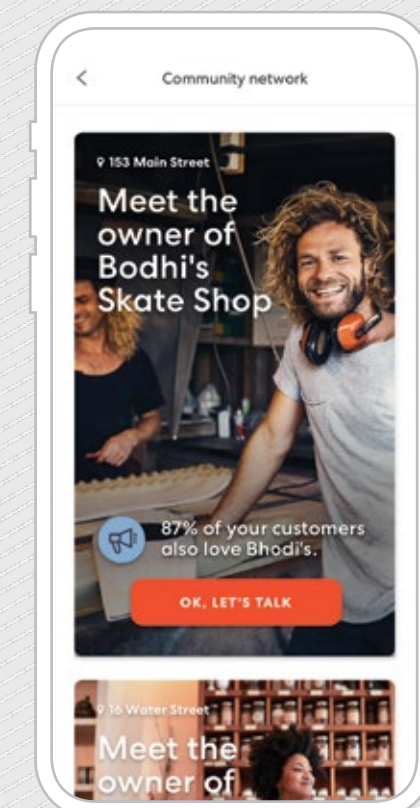
**Flexible leases.** Flexible lease terms and tailored space recommendations would break down barriers to entry and open pathways to low-risk explorations.



**Guided process.** A guided and expedited process would offer full transparency of the necessary steps, with expertise to support planning and management for a space.



**Performance tips.** Adaptable spaces and leases would help merchants maximize space utilization while fostering joint ventures.



**Merchant collectives.** A nurtured network of merchants could bond and unite for better business and neighbour experiences.

## Committing to a diversity of businesses

It is important that businesses of all sizes — and entrepreneurs from underrepresented backgrounds — have the opportunity to partake in the growth process enabled by stoa's flexible structure and the Seed Space platform. Sidewalk Labs plans to ensure this diversity in two ways: an incubator program, and shared equipment and facilities for ground-floor tenants.

# 1

### Small business incubator.

In Quayside, Sidewalk Labs plans to sponsor a small business incubator designed to help those without access to capital open up shop. A pilot of this effort took place during summer of 2018 at Sidewalk Labs' main Toronto office, 307. Sidewalk Labs hosted new Canadian food entrepreneurs who had previously launched their first retail business with support from the Scadding Court Community Centre at Market 707, on the corner of Dundas and Bathurst.<sup>52</sup>

Sidewalk Labs plans to issue a Request for Proposal for partners to help launch and operate this incubator program. That partner would help source, vet, and provide requisite training to entrepreneurs. In turn, as part of the incubator, Sidewalk Labs would reserve a portion of stalls at below-market rents, enabling the cohort to test ideas and sharpen business skills in a low-risk environment.

# 2

### Shared ground-floor facilities.

In Quayside, Sidewalk Labs also plans to leverage shared equipment and facilities to help local makers thrive in three priority sectors: public food markets, experiential arts, and production uses.

To encourage public food markets to participate in the open stoa concept, vendors would have access to a shared commercial kitchen, allowing them to cook food on-site. To encourage the arts, creatives would have access to shared fabrication and digital tools in the Civic and Cultural Assembly, along with affordable spaces to produce and present works, drawing on the tremendous talent in Toronto, including those who have graduated from Artscape Daniels Launchpad, a short walk away at 130 Queens Quay East. And to encourage production uses, stoa would provide shared fabrication equipment and create opportunities for crossover between production and other industries — be it retail, arts and culture, or food and beverage.



Making Open Space  
More Usable More of the Time

## Design an outdoor comfort system for all seasons

Even when the conditions are right to promote a vibrant ground floor, the weather plays a big role in determining how much time people spend outdoors. While the seasons drive the character of public life in Toronto — from summer day trips to the Islands, to fall pumpkin parades across the city — it is no secret that outdoor activity is concentrated in the six-month period from late April through October, when the weather is pleasant.

For centuries, cities have used architecture to moderate the weather and keep public life active on the street. In the late 1800s, as historical photographs show, Toronto was filled with a maze of awnings that extended from storefronts and glass arcades to cover alleyways, providing protection from the sun, snow, and rain.

This approach of mitigating outdoor weather changed in the 20th century, as technologies like central heating and air-conditioning shifted activity indoors to climate-controlled, sealed environments. In Toronto, from November through April, the underground PATH network is the centre of gravity for commuting, and the home is the centre of gravity for social activity. Popular outdoor hangouts like Queen West and Trinity Bellwoods quiet down.

That effect is particularly noticeable on the waterfront, which is uniquely exposed

to chilly winds. Using climate data collected at Billy Bishop Airport and a standard metric called the Universal Thermal Climate Index, Sidewalk Labs calculated that the waterfront is only comfortable, on average, for 30 percent of the year. The rest of the year is either too hot (29 percent), too cold (37 percent), or too wet (4 percent).<sup>53</sup>

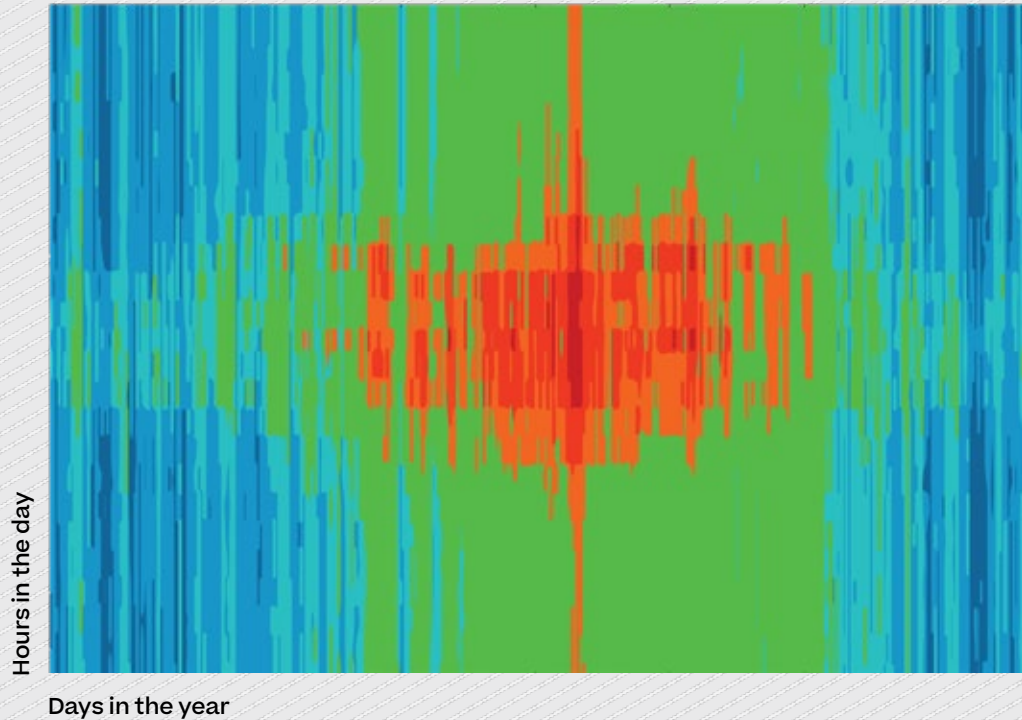
Toronto's waterfront does not have to hibernate, because the capabilities exist to help streets and outdoor space retain their vitality year round. After analyzing climate data and studying how it impacts street grids and buildings, Sidewalk Labs has developed a replicable system of weather-mitigation tools and architectural interventions that could help dramatically increase outdoor comfort. This system would leverage the latest advances in lightweight material technology, and could respond in real time to changing weather.

Systematically applied in Quayside, this approach to weather mitigation would increase the hours it is comfortable to be outdoors by 35 percent, drawing more people into public spaces, together.

Implemented at the full scale of the IDEA District, this approach could go even further, potentially doubling the number of hours it is comfortable to be outdoors each year for key spaces.<sup>54</sup>

# Weather-mitigation tools create 572 more comfortable hours outdoors

**Figure 1.**  
Typical development: Comfortable hours outdoors



**Figure 2.**  
Sidewalk Labs: Comfortable hours outdoors

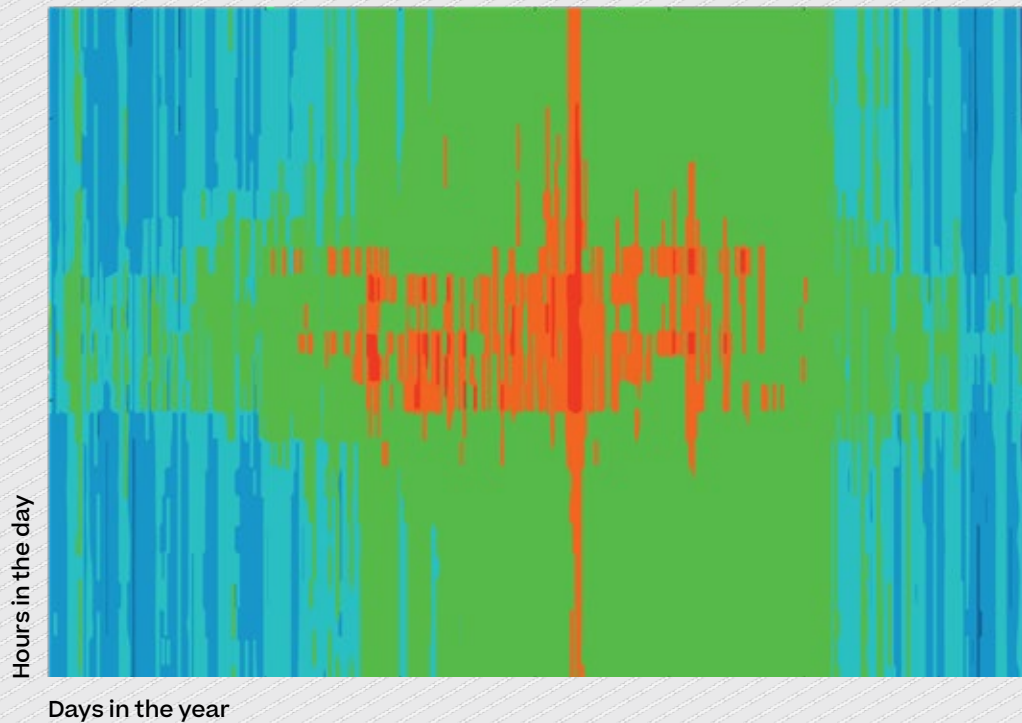
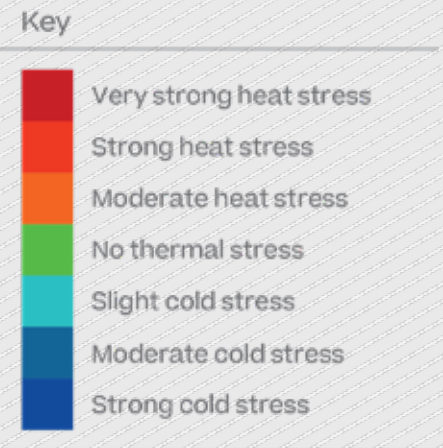


Figure 1 shows baseline outdoor comfort levels for Quayside, based on the Universal Thermal Climate Index. Red areas indicate times when it is uncomfortable to be outside because it is too hot, blue areas show when it is too cold. Green represents times that are comfortable. Because microclimates are complex and dynamic, this methodology focuses on improving comfort in key locations within a neighbourhood, such as pedestrian walkways, plazas, and parks. The metrics in this chart refer to these locations.

Figure 2 shows outdoor comfort levels for Quayside with planned outdoor comfort interventions applied to the neighbourhood site plan. Relative to a typical development on the waterfront, which is comfortable outdoors for 1,653 daylight hours per year, Sidewalk Labs' proposed suite of weather-mitigation tools would make Quayside comfortable for 2,225 hours — an increase of 572 hours, or 35 percent.<sup>55</sup>



This increase would be possible thanks to the impact of optimizing the street grid and building massings over a large area. And because the system's core components are modular, it could be replicated in other areas of the city — or adjusted to different climates in other parts of the world.

## Partnering to develop a data-driven design approach

Designing for outdoor comfort requires studying an area's "microclimate." Microclimate refers to the weather patterns of a very specific geography. In an urban context, that could be down to the level of an individual street or plaza. It looks at factors like sunshine, temperature, humidity, precipitation, and wind chill — all of which are measured on the Universal Thermal Climate Index.

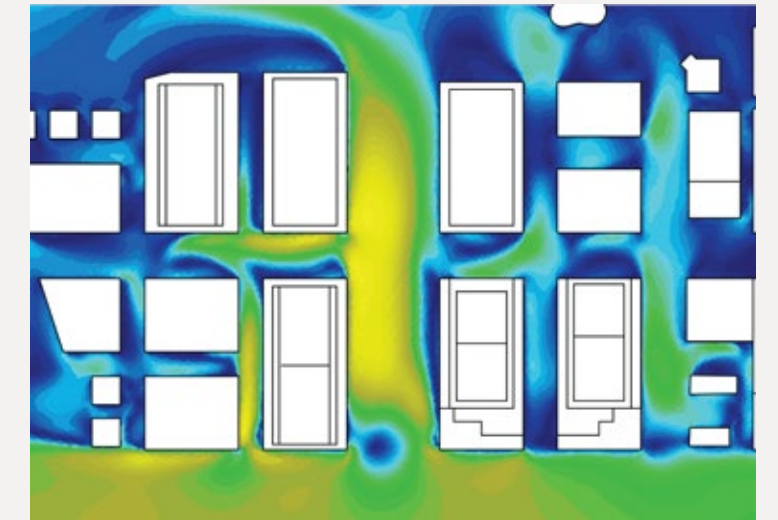
Precision is important when it comes to designing for comfort, because every nook of a city has its own conditions. One street might be in the shade and afflicted by a vicious wind tunnel, whereas the next might be flooded with daylight and have only a pleasant breeze. The difference between these two spaces stems from planning and architecture choices, not inherent qualities of weather patterns.

To create a system that proactively predicts and plans for outdoor comfort, Sidewalk Labs worked in close collaboration with multiple partners. RWDI, a team of Toronto-based climate engineers, ran climate analyses for Quayside and the full IDEA District. They collaborated with PARTISANS, a Toronto architecture firm with expertise in new materials and tensile structures, to help iterate on architectural interventions in response to climate data.

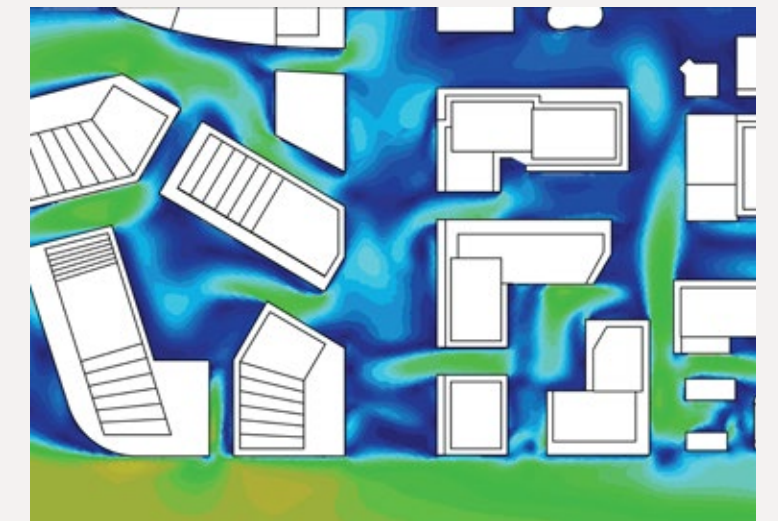
The first step in this joint exercise was to look at the street grid and building masses, and tailor each for wind protection and optimized solar gain. For example, on Cherry Street, adjusting the building facade reduced wind speeds by an average of 35 to 45 percent, and up to 80 percent in certain areas.<sup>56</sup>

# Villiers Island: Adjustments to massing can reduce wind speeds and increase outdoor comfort

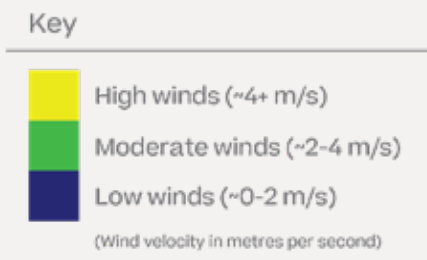
**Precinct plan:**  
Villiers massing and wind speed



**Sidewalk Labs-adjusted:**  
Villiers massing and wind speed



At Cherry Street, creating slanted building facades reduces wind speed. In the top diagram, the yellow areas represent wind tunnels; in the bottom diagram, those tunnels have been eliminated through the facade adjustment.





## Creating a core set of weather interventions: Raincoat, Fanshell, Lantern Forest

Next, to achieve an even higher level of comfort, the partners developed a toolkit to address microclimates in and around common urban environments planned for the waterfront. Three prototypical architectural interventions formed an initial set of tools that designers could adapt and recombine to meet the outdoor comfort targets of a specific site: a Raincoat for the building's edge, a Fanshell for open spaces, and a Lantern Forest for urban canyons (spaces between buildings).

For the Sidewalk Toronto project, these interventions could be installed, managed, and secured through the joint efforts of the ground-floor operator and the Open Space Alliance, a new public realm non-profit entity described on Page 178.

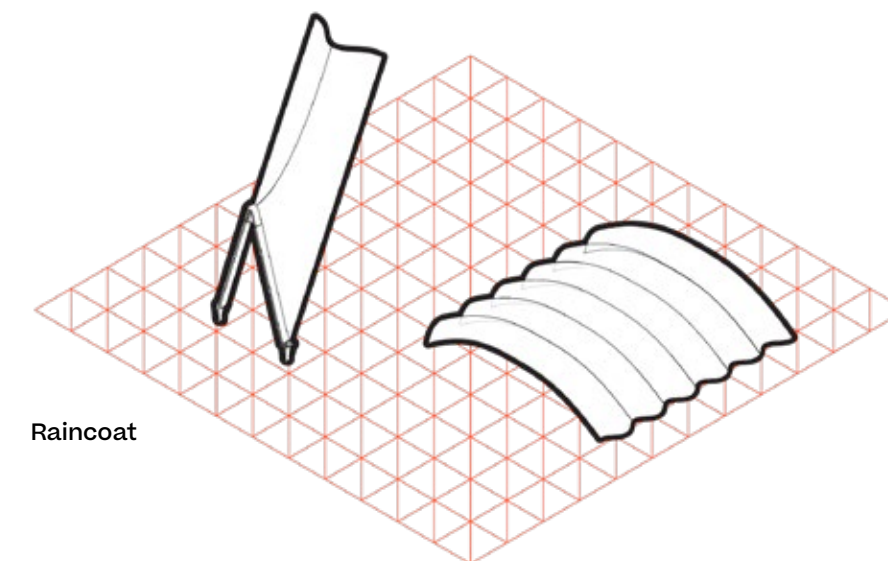
Sidewalk Labs is currently testing these interventions through full-scale prototypes at its Toronto office, 307, which will provide a baseline to evaluate fabrication, installation, maintenance, durability, and comfort performance over the coming months. Design and fabrication partners will provide input on the structure, materials, and costing, and RWDI will measure the comfort performance through the collection of meteorological data around the prototypes.

Sidewalk Labs plans to work with local regulators to ensure AODA compliance for these systems, building on best practices for indicating low clearance zones with tactile cues, and to gain support for pilots in areas where a system (such as the Raincoat) would extend into the right of way.

# The outdoor comfort system would leverage the latest advances in lightweight material technology, and could respond in real time to changing weather.

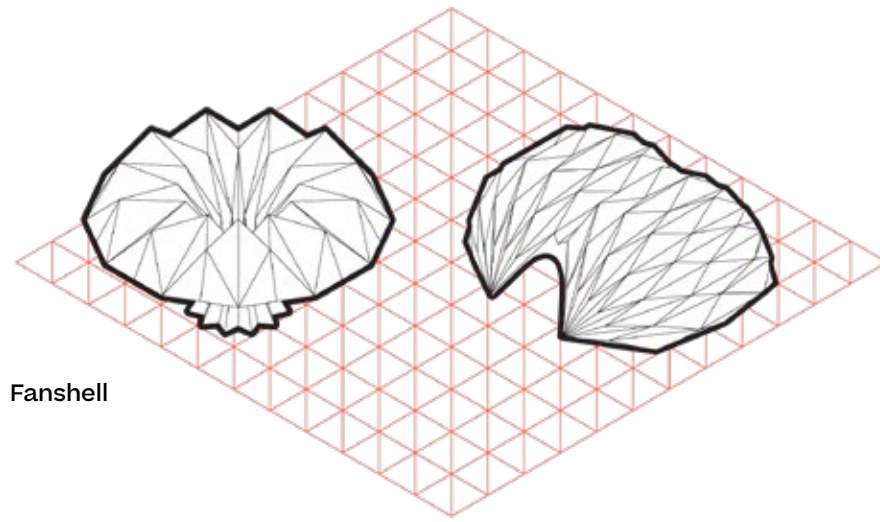


The Raincoat extends a building's edge to protect the sidewalk from rain, wind, and sun.



Raincoat

The Raincoat consists of an adjustable awning or "second skin" that could extend outward from a building's edge to protect the sidewalk from rain, wind, and sun. It could attach to one side of a building and anchor into piles beneath the street pavers, or it could be applied as a retractable canopy, spanning from building to building. In that sense, the Raincoat follows the grand tradition of shop awnings, fixed arcades, colonnades, and other installations that help integrate street life into the ground floor of buildings — albeit with a greater capacity to adjust to outdoor conditions. Unlike awnings, the Raincoat is able to more effectively block wind, and change its transparency to allow in more sunlight on cold days and less on warm days.



Fanshell

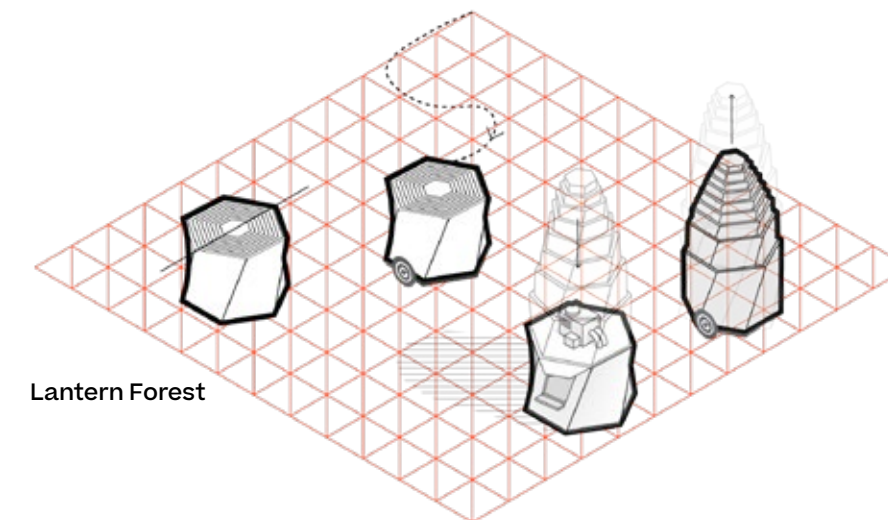
The Fanshell provides open-space coverage for up to 100 people.



The **Fanshell** is a collection of large, temporary urban shelters that could provide outdoor comfort in open spaces, such as Silo Park. The system includes two distinct shelter types: the Shell type, a more enclosed system that protects from wind, rain, and sun, and the Fan type, a more open, umbrella-like covering that protects from sun and rain. Both types cover 80 square metres, can accommodate free-standing heaters, and have the capacity to shelter up to 100 people. Both types also employ an origami-style folded fabric construction, which allows them to achieve wide spans, deploy easily and quickly, and be packed flat and stored more easily than a tent.



The Lantern Forest mitigates wind tunnels that form between buildings.



Lantern Forest

The **Lantern Forest** represents a collection of lightweight, tall, narrow structures that could create shelter from wind when grouped together on the ground (almost like a stand of trees), or when hung together from buildings (like paper lanterns). The Lantern Forest would help address the challenge of wind tunnels that form in the spaces between buildings, often called urban canyons. The structures, which could reach eight metres tall, could be useful in many different conditions: a few Lanterns could be placed along lanes, alleyways, and streets; a flock of Lanterns could be placed in larger open areas. The inside could be inhabited by a few people at once in a variety of ways, from kiosks for vendors to warming stations, and could be secured or collapsed during off hours.



ETFE is a lightweight plastic building material that can adjust its transparency in response to weather patterns. It is becoming increasingly popular for entertainment venues, such as The Shed at Hudson Yards in New York City, which opened in April 2019. Credit: Brett Beyer

**Materials.**

Across the outdoor comfort system, Sidewalk Labs plans to leverage the building material Composite ETFE (Ethylene Tetrafluoroethylene), a durable, highly transparent, lightweight plastic film. ETFE provides transparency without the heavy and expensive structure required to support glass, and is uniquely customizable through printed patterns that can control light and opacity.<sup>57</sup>

ETFE gained popularity as a building material around the turn of the 21st century, and it is now commonly used in venues like sports and entertainment stadia. As its use increased, a panel system of air-filled ETFE cushions was developed to improve energy performance. Each cushion is capable of inflating or deflating on-demand. Depending on how much the cushion is inflated, opaque patterns printed on the film layers align to let in more sun or overlap to block it.

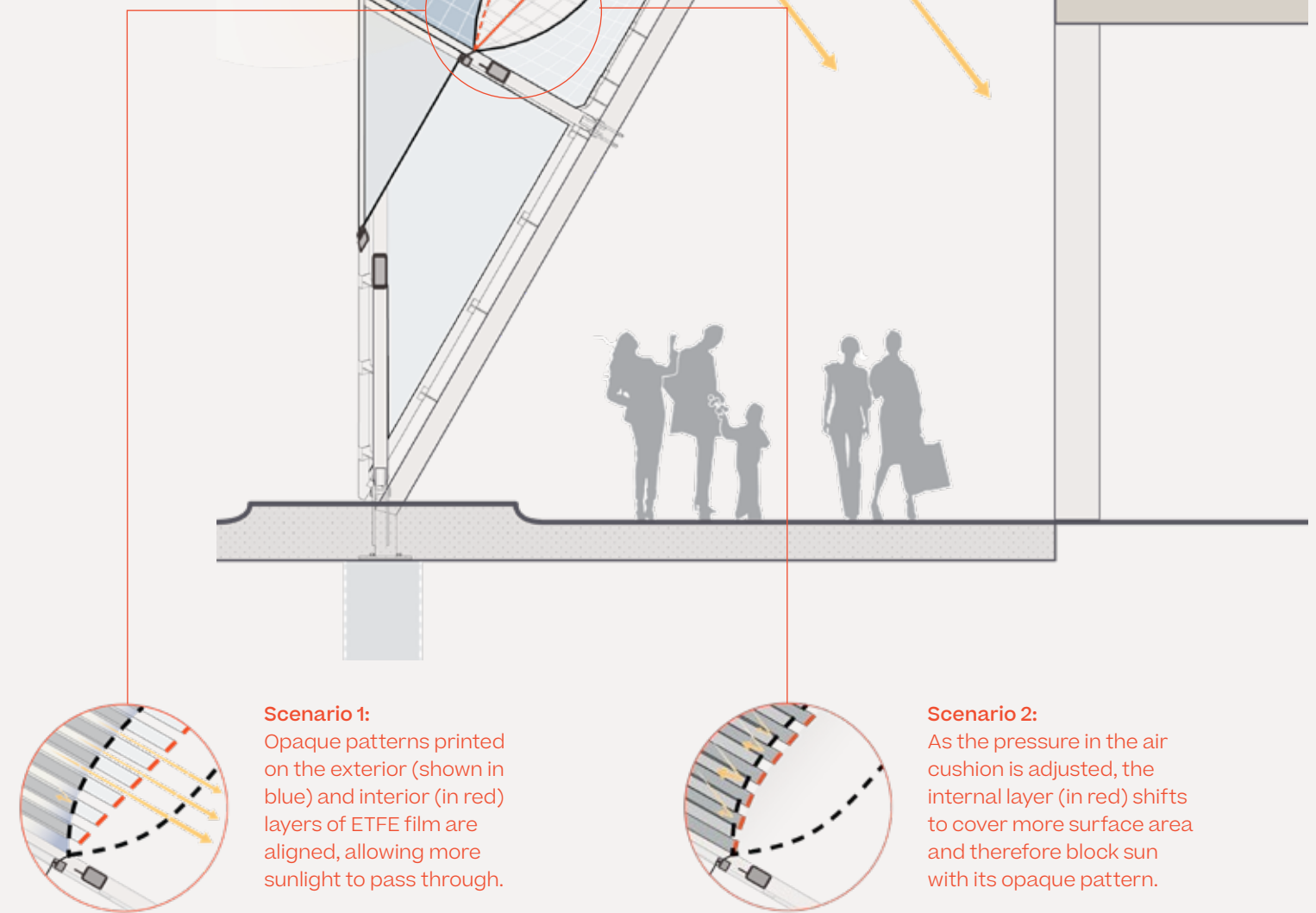
Today, ETFE panels are often applied on one-off projects — such as The Shed in New York City — but they are rarely used systematically as a building material across a neighbourhood. To Sidewalk Labs’ knowledge, the Raincoat prototype at 307 is the first use of ETFE as a building material in Ontario.

Sidewalk Labs estimates that maturing the raincoat technology and installing Raincoats at multiple locations within Quayside would lead to a 71 percent cost reduction per installation (relative to the prototype). There should be an even greater drop in expenses per square foot at the scale of the full IDEA District. This scale also affords a great opportunity to explore diverse architectural expressions.

# How ETFE works

The Raincoat is designed to change its transparency to allow in more sunlight on cold days and less sunlight on warm days. A panel system of air-filled ETFE cushions is capable of inflating or deflating on-demand. Depending on how much each cushion is inflated, opaque patterns printed on the ETFE’s exterior and interior layers align to let in more sun or overlap to block it.

Building Raincoat



### Environmental sensing.

Another key feature of the outdoor comfort system is an embedded network of microclimate measurement instruments, including wind anemometers, thermometers, and sunlight and rain detectors.

Many of these (non-personal) sensors have dropped dramatically in price over the last 10 years, and can now share information digitally rather than through cumbersome manual transfers.<sup>58</sup> While a wind anemometer may not seem innovative, the integration of many local sensors with a predictive and responsive weather-mitigation system is new.

To ensure real-time deployment, these sensors would gather daily data at key distribution points, such as on building rooftops and around Raincoat canopies, and would be capable of communicating live with the comfort system — for example, telling a set of Raincoat canopies to open in advance of rain, or providing instructions for the placement of Lanterns in response to wind patterns. This network could be further enhanced with computational weather-prediction systems to provide an extra layer of resilience and climate responsiveness to neighbourhoods and cities. The ground floor operator could use this data to make decisions regarding frequency of Raincoat deployment, and the Open Space Alliance could play a similar role for Fanshells and Lanterns. [↗](#)

### Deployment.

Each structure in the outdoor comfort system intervention would be light and collapsible. The structures would all be capable of attaching to building facades or plugging into power and data outlets located at grade or on buildings. These features create a system that could be quickly deployed, moved, taken down, and stored. As kinetic technologies and autonomous delivery systems evolve, Sidewalk Labs anticipates that the set-up, take-down, and delivery of these structures could become increasingly automated.

For example, each Lantern would include a mobile base that could serve as a kiosk — similar to those used by street vendors today — as well as a roof structure that could expand to provide wind protection. The roof structures could be placed atop each kiosk, collapsed when the kiosk is moved or stored, and extended upwards to create progressively larger wind breaks when the kiosks are deployed. Alternatively, the Lantern roofs could be hung between two buildings on a catenary wire (included in the design of the street), keeping the ground free until their programming is needed. Some Lanterns could be leased by vendors, while others could be requested for special events.

### Scaling.

The outdoor comfort system's modularity would enable it to accommodate a wide range of community activities and needs.

For example, the Fanshell system is designed to provide large urban canopies that could be reserved and used for things like social events, art installations, and cultural gatherings. The coverage that each Fanshell provides could grow by placing additional Fanshells side-by-side: one Fanshell might be enough to provide shade for a family barbecue, while multiple Fanshells might help an arts organization put on a festival during a rainy spring day. Reservations and requests could be managed through a digital booking system, and two-to-four trained installers could deploy each Fanshell in a matter of hours — making this system much more agile than current rental tents, which require a large crew for setup sometimes a day or more in advance.<sup>59</sup>

### Adaptability.

Each aspect of the system features adaptable materials and components that would respond to microclimate data in different ways.

For example, the Raincoat's ETFE panels have a sensitive exterior cushion that could respond to sunlight by inflating (creating more shade) or deflating (letting in more light). This adaptability would help the Raincoat protect ground-floor space from summer heat; it also would enable the system to transition easily between daytime and nighttime activities, as temperatures and light patterns change. Furthermore, the Raincoat could cover plazas and narrow streets, providing on-demand shelter for pedestrians.

### Cost-Benefit.

The cost to build this outdoor comfort toolkit ranges from \$500 to \$2,100 per square metre, depending on the module.<sup>60</sup> Sidewalk Labs expects further cost declines as technology advances and the markets for new materials grow. The price of ETFE has already dropped significantly in the past decade, as it is used in solar panels and has benefited from economies of scale related to the growth of the renewable energy industry.<sup>61</sup>

Such costs can be justified when weighed against the increase in usable hours of public space. A study done at MIT showed that people were twice as likely to eat lunch in a public courtyard, and stay outdoors for longer, during weather that was comfortable according to the Universal Thermal Climate Index.<sup>62</sup> When more people are comfortable going out, restaurants, stores, and services see more business, offsetting build and operating costs with increased economic activity. Economic activity is known to drop during winter months throughout Canada, with retail sales falling up to 20 percent.<sup>63</sup>

Based on climate modelling of the outdoor comfort system in Quayside, Sidewalk Labs anticipates an increase in comfortable hours of 35 percent annually. While it is hard to determine the exact impact of more comfortable days on economic activity, it is reasonable to assume at least an incremental increase in spending derived by making outdoor spaces, streets, and shopping areas more comfortable.

Weather-mitigation tools can increase comfortable hours by at least **35%** annually in Quayside.



For more on the proposed use of data in public spaces, see the “Digital Innovation” chapter of Volume 2, on Page 374.



## Ensuring Open Space Is More Responsive



### Key Goals

- 1 **Establish an entity to coordinate programming, operations, and maintenance**
- 2 **Provide physical infrastructure that enables community programming**
- 3 **Provide digital infrastructure that enables proactive maintenance**
- 4 **Connect urban innovators and public spaces**

Public spaces typically look fantastic on opening day. Local leaders rally around a ribbon-cutting, inaugurating a space with freshly cut grass, shiny new play equipment, and perhaps a sports field serving a new rec league. But the excitement of Day One aside, the most successful public spaces continuously respond to how people want to use the space, and its ongoing operational and maintenance needs.

In great public spaces, planners, workers, and users are all in sync. The community adopts the space as their own, filling it with programming, and volunteering to help with tasks like raking leaves. But when these groups are misaligned, public spaces can fall into disrepair. In 2017, the Center for Active Design conducted a large-scale quantitative study, which found that it was actually better for a neighbourhood's civic life to have no green space than green space that is poorly maintained.<sup>64</sup>



*Sidewalk Labs proposes to build a public realm that is more responsive by establishing a non-profit entity called the Open Space Alliance (OSA), which would focus on delivering local programming, operations, and maintenance, working in close concert with the community and leveraging new technology. In partnership with the City of Toronto, the OSA would create opportunities to pilot ideas together with city staff, enabling a continuous cycle of knowledge sharing and learning to help successful innovations benefit Torontonians around the city.*

The proposed OSA would administer shared physical infrastructure that could help people shape and program shared spaces, as well as digital infrastructure that could proactively address operational and maintenance needs. The proposed entity could also help urban innovators, ranging from civic technologists to startups, run pilots in open space, advancing the urban innovation economy in Quayside and turning Toronto into a global leader in public realm management.



Goal 1

## Establish an entity to coordinate programming, operations, and maintenance

The idea for the Open Space Alliance to play a central coordination function across programming, operations, and maintenance stems from a few trends visible across cities, including Toronto.

Cities typically try to create an integrated open space experience across a neighbourhood, but face the reality that open spaces are owned or managed by a medley of different entities, from private developers to the parks department to transportation agencies. Coordination across these groups is often difficult, and when they are not in sync it can lead to disjointed programming and maintenance standards, creating a suboptimal experience for residents, workers, and visitors.

Additionally, cities want to explore how technology can improve open space programming, operations, and maintenance, but existing structures do not allow for easy experimentation. Technology development cycles require rapid prototyping, but most cities lack the processes to conduct fast pilots around new software like digital permitting processes, or new hardware like automated trash removal.

Lastly, cities want to maintain a high-quality open-space network, but face chronic funding shortages. In Toronto, the city's parks budget has grown only \$8 million in

the past four years — an amount that has not kept pace with inflation — despite the opening of many new parks.<sup>65</sup> The limited funds that are available are generally focused on daily upkeep, making it challenging to cover the types of temporary arts and cultural programming that bring a space to life.

In Quayside, along with other areas of the IDEA District, management and funding disparities risk becoming even more pronounced, as self-driving vehicles create the opportunity to expand pedestrian areas by up to 91 percent and create new open spaces. These new spaces, which occur in former vehicular rights-of-way, would still be owned by the city and managed by its transportation department, but would now be operated more like parks. These spaces would need to be effectively integrated with the local park network and would benefit from comparable levels of management and funding.

For Quayside and other areas of the IDEA District, Sidewalk Labs proposes the OSA as a public-private partnership, jointly governed and financed by both sectors, to help address these challenges. All city-owned open spaces would remain owned by the government, which would participate in programming, operations, and maintenance with the OSA.

## Establishing a clear mission and governance principles

Sidewalk Labs proposes that the OSA convene residents, commercial tenants, landowners, and government partners to identify and achieve a clear mission consisting of the following objectives:

### Objectives

- A Create a dynamic, well-programmed, well-maintained public realm that benefits the community and city.
- B Create a seamless public realm experience that establishes a unique sense of place and generates value for the neighbourhood.
- C Create the conditions for technology exploration in programming, operations, and maintenance, piloting new approaches that maximize access and enjoyment of shared open space.
- D Create a mechanism for operating open space that is viable over the long term, including sustainable funding, and that ensures public-private sector knowledge-sharing.

This type of public-private partnership on open space management is not new in Toronto, although the technology focus is unique to the Sidewalk Toronto project. When developing open spaces with outside entities, including non-profit institutions, the city typically structures “collaborative management agreements” to share programming, operations, and maintenance responsibilities. Such partnerships include Evergreen at the Brick Works, the AGO at Grange Park, Artscape at Wychwood Barns, and the Bentway Conservancy under the Gardiner Expressway. Partnerships also include agreements with Business Improvement Areas, like at the Village of Yorkville Park, where the Bloor-Yorkville BIA supplies maintenance of specialized features and programming. Sidewalk Labs proposes that the OSA take inspiration from these local best-practice examples.

Sidewalk Labs plans to work with the city, Waterfront Toronto, and a local non-profit partner with experience in open space management to develop the details of the non-profit entity. The working group would apply a version of the following governance principles in the design of that entity:

### Principles

- 1 The public realm needs to reflect a truly public space — with the city retaining ownership of city-owned open spaces — while also protecting the needs and rights of private property owners on their land.
- 2 The day-to-day function of the public realm needs to be as seamless as possible, both to create a better sense of place and to facilitate operational efficiencies.
- 3 The entity needs to be responsive (through legal agreements, board seats, public transparency, or other means) to both government and private landowners.
- 4 The entity needs to be structured to support creative experimentation in all facets of its operations, taking advantage of the physical and digital infrastructure in Quayside.

While the proposed OSA would have the capacity to perform programming, operations, and maintenance services, where and how it delivers these services would depend on agreements with individual landowners, including private landowners, and local land-holding government agencies. The OSA would also be informed by the needs of the community, who would have representation in the entity’s decision making.

The OSA would not have its own product development arm. Instead, as proposed, it would manage the physical and digital infrastructure that Sidewalk Labs plans to deliver, and it would have funds in its annual operating budget to procure technology services that could help improve programming, operations, and maintenance. In addition, its budget would include funds to support technology-enabled arts and cultural programming, such as artist residencies. Generally, the OSA should be set up to facilitate the ideas of others who want to activate and improve open space, rather than act as a top-down planning body.

Like all other technologies proposed for the IDEA District, all projects or pilots involving urban data would have to follow the proposed Responsible Data Use Guidelines, and be subject to the oversight of the proposed Urban Data Trust.



The Bentway is a public space under the Gardiner Expressway. Programming, operations, and maintenance at the Bentway is performed by the Bentway Conservancy, a local non-profit established through a public-private partnership, which was kickstarted by a donation from the Matthews Foundation. Credit: Andrew Francis Wallace via Getty Images



For more on the proposed use of data in public spaces, see the “Digital Innovation” chapter of Volume 2, on Page 374.



Ensuring Open Space  
Is More Responsive

## Provide physical infrastructure that enables community programming

The most vibrant public spaces are the ones in which people have a role in their creation. Toronto knows that well, whether through the community group that organizes Tai Chi in Yonge Dundas Square, Scadding Court's transformation of a defunct Target in Hamilton into a community centre, the families that rally to convert their block in the Annex into a play street, and so many others.

In all of these examples, a small group of passionate people banded together with an idea, and jumped through hoops to make that idea a reality. To build that type of participatory ability into a neighbourhood's foundation, Sidewalk Labs plans to deliver shared physical infrastructure that the community could program and a tool to help communities measure the impact of those efforts.

In Quayside and across the greater geography of the IDEA District, these initiatives would empower the community to turn its needs and ideas into reality, democratizing placemaking across public spaces. The aforementioned 2017 Center for Active Design study found that people who report access to an abundance of community events say that they interact more with their neighbours (up 10 percent); that they work more with others for change (up 11 percent); and that they attend a greater number of events in their neighbourhood (up 22 percent).<sup>66</sup> Shared

infrastructure enables an abundance of diverse, new, community-driven programs, resulting in people spending more time outdoors, together.

### Creating the conditions for community-led programming

In Quayside, Sidewalk Labs plans to build shared, adaptable programming infrastructure into the foundation of the neighbourhood, creating the necessary groundwork for affordable experimentation.

The community would be encouraged to take a leading role in programming its own spaces, supported by diverse types of infrastructure built into the environment to make a broad range of visions possible. Open spaces would be equipped with infrastructure such as projection screens, universal mounts, and utility hook-ups, which people could easily access to bring their vision to life — whether it be an immersive art show or a pop-up food market.

Community members would be able to access this infrastructure for their own programming purposes through the OSA. Shared physical infrastructure could also be complemented by civic engagement tools that enable community members to express their preferences for events that take place in shared spaces.

This kind of shared physical infrastructure could enable any number of ideas for community programming and neighbourhood improvement:

#### Play.

A teenager could join a virtual queue to play a life-size chess game projected onto the side of a building. The next day, the projected game could be Chinese checkers, and an elderly resident might sign up. Crowds could gather to watch the game in action.

#### Arts.

A local arts collective could be chosen to set up an installation in Parliament Plaza. They would be able to affix various components of their installation to the buildings and use the power conduits to operate a moving display. They could also use the proposed public Wi-Fi network to run an augmented-reality experience that complements the art.

#### Community.

The leader of a youth dance group could schedule a practice time slot at a park stage. She could request an outdoor-comfort Fanshell to cover the stage in case it rains. She could also control the speakers, which would be programmed to shut off at a certain decibel level.

#### Nature.

An environmental advocacy group wants to measure air-quality levels. They could receive permission from the Urban Data Trust to hook up (non-personal) air-quality sensors to mounts around Quayside. The data would be transmitted live over the connectivity network and become publicly accessible for others to use as well.

## Helping communities measure impact and drive change

Digital tools that make measuring the success of public spaces easier for everyone, from community groups to municipalities, provide yet another way to encourage local participation and programming.

Urbanists have a long tradition of using data to champion the reform of public space. In the 1960s, Jan Gehl's careful documentation of people standing, sitting, waiting, and talking along Strøget, Copenhagen's main thoroughfare, made the case for pedestrianizing the street, helping to transform the city into a global leader for public space.<sup>67</sup> More recently, after conducting public-life studies to inform TOcore, Toronto's new plan for downtown, the City of Toronto has begun to integrate the practice of public-life studies into their public-realm improvement and capital-planning processes.<sup>68</sup>

But the tools used to study public space have changed very little since they were developed in the 1960s. Today, many managers of public space and community advocates still rely on clipboards or manual clickers to count the number of people in a space and classify what they are doing. Given these high barriers to collecting data and insights, managers are left to steer design, programming, and maintenance without full knowledge of what is happening on the ground. And while there are many forms of obtaining community feedback, lack of quantitative information can make it hard to share findings and compare interventions.

To address this problem, Sidewalk Labs developed a digital application called CommonSpace that makes it easier to

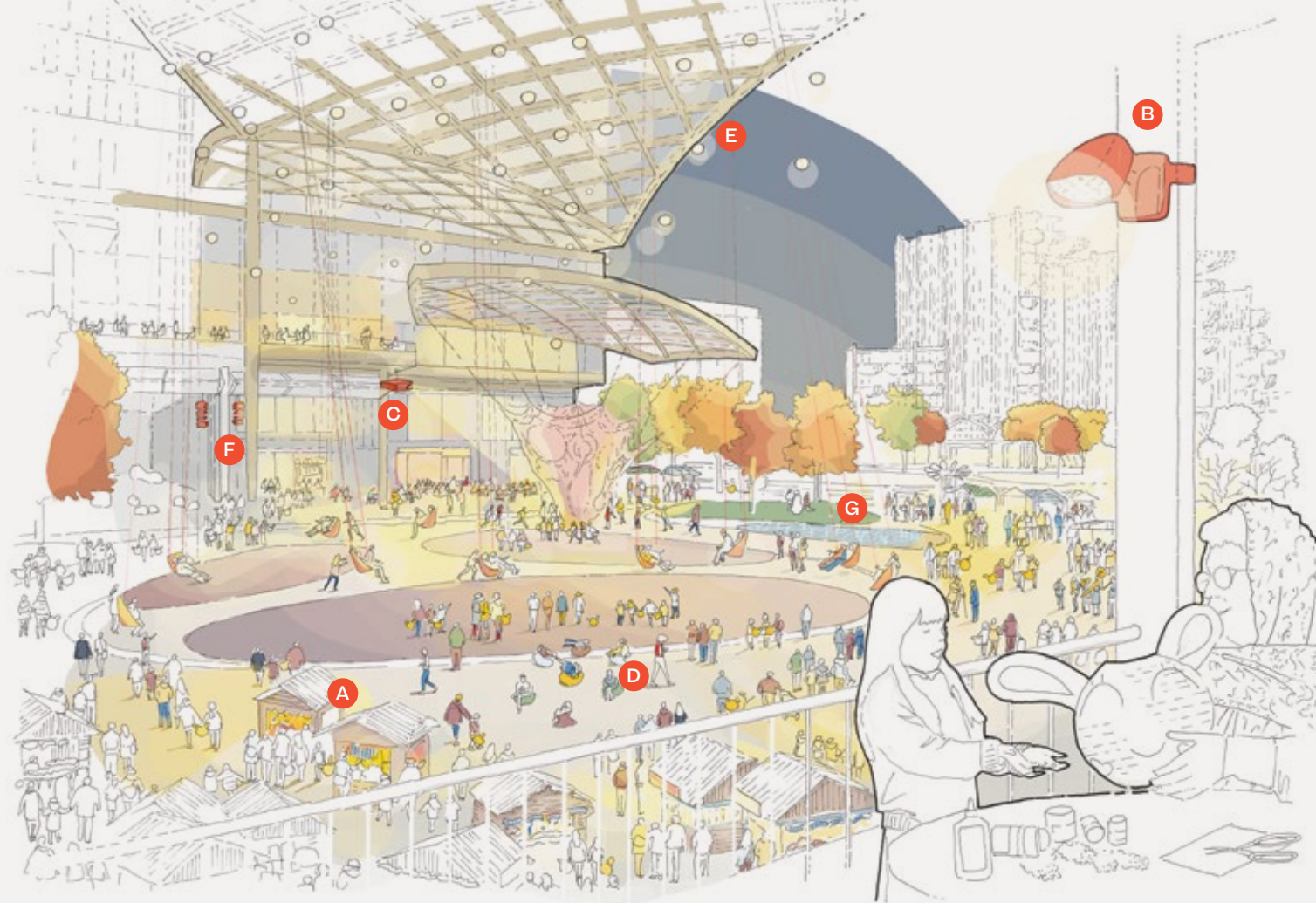
→ Continued on Page 185

The 2017 Center for Active Design study found that more community events foster up to

10%

more interactions with neighbours.

## Shared physical infrastructure supports community programming



### A Power and conduits.

Weather-protected outlets, with 220 and 110 voltage capabilities, would be interspersed on stoa and trusses throughout public spaces. They would have ample conduit space to run cable for data, electricity, or another utility. Having power and conduits available throughout the public realm would enable flexible events or installations.

### B Physical mounts.

Mechanical and electrical connection points located on buildings, light poles, bollards, and other public-realm furniture would enable the installation of new devices and creations on a temporary basis, ranging from lighting to banners to environmental sensors.

### C Projection.

A series of high-resolution laser projectors with interactive capabilities would be accessible throughout

the neighbourhood. These would be mounted to fixed lampposts but have the ability to be repositioned depending on the program. Advanced projection-mapping technology would turn the city into a three-dimensional screen that could be used to show content or for playful artistic creations.

### D Public Wi-Fi.

Ubiquitous connectivity capabilities would be accessible throughout the waterfront. Public Wi-Fi helps tackle the digital divide and enable new experiences in physical space, such as augmented- or virtual-reality exhibitions.

### E Lighting.

An LED lighting system throughout the public realm (typically mounted to stoa or light poles) would allow for dynamic adjustment of lighting levels, colours, and moods. This exterior lighting would provide the

optimal balance of visibility and comfort, allowing for concerts and other activities to take place in the evening.

### F Sound.

An array of speakers and public address systems would be deployed throughout the public realm. In some spaces, speakers would be mounted to trusses or stoa; in others, the sound systems would be movable. Speakers and audio systems would enable things like outdoor movie screenings, cultural performances, or intimate audio art installations.

### G Water.

Controlled applications of potable water would be available in key public spaces, including fountains and service hook-ups at pop-up sites. Not only is water necessary for food and beverage services, but it could also add playfulness to the public realm in the form of mist machines, splash pads, and more.

A volunteer in R.V. Burgess Park uses the CommonSpace app to document activity in the park.



Continued from Page 183

collect reliable data on how people use public spaces. To prototype CommonSpace, Sidewalk Labs has partnered with the non-profit Gehl Institute and a national charity, Park People. The app was field tested as part of Park People's Public Space Incubator Program, an initiative that awards grants to pilot experimental programming in Toronto's public spaces.

With CommonSpace, park operators or community organizers can enter information they observe about public life into a user-friendly app, such as what assets or areas people prefer or what spaces they avoid. The app records data in accordance with the Public Life Data Protocol, an open data standard (published by the Gehl Institute and founding municipal and private partners) that makes it possible to compare public spaces. The data captured with CommonSpace can be easily exported into visualization and analysis tools that communities and space managers alike can use to see patterns, generate insights, and develop evidence-based approaches to advocating for change.

In fall 2018, Sidewalk Labs worked with Park People and the Thorncliffe Park Women's Committee to conduct a field test of CommonSpace in R.V. Burgess Park. The Thorncliffe Park Women's

Committee was funded by Park People's Public Space Incubator to further develop the community cafe and market the committee had started in the park. The test concentrated on using CommonSpace to measure how increased programming and better cafe seating changed how people used the space. Local youth and other residents collected data on how many people came to the park and how the new chairs and programming affected what they did there.

The team found that the park saw a massive, 365 percent spike in visitors on programming days, and that the activity was far more social, with large increases in people coming in groups, meeting new people, and staying into the evening. The study not only gathered valuable data that can help the Thorncliffe Park Women's Committee understand and communicate the impact of its efforts, but it also enabled participants to learn about their community while changing how they think about the park.<sup>69</sup>

CommonSpace's code is open-source and based on an open-data standard, so it can be further developed by users in Toronto and around the world to gather the data needed to improve public life in their communities.





Ensuring Open Space  
Is More Responsive

# Provide digital infrastructure that enables proactive maintenance

Another key to fostering highly active and responsive public spaces is upkeep of operations and maintenance, tasks that can benefit greatly from new technology.

Operations and maintenance are becoming increasingly challenging in cities around the world, including Toronto, as budgets stay flat while infrastructure ages and urban populations grow. The 2016 Canadian Infrastructure Report Card found that public sport and recreation facilities were in worse physical condition than any other asset category, including roads, bridges, and water systems, reflecting lower levels of maintenance and repair spending.<sup>70</sup> Public-space operators responsible for vast portfolios often struggle to keep up with both everyday issues such as overflowing waste bins or broken benches as well as more sudden, severe problems that may arise.

While technology cannot solve budget constraints, it can help cities like Toronto achieve open spaces that work better for everyone. Drawing on new digital capabilities that can make operations and maintenance more responsive, Sidewalk Labs proposes to create a real-time digital map that acts as a centralized repository of information about the conditions of the public realm. This map would leverage environmental (non-personal) sensing to ensure that new issues — from a broken

pipe to dehydrated horticulture — are detected and promptly addressed.

Applied in Quayside and across the IDEA District, this digital infrastructure would lay the foundation for public spaces that are better operated and maintained, encouraging people to invest in their neighbourhood and form community bonds. The Center for Active Design has found that people who report high levels of litter have 10 percent less community pride and believe 10 percent less frequently that community members care about one another than those who report low litter levels.<sup>71</sup> Operational and maintenance upkeep creates public spaces that people want to spend time in and work collectively to improve, creating a virtuous cycle that leads to a thriving neighbourhood.

## Launching a real-time digital map of open space assets

The popularization of real-time digital maps over the past 15 years has revolutionized the ways people interact with cities — from planning a commute to deciding where to eat. But while live, shared digital maps are now pervasive in many industries, they are still relatively uncommon as a tool for open-space management.

Workers could be alerted to a water pipe pressure change that may indicate a leak. A digital map could show them where the sensor is that triggered the warning, so they know where to target their inspection, preventing the leak from worsening.



Planning drawings are typically static files, with geospatial data manually updated at specific intervals, leading to information that is outdated or inaccurate. The various city entities responsible for managing different aspects of the public realm — such as recreation, landscape, and capital projects — might use different operations software built on separate databases, resulting in difficulty coordinating activities. And the public rarely has access to operations data, precluding people from making decisions based on open-space conditions.

During Quayside's design and construction process, Sidewalk Labs plans to create a high-resolution, 3D, comprehensive digital map of the public realm. This map would serve as a single repository for information about open spaces and related infrastructure, creating a shared foundation for ongoing operations and proactive maintenance by the OSA.

This map would be populated by geospatial data that clearly defines boundaries of spaces and managed assets. It would include all types of public spaces, such as parks, plazas, and public libraries; ameni-

ties and physical infrastructure, such as swing sets and benches; and utility systems, such as stormwater pipes, waste systems, and power grids. It would also include the shared participatory infrastructure described on Page 184, such as electrical outlets, Wi-Fi, and media projectors, as well as movable components like picnic tables, chairs, and signs.

The map would be updated continuously through data transmitted by environmental sensors and information provided by open-space managers and users — ensuring it always stays up to date.

Sidewalk Labs proposes that access to the map vary by role. Open-space managers would have a full view of the map and be able to run their operations software on top of it, enabling the integration of complex workflows — for instance, automatically scheduling maintenance staff after a big event. A public visualization would help community members make far more informed decisions about their use of public spaces based on actual conditions — for instance, people could see when construction is scheduled.

The 2017 Center for Active Design study found that community pride drops by

**10%**

when open spaces are poorly maintained.

### Keeping the map updated in real time.

To be most useful, a holistic public-realm map needs to stay updated with actionable information. That is where environmental sensing technology comes into play.

Connected infrastructure is increasingly used by cities to monitor conditions and manage the delivery of public services across sprawling jurisdictions. Many cities, including Toronto, have deployed smart water meters that both reduce costs by eliminating the need for manual meter reads and alert property owners and the city to unexpected changes in usage that may signal leaks.

Sensing systems also help level the playing field of information. Research has shown that the propensity to call 311 and report problems differs among socioeconomic and demographic groups in a manner that can exacerbate inequalities.<sup>72</sup> Environmental sensors have the potential to ensure equity in service delivery by identifying needs in a uniform manner.

Sensors also enable predictive maintenance to prevent major infrastructure failures — for instance, by identifying water main breaks that can lead to sinkholes. These tools identify opportunities for proactive repairs that can save hundreds of thousands of dollars.

### Digitally monitored utilities.

As an example of the power of a real-time map coupled with environmental sensing infrastructure, consider the operation and maintenance of utilities.

Today, the lack of well-organized paper records used to track utilities is a major source of street disruption and project delay. Every time an operator performs work on a utility, someone must check the

records to identify any potential conflicts at a work site, many of which are not readily available or were never recorded in the first place. Even when documents are available, it is not uncommon for work crews to hit some long-forgotten water pipe or old power line installed in an unexpected location, halting work so the hazard can be properly reviewed.

A real-time digital map of the utility network — with utility status regularly updated by sensors — has the potential to reduce the incidence of accidental utility strikes and the overall time associated with maintenance. Such a map could keep an accurate, ongoing record of utility conditions and alert work crews of potential conflicts during repairs or installations. It could also reduce by several weeks the time it typically takes to locate underground utilities and research records.

The application of utility sensors goes far beyond facilitating road work. They could help extend the life of infrastructure systems by providing operators with early warnings, such as the systems monitoring the conditions of water pipes that Toronto and many other cities already have in place to prevent leaks. Sidewalk Labs estimates that, in Quayside, a water pipe sensing system could ultimately save up to \$200,000 a year in preventing quotidian water leaks, and another \$300,000 for each prevented water main break.<sup>73</sup>

More novel applications include the ability to monitor stormwater systems and empty detention tanks before a heavy rain; track temperatures on a thermal grid to maintain the desired range; identify failures in underground freight tunnels or blockages in pneumatic waste collection pipes; and detect street light outages that require bulb replacement, among many other uses that would be helpful for the OSA.

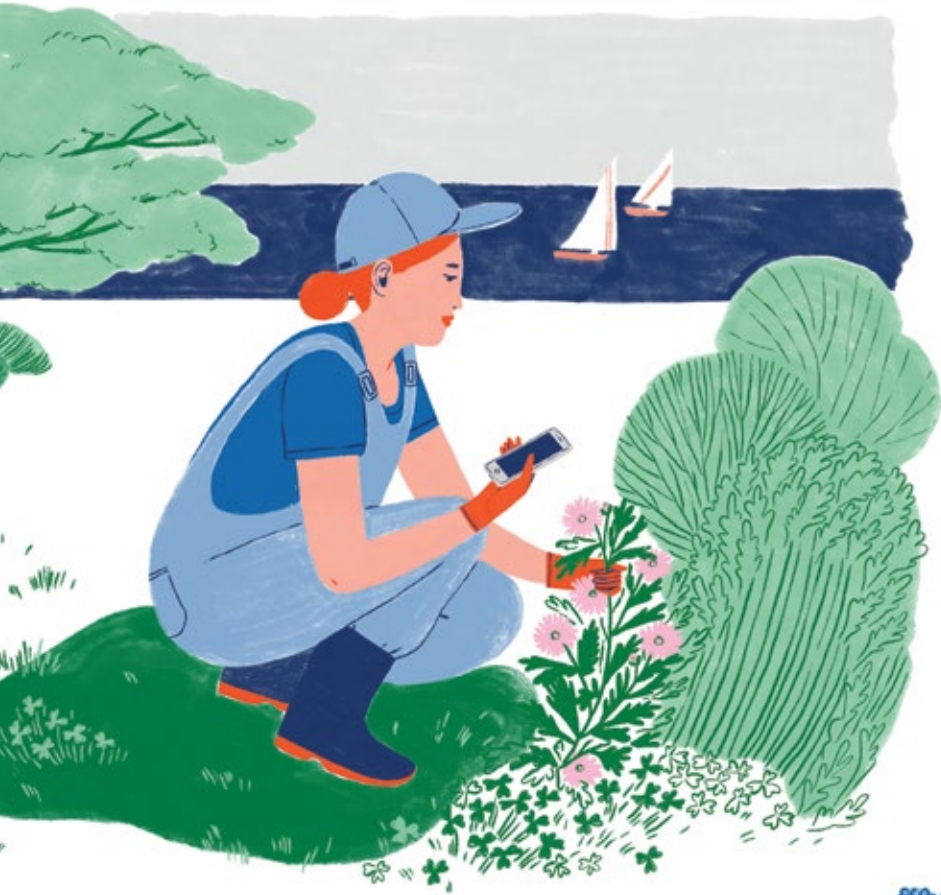
**The Open Space Alliance would enable a continuous cycle of knowledge sharing and learning to help successful innovations benefit Torontonians around the city.**

Water pipe sensors could save up to **\$200,000 a year** in prevented leaks.



Ensuring Open Space  
Is More Responsive

# Connect urban innovators and public spaces



The OSA's new policy and funding framework, which encourages experimentation, coupled with the shared physical and digital infrastructure described on Page 184, enables urban innovators, from civic technologists to businesses, to prototype their ideas in a real-world environment. These tools would not only improve the operations and maintenance of open space but would also have the potential to scale elsewhere and help other parts of the city. The following page describes two hypothetical examples.

A maintenance worker uses image recognition to identify a plant and pull up pruning instructions.



## 1

### Horticultural maintenance.

Take one common operations challenge: a designer plans a park with a naturalistic landscape and a specialized maintenance regime, but maintenance instructions are not readily available to the workers in the field responsible for pruning. In Quayside, the designer could decide to upload instructions into the digital map during the design and construction phase through the OSA's online portal. With access to the map, the designer could include geo-tagged information spelling out how the naturalistic plantings should be maintained.

After the park opens, a computer science software class could build an app that makes it easy for these instructions to pop up whenever maintenance workers arrive on location. This app could use image recognition to help identify plants as well as pest and disease issues, making it easier for people to keep the garden in a state of good repair without specialized landscaping knowledge. The OSA could agree to instruct their maintenance workers to use the app as part of a pilot.

If the pilot were successful, the team of students could seek venture funding — perhaps from the Urban Innovation Institute, a proposed new venue for practical research on the future of cities — to try to further advance or scale the idea. [\[2\]](#)



See the “Economic Development” chapter of Volume 1 for more details on the Urban Innovation Institute.

## 2

### Waste robots.

Take another challenge: making sure that public trash receptacles are emptied before they overflow.

In Quayside, the OSA could place a call for proposals to launch a self-driving waste pilot program. Startups could bid, and once the selected company's proposal was approved by the Urban Data Trust, in coordination with the OSA, it could place self-driving trash cans throughout the public realm for a testing period. The trash cans could include sensors that detect when each bin is filling up. When a bin became full, it could shut itself and travel to a nearby pneumatic chute, dispose of its contents, and promptly return to its original location. It could then transmit data on waste bin location and refill rates into Quayside's digital map, which the OSA's operators could analyze to make more informed choices regarding where waste bins should go.

If the pilot were successful, the startup would have shown valuable proof of concept in a real world environment, and the OSA would have identified a new system that improves the standard of care for its parks at a lower cost. In turn, such successful technologies could spread back to the rest of Toronto, turning the city into the global leader of open-space management.

# Public Engagement

The following summary describes feedback related to the **public realm** and how Sidewalk Labs has responded in its proposed plans.



As part of its public engagement process, members of Sidewalk Labs' planning and innovation teams talked to thousands of Torontonians – including members of the public, expert advisors, civic organizations, and local leaders – about their thoughts, ideas, and needs across a number of topics.

## 1 Create a sense of belonging through participatory design, accessible amenities, and diverse programming

### What we heard

Participants urged Sidewalk Labs to make public spaces as inclusive as possible, no matter a person's background or ability. Participants in co-design sessions noted that all public spaces should be built with people with disabilities in mind and should relay information in multiple modes (haptic, visual, audio). Visitors to 307 wanted to see spaces for diverse cultural practices as well as food stores that cater to diverse cultures. And multiple participants raised the importance of critical amenities, including accessible non-binary washrooms, places for changing diapers or breastfeeding, and affordable retail space.

Participants were particularly enthusiastic about a ground-floor strategy that could provide affordable space for vendors, small businesses, and social enterprises. The experts who attended one workshop on mass timber buildings were similarly enthusiastic about the strategy's potential; however, they urged Sidewalk Labs to consider the governance and management of the space, asking questions like: how would leases or occupancy be ensured, and how would the balance between retail and community use be determined?

Various participants also recommended that inclusion extend to the design process itself, asking that Sidewalk Labs bring community members, especially Indigenous voices, to the planning table. Design excellence need not sacrifice the accessibility or inclusivity of the public realm.

Two visitors embrace as they view RWDI weather-mitigation visuals in the main hall of 307. Credit: Jenna Wakani

### How we responded

#### Emphasizing inclusion.

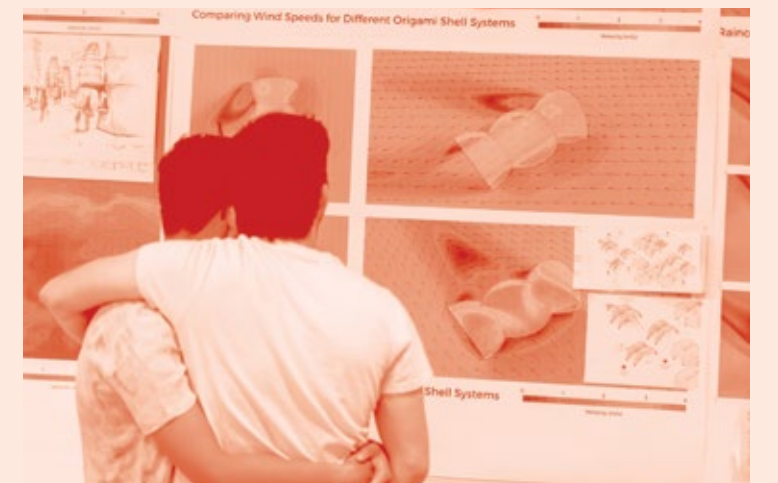
Sidewalk Labs has incorporated an expansive, diverse network of open spaces into the plan for Quayside, and followed design principles focused on inclusive, participatory programming (see Page 178).

#### Incorporating accessibility.

In keeping with Sidewalk Labs' accessibility principles, all public spaces would incorporate responsive sounds and tactile pavement. Sidewalk Labs plans to continue working with the community to ensure that public spaces are accessible to all (see Page 106).

#### Making space affordable.

Sidewalk Labs proposes to include adaptable retail spaces, flexible lease terms, options for co-tenancy, and operating tools and services that tenants can use to reduce the upfront and ongoing costs of occupying ground floor spaces. This mix of offerings would make it financially feasible for community, cultural, and smaller businesses to set up shop (see Page 164).



## 2 Emphasize connections to nature and water

### Expanding opportunities.

Sidewalk Labs plans to offer a small business incubator program that would encourage diversity by both providing space at below-market rents and offering shared equipment and facilities for ground-floor tenants, helping those without access to capital open up shop (see Page 166).

### Engaging Indigenous groups.

The Brook Mollroy Indigenous Design Studio has created a framework for Indigenous engagement and project development — including principles for Indigenous design — based on aspirations of the Indigenous community and the desire for common ground. Sidewalk Labs is committed to continue to engage with these principles and Indigenous communities throughout the planning process.

### What we heard

Participants across public engagement events and co-design sessions were incredibly enthusiastic about the potential for plentiful green public spaces that can better connect people to nature, especially water.

Participants from the design jam on “Water Connections” and the Residents Reference Panel were particularly emphatic on this point: water should be both a destination feature and an accessible, everyday amenity. As one panelist explained, “I make great use of the parks around me. ... I hope Quayside, and the eastern waterfront, will have that same kind of easy access to park space. There needs to be a reason for people to go there other than to live or work. And Lake Ontario is majestic.”

Some visitors to 307 recommended that the public realm design reduce the impact of the Gardiner Expressway and mitigate noise pollution. And Roundtable 4 participants asked about how the community could be more self-sustaining, potentially with urban agriculture, green roofs, and food gardens.

### How we responded

#### Expanding green space.

Sidewalk Labs proposes to reclaim significant street space for the public realm and tree plantings by narrowing lanes, reducing vehicle lanes, and eliminating curbside parking. It also proposes to leverage a digital planning tool to identify opportunities for more high-quality parks, maximizing access to green space (see Page 128).

#### Infusing greenery.

Sidewalk Labs proposes to plant far more greenery than most cities do today. Greenery sequesters carbon, mitigates the urban heat island effect, reduces the risk of flooding, and promotes the health and happiness of residents and workers. For example, the proposed Queens Quay East could host 95 trees per hectare, roughly double the current coverage on boulevards (see Page 135).

#### Incorporating water features.

Sidewalk Labs proposes that Parliament Plaza include water features, such as a splash pad for children and mist machines for public art installations (see Page 146).

#### Connecting to the lake.

Sidewalk Labs proposes to deploy a series of barges in Keating Channel designed for community water-based programming across the seasons, from a waterfront classroom to an aquaponics farm to a cafe (see Page 149).

#### Accommodating marine uses.

Sidewalk Labs proposes that Parliament Slip accommodate a variety of marine uses, from personal watercrafts to water taxis to kayaks, allowing for marine transit to the inner harbour and islands. These uses would be linked to, and supported by, the neighbouring Bayside Community Centre (see Page 148).

#### Integrating gardens.

As the designs for Quayside are refined, Sidewalk Labs plans to explore the integration of community gardens as key amenities.

A crowd gathers to hear remarks at the opening of 307 on June 16, 2018. Credit: Sidewalk Labs



Two 307 visitors spend time in the Learning Garden, developed in partnership with Bowery Project. Credit: David Pike



### 3 Invite participation to a lively, flexible, delightful public realm

#### What we heard

Participants were excited by the possibility of a flexible, lively public realm that could accommodate a diverse number of uses and needs. Torontonians wanted public spaces that are active with events and programs — that are delightful, playful, and inviting. As the Sidewalk Toronto Fellows put it: “Equip public spaces to become an extension of a front and backyard.”

Many participants urged Sidewalk Labs to create spaces that could be enjoyed all year, especially in winter. One 307 visitor pen-named “Cold Australian” asked for “year round comfort in public spaces because Toronto’s weather is inhibiting,” adding: “I want to live life to the fullest.”

Specific ideas for uses that could be accommodated ran the gamut, from dog parks, to spaces for creating and learning, to playgrounds, to outdoor swimming pools. Participants made multiple requests that Sidewalk Labs create opportunities for youths and the arts community to be more present in public space.

While many Torontonians were excited by the flexibility of the spaces proposed, which would give them greater agency over their environment, participants wanted to ensure that flexibility would never preclude accessibility. Some co-design session participants suggested that spaces leverage technology to inform users, in real-time, about the status and layout of these dynamic spaces.

#### How we responded

##### Incorporating flexibility.

Sidewalk Labs proposes to create flexible designs for parks, plazas, and open spaces that better accommodate the diverse needs of an expanding population while preserving accessibility. Such spaces would be multi-purpose and could be quickly reconfigured by day or season. Silo Park, for example, should be able to accommodate at least three sports; one “play” feature; space for food and beverage; and recreational spaces designed to be active and accessible all year (see Page 145).

##### Mitigating weather.

Sidewalk Labs proposes to deploy an outdoor comfort system that can respond to real-time weather patterns, providing protection on rainy, snowy, or windy days and shade on sunny days. Residents or businesses could reserve these tools for gatherings or events (see Page 167).

##### Sharing infrastructure.

Sidewalk Labs proposes to equip public spaces with shared physical infrastructure (such as projectors or power outlets) to encourage users to program these spaces themselves (see Page 184).

##### Encouraging arts and culture.

Sidewalk Labs proposes to encourage and celebrate arts and culture through the provision of rotating installations, affordable production space, and a Civic and Cultural Assembly with shared fabrication equipment and a room for exhibits and teaching (see Page 183).

##### Emphasizing accessibility.

In keeping with its accessibility principles, Sidewalk Labs plans to work with the accessibility community to ensure the accessibility of flexible spaces, including installing options such as way-finding beacons (see Page 106).

### 4 Pursue governance models that ensure safe, well-maintained public spaces over the long term

#### What we heard

The Public Realm Advisory Working Group urged Sidewalk Labs to consider an innovative governance model for public space and to work with the City of Toronto’s Parks, Forestry, and Recreation department to structure a sustainable management and funding plan that would ensure public ownership of parks while allowing for innovation in programming, operations, and maintenance.

Participants were similarly concerned about maintenance, wondering how public spaces would be “future-proofed” and how safety would be ensured.

Sidewalk Labs’ Craig Nevill-Manning teaches young children how to adjust the lights in the 307 Dynamic Street prototype. Credit: David Pike



#### How we responded

##### Proposing the OSA.

To sustain high-quality open spaces over the long term, Sidewalk Labs proposes the creation of the Open Space Alliance as a non-profit entity that could deliver local programming, operations, and maintenance in Quayside. The OSA could also create mechanisms for sustainable funding, staffing, and oversight that ensure the long-term viability of public spaces (see Page 178).

##### Empowering the community.

Sidewalk Labs has partnered with Park People and the Gehl Institute to prototype CommonSpace, a tool that makes it easier to collect reliable data on how people use public spaces, enabling space managers to see patterns, generate insights, and develop evidence-based approaches to advocating for change (see Page 183).

##### Leveraging technology.

Sidewalk Labs proposes to create a real-time map of park assets, from drinking fountains to garbage bins, that can help managers operate and maintain public spaces (see Page 186).

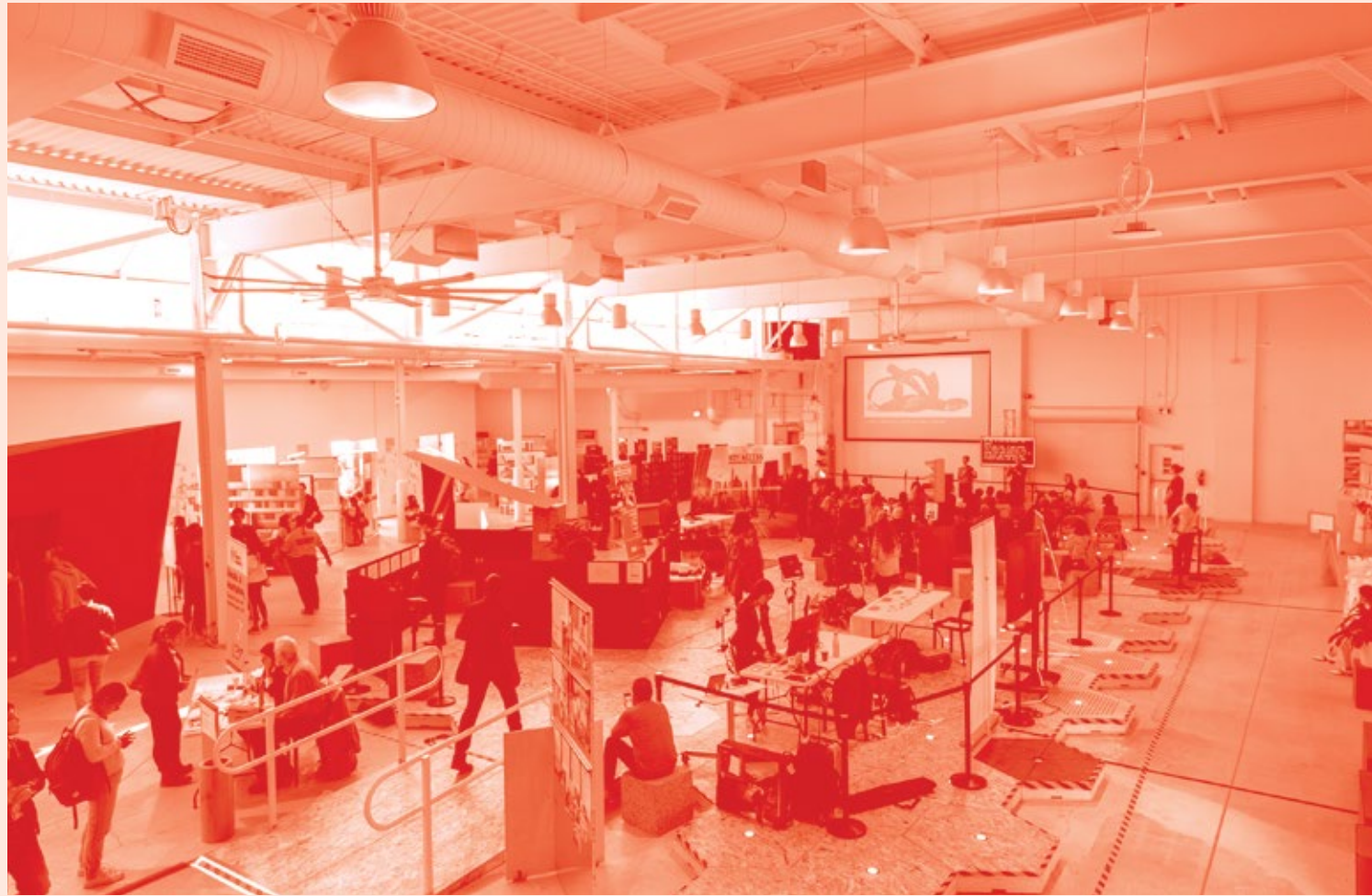
##### Reimagining pavement.

Sidewalk Labs proposes to deploy a novel system of modular pavers that would lower maintenance and repair costs of hardscape in the public realm (see Page 139).

##### Planning for safety.

Sidewalk Labs incorporated safety into every facet of its planning process and plans to design spaces that promote safety — for example, by including lighting in the public realm that would ensure the appropriate visibility at all times.

# Engagement spotlight



Leading Toronto accessibility organizations showcase their work at 307 for Open Sidewalk: The Accessible City. Credit: Jenna Wakani

In developing ideas for the future city, Sidewalk Labs has been interested in exploring a system of prefabricated modular pavers that would enable curbless streets and be easy to maintain and repair. Modular pavers also allow for the embedding of new technologies, such as heating elements to melt snow and ice, LED lighting to communicate new street uses, and permeability to improve storm-water management.

Over the past year, Sidewalk Labs has been prototyping and testing these pavers, and sharing its progress with a variety of groups. At the design jam, “People on Wheels,” accessibility advo-

cates were enthusiastic about the pavers, as road maintenance, ice, and snow present some of the biggest challenges for accessibility. But they pointed out an important flaw: the pavers were the same width as wheelchairs, meaning that when crossed at the wrong angle, wheels could catch in the gaps.

It was a crucial insight that took the planning team back to the drawing board. As a result, the team is testing a design of pavers that are now 20 percent wider and — thanks to those co-design participants — would create a more accessible public realm for all.

**An expanded public realm, activated by community-driven programs and responsive maintenance, would serve as the foundation of a great neighbourhood.**

## Acknowledgements

Sidewalk Labs would like to extend special thanks to the participants of the Sidewalk Toronto Public Realm Advisory Working Group, and to the staffs of the City of Toronto, Province of Ontario, and Government of Canada for their time and guidance.

## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full proposed IDEA District scale are inclusive of the entirety of its proposed geography, including all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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Open space was expressed as a percentage representing the amount of non-building area on the ground, against the total area of the four blocks. For the Sidewalk Toronto project, Sidewalk Labs envisions that the dynamic curb will allow for useful expansion of open space into the right-of-way, but for the purpose of simplifying calculations, this study took a more strict definition of open space.

Sky access was calculated at points on an analysis grid which matched the study area and included all four blocks. For every point in the analysis grid not inside a building, Sidewalk Labs computed the percentage of a hemisphere of view which can see the sky. Sky access for the entire study area was then expressed as the average of all individual percentages.

Gross floor area was calculated by summing the total area of each floor in all buildings. For the precinct plan, ground floors were assumed to be 5 metres high and all other floors 4 metres high. For building massings produced by generative design, floor heights were 5 metres, 4.5 metres, 4 metres, and 3.3 metres depending on use type.

Sidewalk Labs produced 2,051 different block configurations using the generative design pipeline and evaluated them against the precinct plan with the same measures. The generative design pipeline operated in two distinct modes: (1) modifying and optimizing human-created building massings through geometric operations of translation, scaling, rotation, and reflection, and (2) creating new designs using a series of algorithms for block subdivision and massing creation. For the former, designs from Beyer Blinder Belle were modified to fit on the four blocks; for the latter the pipeline used inputs for target ground floor areas that matched the original precinct plan.

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This data was used to compute a blended average of street activity for each type of street: 10 hours a day for destination, 10 hours a day for local, and eight hours a day for downtown. Street activity was defined as more than one-third of businesses being open. The average across all three types of streets was nine hours of street activity a day.

Sidewalk Labs then conducted the same computation for the Sidewalk Toronto project, looking at expected hours of street activity in Quayside, based on an anticipated program in 2035. Due to the more diverse program mix than typical Toronto streets, Sidewalk Labs anticipated 11 hours of street activity a day in Quayside.

In addition, tenants in Quayside would be able to easily share space. Sidewalk Labs assumed that 20 percent of tenants would participate in space sharing, either through co-tenancy arrangements they broker themselves, or through shared space by design, as seen in the stoa. The impact of space sharing is that the street would be active for an additional hour, as it is anticipated that businesses with complementary opening hours will co-locate. That takes Quayside's total average street activity to 12 hours a day, in contrast to nine hours a day seen on typical streets in Toronto.

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# Buildings and Housing

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## Introduction

p204

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## Part 1

Accelerating  
Construction  
Timelines

p208

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## Part 2

Helping  
Neighbourhoods  
and Households  
Evolve

p236

---

## Part 3

Expanding Tools  
for Housing  
Affordability

p262

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## Public Engagement

p288



# Introduction

## The Vision

Sustainable buildings that can be **constructed and adapted far more quickly**, and a new set of financial and design tools that help **improve affordability and expand options** for all households.

For two years running, Toronto has hoisted more construction cranes than any other city in North America.<sup>1</sup> But for a city that is a leader in openness and inclusion, it has been hard to achieve ambitious levels of affordability during the building boom.

Much of Toronto's new skyline consists of condo towers priced out of reach for the median Toronto household, which makes roughly \$66,000 a year.<sup>2</sup> Faced with great uncertainty around construction costs (rising at 6 to 8 percent annually in recent years)<sup>3</sup> and completion timelines, developers often build condos they can sell before breaking ground. In the last 20 years, 77 percent of the new housing stock in Toronto has been condos.<sup>4</sup>

To help, all levels of government have increased support for affordable housing programs, but additional funding is needed, as are viable paths to create new private sources. Half of households earning \$40,000 to \$60,000 are housing “burdened,” spending more than 30 percent of their income on rent.<sup>5</sup> Few options exist for middle-income households that do not qualify for housing programs but also cannot afford market-rate homes.

Beyond housing, economic opportunity improves with true live-work communities that host a lively mix of homes, offices, shops, and services. Such neighbourhoods provide residents with easier access to jobs and essential daily services and with housing options for families to grow over time. They also provide affordable commercial space in buildings and on ground floors for local retailers, community groups, artists, and startups, not just big chains and corporate offices.



### The innovation plan.

To help Toronto's waterfront achieve its goals for a mixed-income community that builds on the city's diversity, and to demonstrate a path forward for affordability and economic opportunity in high-demand cities, Sidewalk Labs proposes a comprehensive strategy for construction, building, and housing innovation.

First, Sidewalk Labs proposes **construction innovations that would accelerate project timelines while reducing costs and uncertainties**, helping developers look beyond condo towers. This plan centres on a new factory-based construction


approach, enabled by an emerging building material called “mass timber,” which is easier to manufacture and better for the environment than concrete or steel, yet just as strong and fire-resistant. Digital building information modelling tools could support this factory approach by coordinating projects across the supply chain.

Second, Sidewalk Labs proposes **building design innovations that could accommodate the full range of live-work needs and respond nimbly as those needs change**.

These include adaptable “Loft” spaces — supported by flexible interior panels and a real-time code-monitoring system — designed to cut renovation times and help communities retain a lively mix of businesses and residents. For homes in particular, efficient units and co-living spaces could improve affordability while expanding options for all types of households.

Finally, Sidewalk Labs' proposed **housing innovations aim to realize an ambitious affordability program wherein 40 percent of units are below market rate**, with half of the program's total units consisting of purpose-built rentals to improve long-term affordability. To achieve this program, Sidewalk Labs proposes to implement new tools that could help the private sector support below-market rental housing while still earning returns, including through leveraging the value created by factory-based construction.

With a commitment of at least 6 million square feet of construction along the waterfront, an Ontario-based factory could be financed and ready for operation by 2021, leading to 350,000 work hours during the development of Quayside.<sup>6</sup>



## Benefits of implementing the vision

- Accelerate construction timelines by as much as 35 percent
- Unlock a new Ontario-based sustainable mass timber industry, creating roughly 2,500 jobs over 20 years of development at the scale of the IDEA District
- Generate over \$1.4 billion for below-market housing through 2048
- Enable buildings to support evolving live-work communities through fast, affordable renovations



### IDEA District

The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.



### The impact.

In Quayside, Sidewalk Labs estimates that factory-based construction techniques could demonstrate that it is possible to reduce construction timelines by as much as 35 percent,<sup>7</sup> while creating the world's first neighbourhood made entirely of sustainable mass timber. Adaptable structures could allow for a true live-work community by making renovations easier, with 50 percent lower costs and timelines. An ambitious housing affordability program could provide roughly 1,000 below-market units, including new options for middle-income households, growing families, and seniors.

Applied to the proposed full scale of the IDEA District, Sidewalk Labs' approach could go even further towards addressing the city's objectives concerning affordability and opportunity.

At this greater scale, factory-based construction could give rise to a new Ontario-based sustainable timber industry, creating roughly 2,500 jobs over 20 years and unlocking new land value through faster project timelines and reduced risks. Sidewalk Labs estimates that the total value created by factory-based construction, efficient housing designs (which enable developers to build more units on a given site), and other proposed financial tools (such as a condo resale fee to support mixed-income communities), could reach over \$1.4 billion through 2048. This approach would also demonstrate a viable and replicable path for the development sector to support the public sector in improving housing affordability.

Such a program could include around 6,800 affordable housing units, representing nearly a third of the current annual citywide target for new affordable rental housing units, in accordance with the city's Open Door program,<sup>8</sup> or well over half the goal if the definition of affordable housing is expanded to include middle-income households in need.

Most of all, this approach could provide a model for Toronto to welcome its consistent influx of new arrivals — roughly 1 million additional people are projected to live there by 2041<sup>9</sup> — allowing the city to maintain its exemplary commitment to inclusion.

# This housing vision could create over 6,800 units of affordable housing, tackling nearly a third of the annual city-wide targets for new affordable rental housing.



# Part 1



## Accelerating Construction Timelines



### Key Goals

- 1 **Catalyze a new sustainable industry around mass timber**
- 2 **Launch a factory to produce a complete library of building parts**
- 3 **Coordinate the supply chain with a digital delivery system**

The ability for development projects to go up quickly is critical in helping cities meet new demands for residential or commercial space. But in Canada and around the world, developers face a number of challenges that make it difficult to complete projects on predictable timelines and with predictable costs.

Perhaps the biggest challenge is the unpredictability of finding (or, in developer speak, “sourcing”) a set price for the many building materials needed for a given project. Costs keep rising for concrete and steel<sup>10</sup> — the main urban building materials — and customized designs make each project time-consuming. Both factors can lead to construction delays or project cancellations; even in a high-demand market like Toronto, at least 17 projects have failed since the start of 2017 alone.<sup>11</sup>

The challenge of accelerating urban construction is not new, but no one has yet cracked the code, stymied by heavy building materials that are hard to produce in a factory and the difficulty of coordinating a construction supply chain across designing, financing, contracting, and permitting. In general, off-site (or mass-produced) construction has yielded repetitive designs applied mainly to single-family homes, hotels, and temporary housing.

But the time is right for off-site construction to take hold. Today, advances in technology are shifting the paradigm for urban construction. A wave of companies around the world is taking advantage of lightweight materials (such as mass timber), robotic machinery, and building information modelling software to construct architecturally distinct buildings faster, and at a lower cost, including: Lindbäck's Bygg in Sweden, Legal & General in the U.K., Sekisui House in Japan, Admares in Finland, and Katerra and Factory OS in the U.S.

# Off-site mass timber construction can accelerate project timelines by 35 percent, reduce costs, and greatly improve overall predictability.

**Vancouver's 18-storey all-wood Brock Commons went up at two floors per week.**

Canada has demonstrated the promise of this approach with discrete projects. Recently, Toronto has seen the emergence of higher-quality modular construction, such as the Great Gulf Home factory, although this work has focused on low-rise buildings.<sup>12</sup> In Vancouver, the 18-storey, all-wood Brock Commons building on the University of British Columbia campus went up at a speed of two floors per week for the basic structure.<sup>13</sup>



**Sidewalk Labs proposes to advance these efforts by committing to use prefabricated building components in Quayside and beyond. This commitment would enable the establishment of a factory in Ontario, which Sidewalk Labs is willing to support financially, potentially in partnership with others. Such a factory would process mass timber building parts and catalyze a new industry around this sustainable material.**

**Sidewalk Labs also proposes to create a library of building parts that could be combined in thousands of different ways to ensure design excellence and to develop a digital management system that coordinates the entire supply chain from conception to completion.**

Together, these approaches can accelerate project timelines by 35 percent, reduce costs below current market rates, and greatly improve overall predictability for any given development.<sup>14</sup>



# Catalyze a new sustainable industry around mass timber

The first step in Sidewalk Labs' proposed approach to construction innovation is the wide-scale manufacturing of mass timber, a sort of "super wood" created by compressing multiple pieces of timber together.

Wood ranks among humanity's most ancient building materials, but today conventional timber is mostly used to create simple two-by-four wood structural elements (such as beams) for low-level housing. Mass timber emerged in Central Europe in the mid-1990s as a much stronger material than conventional timber, with the potential for use in tall urban buildings.<sup>15</sup> It is as strong as steel and twice as strong as concrete by weight — yet far easier to manufacture and faster to assemble.<sup>16</sup>

Mass timber is also far more sustainable than steel or concrete. Trees "sequester" carbon as they grow — trapping 1 tonne of carbon dioxide in every cubic metre of timber.<sup>17</sup> In this way, buildings made of timber act as a vault, storing carbon that otherwise would have been released back into the air through decomposition. For example, the timber required to build Brock Commons in Vancouver stored 1,753 tonnes of carbon dioxide, the equivalent of taking 511 cars off the road for an entire year.<sup>18</sup> Mass timber also improves air quality and has "biophilic" properties, the term for human health benefits ascribed to interaction with nature (see Page 211).

Sidewalk Labs plans to support the launch of an Ontario-based factory by 2021 that would process two mass timber products: cross-laminated timber structural panels and glulam beams. This factory would use Canadian-sourced mass timber — specifically spruce trees from the boreal forests of Quebec and Ontario and Douglas fir trees from British Columbia, the two dominant types of wood in the traditional North American timber industry. The factory would operate in collaboration with Canadian foresters, sawmills, and other industry partners.

In Quayside, Sidewalk Labs proposes to use mass timber in all buildings it develops, with the goals of proving out the technology's viability up to around 30 storeys, a new record, and of becoming the world's first fully mass timber neighbourhood. Using wood for all 2.6 million square feet of building development in Quayside would be equivalent to removing over 20,000 cars from the road annually.<sup>19</sup>

Across the full scale of the IDEA District, Sidewalk Labs proposes to require third-party developers to use materials that meet the sustainability standards of those buildings planned for Quayside, which would be substantially constructed of mass timber. If mass timber materials were used in the IDEA District, they would need to be certified by the international Forest Stewardship Council or equivalent forest certification bodies.

## Benefits spotlight

# Health, wellness, and mass timber

Mass timber is not just sustainable for the natural environment — it can also help sustain people inside the built environment.

**A wide range of research shows that exposure to natural environments and materials elicits restorative responses in the body and brain.**

### Healing.

A seminal 1984 study by architect Roger Ulrich, which has since been replicated many times, found that surgery patients whose recovery rooms had a window view of natural scenery recovered faster and required fewer painkillers than those whose rooms did not.<sup>20</sup>

### Stress reduction.

Japanese researchers have shown that a short walk through a natural environment reduces the body's production of cortisol (the fight-or-flight hormone) and keeps it down for hours afterwards.<sup>21</sup>

### Comfort.

Another Japanese study showed that, in rooms with 45 percent of their surface areas covered by wood, participants not only found the room comfortable, their diastolic blood pressure decreased while their pulses quickened — a kind of relaxed alertness.<sup>22</sup>

### Calming.

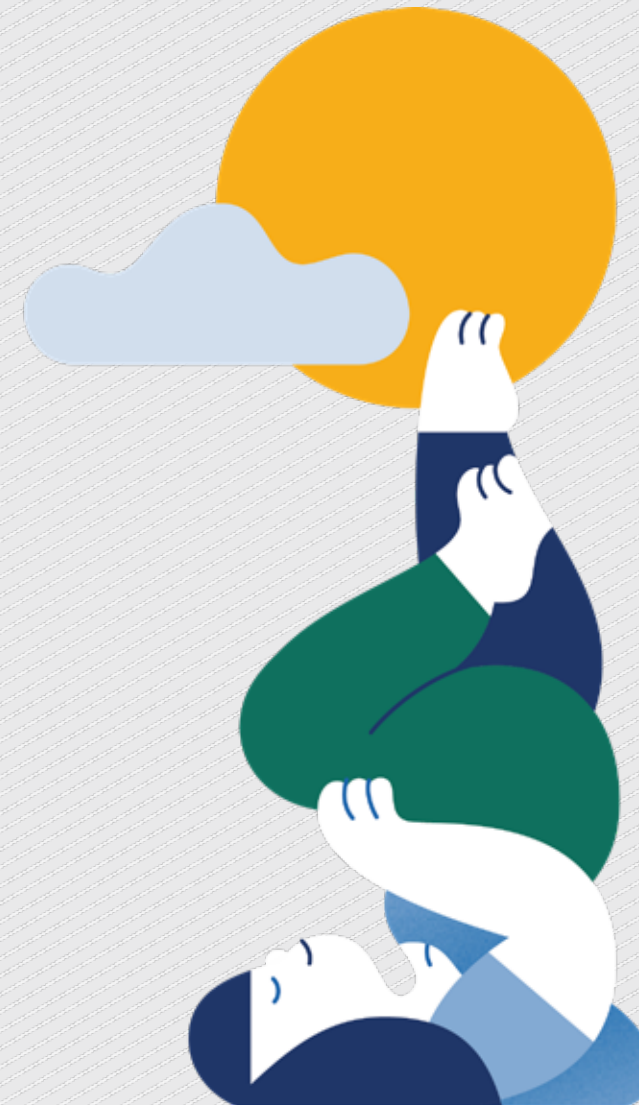
Exposure to nature has been found to calm the subgenual prefrontal cortex, the part of the brain responsible for mental brooding. Neurologists believe it takes as little as 40 seconds of staring at an image of natural scenery for this calming effect to kick in.<sup>23</sup>

### Cognition.

A 2008 University of Michigan study compared the cognitive effects of walking through downtown Ann Arbor with the effects of strolling through the city's arboretum. The nature walk restored voluntary attention — responsible for such tasks as problem-solving — far more effectively.<sup>24</sup>

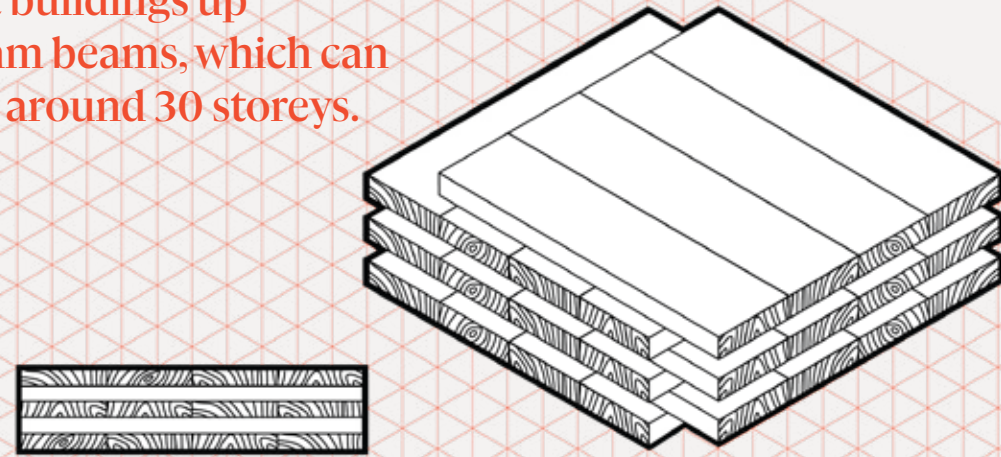
### Concentration.

A 2012 study from the University of Texas at San Antonio showed that, in workplaces, the presence of fractals (self-repeating patterns at a variety of scales, from small to large) serves as a buffer from stress that can help people perform challenging mental work.<sup>25</sup> Wood grain is, in essence, a series of fractals — like snowflakes, no two wood pieces are ever alike.



# Two types of mass timber parts

To help Quayside become the world's first entirely mass timber neighbourhood, an Ontario-based factory would process cross-laminated timber panels, which can self-support buildings up to around 10 storeys, and glulam beams, which can provide structural support for around 30 storeys.



## Cross-laminated timber panels

Sidewalk Labs plans to use cross-laminated timber, commonly called CLT, to manufacture structural wall panels and floor plates. In Quayside, Sidewalk Labs proposes to create a 10-storey building entirely from CLT.

### Composition.

The creation of CLT begins by milling a piece of wood ranging from 15 to 35 millimetres thick. Typically, three to seven layers of such pieces are arranged with the grains perpendicular to each other, then are compressed together with a green-certified glue to create a panel of up to 4-by-18 metres.<sup>26</sup>

### Adhesives.

The most common adhesives for CLT are polyurethane-based, or PURs, which are free of solvents and of formaldehyde, and ensure both low toxicity and capacity for future reuse or recycling. Industry testing has demonstrated that CLT panels utilizing PURs have no impact on internal

air quality by the emission of volatile organic compounds, commonly called VOCs.<sup>27</sup>

### Strength.

Whereas traditional timber is only strong in the direction of the grain, CLT's layered arrangement gives it strength in two directions.<sup>28</sup> A typical CLT wall panel is capable of bearing a vertical force of 197 kilonewtons per metre, which is equal to four elephants standing on top of a one-metre section of wall.<sup>29</sup> As a result, CLT wall panels and floor plates have enough strength to support up to a 12-storey building on their own, without the need for the structural beams and posts used in conventional mid-rise constructions of the same height, thus freeing up the interior space typically devoted to beams and posts.<sup>30</sup>

### Shipping.

To optimize for shipping, CLT panels can be manufactured to fit a standard articulating truck.

That means a truck can be packed up to 50 percent full with CLT walls and floor plates, with the rest of the cargo weight going towards racks that hang these pieces. By contrast, when shipping steel, a truck is considered overweight after only 5 percent of its cargo volume is filled, given the weight of the material. (More on shipping on Page 226.)

### Assembly.

CLT panels can be manufactured with interlocking metal cleats at both ends to accelerate assembly.<sup>31</sup> The assembly speed is extremely fast because there is no need to use structural posts and beams or partition walls for structural support. While CLT panels can be treated with any type of paint or plaster, design experts believe 45 percent of the natural wood should be exposed to get the full health benefits of its biophilic properties. (More on assembly on Page 227.)

## Glulam beams

For buildings that exceed the 12-storey structural limitations of CLT, Sidewalk Labs proposes to use a different type of mass timber called glulam to manufacture structural posts and beams. In Quayside, glulam supports (along with CLT floor panels) would be used to develop buildings of around 30 storeys tall, a new record that would demonstrate the technology's capabilities.

### Composition.

Glulam's name comes from the use of glue to laminate wood together. Glulam is made using three to nine layers of timber, but unlike CLT, glulam is made with the timber grains oriented in the same long direction. As a result, glulam has immense load-bearing strength across the length of the beam or straight down a post — the same support steel offers in traditional construction.

### Adhesives.

The adhesives used in glulam are also PURs.

### Strength.

Glulam beams and posts, combined with CLT panels and floor plates, would provide the technical strength to support a skyscraper as tall as the Empire State Building.<sup>32</sup> However, as a building's height increases, the size of the glulam beam nec-

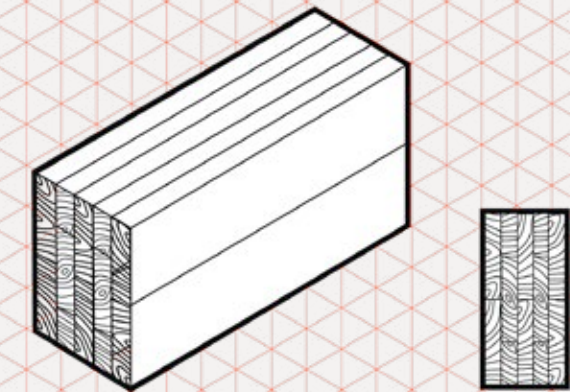
essary to support the structure expands significantly, reducing the amount of usable interior space. With existing engineering, the beam size would become intrusively large, or 1.5 metres deep, when a building exceeds around 30 storeys.

### Shipping.

Like CLT, glulam materials are half the weight of steel beams and posts, making them easier to transport. Whereas a typical truck can handle two or three steel beams, it can carry 10 times as many glulam beams.

### Assembly.

As with CLT, the lighter weight of glulam makes these pieces easy to assemble on-site via metal cleats.



## Ensuring fire resistance with “Shikkui plaster”

When people first learn about the prospect of tall wooden buildings, their first question is often: “What about fire?” Despite this reasonable concern, **mass timber is engineered to be not only more fire-resistant than typical wood<sup>33</sup> but just as fire-resistant as concrete or steel.<sup>34</sup>**

As a primary form of fire resistance, mass timber panels can be designed with an outer layer of wood in place solely to provide a “charring layer,” which acts as a buffer, protecting the interior (and structurally essential) layers from further combustion.<sup>35</sup> These fire-resistant charring layers protect mass timber pieces that are exposed (or viewable) as part of a building’s interior design. These layers also help extend the life of a mass timber building, because they can be replaced (rather than demolished) if charred.<sup>36</sup>

Alternatively, mass timber panels designed without charring layers (to reduce size) could be protected by a non-combusti-

ble fire-insulating panel, such as drywall. But the use of drywall, which is the typical construction practice, is labour intensive and wasteful: it generates nearly 12 million tonnes of debris every year.<sup>37</sup> That debris represents up to 27 percent of overall construction waste<sup>38</sup> and often languishes on construction sites as a potential hazard; eventually, it goes to landfills, where it becomes poisonous gas,<sup>39</sup> negating some of the sustainability benefits of using mass timber.

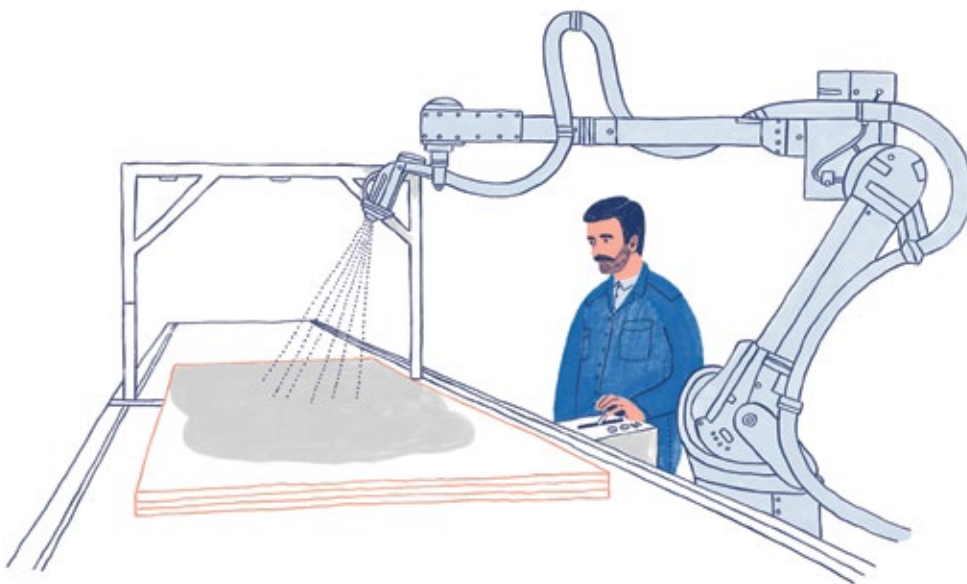
In search of a better form of protection, Sidewalk Labs is developing new applications for a natural plaster system called Shikkui plaster, which has a fire-resistance rating comparable to that of drywall (see sidebar on Page 215) and has many additional advantages, including sustainable properties, health benefits, faster application times, and a green waste stream.

Made from natural ingredients, including slaked lime, seaweed extracts, eggshells, and plant fibres, Shikkui plaster has been used in Japan for over 1,000 years on walls and ceilings as an aesthetic finish that also protects

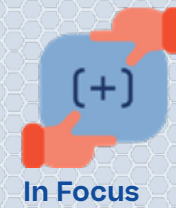
wood buildings against water and fire damage. As a hybrid of natural substances, Shikkui is completely environmentally sustainable (receiving the globally recognized Cradle to Cradle certification), fully recyclable and compostable, and produced with low amounts of energy. Its low carbon footprint is reduced even further as it continuously absorbs carbon dioxide after installation.

Shikkui also provides health benefits: its high alkalinity makes it a natural killer of bacteria and mold, and its anti-static properties prevent the accumulation of dust that allergens feed off of. Additionally, its finish includes customizable textures and colours, enabling interior variety with no need for any paint.

The Shikkui system can also accelerate construction timelines. Sidewalk Labs plans to mechanically install Shikkui onto mass timber panels in a factory, cutting the amount of time typically devoted to the application of paint and drywall in half. This approach results in a waste stream that can be recycled as plant-beneficial fertilizer.<sup>40</sup>

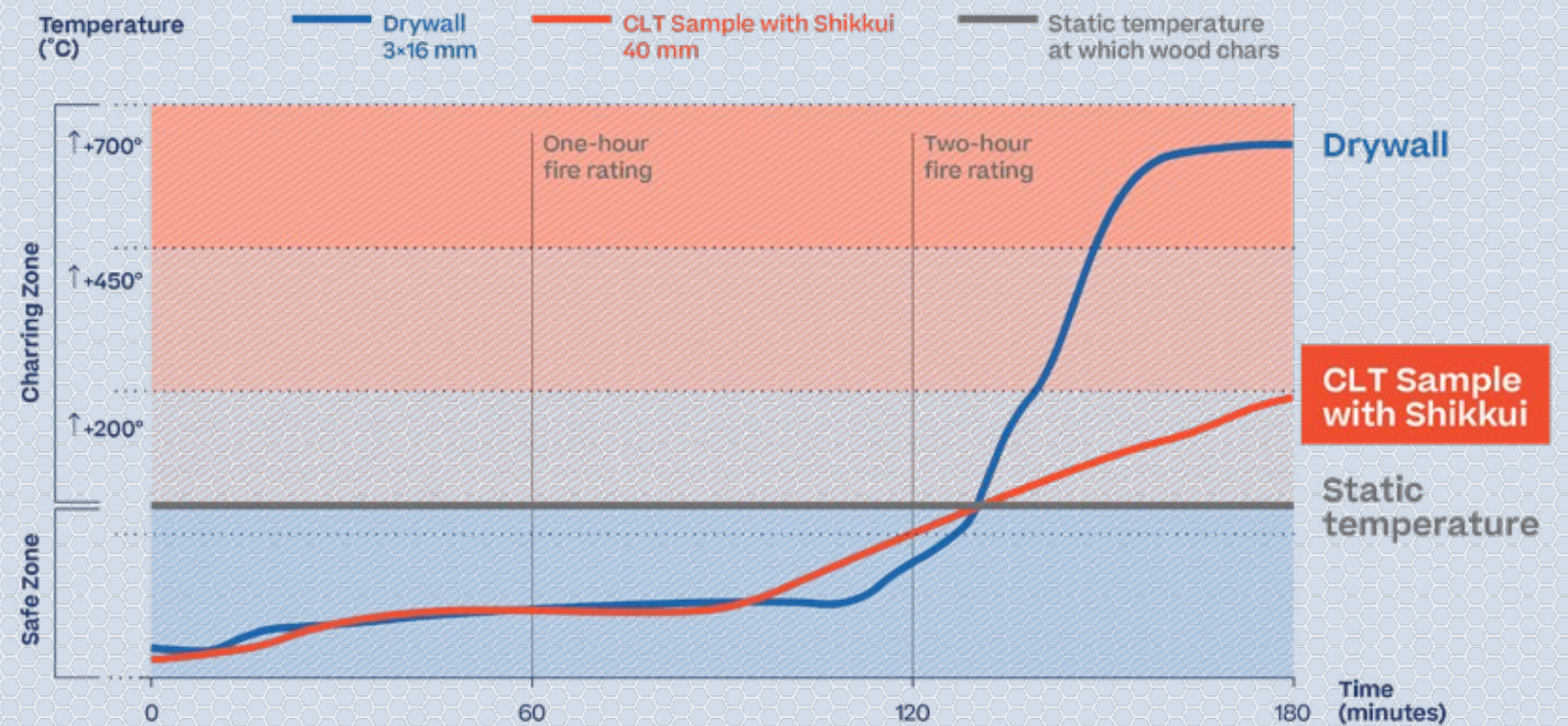


**Mechanically applying Shikkui plaster to mass timber panels can help accelerate construction timelines.**



### Independent test results

## Shikkui system matches drywall on fire protection



To demonstrate the fire-resistance of mass timber panels coated in Shikkui plaster, the coated panels must meet the American Society for Testing and Materials (ASTM) E119 standard called “Standard Test Methods for Fire Tests of Building Construction and Materials.”<sup>41</sup>

The ASTM E119 test is designed to assess how well building elements can contain a fire and maintain structural integrity over a given time period, commonly referred to as one- and two-hour “rated assemblies” — the same standard achieved by double and triple five-eighths-inch drywall. These time periods are considered long enough for occupants to safely evacuate, and for firefighters to control the fire damage.

(On its own, Shikkui plaster already meets the Class A rating for the ASTM E84 standard, also known as the Steiner Tunnel test, meaning that it does not let fire spread across its wall or ceiling surfaces.)

The ASTM E119 test places the plaster-coated mass timber panels in a flat furnace and subjects them to a controlled flame. Within five minutes, the furnace reaches temperatures of 537 degrees Celsius, rising to 927 degrees Celsius at one hour and to 1,010 degrees Celsius during the second hour. The furnace test continues until the target one- or two-hour test limit is successfully achieved or until an unsuccessful outcome occurs, such as when the structure collapses or the material surface reaches a temperature of 300 degrees Celsius.

Preliminary tests conducted by an independent laboratory achieved the one- and two-hour “rated assemblies,” meaning the Shikkui-coated mass timber withstood exposure for both one and two hours, as required by ASTM E119. Further tests will be conducted in a state-of-the-art, certified independent laboratory and supervised by the National Research Council Canada.

## Strengthening wind resistance and building cores

Mass timber is about half the density of concrete or steel. While that makes it easier for trucks to ship and for construction workers to assemble, this lightness also makes mass timber structures more susceptible to wind, especially once they exceed 10 storeys (depending on building massing).

Many of the tallest timber buildings in existence today integrate steel-based external frames or other lateral support systems to anchor and stiffen the building against wind, but adding steel detracts from timber's sustainability advantages. As part of the planning process, Sidewalk Labs explored three potential innovative building cores that could be used to strengthen resistance from wind and seismic activities for mass timber buildings. Sidewalk Labs plans to explore which cores provide the best fit for buildings developed in Quayside, and to make all three options publicly available for third-party developers to consider for their own building needs.<sup>42</sup>

### Timber cores.

For buildings up to 12 storeys, cores made entirely of timber could be a viable alternative to external frames, maintaining the building's low carbon footprint.

### Prefabricated steel cores.

For buildings higher than 12 storeys, a new type of prefabricated steel core could anchor the building. Although lacking the environmental advantages of timber cores, this approach has the potential to reduce on-site construction times by roughly one month over traditional concrete cores, with steel cores (including elevator rails) delivered straight to a site from a factory.

### Hybrid.

The exploration also found potential in a new type of timber core that incorporates post-tension steel cables to increase the overall stiffness of the core. This option could support timber structures of at least 30 storeys, while offering a more sustainable option than a steel core.

## Making Ontario a global leader

Canada has all the ingredients for a transformative industry in mass timber building materials.

The country owns about 37 percent of the world's certified forests, defined by the international Forest Stewardship Council as areas that can be harvested for wood in a sustainable way, with proper spacing to regrow trees and with access to existing railways or roads to transport supplies.<sup>43</sup> Almost half of Canada's 374 million hectares of forests are certified. Roughly half a billion new seedlings are planted every year. The \$24.6 billion forestry industry in Canada employs more than 200,000 people (including more than 12,000 from Indigenous populations), with more than half of all jobs located in Ontario and Quebec.<sup>44</sup>

Canada harvests nearly 800,000 hectares of timber per year, but devotes the majority of that supply to framing lumber, such as simple two-by-fours or plywood. As a result, Canada currently imports mass timber parts from Austria and other production centres.

By supporting the launch of a factory in Ontario for the construction of mass timber structures in the IDEA District, Sidewalk Labs would help jumpstart this next-generation Canadian industry. This newly expanded supply chain would

begin with local foresters and sawmills creating the baseline CLT and glulam pieces, which would then be sent to the factory to be cut into assembly-ready posts, beams, and panels — part of the complete library of factory-made building parts described in the following section of this chapter.

### Engaging the timber community.

Sidewalk Labs has engaged more than 150 stakeholders across this potential supply chain to figure out what needs to happen to make Ontario a global leader in what could be a major piece of the future of urban building. Part of the answer is a commitment to ensure that the demand for mass timber starts at the proposed 6 million square feet of development — with the potential to grow to 33 million square feet at the full scale of the IDEA District.

An equally important factor is supporting close collaboration among designers, contractors, and manufacturers, thus establishing partnerships that might not be in place today across trades (see sidebar on this page).

To jumpstart the process of collaboration, Sidewalk Labs has hosted or planned a series of industry events focused on mass timber. To date, these events have included an overview of the Sidewalk Toronto project and a design review of Sidewalk Labs' proposed library of building parts to construct a building. Future events are expected to include discussions of risk mitigation and capacity building. (More information is available at the Sidewalk Toronto project website.)

By helping to grow the capabilities of local players, and by building on the timber industry's momentum, Sidewalk Labs can enable a sustainable ecosystem for mass timber that can contribute to further innovation in timber construction and realize economic benefits for the city, province, and country for decades to come.

### Sidewalk Labs small research grant

## Modular timber construction in Ontario

The use of mass timber to construct high-rise buildings has enormous appeal. But as with all new technologies, costs are expected to be higher at first, as production techniques are worked out and economies of scale are developed. That is also true in the regulatory world. Permitting and code agencies are unfamiliar with mass timber and may at first take more time and be less predictable in their judgements, which adds to costs.

In the report "Mass Timber in High-Rise Buildings: Modular Design and Construction," commissioned by Sidewalk Labs, authors Dalia Dorrah and Tamer E. El-Diraby, professor in the Department of Civil and Mineral Engineering at the University of Toronto, recommend that industry and government work together to accelerate the process of lowering costs and streamlining techniques, both industrial and regulatory. Doing so can help unlock the potential to build a vital new industry in Ontario, which could supply a new economic base while improving the built environment of Toronto and the region.

To this end, Dorrah and El-Diraby propose that developers, manufacturers, contractors, and government officials work to establish councils and partnerships to share information. One difficulty, the authors argue, is the fear that mass timber buildings would be fire hazards. Studies show this concern is misplaced, but the issue needs to be addressed head on.

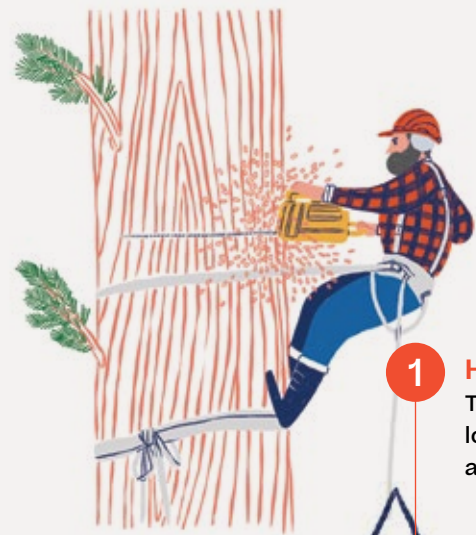
They also suggest using an Integrated Project Delivery System, where owners and contractors can share information more fully, as well as a three-dimensional modelling system known as building information modelling (BIM). These tools would establish the common contractual and technical platforms that would boost cooperation and collaboration.

Finally, Dorrah and El-Diraby say development of mass timber has another potential side benefit: it could test the resiliencies of contractors and developers as they work out new techniques, ultimately better preparing them for a changing market.



# Catalyzing a sustainable mass timber supply chain

Sidewalk Labs would build on Canada's growing efforts to embrace mass timber by reimagining the supply chain, harvesting local sustainable timber that would be processed in a new Ontario-based factory. The resulting construction process would be faster, more predictable, less expensive, and better for the environment — jumpstarting a new national industry.



**1 Harvesting sustainably.**  
The supply chain would begin with local foresters harvesting timber in a sustainable way.



**2 Collaborating with local sawmills.**  
Harvested timber would then make its way to local sawmills, where it would be turned into CLT and glulam pieces.



**3 Manufacturing a library of parts.**  
The new factory would then cut and prepare these mass timber pieces into assembly-ready wall panels, floors, beams, and posts (in addition to preparing other components of its building library).



**5 Assembling faster.**  
Mass timber parts would be fitted with a cleat system that would make assembly fast: the structure could go up as quickly as one floor per day.



**4 Shipping to the site.**  
Once ready for assembly, mass timber parts would be efficiently shipped to a construction site.





# Launch a factory to produce a complete library of building parts

A set of mass timber structural pieces is the foundation for a new, factory-based approach to sustainable urban development. But a building consists of more than panels and beams. To accelerate project timelines, improve predictability, and reduce costs in a holistic way, Sidewalk Labs plans to establish a complete library of factory-made building parts available to all developers — whether in the IDEA District, elsewhere in Toronto, or around the world.

The building parts created and assembled in this new factory would be produced in sufficient volumes to reduce both costs and sourcing time for developers and contractors. Sidewalk Labs has started to work closely with local regulators to enable these pieces to be pre-approved, creating more certainty around construction timelines and the permitting process. These parts would still be customizable by architects seeking to deliver distinctive designs, as the same library of parts can lead to dramatically different buildings.

The result would be unique designs built on a faster, more predictable timeline, with reduced risks and opportunities to lower key project cost categories. These benefits emerge from several areas:

#### Materials procurement.

Pre-determined components could create more predictable, shortened timelines for sourcing and procurement. Bulk purchases would also cut the rising cost of materials, ensuring consistent pricing.

#### Design.

A pre-designed library of parts would reduce time spent on designing. A pre-established strategy around technical details (such as fire-resistance ratings, acoustics, and deflection, as well as mechanical, electrical, and plumbing integration) would dramatically reduce overall design time and cost.

#### Assembly.

The easier on-site assembly of prefabricated mass timber parts would accelerate project speeds, saving time and reducing project management costs and site operational costs during the construction period.

#### Transportation.

Developing a library of parts created to optimize shipping would reduce transportation costs.



Factory-based construction of building parts would result in less waste, better working conditions, and streamlined regulatory approvals.

#### Waste.

Finishing parts in a factory would capture waste for recycling and nearly eliminate on-site waste.

#### Labour.

Off-site factory conditions would improve productivity and reduce on-site supervision needs, while also reducing risks of injury.

#### Regulatory approvals.

Pre-certified building components and assemblies would create clarity on meeting code and permit reviews.

#### Contingency.

The greater reliability of the factory supply chain would reduce the need for developers to build “contingency” costs into their projects.

Sidewalk Labs has considered a wide range of building materials and technologies and will continue to explore others in the hopes of further improving the sustainability of the system and the efficiency of the construction supply chain. Some of these innovations are designed to be integrated in tall timber systems (such as new manufactured timber products or wall systems) and others have driven innovation in other industries but could be incorporated in building systems (such as mineral wool insulation and pressurized walls and windows).

The following sections describe these benefits in greater detail. By injecting more certainty into the building process, Sidewalk Labs hopes to enable projects that meet both the city’s objectives for affordability and the waterfront’s standards for aesthetic excellence.

# The six core components that make up the library of parts

The proposed off-site factory would process six core building components: exterior facades and windows, exterior wall systems, structural elements, interior wall systems, kitchens and bathrooms, and building roofs. Together, these parts can improve predictability of design and procurement of parts for developers.


Working in collaboration with local foresters, sawmills, and suppliers, the proposed off-site factory would produce and assemble the building parts shown here, helping to reduce the time spent sourcing and procuring materials and conducting initial designs, while also making the costs of materials more predictable.

## A Exterior facades and windows.

The success of manufactured buildings will rely in large part on the ability of architects to design structures that do not look like they just rolled off a factory line. Sidewalk Labs' proposed building library would incorporate a customizable facade system that includes windows of all shapes, shades, and sizes, and outer cladding (or coating) of different materials to help create unique exteriors.

As part of this facade kit, Sidewalk Labs plans to incorporate a type of triple-paned electrochromic glass that can be used for windows, skylights, facades, or curtain walls.<sup>45</sup> Electrochromic glass can be tinted — either manually, by building occupants, or automatically, by a building management system — to deflect heat before it enters a building, reducing the need for air-conditioning and leading to lower utility bills. While this technology is not new, it has only recently become affordable and customizable in a way that lends itself to widespread use.

## B Exterior wall systems.

Exterior wall systems form the outside structure of a building. These walls can be made out of any number of materials, such as non-structural CLT panels or glass curtain walls. The factory would produce or assemble facade panels that meet Toronto Green Standard Tier-3 sustainability standards, creating an airtight building seal that reduces the need for heating and cooling. 

## C Structural elements.

As described on Page 212, Sidewalk Labs plans to create structural components from mass timber that include CLT building floor plates, CLT structural wall panels, and glulam beams and posts, as well as the standardized cleats and fittings required for their assembly.


## D Interior wall systems.

Interior wall systems include non-structural walls and the electrical and water systems that typically come with them. Sidewalk Labs would incorporate a new system of flexible interior walls that could be easily clipped into place for faster renovation, while being every bit as strong as interior walls commonly used today. These walls would feature mist-based fire systems and low-voltage power systems (see Page 246 for more details).

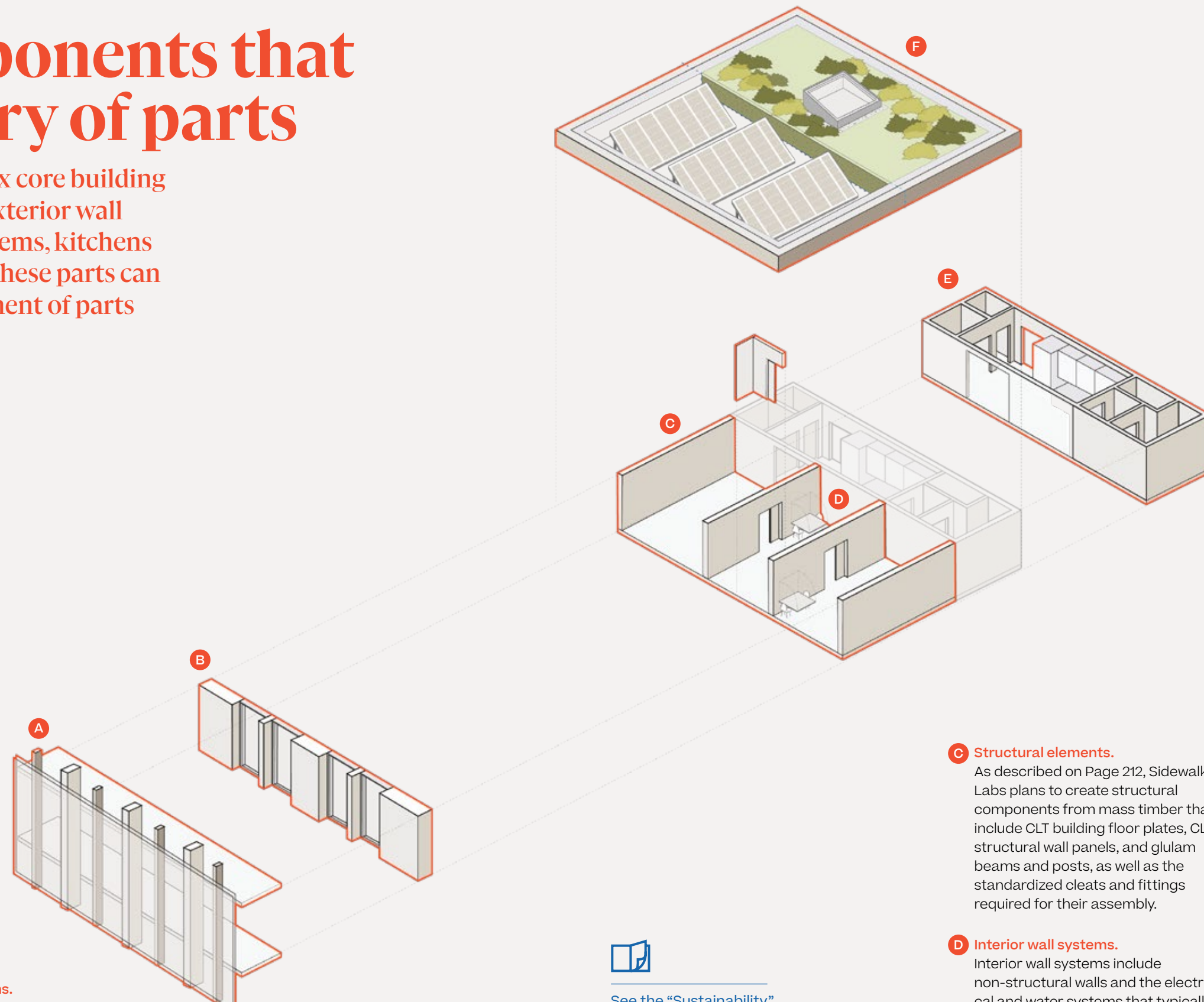
## E Kitchens and bathrooms.

Kitchen and bathroom units are the most complicated and time-consuming on-site construction elements in residential buildings, as tile layers, electricians, plumbers, and fixture installers all try to work in the same small space at once. For these reasons, Sidewalk Labs would pre-assemble these units in a factory, where each of these trades can be sequenced to avoid conflicts and to achieve higher-quality installations. These units would be customizable with appliances, finishes, and colour schemes to meet individual styles and preferences. Sidewalk Labs is working with partners to develop appliances specifically designed for a new low-voltage power system (see Page 247).

## F Building roofs.

Sidewalk Labs plans to assemble several types of building roofs, including photovoltaic roofs designed to harvest solar energy, green roofs to integrate nature or garden space into the building structure, and “blue roofs” to help manage stormwater. Blue roofs would have a predesigned flow rate to significantly slow down the volume of water leaving the roof, helping to avoid downstream or localized flooding. 

With this same library of parts, architects and developers would be able to create dramatically different buildings that achieve the highest design standards while still cutting costs; three illustrative examples from global architecture firms are shown in the accompanying visuals.



See the “Sustainability” chapter of Volume 2, on Page 296, for more details on energy-efficient building designs.

## Creating three unique designs from one library of parts

Sidewalk Labs' library of factory-made building parts can be combined in thousands of ways to produce strikingly different designs. Using the same set of modular components, three global architecture firms developed creative design concepts for Quayside's mass timber buildings (for illustrative purposes only).



**Library of parts interpretation:**  
**Michael Green Architecture (Vancouver).**

Michael Green Architecture envisioned wood buildings for Sites 1 and 2 in Quayside that incorporated garden spaces into the design and aimed to create a diverse range of public and private spaces on the lower floors. Overall, these designs aimed to strengthen connections with nature and with fellow community members. Credit: MGA | Michael Green Architecture



**Library of parts interpretation:**  
**Snøhetta (New York).**

Snøhetta used the Sidewalk Labs mass timber toolkit to create designs for Sites 3 and 4 in Quayside that prioritized adaptability, with lower-floor stoa spaces anchoring a vibrant open-air plaza beside Parliament Slip. The wood system also enabled the team to envision an architecturally striking "hull" that curves atop this public space. Credit: Snøhetta



**Library of parts interpretation:**  
**Heatherwick Studio (London).**

Using the mass timber library of parts, Heatherwick Studio created a design for Site 5 in Quayside that is both expressive and unique. Freed by the modular system from the need to focus on "how" to achieve the building, the team envisioned a more intimate scale for the site that connects with the public realm and the waterfront. Credit: Picture Plane for Heatherwick Studio

# Saving on waste, shipping, and assembly

Sidewalk Labs estimates that its efficient factory process would produce a 75 per cent reduction in waste, 85 percent fewer deliveries to a construction site, and a 35 percent acceleration of assembly compared with typical on-site construction techniques.

## Waste

Reducing waste by 75%

	Concrete	Timber	
<b>Number of dumpsters required</b>			
Single building Residential Site 2	303	76	75% fewer dumpsters
<b>All Quayside</b>	<b>5,066</b>	<b>1,271</b>	

The manufacturing process nearly eliminates site waste, because the prefabricated mass timber pieces are designed as perfect fits, and new sizes can easily become standardized over time. Addi-

tionally, as noted on Page 214, Shikkui plaster dramatically reduces waste compared to drywall. For example, in Quay-side, the use of Shikkui will divert over 275 tonnes of drywall debris from landfills.

## Shipping

Reducing truck site deliveries by 85%

	Concrete	Timber	
<b>Number of trucks required</b>			
Single building Residential Site 2	695	90	85% fewer trucks
<b>All Quayside</b>	<b>11,619</b>	<b>1,505</b>	

Note: These figures account for structural parts only and do not include shipments for foundations and building fit-outs.

Shipping has traditionally been a difficult challenge for factory-produced structures. While whole rooms might be cheaper to assemble off-site than on-site, they are far more expensive to ship — in effect, shipping an empty room means paying to ship air.

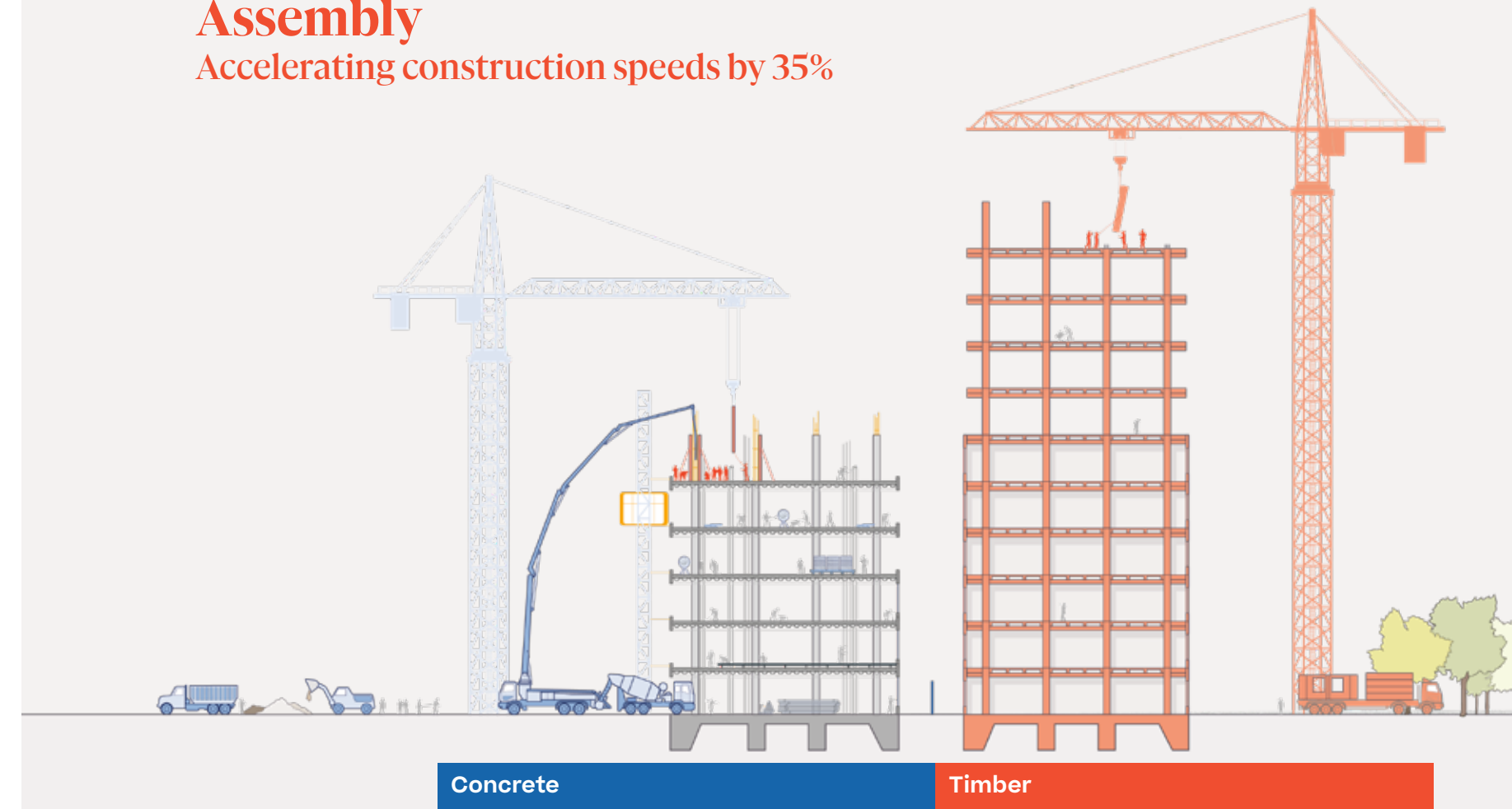
Sidewalk Labs' library of building parts would be designed to maximize shipping efficiency, reducing the transportation costs that have hampered manufactured buildings in the past. As noted on Page 212, the lightness of mass timber makes

it possible to fill a standard truck with far more parts than is possible with steel or concrete. A single 40-foot truck can hold either 18 CLT floor panels, 18 CLT wall panels, a mix of six panels and six walls, and two "wet boxes" (kitchens or bathrooms), or roughly 20 beams or posts.

On average, mass timber post and beam structures require up to 85 percent fewer deliveries to a construction site than concrete structures do, dramatically reducing the amount of congestion and neighbourhood disruption.

## Assembly

Accelerating construction speeds by 35%



Concrete

Timber

Sidewalk Labs' factory-based approach would dramatically speed up construction for two main reasons. First, the lightness of mass timber structures would require less extensive foundations. Second, the CLT and glulam cleat technology would make it easy for mass timber parts to snap into place quickly.

Sidewalk Labs believes the structural assembly of a building could ultimately reach speeds of one floor a day, compared with a typical on-site construction timeline of one floor per week. In other words, the basic structure for a 12-storey mass timber building could go up in as little as 12 days, compared with a more typical timeline of three months.

To complete a 12-storey building — which involves basic structural assembly as well as the installation of all finishes, the connection of all electromechanical equipment, and the execution of all tests — Sidewalk Labs estimates that its factory-based process can reduce construc-

tion time from 20 months to 13 months, delivering projects 35 percent faster than today's methods.

The advantages of assembly for mass timber exist at the scale of a single building but would likely increase over time, since construction workers would become more familiar with the cleat system and on-site managers would optimize the assembly sequence. These assembly innovations would also lead to a dramatically quieter construction site by removing the need for heavy equipment, eliminating material staging space, and reducing the number of on-site workers.

Sidewalk Labs does not plan to perform its own on-site assembly and instead proposes to work with local general contractors for this part of the process. Sidewalk Labs commits to reserve 10 percent of the hours spent on the construction of the neighbourhood for workers from historically disadvantaged and equity-seeking groups.

## Improving productivity and worker conditions

Sidewalk Labs' plan for an off-site factory would result in a lower cost of construction and a faster completion time, both important steps towards helping Toronto reach new levels of affordability. But changes to the construction industry would have impacts on jobs and labour that must be taken seriously. While a new ecosystem of manufactured buildings would reduce total job hours for on-site construction crews, Sidewalk Labs believes that, on net, its approach to off-site manufacturing would have several benefits for construction workers in Toronto and across the region:

### New, higher-paying jobs.

Though it would reduce on-site construction jobs, an off-site factory would increase job hours in factories and would create new

jobs in related trades. Sidewalk Labs has explored these trade-offs with leadership of Ontario's Carpenters Union Local 27, who believe a new industry focused on mass timber could create new carpentry schools that teach workers to use engineered wood, leading ultimately to higher-paying factory jobs for this new specialty.

Additionally, the emergence of a mass timber factory in Ontario could bring about new local suppliers of timber as well as competing factories over time. Finally, by accelerating development within the IDEA District, a factory would catalyze an estimated 5.2 million total work hours for all factory-related trades.

### Shorter commutes, greater comfort.

Shifting on-site construction jobs into factories has the potential to change the geography of labour across a region, a shift that

comes with some notable advantages. Factory-based construction provides stability of commutes, since the job site never changes. Hours in factories are far more predictable. And unlike on-site construction jobs, factories are climate-controlled and well lit, with access to sanitation and lunch areas.

### Safer work environments.

Labour statistics suggest an off-site construction factory would also improve worker safety. According to Ontario's Workplace Safety and Insurance Board, construction sites are considerably more hazardous for workers than manufacturing facilities. From 2013 to 2017, the WSIB recorded 4,499 claims from construction workers who lost time on the job due to injury. That amounts to 1,146 claims for every 100,000 construction workers, compared to only 641 lost-time claims for every 100,000 manufacturing employees (see table below).<sup>46</sup>

## The safety benefits of manufacturing jobs

From 2013 to 2017, Ontario construction workers filed an average of 1,146 injury claims for every 100,000 workers, compared with 641 for factory workers.

	Construction	Manufacturing
Claims per 100,000 workers		
Lost-time claims	1,146	641
High impact claims	429	207
Fatalities	5.6	0.9

Note: All figures represent five-year averages. Manufacturing includes making, preparing, altering, repairing, ornamenting, printing, finishing, packing, packaging, inspecting, testing, assembling, and adapting for use or sale any article or commodity or raw material.

## Achieving construction cost savings of 20% at scale

A factory-based approach to mass timber could reduce costs across typical construction categories, including material procurement, assembly, waste, and on-site workers. Realizing these savings requires a sufficient scale of development, such as the proposed IDEA District, both to produce a significant volume of building parts and to optimize factory operations.

	Share of typical project cost	Share of mass timber factory costs
Materials procurement Bulk purchases would limit the rising cost of materials and ensure predictable pricing.	30%	27%
Design A pre-designed library of parts would dramatically reduce overall design time and cost.	6%	5%
Assembly Easier on-site assembly of prefabricated mass timber parts would reduce project management costs and site operational costs during a shortened construction period.	14%	12%
Transportation A library of parts would enable optimized shipping, reducing transportation costs.	3%	2%
Waste Finishing parts in a factory would nearly eliminate on-site waste.	2%	1%
Labour Factory construction would reduce on-site construction needs, while increasing hours for factory workers and improving safety.	35%	26%
Contingency Greater supply chain reliability would reduce the need to build "contingency" costs into projects.	10%	7%
<b>Total typical project cost</b>	<b>100%</b>	<b>80%</b>

Accelerating development would catalyze an estimated 5.2 million total work hours for all factory-related trades.

## Improving project predictability through pre-approved prototypes

Canadian code currently restricts mass timber buildings to a maximum of six storeys, given the relative youth of this technology. But mass timber has advanced rapidly. In the last five years, construction has begun or been completed on 21 timber towers above seven storeys worldwide.<sup>47</sup> Toronto has four tall timber buildings planned or in the works, including a 14-storey building at the University of Toronto and a 12-storey research and education centre at George Brown College called the Arbour.<sup>48</sup>

Additionally, the National Research Council, Canada’s code body, may align with its equivalent body in the U.S., the International Code Council, in approving by 2021 an approach for timber buildings up to 18 stories tall. These provisions would include protections against fires, as already exist for other materials such as concrete and steel.

In Quayside, Sidewalk Labs proposes to create buildings up to around 30 storeys by filing for a common performance-based approvals pathway known as “alternative solutions,” the approach used by Terrace House in Vancouver and being pursued by the Arbour in Toronto. Approval of this alternative solution involves submitting project-specific structural-engineering calculations and computer models to regulators, demonstrating how the building would perform as well as or better than the “acceptable solution” for conditions such as wind, rain, fire, and seismic activity.<sup>49</sup>

To enhance its filing, Sidewalk Labs plans to have its building designs peer-reviewed by independent evaluators, including the Vancouver-based Aspect Structural Engineers; Vortex Fire Consulting, a global fire-code consulting firm with offices in Toronto; and CHM, a fire-engineering consultancy with offices in Ottawa. Sidewalk Labs is also working with Equilibrium, a Vancouver-based structural engineering firm that was part of the team (along with CHM) that designed the Wood Innovation and Design Centre at the University of Northern British Columbia, an eight-storey, mass timber building completed in 2014.

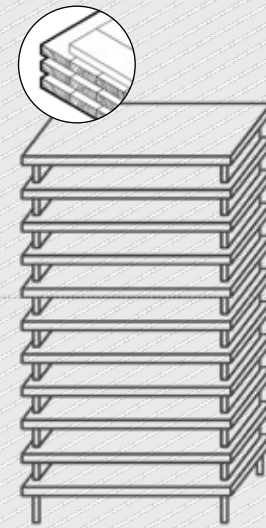
After completing these approvals — and given the standardized components of the factory’s library of parts — Sidewalk Labs anticipates that code reviewers and permit authorities could potentially identify pre-certified building components and assemblies, even for entire structures. For example, after a 10-storey CLT residential tower gained approval once, that same design could be “express” approved when applied to a new building project, with the architect or engineer of record responsible for confirming that the design has been used before.

### Technical spotlight

## Sidewalk Labs’ proposed approach to constructing mass timber buildings

Height of Brock Commons  
(18 Storeys)

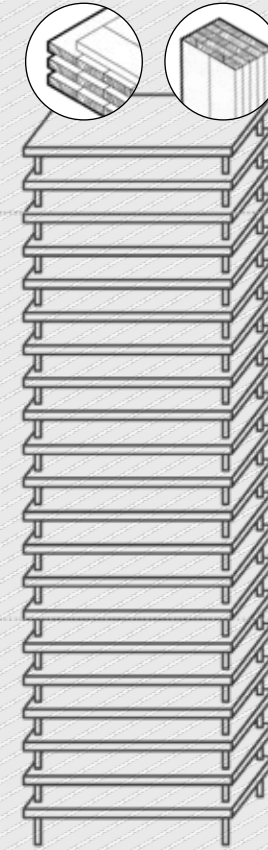
Today  
Canada code



**2–10 Storeys**  
Res – Loft 1/2/3

**A self-supported tower prototype of around 10 storeys would be built using “three-ply” (or three-layer) CLT structural wall panels and five-ply floor plates.**

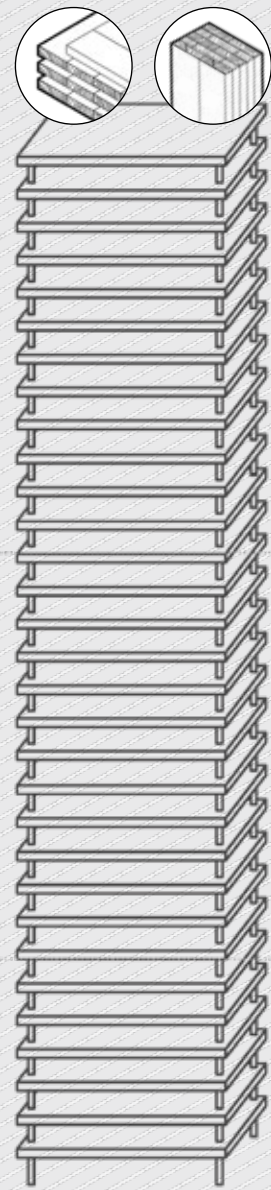
The main advantage of CLT-only towers is that they are faster and less expensive to assemble than buildings that require interior posts and beams for structural support. Currently, a 10-storey building approaches the structural limitations of a three-ply and five-ply CLT system. To support buildings of taller heights, thicker CLT panels would be required, which would eat into usable square footage and create a more complicated and expensive structure.



**10–20 Storeys**  
Res – Loft 1/2/3

**A building prototype of around 20 storeys would be built using glulam beams and posts as the structural support system throughout the building.**

Existing buildings, such as the 18-storey Brock Commons, have demonstrated the viability of mass timber construction near this height — although 20 storeys would top the existing record for Canada.



**20–30 Storeys**  
Res – Loft 1/2

**A building prototype of around 30 storeys would also be built using glulam beams and posts as the structural support system.**

In 2019, Sidewalk Labs plans to begin designing a prototype of around 30 storeys called Proto Model X (or PMX) that would allow for testing and refinement of the library of building parts within Quayside. Delivering PMX would demonstrate the viability of integrating various technologies as well as the factory process. This work would require close collaboration with government partners to determine the necessary approvals for delivering a system of tall timber buildings, starting with Quayside.

## Unlocking value and reducing contingency through overall project predictability

Factory-based construction techniques and a library of building parts would help developers accelerate project timelines and improve overall predictability. Sidewalk Labs estimates that 6 million square feet of delivery output would be needed to refine the factory process to a point of peak efficiency. This demonstration phase would also stabilize the operating margins critical to reducing developer risk.

With that period complete, Sidewalk Labs believes its proposed factory process would lead to improved project economics, enabling developers to clear returns while contributing to an ambitious vision for 40 percent below-market housing within the IDEA District.

A market analysis conducted by Sidewalk Labs anticipates that accelerating project timelines and reducing project risks would enable developers to create value by reducing contingency costs compared with current practices and by completing more projects over the same time period. In response to these benefits, developers might even choose to accept lower rates of return on any given project.

As described in the section of this chapter on housing affordability, beginning on Page 262, Sidewalk Labs estimates that factory-based construction techniques could unlock \$639 million in value through 2048 when deployed at the full scale of the IDEA District. That value represents a sizeable contribution from developers toward below-market housing, which would complement government affordability programs to help Toronto achieve its goals for mixed-income communities.

Value unlocked for below-market housing:

**\$639 million**

# Factory-based construction enables developers to support an ambitious vision for 40% below-market housing.



Accelerating Construction Timelines

## Coordinate the supply chain with a digital delivery system

To coordinate every part of the proposed mass timber supply chain, including the off-site factory line and on-site assembly, Sidewalk Labs plans to create a digital coordination system called Sidewalk Digital Fabrication.

Automobile manufacturers have long used integrated software systems to coordinate every stage of their production chains — from the factory in one place making hubcaps, to the regional assembly plant in another place putting all the pieces together, to the car dealership in yet another place selling whole cars on a lot. Car designers also get feedback from the product to make those cars both safer and better suited to consumers.

In the past 10 years, the emergence of similar software for buildings, known as building information modelling (or BIM), has helped organize the building process. BIMs can track essential details such as availability, price, material, weight, shape, strength, all the way down to the serial number of a given component. Just like the coordination systems for cars, BIMs create more reliable cost and time estimates, as well as a feedback loop for the supply chain to improve over time.

The proposed Sidewalk Digital Fabrication system would build on existing BIMs to create an end-to-end digital backbone for the entire construction pipeline, connecting suppliers, developers, architects, regulators, contractors, and even landlords.



An integrated software system for buildings, similar to those used by car manufacturers, can provide more reliable time and cost estimates.



# A new digital system makes it possible to coordinate every part of the mass timber supply chain, from the factory to the construction site.

Lack of coordination among these groups is a big reason why construction costs are so unpredictable today. In a typical case, developers create a feasibility study for a plot of land — a lengthy, iterative process. Once that study is done, an architect typically integrates those ideas into an actual building design despite having little visibility into available construction supplies. From there, a contractor bids on the price of completing the job, which often means the architect must revise the designs to meet a budget. At that point, regulators would say whether or not the design meets approval; if not, it is back to the drawing board again. All of these hiccups add time and money to a project.

The Sidewalk Digital Fabrication system would aim to create an unprecedented degree of clarity across the entire development ecosystem, enabling all parties to reduce costs related to uncertainty.

The system would make site-specific details of a development process trackable in real-time, including factory parts, building designs, shipping statuses, construction-site management, and building operations. This integrated digital interface would provide instant feedback on how decisions impact capital costs, delivery timelines, operating performance (such as energy use), and other considerations throughout the planning process.

Sidewalk Labs plans to build the underlying infrastructure to support this advanced system but to partner with other innovative players in the field, such as Autodesk, which can provide other components of the planning platform, such as tools to estimate costs and procure materials.

## Comparison

### Improving the entire building supply chain

	Today	Sidewalk Digital Fabrication
<b>Architects and designers</b>	A lack of reliable manufacturing options encourages customization, driving up project costs and creating greater risk of delay. Design teams spend significant time coordinating and modelling a project-specific approach to building detailing; mechanical, electrical, and plumbing integration; fire performance; and acoustic performance — just to have the designs modified after bidding and the engagement of suppliers and contractors. Lack of insight into parts and costs leads to projects that are over budget. If costs must be cut late in the process, the original vision might get sacrificed.	A library of building options — with real-time prices and delivery times shown through the BIM interface — would enable architects to create designs with certainty about what supplies are available. The variation of these materials would also facilitate design excellence. Additionally, a new BIM module could enable architects to rapidly evaluate computer-generated design options and balance planning decisions with their creative vision.
<b>Manufacturers</b>	Customized building designs make it difficult to create parts ahead of time and in sufficient volume to reduce costs.	Feedback from a BIM could ensure that a factory created a consistent supply of standardized building component types, thus also offering pre-determined delivery timelines. This coordination would ultimately lead to more efficient operations, more predictability, and reduced costs.
<b>Contractors</b>	Customized designs make for a less standardized assembly process.	BIM systems can help contractors know how best to assemble the parts in a given design. Additionally, the standardization of parts would help workers assemble them easily and quickly, particularly as crews gain more familiarity with the standardized components.
<b>Regulators</b>	Customized designs introduce uncertainty about whether building elements will meet code or require costly alterations. A code authority reviews designs for the first time and issues permits and approvals late in the development process. If a reviewer identifies certain aspects of a plan that fail to meet code, architects and contractors must often go back to the design and procurement phase, potentially adding months to a project timeline.  Additionally, code authorities are sometimes overwhelmed by the volume of applications from developers and the amount of manual work and background research required to respond. That can lead to delays in the permitting process, which in turn adds time and cost to projects throughout the city.	Code reviewers and permit authorities reviewing a BIM model could identify pre-certified building components and assemblies. This process would free architects and engineers to choose from a kit of parts with confidence that their final designs and plans will meet code and require minimal permit review.  For example, after one 10-storey CLT residential tower has been approved by the buildings department, that same design could be “express” approved when applied to a new building project, with the architect or engineer of record responsible for confirming that the design has been used before.
<b>Landlords and tenants</b>	Customized designs make it difficult, time-consuming, and costly for landlords or tenants to replace or maintain outdated building elements.	Landlords or tenants could easily maintain and operate buildings because any replacement parts would be well documented in the digital system and available via continual supply. For example, it would be easy to find out where a broken window came from and order a new one.

# Part 2



## Helping Neighbourhoods and Households Evolve



### Key Goals

- 1 **Create an adaptable “Loft” space built for all uses**
- 2 **Accelerate renovations with a flexible interior wall system**
- 3 **Enable a safe, vibrant mix of uses with real-time building codes**
- 4 **Design affordable and flexible housing units**

New construction techniques represent a first key step towards faster development and more affordable neighbourhoods. But a comprehensive plan for affordability must also design building structures with flexibility and adaptability, features that can enable a complete community of residents, businesses, and workers.

Today, most spaces within a building are created for a single purpose: residential, commercial, or industrial, with perhaps a little retail on the ground floor. Adapting these spaces to accommodate new uses requires lots of time or money. Yet the needs of cities, local economies, and households evolve over time, and rigid building designs are a barrier to meeting them.

To help neighbourhoods evolve, buildings should be able to accommodate a range of uses and shift quickly and inexpensively from one need to another. The result would be communities where people can live, work, shop, and social-

ize within a short walk. Residents could visit cultural installations without a car or take lively nighttime strolls past buzzing parks and restaurants. Within a single neighbourhood people could find affordable space to pursue their professional dreams, whether a single co-working desk to plot out a startup or a short-term stall to sell a hand-crafted confection. Homes could meet the needs of growing families and single-person households alike.

Adaptable spaces also enable a community to respond more effectively to larger trends. Right now, high-demand cities like Toronto need as much housing as possible, but at other moments in time they have needed industrial or office space with equal urgency. Looking ahead, retail spaces are on the verge of transforming in the face of e-commerce. When a space can be used for many different purposes, or when it can be renovated for any new use at a low cost, it is unlikely to remain vacant for very long.

Sidewalk Labs’ plan to create buildings that can actively support communities over time has four core components.



*A loft-style, adaptable approach to floor plans and interior spaces could be adapted for many different types of residential and non-residential uses. A flexible wall system would enhance this approach by dramatically accelerating interior renovations. A real-time building-code system could ensure consistent safety levels even as a building changes its mix of tenants. And housing units of all sizes designed for peak efficiency could provide affordable options and flexibility for all types of households.*

At the neighbourhood scale of Quayside, Sidewalk Labs plans to build approximately 350,000 square feet of adaptable space to demonstrate this design’s ability to accommodate residential, commercial, and other uses within a single structure. Sidewalk Labs estimates that this adaptability would reduce the time required to convert individual spaces by an esti-

**Adaptable spaces would reduce renovation time by 50%**

mated 50 percent. In collaboration with the city, the real-time code system would also be tested in Quayside for its ability to detect nuisances in real time. Using an efficient approach to unit design, Sidewalk Labs plans to make 40 percent of all housing units family sized (two bedrooms or more).

Implemented at the full scale of the IDEA District, Sidewalk Labs’ adaptable building innovations could be extended across hundreds of spaces, providing a dynamic new model of mixed-use development that can keep pace with a community’s evolving needs. For the first time, cities would be able to know in real time that buildings are meeting safety codes, enabling a far greater mix of uses than typically found today. And an efficient approach to unit design would enable developers to create more overall units while retaining liveability, unlocking new value that could help meet the ambitious goals of affordable and below-market housing programs.

**Flexible buildings enable a dynamic new model of mixed-use development that can keep pace with a community’s evolving needs.**



# Create an adaptable “Loft” space built for all uses

Toronto has many examples of the adaptive power of buildings with vast open floor plates, known as lofts.

Take the King Street West neighbourhood, once home to thriving manufacturers and warehousing facilities that served the city through World War II.<sup>50</sup> As these operations began to decline, many buildings fell into neglect, only to be revived and adapted in recent years into new homes, office spaces, shops, and restaurants — uses far different from the neighbourhood’s industrial roots. But while these industrial structures proved nimble enough, adapting building spaces to dramatically different needs is generally expensive.

To reduce the cost of renovating spaces while retaining the spirit of industrial loft structures, Sidewalk Labs has designed an adaptable building space called, simply, Loft.

Sidewalk Labs’ Loft concept improves upon traditional loft buildings by planning explicitly for ongoing, more frequent interior changes around a strong skeletal structure (sometimes called “good bones”). Lofts are designed around a post-and-beam skeleton and feature high ceilings as well as a flexible wall system to make renovations fast and easy.

This combination of a durable exterior with a nimble interior enables buildings to remain flexible throughout their life-cycles, accommodating a wide range of uses — including residential, retail, production, community, office, hospitality, and parking — that can respond quickly to evolving needs.

The basic idea behind Loft is to over-build the “bones” of a building to allow for unanticipated uses in the future. A physician’s office that needs a lot of interior rooms, a retail showcase that needs few interior rooms, and an artist studio that needs high ceilings could all occupy the same space over time, instead of having to find separate building spaces designed to fit their needs. That flexibility means Lofts would be more expensive to create up front, but it would also help the spaces recover these costs over time by decreasing vacancy periods by 50 percent compared to traditional spaces. If turnover of a typical space takes four weeks, adaptable space would decrease that period by about two weeks by removing time-consuming activities, such as demolishing partition walls and moving electrical wiring (see Page 246 for wall renovation comparisons). Sidewalk Labs estimates that after roughly two tenant turnovers, the initial cost of Loft would break even.

In addition to facilitating tenant changes, Loft spaces would make it easy for tenants to adjust their own spaces, thanks to reusable interior fittings such as interior walls. For example, a company could reconfigure a Loft office space to accommodate a weeklong training seminar, then return it to offices or small conference rooms. Likewise, a family might decide to subdivide a room in a Loft housing space to accommodate a long-term guest or new family member. Beyond saving time, reusable interior fittings also cut down on construction debris.

At the core of this flexibility is a system of standardized dimensions and modular interior parts that enable buildings to be reconfigured rapidly from one use to the next. This technical foundation includes: high ceilings, long floor spans, modular

fittings, utility cavities, and prefabricated wetboxes. (See the next page for more.)

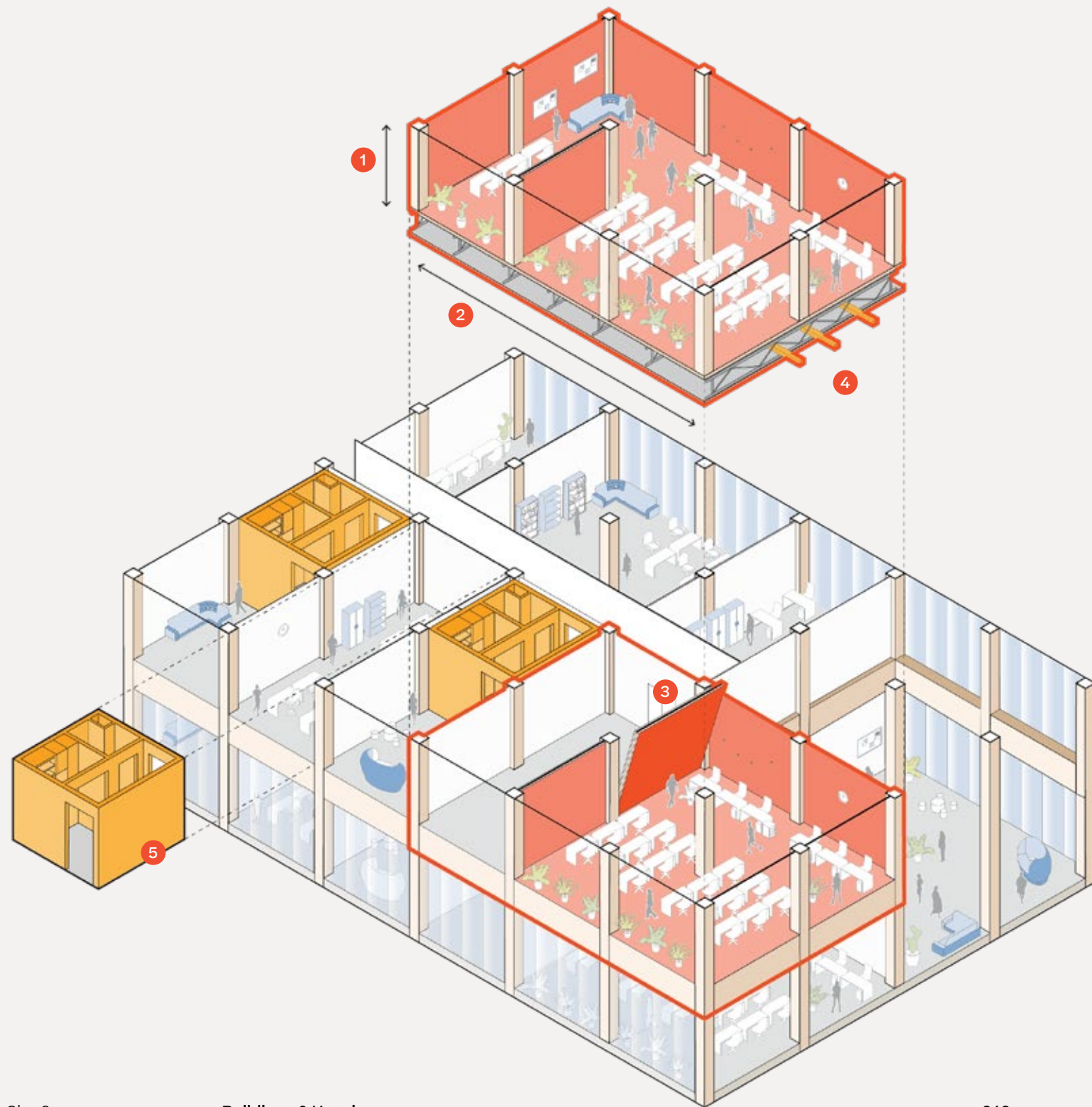
In Quayside, roughly 10 percent of building square footage would be Loft space. In an effort to diversify spaces vertically, Quayside’s buildings would incorporate Loft spaces from the 3rd to the 12th storeys. Loft spaces would begin as a combination of residential, commercial, office, and light industrial tenants. Over time, they would have the ability to shift across these uses in response to neighbourhood needs.

One reasonable concern with flexible spaces such as Loft is that they would all immediately shift towards the area of greatest market demand. For example, if developers converted all Loft spaces in Quayside to housing, that outcome would indeed respond to current local needs, but it would also undermine the larger goal of creating a live-work neighbourhood. For that reason, Sidewalk Labs plans to implement minimum targets on its Loft spaces for commercial usage, so they always reflect some level of mixture across commercial and residential uses.

**To reduce renovation costs while retaining the spirit of industrial loft structures, Sidewalk Labs has designed an adaptable building space called, simply, Loft.**

# Loft's five flexible design features

By incorporating high ceilings, long floor spans, modular fittings, utility cavities, and prefabricated kitchens and bathrooms, adaptable Loft spaces can be renovated in half the standard time. This flexibility can accommodate a lively mix of homes, shops, offices, and other uses to help a community meet its evolving needs over the short and long term.



## 1 High ceilings.

At roughly four metres, Loft ceilings are taller than usual to create sufficient space for a variety of interior uses, such as art studios, small businesses with lots of inventory storage, or smaller apartments that feel more comfortable with higher ceilings.

## 2 Long floor spans.

At 27-by-33 feet, with few columns interrupting the space, Loft floor spans would provide for the flexible arrangement of spaces and make it easier to subdivide the same space for new uses.

## 3 Modular fittings.

Loft's flexible interior walls (described in detail on Page 246), doors, finishes, and other modular fittings would be designed to be reusable and interchangeable across all uses.

## 4 Utility cavity.

By placing utilities in a cavity beneath the floor plate, Loft would create an independent home for water, electrical, lighting, ventilation, fire suppression, and heating and cooling systems, among others, enabling renovations without needing to rip out utilities and reinstall them every time.

## 5 Prefabricated wetboxes.

Loft is designed so that the bathroom and kitchen sub-components arrive as boxes that can be easily slotted into a building's structure during assembly and quickly connected to all utilities.

*In addition to featuring long-term Loft spaces throughout buildings, Quayside would also pilot two specific applications of the concept: a lower-floor flexible space called "stoa," and a future-proof parking structure.*


# Stoa: A flexible new ground floor

Much like buildings themselves, today's ground-floor spaces tend to be pre-defined for specific purposes. A barber shop needs very little storefront: just a door and a glimpse of a haircut. But a department store needs a long series of windows to attract customers with a variety of merchandise. Those specific designs make it very hard for landlords to fill retail vacancies and for business owners to contract or expand in response to changing economic conditions, such as the rise of e-commerce.

To improve the flexibility of ground-floor space, Sidewalk Labs plans to apply an adaptable structure to the lower two floors of its buildings called “stoa,” taken from the lively open markets of Ancient Greece. Stoa spaces would be supported by large glulam posts spaced 12-to-18 metres apart to create long open stretches that could be divided into a variety of retail, production, or community spaces, according to neighbourhood needs. These spaces could be separated or combined to meet a variety of uses: one stoa stall might form a barber shop, while many stalls together could form a department store.

For retail tenants in particular, the cost of a launch would be significantly reduced in a stoa stall compared to a typical ground-floor retail space. In traditional retail spaces, tenants face high launch costs regardless of the length of a lease. Because stoa spaces are designed for more frequent turnover, tenants would incur a fraction of the launch costs up front and could make a return on their investment in a matter of months, rather than years.

Sidewalk Labs estimates that costs associated with structural and mechanical elements of renovation, such as moving walls and electrical wiring, would decline by roughly 50 percent. So if it would typically take a landlord \$40 per square foot to conduct these aspects of a renovation, it would instead only take \$20 per square foot. In addition, tenants who choose to take full advantage of prefabricated components and finishings could reap additional cost savings.

In addition, renovating a stoa space would be an estimated 50 percent faster than renovating a typical space, leading to less time between tenants, and thus to more vibrant communities. For example, companies with different peak seasons — a tax preparation firm, a costume store, a ski shop, and so on — could occupy the same stoa stall across the year. 

Sidewalk Labs' stoa ground-floor space would be designed for fast, affordable renovations, enabling a lively mix of traditional retailers, small businesses, makers, community groups, and more, as well as a mix of short-term, seasonal, and long-term uses.

## First floor roof

- A** **Weather-mitigation structures** (such as the building Raincoat shown here) can help to keep ground-floor spaces vibrant in all seasons.

## Mezzanine

- B** Stoa provides spaces for **unique modular retail setups**, such as kiosks that can host temporary installations, supporting a dynamic mix of uses.
- C** A **flexible wall system** enables fast and affordable renovations that support the growth of businesses over time and help stoa adapt with changing neighbourhood needs.
- D** **Double height spaces** help stoa accommodate a wider range of uses than typical ground-floor spaces, such as art studios or small businesses with lots of inventory storage. These heights begin on the ground floor and can extend through the mezzanine area.

## Ground floor

- E** Seamless **indoor-outdoor connections** help to break down the barriers between ground floors and sidewalk spaces, increasing vibrancy and interaction.
- F** Stoa space facilitates the launch of **small-scale pop-up shops** and other short-term initiatives that activate the ground floor.



See the “Public Realm” chapter of Volume 2, on Page 118, for more details on stoa.

# Flexible parking garages for a self-driving future

As described in the “Mobility” chapter of Volume 2, the arrival of self-driving vehicle fleets would mean neighbourhoods need fewer parking garages over time. But traditional parking garages are difficult to adapt to new uses given the inclines of their interior ramps and the orientation of their elevators, which tend to be along their perimeters. In conventional buildings, elevator shafts are placed in the centre for shared access.

Sidewalk Labs has developed a design approach for a Loft-style parking garage that can accommodate a reduced need for parking over time — without demolishing the entire structure. While an adaptable parking garage is not a fit in a small neighbourhood like Quayside with very little on-site parking, Sidewalk Labs plans to explore the potential for such a structure within the IDEA District.

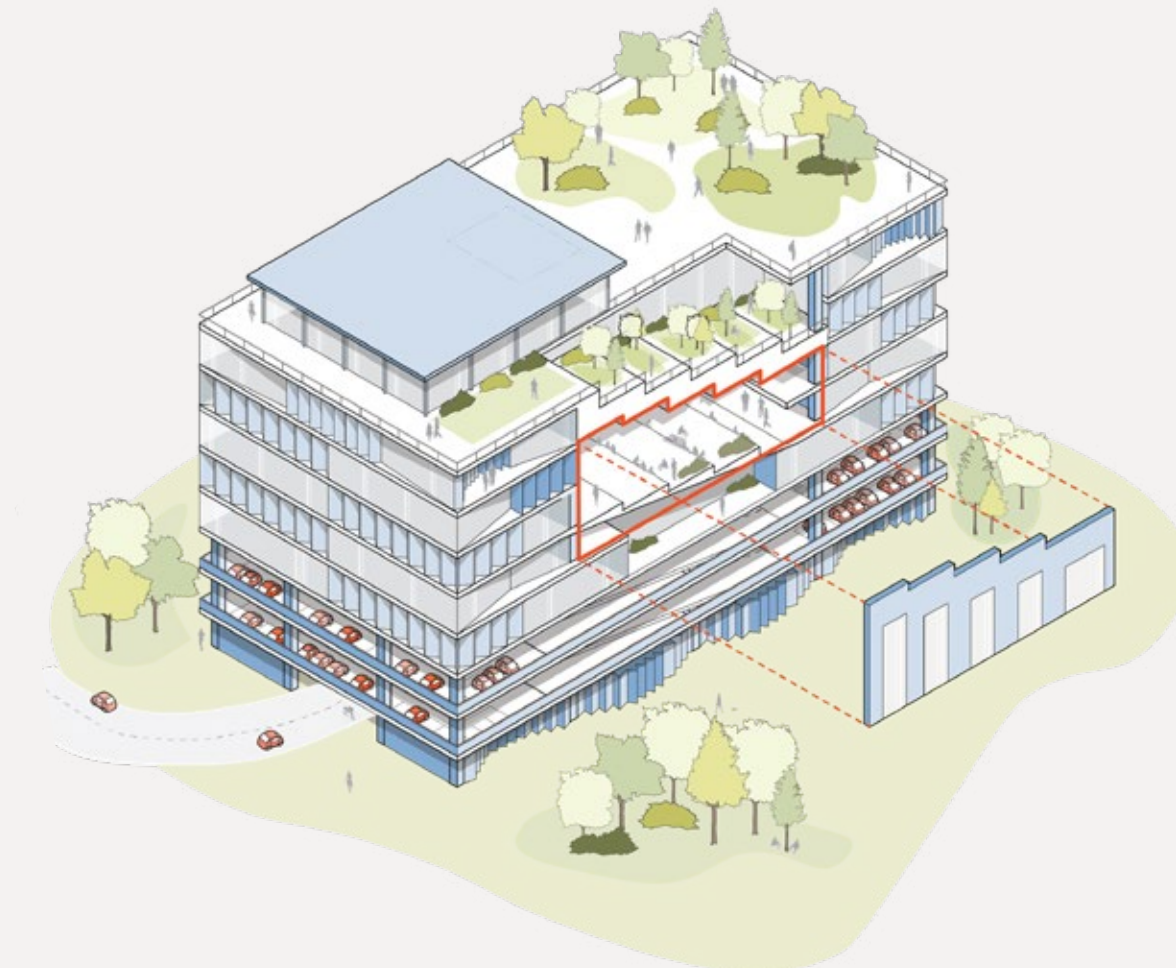
This design approach would put a majority of the parking space above ground, realizing \$5.2 million in construction savings against a traditional 30,000-square-foot below-ground garage. To ensure flexibility of this design, ramps would be placed at the perimeter of the garage for easier removal or unobtrusive conversion. The elevator cores would be in the centre to accommodate an unknown mix of future uses. Stairway capacities and locations, as well as HVAC systems, would be suited to commercial or residential needs in anticipation of future conversion.

If the demand for parking did diminish, the conversion to an office or residential use could occur quickly and would incur a \$8.6 million investment, much less expensive than building an entirely new office or residential building with the same capacity. This conversion would allow a building to continue generating revenue from all of its spaces, rather than getting stuck with a vacant parking garage.

Initial design  
Before self-driving vehicles



Future adaptation  
Once self-driving vehicles arrive



## How a flexible parking garage can evolve over time

Underground parking would represent a sunk cost if demand diminishes due to the arrival of self-driving vehicles that reduce the need for car-ownership by operating as a shared-ride service. Sidewalk Labs’ adaptable design would feature only above-ground parking that could be easily repurposed in the future.

Such a parking structure, whether stand-alone or integrated within a commercial or residential building, could allow for a building’s investment to be adapted for other uses.

For example, with adaptable design of ramps and cores, a parking garage could be converted into an office or another use — instead of demolished and rebuilt at much higher cost — if parking demand declined in the future.



# Accelerate renovations with a flexible interior wall system

The rigidity of interior wall panels presents one of the biggest barriers to building renovations today. Demolishing drywall, moving electrical wires, reconfiguring sprinkler systems, and other common renovation requirements can take months and cost thousands of dollars, leading to long vacancies that take an apartment or storefront off the market, and making it hard for small businesses to compete.

Renovations are also rarely straightforward. Renovation workers almost always run into surprises, from the detection of incorrect wiring to the discovery of mold or asbestos, adding time and money to the process. It is not uncommon for adjacent tenants to get so annoyed at a lengthy renovation next door that they, too, leave a building. On top of these impacts, renovation involves knocking down drywall that ends up in landfills and churning up dust that reduces indoor air quality.

To tackle this challenge, Sidewalk Labs plans to create a flexible interior wall system that would enable adaptable Loft spaces to change within weeks instead of months, at a cost of hundreds instead of thousands of dollars, compared with traditional renovations.

These factory-produced, floor-to-ceiling interior walls would be 10 centimetres thick and made from timber panelling, with an acoustic insulation that would, according to standardized acoustical testing, make them as sound-resistant as conventional walls. Taken as a unit, this wall system would be easy to mount, move, or replace, helping building owners reduce vacant space, tenants alter space to fit business needs, and communities avoid lengthy disruptions to storefronts.

In addition to flexible walls for Loft spaces, Sidewalk Labs also plans to build flexibility into permanent interior walls in residential units, enabling them to expand (or contract) in response to resident needs. These walls would be designed with a flexible opening embedded in the wall. For example, if a family expands, a panel insert could be removed to create a new passage between rooms. The same panel could be reinserted if the additional room is no longer needed. Either process would take roughly half a day. (More on flexible units on Page 253.)

To ensure this flexibility, Sidewalk Labs also proposes new approaches to power systems and fire suppression protections, two of the biggest existing challenges to faster renovations.

## Incorporating low-voltage power systems

Today, moving electrical wiring is a lengthy process, because most wires are protected in steel or corrugated plastic conduits and embedded in walls to reduce the risk of fires. Roughly 37 percent of all fires in Toronto are a result of electrical malfunction or cooking fires, with multifamily buildings experiencing a higher incidence of fatalities due to such events, according to Toronto Fire Services.<sup>51</sup>

Sidewalk Labs plans to design a low-voltage (under 2,000 watts), digital, electric power system that can travel over ethernet cables hidden under the baseboard or crown molding of flexible interior walls. Compared to electrical wires embedded inside walls, this system would dramatically reduce the risk of fires as well as the length of renovations. (To address cooking fires, Sidewalk Labs has proposed alternatives to natural gas that would result in cooking appliances being powered electrically.)

Power-over-ethernet is a controlled system that only sends power when a receiving device is active on the other end, unlike electrical outlets today, which receive a continual stream of power whether or not a device is active. That makes it possible to eliminate the cost of building a traditional “breaker box,” which typically is needed to de-energize a wall plug or light fixture when there is a malfunction. It would also save closet space where breakers are usually stored. Sidewalk Labs will initially include provisions (such as converter boxes) to support appliances designed for AC power systems.

In addition to reducing fire hazards, power-over-ethernet capabilities enable buildings to eliminate electricity meters, since the same cable that carries the power can track electricity data down to the level of an outlet. This advance makes it possible for tenants who share a space — for instance, a co-working space, or even roommates — to receive individual electricity bills, encouraging energy efficiency.

## Implementing mist-based fire protection systems

Conventional sprinkler systems represent another major barrier to faster interior renovation. Typically, fire sprinkler systems embed one-to-two-inch pipes in ceilings and walls. To move this type of system requires draining the pipes, opening the walls, unscrewing the piping, re-plumbing the connections, refilling the system, and checking for leaks. It can cost thousands of dollars per move.

As part of its interior wall system, Sidewalk Labs plans to incorporate a mist-based fire protection system that can be hidden along a wall surface or ceilings in one-centimetre (three-eighth-inch) tubing, reducing renovation time to less than an hour while improving fire protection.

Mist-based fire systems originated with the shipping industry as a way to fight vessel fires using just 10 percent of the water volume of traditional sprinklers. Museums and historic buildings later adopted them to cause less water damage to the art and historic architecture.<sup>52</sup>

→ Continued on Page 250



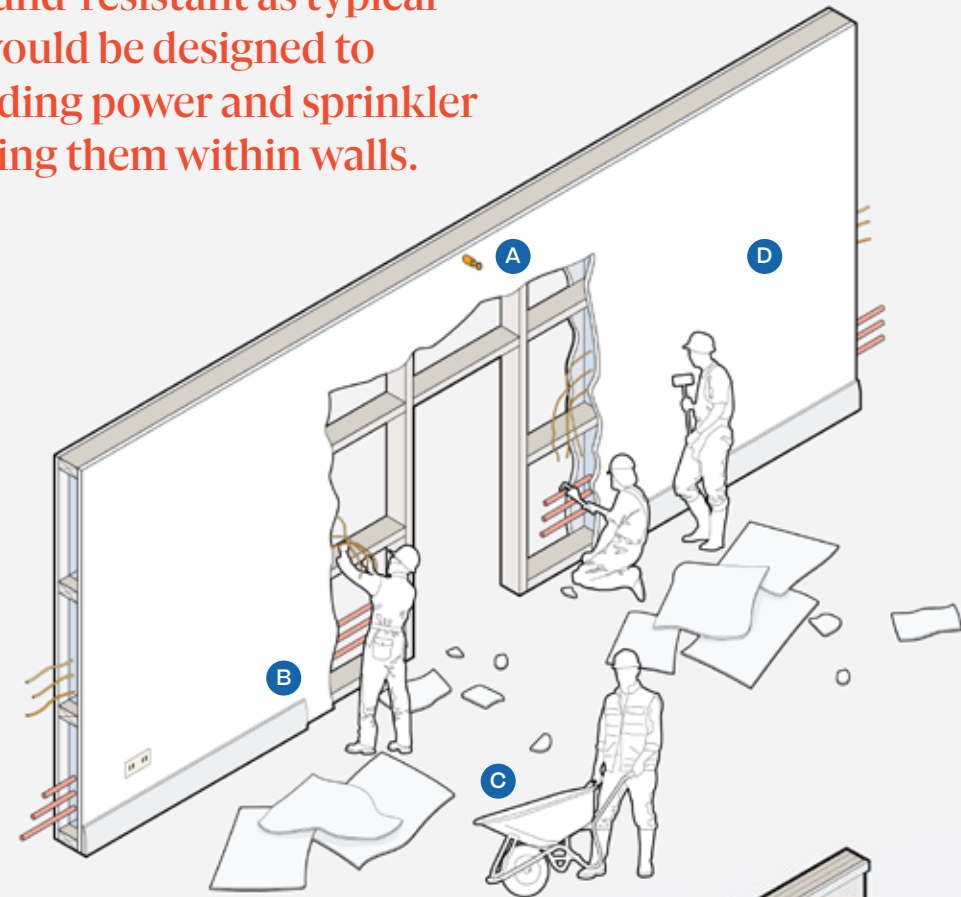
See the  
“Sustainability”  
chapter of Volume  
2, on Page 296, for  
more details on  
electrification.

# Renovation that saves time and money

While just as strong and sound-resistant as typical walls, flexible wall panels would be designed to accelerate renovation by hiding power and sprinkler systems instead of embedding them within walls.

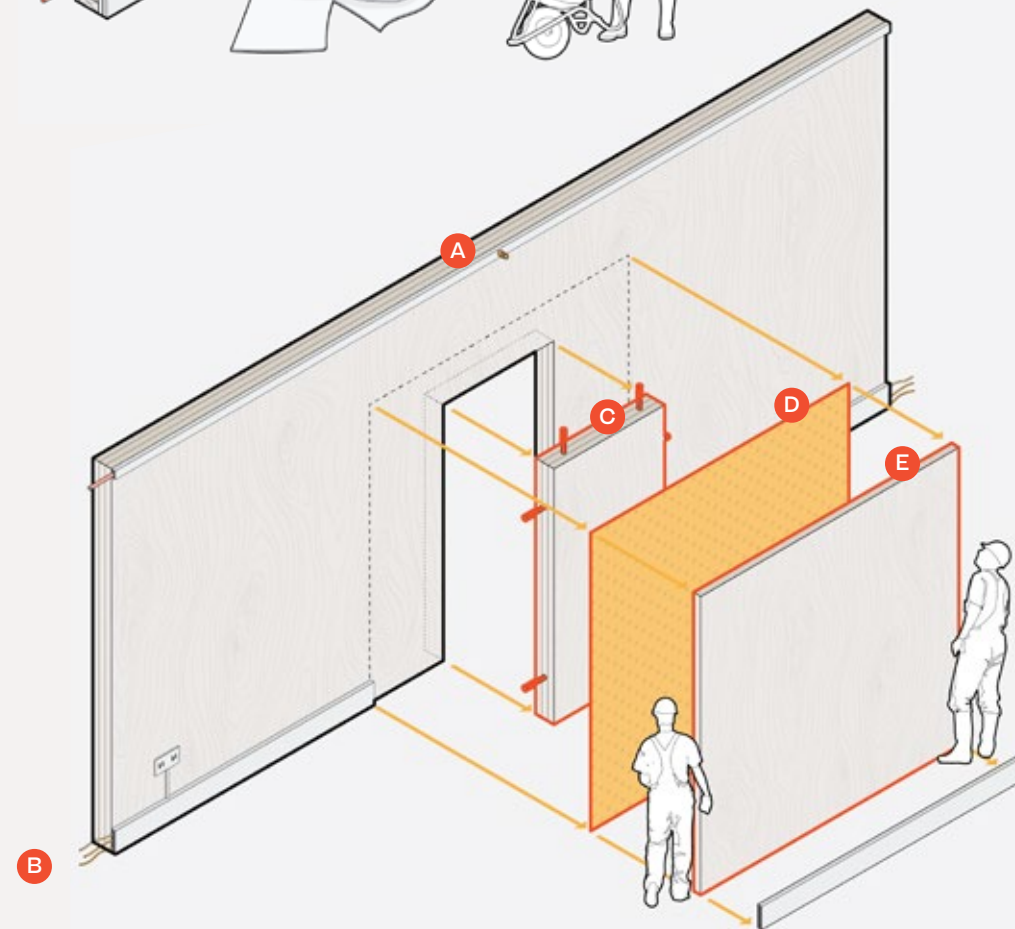
## Residential Traditional wall

- A** Sprinkler pipes (2.5 to 5.1-centimetres) embedded in ceilings and walls require draining the pipes, opening the walls, re-plumbing the connections, refilling the system, and checking for leaks.
- B** Access to embedded utilities requires drywall to be removed.
- C** Plasterboard and wiring in partition walls creates waste during demolition.
- D** Two iterations of spackling and sanding are typically required to produce a smooth surface ready to paint.



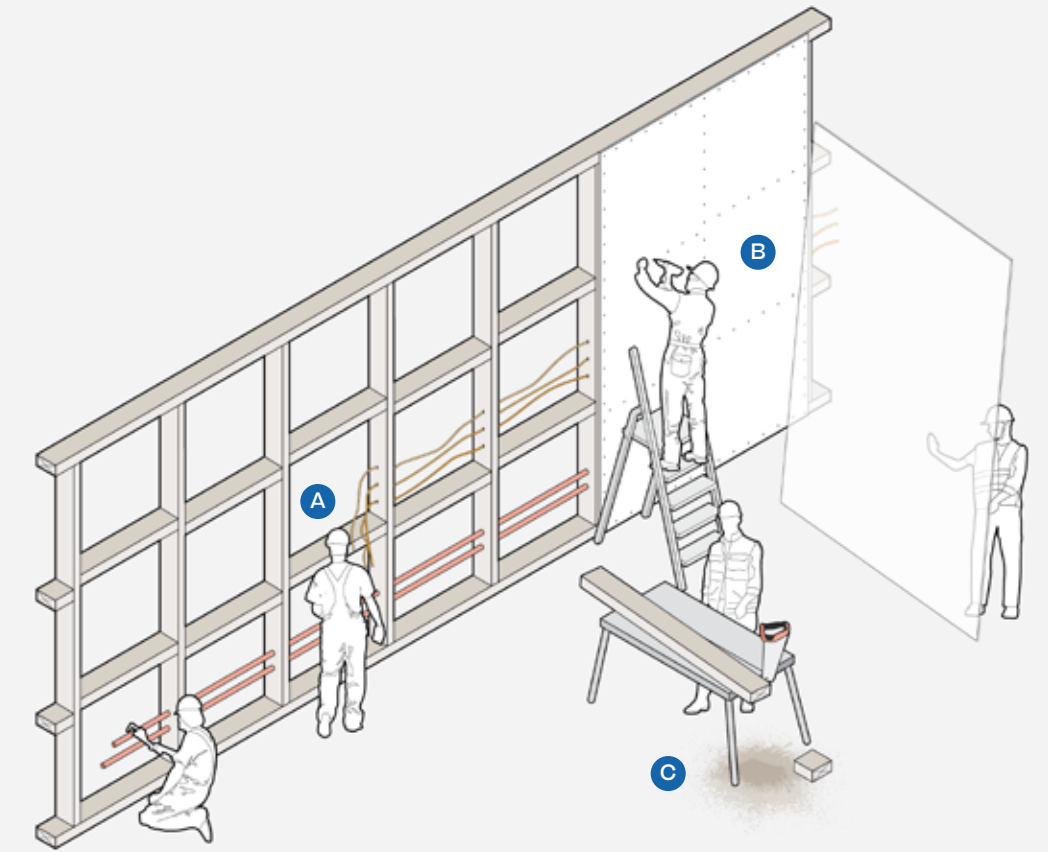
## Residential Flexible wall

- A** Mist systems in one-centimetre tubing are hidden along a wall surface or ceiling and could be easily moved in less than an hour.
- B** Removable baseboards hide systems, including a low-voltage digital, electric power system.
- C** Removable panels close interconnecting spaces.
- D** Additional soundproofing is included.
- E** Architectural panels hide removable panel seams, and do not require spackling or sanding.



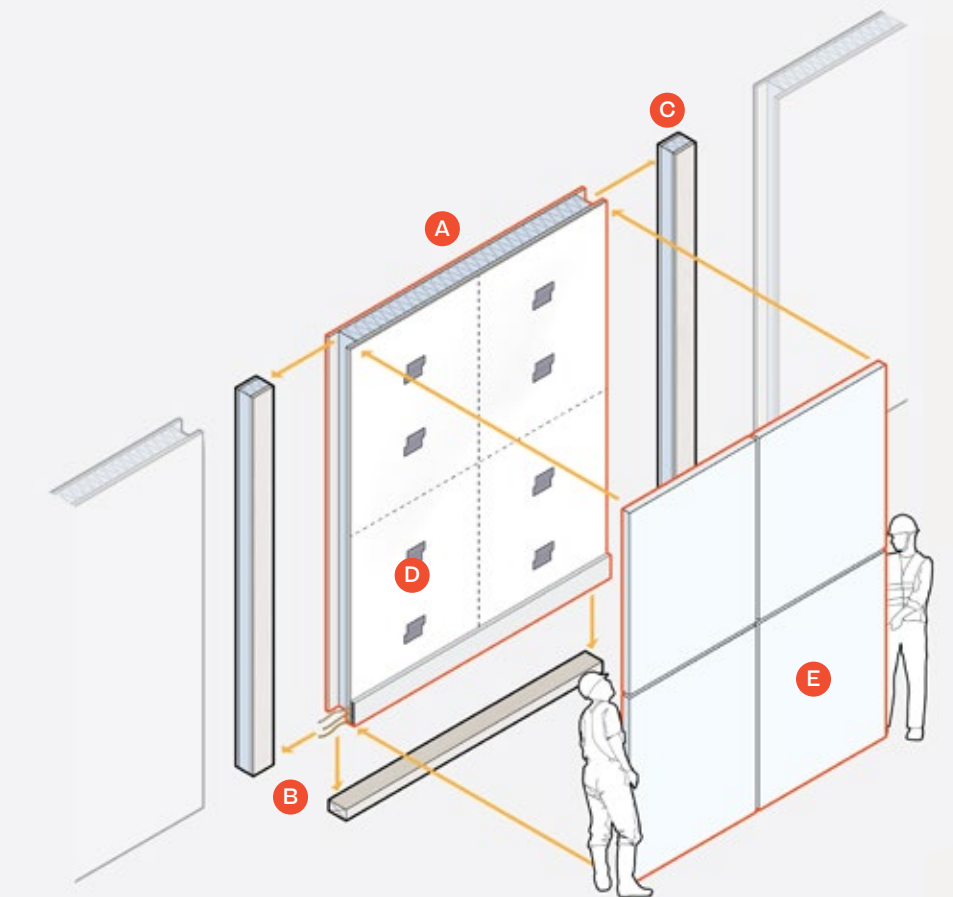
## Commercial Traditional wall

- A** Electrical wires protected in steel or corrugated plastic conduits are embedded in walls and must be roughed into the correct placement.
- B** Installation of drywall requires coordination among carpenters, electricians, and finishers.
- C** Wall frames make buildings inflexible; full wall demolition is required, including removal of electrical wiring, sprinkler systems, and other components embedded in wall systems.



## Commercial Flexible wall

- A** Loft's flexible interior wall systems could allow for walls to be removed as a panel from mounts, rather than demolished.
- B** Low-voltage power systems are surface-mounted.
- C** Walls have support structures.
- D** Clip system allows for tenant to apply finishes.
- E** Finished panels are chosen by tenant.





→ Continued from Page 247

In a traditional sprinkler system, water floods out like a hose, causing a lot of the water to fall below the fire before it is able to absorb heat. In mist-based systems, water is sent through a high-pressure (70 bar) nozzle that disperses the droplets into a layer of fine mist. This approach effectively acts as a vapor blanket that starves the fire of oxygen, snuffing it out. The reduced water quantity of the mist system makes it easier to clean up extinguished areas, thus preventing the water damage associated with traditional sprinkler systems. A low flow of water can also be delivered through tubing that is easily concealed in the interior finishes of buildings.

While mist systems initially cost more than traditional sprinklers, they recover these costs over time through their ability to improve wall flexibility and accelerate renovations. In Canada, three mist systems have been approved thus far, including one in the Credit Valley Hospital in Mississauga.<sup>53</sup> Quayside would be the first development in Toronto to use such a system in a neighbourhood of new buildings, demonstrating the potential for this technology's wider adoption.

Mist-based systems use **10%** of the water volume of traditional sprinklers.

## Compared to electrical wires embedded inside walls, low-voltage power would dramatically reduce the risk of fires.



Goal 3

Helping Neighbourhoods and Households Evolve

## Enable a safe, vibrant mix of uses with real-time building codes

The prospect of buildings that contain a shifting mix of residential, commercial, and industrial spaces creates the need for new tools capable of ensuring all tenants can not only coexist safely, but also thrive.

For most of the 20th century, cities separated residential, commercial, and industrial uses geographically to protect homes from noise, air pollution, and other nuisances.<sup>54</sup> This approach of “single-use zoning” made sense in a world without reliable tools to monitor the environmental nuisances of commerce and industry. But it also discouraged an active mix of home, work, and retail spaces in the same neighbourhood — let alone the same building.

Meanwhile, the modern economy has blurred the lines of traditional uses. Should a tech startup that launches in a spare bedroom be viewed as a home or an office? Should the studio of a craft maker creating wares for an e-commerce site like Etsy be viewed as a home or an industrial space? People in cities want not only to live in places with a mix of activities but also the ability to change those activities at a rapid pace.

To enable a vibrant mix of uses while still protecting quality of life, Sidewalk Labs proposes to require a digital building code system that can measure the impacts associated with a shifting mix of building uses in real time. Designed with inputs from city government, Sidewalk Labs' proposed building code system would monitor interior spaces in a non-invasive way for noise, air pollution, and other nuisance levels.

The proposed system would be operated and managed by the building owner, and enforced by the City of Toronto, in full accordance with the standards established by the city.

In Quayside, Sidewalk Labs proposes a pilot of this system, with the city able to monitor the performance of a building using the system's real-time data. For example, if a building registered a noise level that exceeded a code standard, the landlord and city would be notified of the violation.

At full scale of the IDEA District, provided the system's value is demonstrated in Quayside, it could be used to grant permits based on proposed building uses instead of based on prescribed land uses, enabling communities to pursue a greater mix of live-work buildings and local economic activity.

## A system based on “outcomes”

Sidewalk Labs’ proposed real-time code system would be designed around the premise that buildings should be able to house a diverse range of tenants — residential, commercial, and light industrial alike — so long as everyone adheres to the building’s rules. For example, if a mom-and-pop craft jeweler does not use noxious chemicals or make loud noises, there is no reason it should have to be located in an industrial area. In other words, it is the *outcomes* that matter most, not the *uses* that define traditional zoning.

By setting an “outcome-based” standard, a real-time code system can better protect all uses and support a broader mix of uses at the building and district scales, including the integration of production spaces and small-scale industries within a residential and commercial building or neighbourhood.

Toronto’s existing building codes have distinct standards for 25 different uses. In 2018 and early 2019, Sidewalk Labs and code experts worked together to identify nine code categories whose anticipated outcomes are similar enough to be condensed into a single, flexible “use-neutral” category, such as restaurants, single-dwelling units, mercantile/retail, low-hazard industrial, and more.

Any use covered under this integrated “use-neutral” category would be allowed to occupy a building, provided the tenant adheres to the building regulations — the outcomes.

To enable this new diversity of uses while protecting quality of life and public safety, this outcome-based system would monitor several types of building regulations on an ongoing, real-time basis via environmental (non-personal) sensors. These devices would be placed in building hallways to collect information on structural integrity and vibration, interior air quality, and noise levels. For example, a strain gauge sensor in a floor slab would be able to detect structural integrity issues in cases where individual building occupants place undue loads on floors.

(These systems would not replace the need for standard building sensors, such as fire detectors.)

This proposed system would be designed to collect only the specific information pertaining to building codes, without the ability to capture any personally identifiable information, in accordance with Sidewalk Labs’ proposed Responsible Data Use Guidelines. To encourage further innovation around building uses by government officials, researchers, and other third parties, access to this non-personal and aggregated data would be made publicly available in real time under the terms of the proposed Urban Data Trust. [UDT](#)

Partnered with proper enforcement, real-time monitoring would create a responsive code system that would protect neighbourhood safety while enabling buildings to include a far more diverse array of homes, shops, and workplaces than typically found today.



Helping Neighbourhoods and Households Evolve

# Design affordable and flexible housing units

Innovations that enable faster construction and more adaptable buildings also have the potential to unlock housing design that better meets the needs of modern families and can evolve with changing household types. In Toronto, as in many cities, housing options for downtown living currently fall short for many groups, and a number of economic and social trends suggest that traditional ways of designing downtown apartments need to change to keep pace with demographic shifts.

A mobile workforce values the ability to follow job opportunities, and find lean housing options, in new cities. Growing families and downsizing empty nesters who might once have chosen (or remained in) the suburbs are willing to trade space to live in the city for its diversity, amenities, and culture — if they can find apartments the size they need, and provided they can retain a sense of community. Also, many households are embracing the rise of sharing services, reducing their need for storage space.

In cities around the world, new housing innovations have emerged to address these trends and keep a more diverse set of people living downtown (see sidebar on Page 257), including the rise of “micro-units” (smaller units that rent for less while remaining livable through efficient design) and co-living programs (which feature shared building amenities, such as communal kitchens, to enhance community while keeping rents lower).

Building on these global trends, Sidewalk Labs plans to offer a set of efficient, ultra-efficient, and co-living units designed to deliver housing that is flexible enough to meet these changing social needs, but still affordable. To ensure that the full Quayside program supports the needs of families, 40 percent of all units would be sized for families, with two bedrooms or more.



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2, on Page 374.

## Quayside’s housing program is designed to accommodate households of all sizes

	Studio	One-bedroom	Two-bedroom	Three-bedroom	Four-bedroom	Total
Percent of proposed housing program	20%	38%	28%	11%	3%	100%

The transition to smaller units is made possible without sacrificing comfort, through thoughtful space-saving furniture; flexible walls that enable households to contract or expand with greater ease than currently found in apartments or condos; shared building amenities, such as communal eating spaces or co-working spaces; and sufficient access to neighbourhood-enhancing amenities, such as on-demand storage delivery and an extensive public realm.

Together, these new unit designs can make dense urban living more appealing — and affordable — to a wider group of people, including the singles, seniors, and multi-generational families who make up a growing percentage of the Toronto population.

## Efficient and ultra-efficient units

Sidewalk Labs' proposed efficient and ultra-efficient units would be designed to make the most of their space. They would exist at a range of bedroom sizes — all the way up to four bedrooms — and cross all income levels. (These proposed options would exist in addition to proposed “standard” units that are comparable in size to existing downtown developments but designed more efficiently as well.)


Building on global research by nArchitects, Sidewalk Labs conducted initial design explorations on efficient units with three local architecture firms: gh3, Dubbeldam Architecture and Design, and Teeple Architects. This work surfaced a set of design features that would enhance the liveability of smaller units (see studio image). Using these concepts as a starting point, Sidewalk Labs plans to continue refining specific unit designs to best match market and community needs over time.

### Multi-purpose furniture pieces.

Sidewalk Labs plans for its units to include efficient furniture designed to maximize space and create space for something else when not in use. Examples include multi-purpose benches on height-adjustable rails that can double as desks or shelves; convertible beds that can be configured into a couch or folded up to free up floor space; and fold-down tables. For example, in the gh3 studio concept featured here, the movable desk and flip-down table can free up an additional 9 square feet of usable space.

### On-demand storage.

The proposed efficient units would be designed with less in-unit storage space than a market comparison apartment design. But the efficient units would compensate in two ways. One is the availability of free in-building storage. This would enable families to store weekend recreation items, infrequently used kitchen items, or that special suit or dress.

Second is the availability of low-cost, on-demand delivery from off-site storage facilities located nearby. This service would make it easier for households to store items they seldom use — such as seasonal clothing, holiday items, or skis — outside the apartment. An underground delivery network linked into all residential and commercial buildings would ensure that residents could access their items quickly and at any time. 

### Spatial quality.

High-quality living in small downtown spaces requires innovative spatial designs. The gh3 units described here would be designed with tall ceilings (2.7 metres) to increase daylight penetration within the units and also allow for more vertical storage space — basic enhancements that do not significantly erode the cost basis for developers. They would also locate all bedrooms on an exterior wall with a window (no longer a common feature in new Toronto development). Finally, these units could reveal the mass-timber construction, unlocking some of the biophilic health properties that have been shown to occur with exposure to nature in cities.

 [Continued on Page 259](#)



See the “Mobility” chapter of Volume 2, on Page 22, for more details on neighbourhood delivery.

# Efficient units could be designed with less storage space thanks to fast on-demand delivery from neighbourhood storage facilities.

# Efficient units: Warm, flexible living



- A Enclosed balcony.** Enclosed balcony with floor-to-ceiling electrochromic glazing is usable throughout the year and provides generous daylight exposure.
- B Off-site storage.** Residents would have access to off-site storage space at the neighbourhood logistics hub, with packages sent and delivered on demand by self-driving dollies and tracked via app.

- C Healthy, warm interiors.** Mass timber buildings would offer warm, inviting spaces with exposed wood and elegant finishes. Exposed wood also unlocks “biophilic” health benefits, such as reduced stress, that have been shown to occur with exposure to nature in cities.
- D Space-saving flexible furniture.** Clever design maximizes the space in these units, including features like convertible furniture, built-in shelving, and fold-out tables and beds to improve livability.

- E Efficient closets.** Efficient closet designs make use of traditionally underutilized in-unit spaces.
- F Flexible wall systems.** Flexible wall systems allow future connection to adjoining units. (See the next page for more details.)

Sidewalk Labs small research grant

## Housing trends from around the globe

Commissioned research from Ryerson and OCAD points to innovations that can help cities tackle affordability.

Sidewalk Labs commissioned two reports on global housing innovations, one from the Ryerson City Building Institute and one from the System-CITY Research Team in the Faculty of Design at OCAD University.<sup>55</sup>

Here are a few ways other cities are trying to bring down the price of housing and keep a more economically diverse set of people living downtown:

### Redesign the box.

Many cities have experimented with “micro-units”: smaller homes and apartments of between 250 and 400 square feet. To make sure they are livable, the city can adopt minimum unit sizes and daylight requirements.

### Unbundle the box.

Market condos often come with a long list of amenities: granite counter tops, premium backsplash tile, washers and dryers, and more. These can all be unbundled from the cost of a home to make it more affordable.

### Co-live a space.

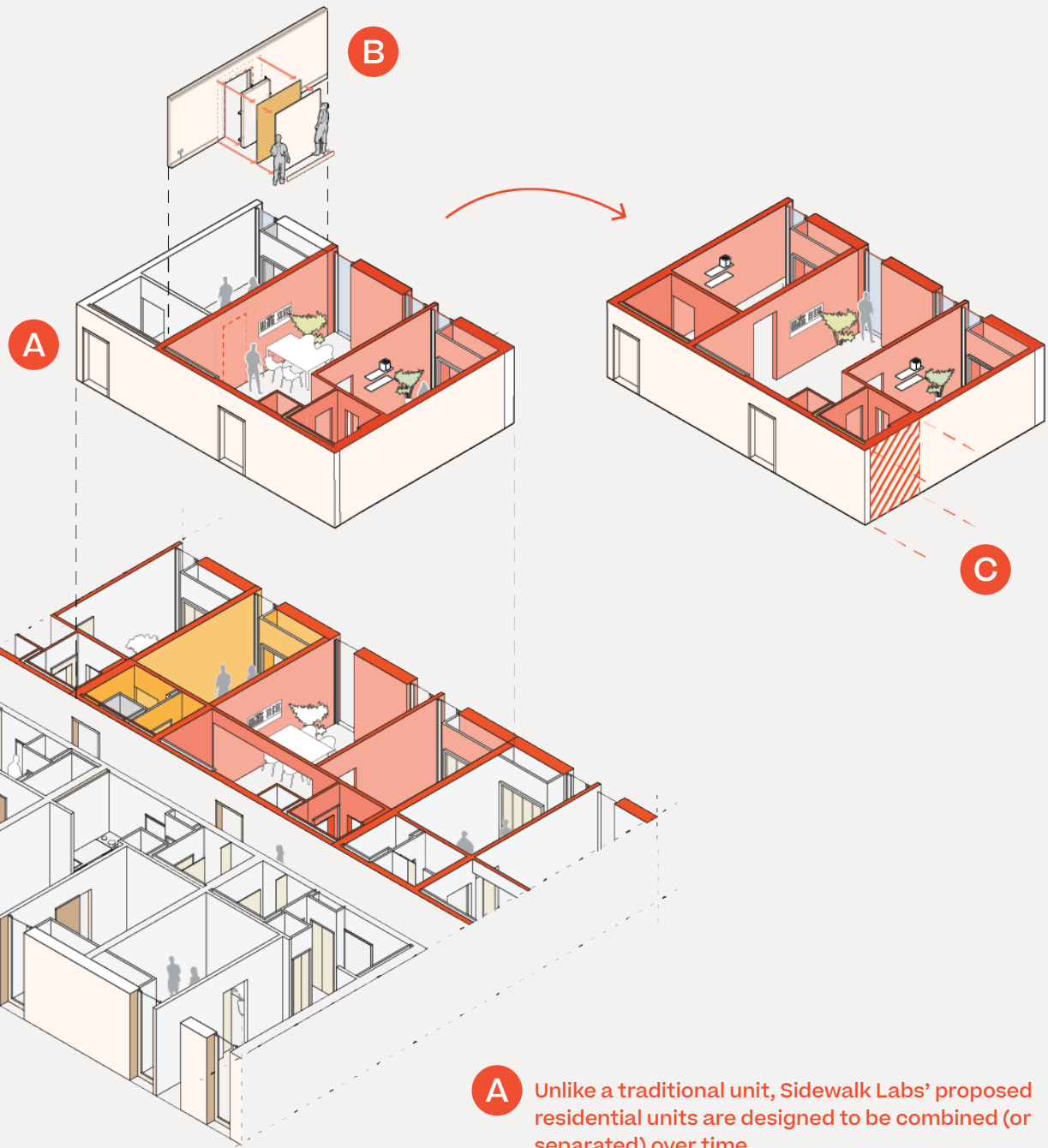
Another strategy that combines well with smaller units is “co-living,” where residents give up some private individual space in exchange for shared space within their building, such as children’s spaces, workshops, and larger kitchens.

### Build cheaper.

No matter the living arrangement, new construction practices can reduce the cost of development. These new approaches include modular construction, prefabrication, and adaptive designs that can meet the changing needs of residents and the community.

These are just some of the expanding options that can help increase the supply of housing while decreasing the cost.

# Designing residential units to support changing household needs



- A** Unlike a traditional unit, Sidewalk Labs' proposed residential units are designed to be combined (or separated) over time.
- B** Flexible walls (shown in light red) and floor plans enable smaller units to be combined into larger ones.
- C** Consistent floor plans with aligned wet-box (kitchen and bathroom) corridors could be designed to accommodate the future addition or subtraction of adjacent units.

→ Continued from Page 255

## Flexible floor plans and wall panels.

Floor plans with aligned wet-box (kitchen and bathroom) corridors could be intentionally designed to accommodate the future addition or subtraction of adjacent units. This approach, combined with built-in wall panel flexibility, would enable housing units to grow or shrink with household sizes, allowing families to “grow up” in Quayside. For example, a three-bedroom could be converted into two smaller units if a child leaves for college; conversely, smaller units could be combined into a larger one with the arrival of a new baby.



See the “IDEA District” chapter of Volume 3 for more details on regulatory aspects of the proposed district.

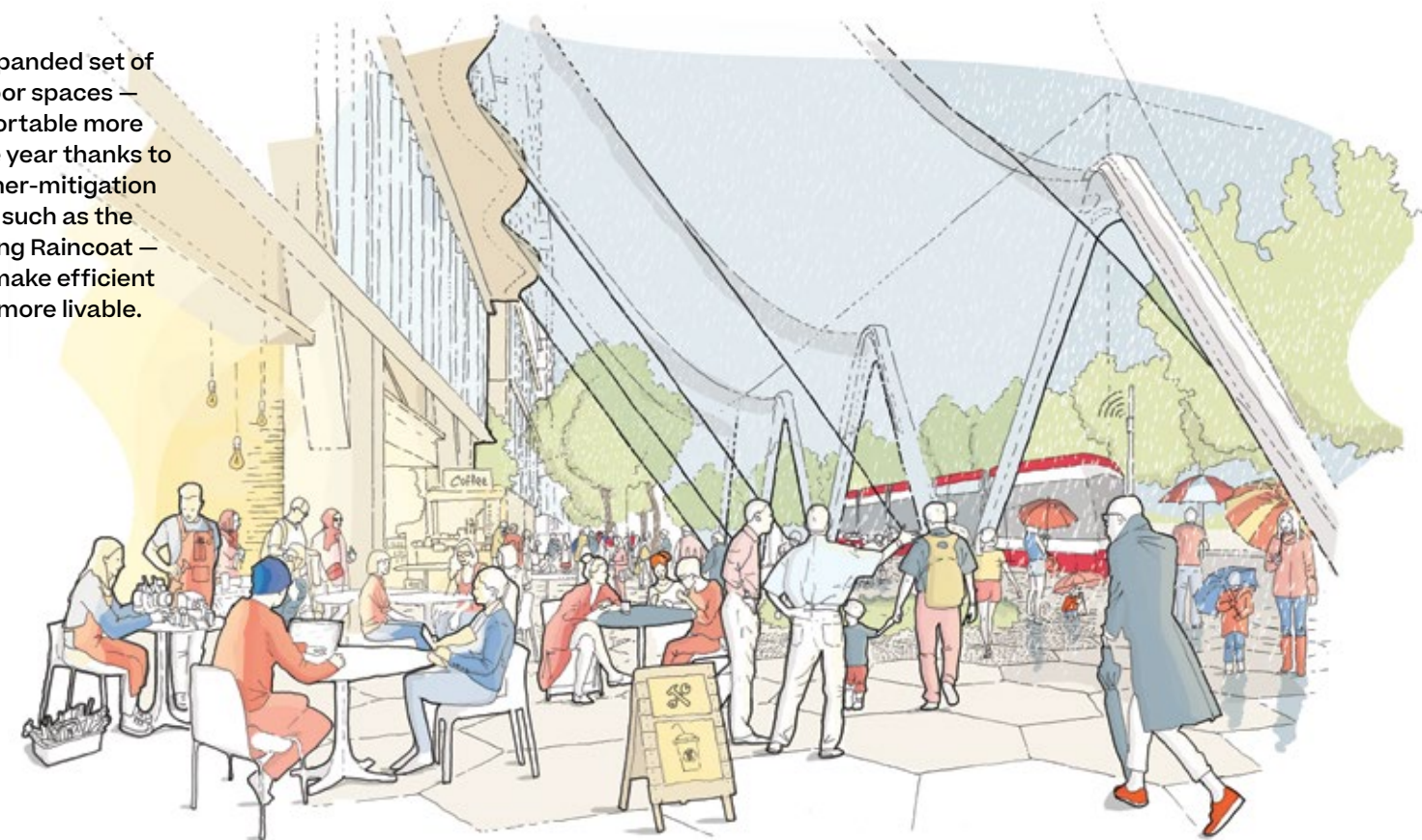
## Expanded public realm.

Sidewalk Labs' approach to public realm design is also meant to improve comfort for residents in efficient units. An expanded set of parks, plazas, and public spaces — comfortable year-round thanks to weather-mitigation systems — means people could spend more time outdoors, in spaces they can decide how to use themselves.

Together, these space-saving and neighbourhood-enhancing features would not only help meet the needs and preferences of modern-day Torontonians, they would also make dense urban living more affordable to more types of people. Designed with similar features, ultra-efficient units would maximize space even further than the efficient units.

Sidewalk Labs proposes to seek relief from existing relevant guidelines and standards related to unit size to enable developers in the project area to create these new occupancy types within the IDEA District.

An expanded set of outdoor spaces — comfortable more of the year thanks to weather-mitigation tools, such as the building Raincoat — help make efficient units more livable.



Co-living offers shared amenities, such as a communal kitchen and dining room, to foster community among residents.



### Providing co-living spaces to strengthen community

A co-living model combines efficient unit footprints with community-based programming and shared spaces designed to bring residents together.

Around the world, and with a few early examples in Toronto, co-living has gained popularity with younger professionals who enjoy the prospect of living in well-designed units, with access to common areas filled with more shared amenities than a typical apartment.<sup>56</sup> But co-living could also be built for seniors needing more in-building care, and for families with young children needing additional bedrooms or child-related amenities (such as shared playrooms) and services (such as daycare options).

Sidewalk Labs plans to dedicate certain floors of buildings in Quayside to co-living initiatives. A key feature of this housing option would be shared building space: communal areas could include co-working space, cooking and dining areas, exercise rooms, child recreational areas, and potentially a communal guest room that could be shared among residents.

These spaces would be designed to encourage social interaction among residents seeking a stronger community.

### Creating value through “affordability by design”

Sidewalk Labs calls this approach towards efficient unit design “affordability by design,” both because it provides more affordable options for households, and because it enables developers to meet affordable and below-market housing targets through the creation of additional units.

For example, in Quayside, the reduction in average size for each efficient and ultra-efficient unit would enable the creation of 87 more total units than would exist with conventional development.

As explained more in the following section on housing affordability, Sidewalk Labs estimates that this approach to affordability by design can create \$37 million of value in Quayside and up to \$475 million in value through 2048 at the full scale of the IDEA District — money that could be applied toward an ambitious 40 percent below-market program.

**“Affordability by design”  
can create up to \$475  
million in value through  
2048 to support an  
ambitious 40% below-  
market program across  
the IDEA District.**

# Part 3



## Expanding Tools for Housing Affordability



### Key Goals

**1**  
Create an ambitious program to meet the housing affordability challenge

**2**  
Achieve this program with innovation that yields greater affordability

Reducing construction timelines and risk, and making buildings more efficient and adaptable, are important steps towards creating neighbourhoods that are more affordable to more people. But to fully achieve a vision for inclusive communities, more direct action is needed — especially in a high-demand market like Toronto.

No issue is more pressing in Toronto right now than housing affordability.<sup>57</sup> Since 2006, home prices have far outpaced wage increases. Vacancy rates have reached all-time lows<sup>58</sup> and now sit around 1 percent — far below a minimum “healthy” rate of 3 percent<sup>59</sup> — making it more difficult for Torontonians to find affordable homes. Limited housing size options and an aging rental stock have further led to inadequate choices for multi-generational, single-person, and middle-income households.

The result is that Toronto’s neighbourhoods are becoming increasingly stratified by income. In 1970, 58 percent of Toronto’s census tracts (which are generally neighbourhood-sized) were considered middle-income. By 2015, only 29 percent of city tracts merited that designation. Toronto has tended to sort itself into “Three Cities”: wealthy areas downtown, low-income areas forced to the edges, and middle-income pockets that continue to shrink.

The public sector has recognized these challenges and made important moves to address them. The recent National Housing Strategy laid out a \$40 billion plan over 10 years to increase affordable housing, with significant provincial government matching requirements.<sup>60</sup> Toronto launched its Open Door plan in 2015 to provide new options and incentives for affordable housing, and recently announced the Housing Now Initiative that offers 11 city sites to create new housing units, including affordable rental.<sup>61</sup>

To build on that momentum and help Toronto face its housing challenges, Sidewalk Labs proposes a housing vision anchored by 40 percent of units at below-market rates. This vision is driven by the objectives of creating a truly mixed-income community with options across the income spectrum — not just narrowly affordable or market-rate — for people of all ages and families of all sizes. Sidewalk Labs proposes a two-part approach to achieve this vision that relies increasingly on private innovation and decreasingly on government sources.



First, Sidewalk Labs proposes to create new types of units designed with affordability in mind from the start. These efficient units could rent for less than comparable apartments downtown without sacrificing living quality thanks to space-saving designs, shared building amenities, and neighbourhood features that include on-demand offsite storage. Such units improve affordability by enabling developers to increase the supply of housing on a particular site, and they respond directly to the changing needs of families, seniors, and young professionals.

**To support a mixed-income community, Sidewalk Labs proposes a housing vision with 40% of units at below-market rates.**

Second, Sidewalk Labs proposes to implement new tools that help the private sector support below-market rental housing over time. These tools include leveraging the value created by factory-based construction to help developers meet ambitious affordable housing targets while still earning returns, and implementing a resale fee on market-rate condos to help pay for below-market units and make downtown living affordable for more people. A proposed housing trust fund could “lock-box” these savings to create a sustainable source for below-market units.

In Quayside, these approaches could support a paradigm-shifting housing program featuring 40 percent of units at below-market rates, with half of the entire program consisting of purpose-built rentals. The neighbourhood can also begin to implement and refine the factory-based construction approach and demonstrate its value to developers in terms of time and cost.

But while additional tools such as factory construction and resale fees can be initiated in Quayside, a neighbourhood of this scale and near-term development timeline requires significant support from existing government funding sources to meet — and exceed — the affordability objectives established by Waterfront Toronto.

# The Sidewalk Toronto project can set a new precedent for housing affordability, generating funding through off-site construction, efficient unit design, and other innovative tools.

This plan creates nearly **1.4 billion** for below-market housing.

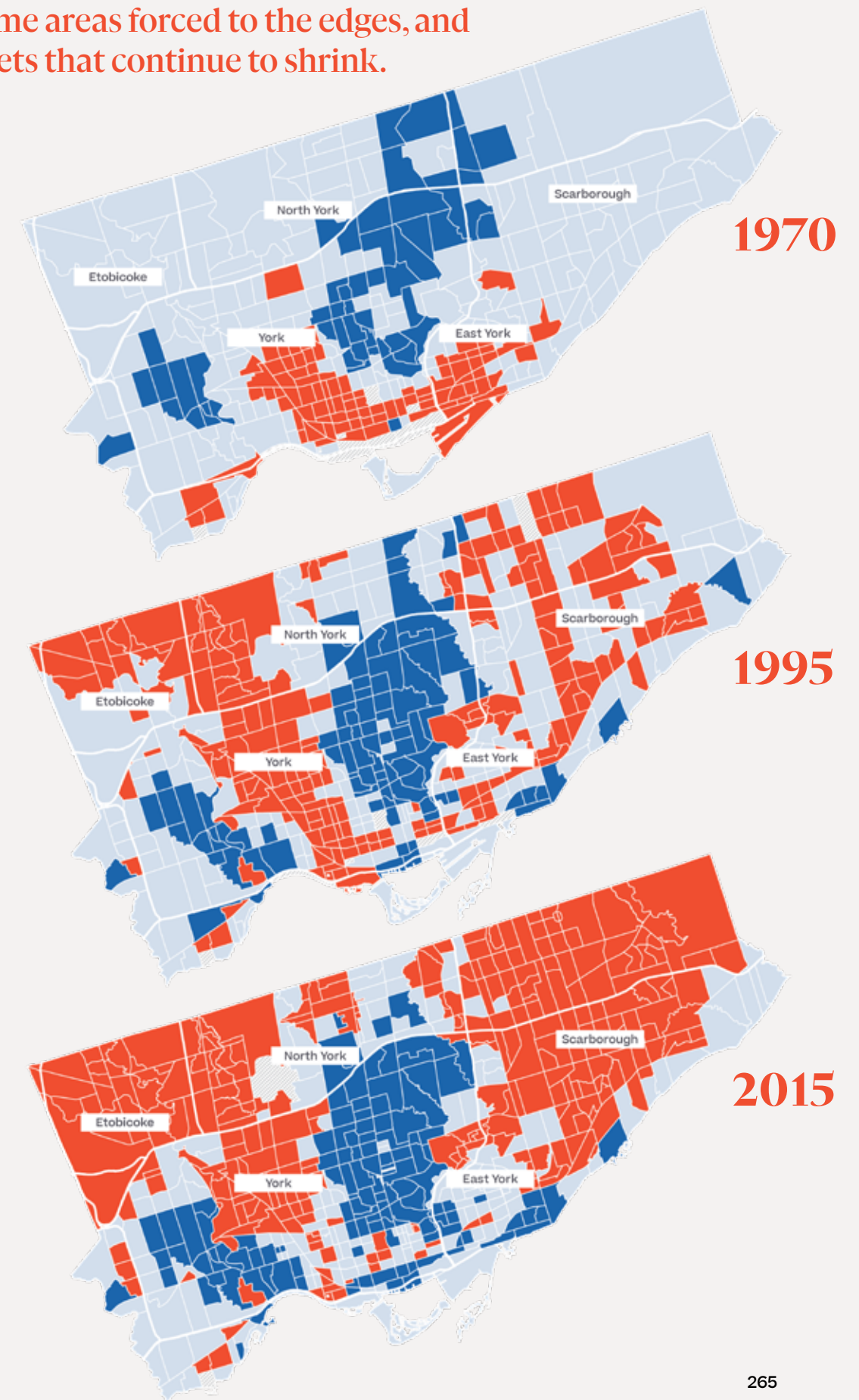
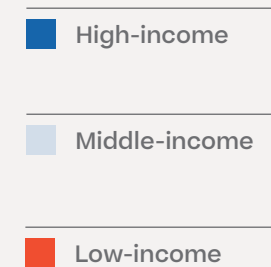
Implemented at the full scale of the IDEA District, this approach can unlock powerful tools that enable the private sector to support the public sector in delivering below-market housing. Sidewalk Labs estimates that the potential value created by factory-based construction, condo resale fees, and efficient unit designs could amount to over \$1.4 billion through 2048.

Such a program could include around 6,800 affordable housing units, representing nearly a third of the current annual citywide target for new affordable rental housing units, in accordance with the city's Open Door program.

In so doing, the Sidewalk Toronto project would help set a new precedent for housing affordability, demonstrate that it is possible for cities to hit ambitious affordability targets while relying on a more balanced mix of government funding sources and support from private sources, and above all, give rise to mixed-income communities that live up to the city's values for inclusive growth.

## Toronto's fading middle-income neighbourhoods

Since 1970, Toronto's neighbourhoods have become increasingly segregated by income, with wealthy areas downtown, low-income areas forced to the edges, and middle-income pockets that continue to shrink.





## Three factors that informed Sidewalk Labs' approach: Rental supply, funding, and demographic shifts

Three clear factors are driving Toronto's affordability challenges: a housing ecosystem that incentivizes condo development over purpose-built rentals; affordable housing policy that has faced historical defunding; and shifting demographics defined by record growth and more young people, seniors, and multi-generational households.

# 1

### A development landscape lacking rentals.

Condo development has dominated Toronto residential construction for the past two decades. At the same time, Toronto has seen a precipitous decline in purpose-built rental housing.

As shown in the bar chart on the opposite page, Toronto once constructed a lot of purpose-built rentals: roughly 12,000 units a year from 1960-1974, and 3,000 a year in the decade that followed. That rental boom occurred thanks to strong tax incentives and government funding.<sup>62</sup> But as such incentives disappeared in the 1980s, so, too, did new rental construction.

As a result, the city has missed out on decades of "filtering," the process by which new purpose-built rentals age and thus become more affordable over time.<sup>63</sup> According to research by Ryerson University and Evergreen, Toronto will only rebalance its market and improve long-term affordability if purpose-built rentals

make up a sizable share of new housing supply — approximately 8,000 units a year through 2041.<sup>64</sup>

This imbalance impacts renter households in personal ways. Households unable to find a purpose-built rental unit often find accommodations on the secondary market, renting out condo (or other accessory dwelling) units instead. Condo renting is a less secure form of tenure than professionally managed rentals, since a condo can quickly transfer ownership or be taken off the market if an owner decides to sell or move back in.

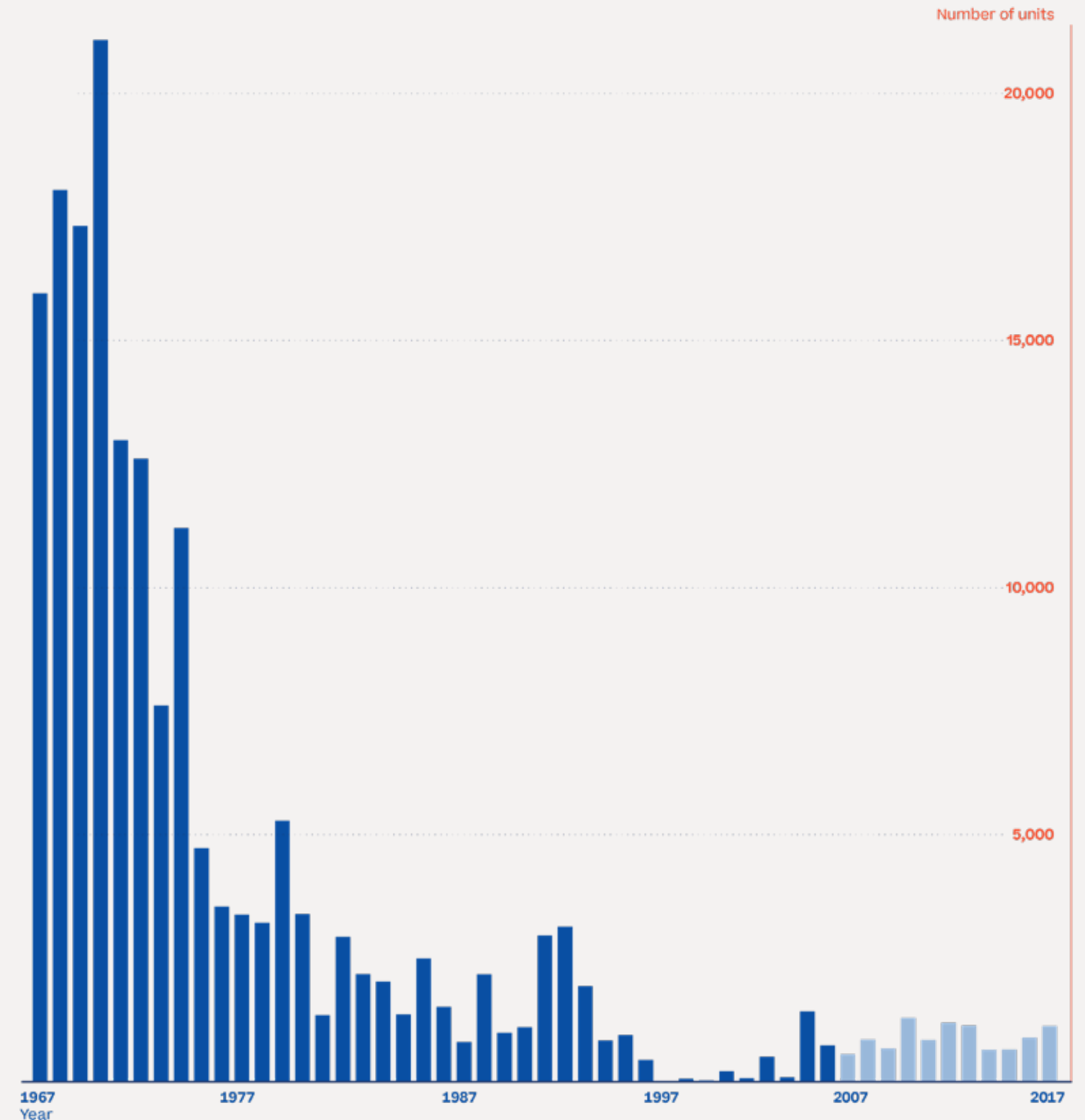
It also hampers government's ability to harness the private sector for affordable housing — since tax incentives and other programs often rely on rental stock to do so. In the past year, Toronto has seen an increase in rental housing production,<sup>65</sup> particularly luxury rentals, in part due to new government programs, such as the Canada Mortgage and Housing Corporation's (CMHC) rental construction financing initiative program. But despite this recent rise, market conditions still favour the pre-sale of higher-end condos to reduce the risks of financing new development.

### How this trend informed the approach:

Sidewalk Labs recognized that purpose-built rentals must form the core of any proposed housing program, both to build on the recent progress being made in this area and to improve long-term affordability within the IDEA District.

# The decline of Toronto's purpose-built rental stock

Toronto has seen a precipitous decline of purpose-built rental development since the 1960s.



Source: CMHC

# 2

## Limited affordable housing funding.

Toronto has a proud history of providing affordable housing. The mid-1970s were a bright spot of affordable housing,<sup>66</sup> as public subsidies from all levels of government flowed to private developers, nonprofits, and co-ops alike, leading to neighbourhoods like St. Lawrence that offered a robust social and cultural mix of owners and renters, families of different sizes, residents from different backgrounds, and people of all incomes. This public investment began to fade in the mid-1990s.

As mentioned on Page 262, today all three levels of Canadian government are increasing their support for affordable housing through a variety of plans and programs. As a result, the city has seen progress, such as the Regent Park revitalization, which is on track to redevelop almost 1,800 affordable units with rent geared to income, as part of a landmark five-phase public-private partnership.<sup>67</sup>

Still, there is an opportunity to better engage private sector partners on affordable housing. Increasing predictability and certainty of funding can enable developers to contribute more affordable housing.

### How this trend informed the approach:

Based on these trends, Sidewalk Labs recognized that the private sector must play an important role in identifying financial tools that can build on public funding and help extend options across the income spectrum, including to middle-income households that currently cannot pay market rates but do not qualify for affordable housing.

# 3

## Shifting demographics.

Since 2001, Toronto has seen record growth of intergenerational households,<sup>68</sup> and for the first time ever, single-person households in Canada have overtaken all other types as the dominant type.<sup>69</sup> Coupled with rising rates of seniors, particularly in the neighbourhoods surrounding Quayside, these shifting demographics highlight where housing options fall short.

Hampered by a limited number of multi-bedroom units downtown, Toronto families sometimes become “condo hackers” — packing far more people into a one-bedroom condo than is desirable. Older residents also struggle to find a suitable place downtown to age in place. Some are empty nesters who have more bedrooms than they need. Others simply need more support and community.

Then there are the students and young people aggressively competing for the few attainable rentals on the Toronto market. Too often the result is that young people who want to live close to the action instead wind up living back at home with their parents — a situation that affects 47 percent of Toronto residents aged 20 to 34<sup>70</sup> — or squeezing into shares not designed for multiple tenants.

### How this trend informed the approach:

These trends informed Sidewalk Labs’ approach to designing efficient and co-living units that respond to changing needs, including a mix of sizes, tenures, and flexible units that can accommodate households at every life stage. This approach to “affordability by design” can also help deliver below-market housing by increasing the supply of units a developer can provide across a project.



Goal 1

Expanding Tools  
for Housing Affordability

# Create an ambitious program to meet the housing affordability challenge: 40% below market

These factors and trends formed the basis for Sidewalk Labs’ proposal for an ambitious housing program whose cornerstone is a proposed **40 percent of units at a below-market rate**. This vision builds on the affordability commitments set by Waterfront Toronto but pushes beyond them to demonstrate the private sector’s ability to support the shared objective of truly mixed-income communities that are inclusive of all households, responsive to resident needs, and adaptable over time.

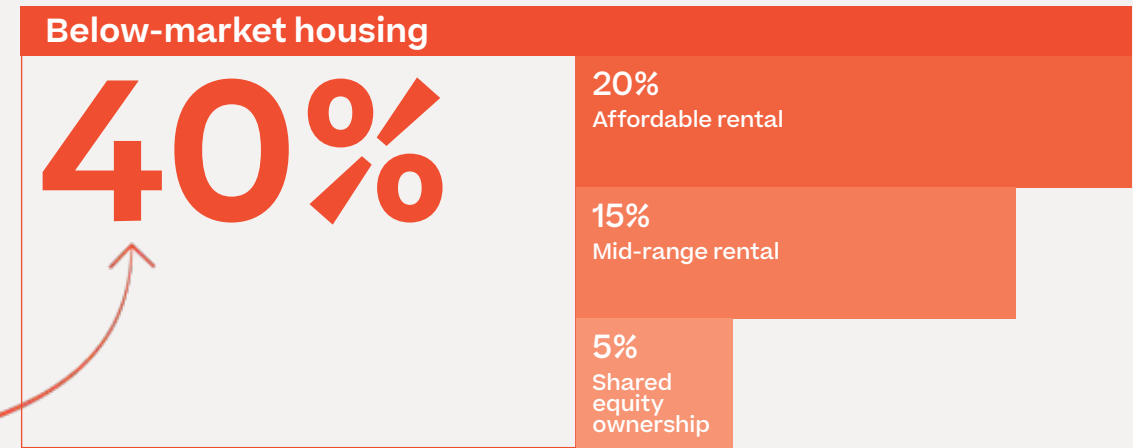
The below-market housing would include 20 percent traditionally “affordable” housing units, a quarter of which would go towards households with “deep” affordability needs. It would also include 20 percent middle-income units (a quarter of which would be “shared equity” units that create an affordable ownership option), expanding the definition of affordability from its current standards. And to improve long-term affordability, half of the total proposed residential program would consist of much-needed purpose-built rentals.

Sidewalk Labs commits to achieving this program mix in Quayside using a combination of existing government funding sources and new innovations. It hopes to prove that such a program composition could be financially feasible across a larger area, once the innovations initiated in Quayside reach their full potential.

## Sidewalk Labs aims to expand affordability, dedicating 20% of units to middle-income households.

# Achieving a 40% below-market housing program

Sidewalk Labs commits to achieving a 40 percent below-market program in Quayside, which could scale across the IDEA District with government support to help achieve the city's affordability goals.



**Market-rate rental**  
These units would be purpose-built rentals renting at market rates.

**Affordable rental**  
These units qualify as affordable housing in Toronto (below 100 percent Average Market Rent) and include at least 5 percent deeply affordable units (at 60 percent AMR or below).

**Mid-range rental**  
These units are geared towards middle-income families who do not today qualify for affordable housing (100-150 percent AMR).

**Shared equity ownership**  
These units would offer a new type of affordable homeownership for middle-income families unable to afford full ownership.

**Market-rate ownership**  
These condo ownership units would, as with all other unit types, offer a range of new options, including family units and co-living spaces.

**Affordable rental housing (20 percent).**

A key element of Sidewalk Labs’ proposed housing program is providing affordable rental housing for lower- and moderate-income households in Toronto.

To ensure a diverse, mixed-income community, the program would accommodate households at a range of incomes below the City of Toronto’s definition of affordable housing (households paying less than 100 percent average market rent eligible to receive government funding) – not just the upper end.

At least a quarter of this supply will go towards households with “deep” affordability needs (below at least 60 percent AMR). In Quayside, Sidewalk Labs proposes keeping units affordable for the long term.

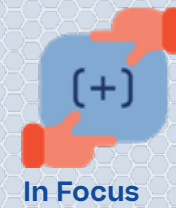
Additionally, in Quayside, Sidewalk Labs proposes to deliver the lower-income affordable units in close collaboration with non-profit operators. Rather than wait until after the development is approved, Sidewalk Labs would invite non-profit organizations to participate in the earliest stages of the design process

(see sidebar on Page 273). By tapping into the deep expertise of non-profit housing operators, Sidewalk Labs seeks to ensure that the affordable housing truly meets the needs of all its residents— including those with lower incomes – while setting a path for continued capacity-building in the sector.

**Mid-range rental housing (15 percent).**

A strong housing plan must provide for middle-income households that do not qualify for traditional affordable housing yet struggle to pay market rates. A core feature of the proposed housing program is that 15 percent of all housing units would be purpose-built rentals priced specifically for middle-income households in the mid-range (100 to 150 percent) AMR band.

In Quayside, to ensure these units remain affordable for middle-income families, Sidewalk Labs plans to implement a rent cap. For example, rents for a two-bedroom unit would range from \$1,492 to \$2,238, according to existing rental bands established by the city.



**Community engagement**

# Catalyzing non-profit housing collaboration

Sidewalk Labs plans to collaborate with non-profit operators to deliver lower-income affordable units in Quayside, and has engaged non-profit leaders to identify ways to strengthen partnerships.

During its public engagement process for the Sidewalk Toronto project, Sidewalk Labs partnered with United Way Greater Toronto to convene a roundtable discussion with non-profit leaders representing a dozen local housing organizations. The group identified ideas and guiding principles for what partnership with non-profits in Quayside could look like. These ideas included allowing non-profits to:

**Express interest.**

Non-profits will be invited to submit letters of interest for participation in the project, enabling them to engage early in the development process without undue burden. Non-profits could become involved without having to spend resources on the production of an uncertain Request for Proposals response.

**Be rewarded for collaboration.**

An operating partner (either one or more non-profits) would be selected through a transparent evaluation process designed specifically to reward joint applications that serve diverse deep affordability populations.

**Participate in design.**

Selected non-profits would be invited to participate actively in the design process, helping the project identify and meet the housing needs of specific populations and create a physical design that is optimized for operations.

Sidewalk Labs believes that active collaboration would make the waterfront’s proposed mixed-income neighbourhoods stronger overall. Over time, this engagement could help non-profits build their capabilities for creating and delivering affordable housing. It would also demonstrate ways of working between the non-profit and private sectors.

## Qualifying for a below-market 2BR rental in Quayside

In addition to providing traditional affordable housing, the Sidewalk Labs plan provides below-market housing for middle-income households.

	Mid-range	Affordable	Deep affordable
Households earnings at this level or below: *	\$107,424	\$71,616	\$42,970
... can expect to pay this monthly rent: **	\$2,238	\$1,492	\$895
... which corresponds to this level of average market rent (AMR) as defined by the city: ***	150%	100%	60%

\* As determined by the City of Toronto’s initial income limit, calculated as four times the monthly occupancy cost for the housing unit, multiplied by 12. CMHC and other programs may use different definitions. Numbers rounded.

\*\* Monthly rent figures that correspond to AMR are released each year by CMHC and are used to set income thresholds for developers leasing up affordable rental units. Those shown correspond to 2019 AMR figures released by the City of Toronto and are not yet adjusted for utility allowances.

\*\*\* The City of Toronto defines affordable rental housing as being at or below 100 percent AMR. Sidewalk Labs defines “below-market” to include mid-range rental housing at 100-150 percent AMR as well.

Source: City of Toronto, 2019

**Market-rate rental housing (15 percent).**

As part of a balanced offering, the proposed unit mix would include 15 percent of units as professionally managed, market-rate rentals, contributing much-needed supply to the Toronto market. This need is driven in part by unserved segments of the population, such as empty nesters seeking to downsize into downtown living.

**Shared equity housing (5 percent).**

In addition to mid-range rentals, 5 percent of proposed units would involve a shared equity program that enables middle-income households to own part of an apartment, providing a path to build equity while renting. This shared equity program would help address a common barrier to home ownership for middle-income Torontonians: the need for a significant down payment.

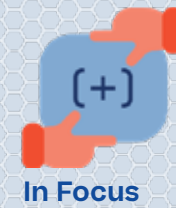
Traditional home buyers own 100 percent of a property, often with help from a bank or other lender, with a considerable down payment. A shared ownership program enables home buyers to put a lower down payment towards a partial equity stake of a property, in partnership with a non-profit or other independent entity. Residents in shared ownership programs pay mortgage payments on the part they own and pay rent on the part they do not. Buyers also profit from the appreciation of their unit, with the ability to cash out when they move.

In Quayside, Sidewalk Labs proposes to deliver this option at cost to a capable partner, believing it would contribute meaningfully to middle-income housing options. (The cost of providing this option represents a contribution by Sidewalk Labs of \$13.5 million, since delivering shared equity units comes at an opportunity cost of delivering condo units.) Based on preliminary discussions with local providers of affordable ownership units, there appears to be an appetite in Toronto to partner and explore this model further.

Although the city’s Home Ownership Assistance Program has made meaningful strides towards the goal of reducing barriers to home ownership, Sidewalk Labs’ shared equity program would seek to address a significant drawback of such programs, which is that they typically select a single “winning” household that takes all of the value of the property upon the first sale. In Quayside’s proposed shared equity model, the unit would remain affordable for the long term.

**Market-rate condo housing (45 percent).**

Because creating a mixed-income community means including market-rate as well as below-market households, Sidewalk Labs’ proposed program would include about 45 percent market-rate condos. These condos would bring in revenue, which in Quayside would cross-subsidize the overall program. And, as explored further on Page 283, a condo resale fee would generate private funds for affordable housing when condos are resold.



**Innovation explainer**

**Two examples of how shared equity units could work in Quayside**

The program aims to address a common barrier to home ownership for middle-income households: the need for a significant down payment.

	<b>One-bedroom \$375,000</b>		<b>Three-bedroom \$600,000</b>	
	<b>Traditional ownership</b>	<b>Shared equity program</b>	<b>Traditional ownership</b>	<b>Shared equity program</b>
<b>Down payment</b>	<b>\$75,000</b> 20% on 100% ownership stake	<b>\$15,000</b> 20% on 20% ownership stake	<b>\$120,000</b> 20% on 100% ownership stake	<b>\$24,000</b> 20% on 20% ownership stake
<b>Monthly payment</b>	<b>\$1,600</b> mortgage	<b>\$1,300</b> \$300 mortgage and \$1,000 rent	<b>\$2,500</b> mortgage	<b>\$2,100</b> \$500 mortgage and \$1,600 rent



**Young couple**

As an example of how the program works, consider a couple moving into a one-bedroom apartment that costs \$375,000. In a traditional ownership scenario, the buyer might have to pay up to \$75,000 up front for a 20 percent down payment, with a monthly mortgage of roughly \$1,600. In the shared equity program, the couple could put down just \$15,000 for a 20 percent down payment on a 20 percent ownership stake, for a total monthly cost of just over \$1,300, comprising \$300 in mortgage payments on the part they own and \$1,000 in rent for the rest. If they decided to sell in Year 5, the couple could stand to make around \$12,000 profit assuming 3 percent annual appreciation on their unit.

**Note: Figures on this page are provided for illustrative purposes only.**



**Young family**

Similarly, consider a young family that is tired of “condo hacking” a one-bedroom rental and finds a three-bedroom condo at \$600,000, hoping to obtain more room for their children. In a traditional scenario, the family’s down payment might be as high as \$120,000, with a monthly mortgage of roughly \$2,500. In the shared equity program, the family could put down just \$24,000 for a 20 percent down payment on a 20 percent ownership stake, paying rent on the rest for a total of \$2,100 a month, comprising \$500 in mortgage payments and \$1,600 monthly rent. If they decide to sell in Year 5, the family stands to make up to \$20,000, assuming 3 percent annual appreciation on their unit.

**How Sidewalk Labs plans to work with a non-profit partner to deliver shared equity units**

Sidewalk Labs’ sale of units at cost to a non-profit would enable the non-profit to provide equity stakes at below-market prices to qualifying middle-income households. The non-profit would receive steady rental payments on the portion of the home that is not owned, plus any home price appreciation on its owned portion upon resale. In

addition, the non-profit would oversee restrictions on resale to ensure ongoing affordability to subsequent income-qualifying households, which could include an independent appraisal process to determine selling price and maintenance of an applicant waitlist. In the young family example above, the entity would purchase at cost from Sidewalk

Labs, sell 20 percent at the same price to the family, and hold the remaining 80 percent at a cost basis of \$480,000 (80 percent of the \$600,000). It would then receive a 4 percent rental yield, or \$103,500 over five years, plus house price appreciation of \$76,500 (on their 80 percent share), leading to a 7 percent annual return, or profit of \$180,000 if the unit sells.

# The Sidewalk Toronto project can demonstrate ways for cities to hit ambitious affordability targets with a more balanced mix of government and developer funding sources.

## Innovation case study

### Reimagining the process of applying for housing

A digital tool could create a one-stop portal for housing applications and updates.

Working with the City of Toronto, Sidewalk Labs proposes to develop a streamlined, digital application process for all housing options in Quayside, including mid-range, market, and affordable units. This would

address known challenges in today's affordable housing application process and also foster an unparalleled resident experience of diversity and inclusion for all income levels.

#### Today

##### Many different options, no single source.

Affordable housing applicants can find out about a unit through a housing provider's flyer, by calling the city or one of its affordable housing partners, or even through social media — a highly decentralized process compared to the city's centralized waitlist for social housing units.

##### Many separate applications.

It is hard to keep track of each developer application's unique eligibility or submission requirements.

##### Hard to determine status.

Residents who complete an application might not receive updates for a long time or might be left in the dark about where they are in the process.

#### Future



##### One-stop shop.

Affordable housing applicants could find all housing opportunities in a one-stop shop. Developers could upload and market projects easily into a portal.



##### Common application.

A digital application means people could apply to as many projects as they would like, with a single form. Developers would have more confidence in the income-eligibility process, through an auto-verification functionality that could ensure applicants pass income eligibility requirements.



##### Real-time updates.

Applicants could get updates in real time and understand timing and eligibility expectations for housing matches. Developers could expedite lease-up timelines, thus reducing vacancy risk and other lease-up challenges.



# Achieve this program with innovation that yields greater affordability

Informed by Toronto’s existing affordability challenges, Sidewalk Labs’ vision for housing includes 40 percent of units at below-market rates, a focus on purpose-built rentals to improve long-term affordability, and new options for seniors, young professionals, families, and middle-income households. But identifying an ambitious program is not enough — there must be a credible financial plan to achieve it.

To make the economics work, developers of affordable housing have typically relied on a mixture of public sources of funding and high-end, market-rate rentals to subsidize below-market units. While this approach can deliver some measure of affordability, it also creates a barbell effect, with new developments consisting primarily of luxury units and a handful of affordable apartments. To break this mold and create a broad diversity of incomes across a given housing development, Sidewalk Labs has explored a range of traditional and innovative funding sources.

Sidewalk Labs has estimated the cost of implementing this housing vision by comparing the costs of delivering a program with 40 percent of units at below-market rate to the land value that would exist in a conventional market-driven development program, which would deliver the bare minimum of affordability required.

In Quayside, achieving a housing program of roughly 2,600 total units with roughly 1,040 below-market units would cost an estimated \$229 million. At the full scale of the IDEA District, achieving a total cumulative residential program of more than 34,000 units that include more than 13,600 below-market units would cost an estimated \$3.9 billion.

To help cover the costs of this greater level of affordability, Sidewalk Labs identified categories of traditional public sources, including existing government programs, land value, and other potential contributions. Sidewalk Labs also identified three new private sources that together enable the traditional public sources to go farther.

These private sources begin with more efficient unit design, which creates value by increasing the supply of housing units a developer can provide across a given project — an approach that Sidewalk Labs calls “affordability by design.” A second source is new land value unlocked by factory-based construction techniques, as achieved by a factory in Ontario specializing in modular building components made from mass timber. A third source could be revenue generated by condo resale fees.

→ Continued on Page 280

## Identifying funding sources to achieve a 40% below-market program

With these sources, Sidewalk Labs proposes to achieve a 40 percent below-market program in Quayside and to demonstrate the potential impact of innovative financial and design tools to achieve this same program at the full scale of the IDEA District.

	Quayside		IDEA District	
	Below-market program achieved*	\$M	Below-market program achieved	\$M
<b>Traditional public sources</b>	<b>20%</b>	<b>\$115</b>	<b>25%</b>	<b>\$2,492</b>
Existing government programs**	13	77	10	997
Land value or other gov’t contributions	7	38	15	1,495
<b>New private sources</b>	<b>7%</b>	<b>\$37</b>	<b>15%</b>	<b>\$1,435</b>
Affordability by design	7	37	5	475
Factory-driven land value	0	0	7	639
Condo resale fee***	0	0	3	321
<b>Sidewalk Labs contribution</b>	<b>13%</b>	<b>\$77</b>	<b>-</b>	<b>-</b>
<b>Total sources</b>	<b>40%</b>	<b>\$229</b>	<b>40%</b>	<b>\$3,927</b>

\* These figures reflect the incremental impact of each source towards creating a below-market program, based on overall 40 percent below-market program cost of \$229 million.

\*\* Existing government program figures are estimated for Quayside based on recent awards and the proposed below-market housing program. These figures assume programs are scaled up across the IDEA District on the same basis as in Quayside. As a result, totals may exceed annual budget allocations pending timeline of affordable units coming online between 2024 and 2048.

\*\*\* Analysis assumes 2.5 percent annual inflation rate.

Continued from Page 278

In Quayside, traditional public sources could provide the funding needed to deliver 20 percent affordable housing, consistent with current requirements. The remainder of the below-market program proposal could be covered, in part, by affordability by design (7 percent). But factory-based construction and condo resale fees require a longer timeline to realize value (through factory efficiency and sales, respectively), leading to a need for additional private sources in Quayside.

To realize the full below-market program vision in Quayside, Sidewalk Labs proposes to make a contribution of \$77 million, in an effort to catalyze those sources for the future while still realizing an ambitious affordability program in the present. (This contribution would exist in addition to other innovation investments, including support for the Ontario-based factory for mass timber building parts described earlier in this chapter, on Page 210.)

At the full scale of the proposed IDEA District, however, private sources can realize significant value. In total, it is possible to achieve a 15 percent below-market program using private sources, which could generate more than \$1.4 billion between 2024 and 2048. To achieve a 40 percent target at the scale of the IDEA District, the remainder would have to be supplied by existing government programs, contributing land at below-market value, or other sources.

Together, this combination of traditional public sources and innovative private sources could help deliver a groundbreaking housing program that would supplement reliance on existing government programs to enable unprecedented levels of affordability.

The following sections describe the proposed funding sources in greater detail, including their potential application in Quayside by Sidewalk Labs, and across the IDEA District by other developers.

### New private sources

To achieve its 40 percent below-market housing vision, with a diverse range of incomes across the community, Sidewalk Labs proposes the creation or use of several private sources of funding.

These sources begin with the value created by more efficient unit design — an approach that Sidewalk Labs calls “affordability by design.” They also include new land value unlocked by accelerated construction techniques, catalyzed by a factory in Ontario specializing in modular building components made from mass timber. A third source could include revenue generated by condo resale fees.

Additionally, a proposed affordable housing trust could package some of these new funding sources to meet affordability objectives.

While these tools would be initiated in Quayside, they require varying timelines and development scales to provide sufficient funding sources for the housing vision. But once the viability of these tools is demonstrated, Sidewalk Labs estimates they could generate over \$1.4 billion to support housing affordability — enabling developers to meet ambitious below-market housing targets while still achieving reasonable returns.

#### Affordability by design.

To help achieve its 40 percent below-market housing vision, Sidewalk Labs plans

to create value by designing affordability into its proposed housing units.

As described on Page 253, Sidewalk Labs plans to provide efficient, ultra-efficient, and co-living units in Quayside that are designed to make the most of their space through features such as multi-purpose furniture; reduced in-unit storage, enabled by on-demand storage recovery in the neighbourhood; and shared building amenities, such as communal eating or co-working areas. While these units are smaller than comparable units on the market, they also enable affordability and their efficient designs provide for high-quality living.

(In addition to efficient and ultra-efficient units, Sidewalk Labs also proposes to create a minor amount of new “standard”

units that are comparable in size to existing downtown developments.)

The ability to design efficient units that remain comfortable enables developers to create more total units across a given project. This additional supply increases the revenue potential for developers without increasing the cost basis, creating new value that can be applied towards a mixed-income housing program.

For example, in Quayside, Sidewalk Labs’ proposed efficient unit — averaged across different unit types and based on a unit mix that skews towards more bedrooms — would be 7 percent smaller than its equivalent proposed standard unit. Efficient units would benefit from features such as multi-purpose furniture that enable a smaller footprint.

## Creating value for below-market housing through efficient unit design

With efficient unit design, Sidewalk Labs is able to build an additional 87 units of below-market housing at Quayside when compared to traditional unit designs. This has the potential to generate an estimated \$37 million in additional revenue, which can help support the below-market housing program.

Assuming 535,035 square feet dedicated to below-market rental units	Average below-market size (sq ft per unit)	Number of units	Value (in millions)
Standard unit design	638*	839	\$207
Efficient unit design	578**	926	\$242
Impact of efficient unit design	60 fewer square feet per unit on average	87 more total units	\$34 for below-market housing***

\* Standard unit design is based on a market landscape analysis of comparable downtown developments.

\*\* The average efficient unit size indicated on this table is slightly larger than the overall average efficient unit size (see prior table) because it is weighted by bedroom splits for an exclusively below-market housing program. Sidewalk Labs’ proposed housing program is grounded in demographic need, which allocates more family-sized units (with more bedrooms) to below-market units.

\*\*\* Note that \$37 million in sources from affordability by design includes \$3 million attributable to market rental housing not included in this analysis.



Assuming the same amount of area is dedicated to below-market housing, this reduction in average size enables the creation of 87 more units in Quayside than would otherwise exist in a conventional development.

In Quayside, Sidewalk Labs estimates that affordability by design could create \$37 million in value that could be applied towards its housing vision. Applied at the full scale of the IDEA District, affordability by design could generate \$475 million in value that could contribute to ambitious below-market housing targets.

Critically, affordability by design not only enables more below-market housing but also provides a set of new downtown living options that respond to the needs of families, seniors, young professionals, and other groups.

#### Unlocking land value from factory-based construction.

As described on Page 208, Sidewalk Labs proposes to build residential and commercial spaces using an off-site factory process that can accelerate project timelines and enhance cost certainty. Once proven, these outcomes would enable developers to pay more for land, with such premiums directed towards below-market housing.

Sidewalk Labs estimates that it will take at least 6 million square feet of buildable area for the factory to hit peak efficiency; so, the impact of this approach would not take effect in Quayside.

This estimate takes into account the fact that, during the ramp-up period with the first assemblies, the factory processes would take time to reach operational efficiency and a payback on the initial invest-

ment, as well as to stabilize an operating margin that reduces timelines and risk for developers. This estimate is based on the capital cost required for the factory and initial operating costs.

But when the expected efficiencies from this investment are realized at scale, factory construction would increase land values in two key ways: faster construction and reduced project risks.

→ **Faster construction.** Sidewalk Labs has estimated that its factory process can reduce project timelines by 35 percent, thanks largely to dramatic reductions in onsite assembly time. That accelerated speed would enable developers in the Sidewalk Toronto project area (whether Sidewalk Labs or any other third party) to bring projects to market more quickly, recover their investment faster, reduce their exposure to rising interest rates, and potentially complete more projects over the same amount of time. For commercial properties, this speed also opens up the possibility of pre-leasing to a new category of tenants unserved by the current market: rapidly growing startups that are unable to pre-lease four to six years before delivery, given unknown future business needs.

→ **Reduced risk.** The factory-based construction process also creates a more reliable set of costs related to design and materials procurement, primarily by providing developers with a library of pre-designed (yet customizable) building parts that have been pre-approved for use. Additionally, this library of parts has been optimized for shipping, reducing transportation costs, and created

for faster assembly, as described on Page 227. The greater reliability of this factory supply chain reduces the need for developers to build “contingency” costs into their projects and should command tighter risk premiums from equity.

Together, these factors could enable more affordability in multiple ways. First, developers who recognize these benefits could be willing to pay more for land, the value of which could be applied to below-market housing. That is the approach used to generate the estimates shown in the funding sources table.

An alternative would be that government could increase affordability requirements, knowing that better project economics would enable developers to meet them while still clearing returns.

Sidewalk Labs estimates that the premium that would accrue to land when developers have access to factory-based construction techniques has the potential to generate proceeds estimated at \$639 million across government-owned parcels across the IDEA District over the 24 years, from 2024 to 2048.

#### Generating new funding with a condo resale fee.

Sidewalk Labs proposes implementing a 1 percent fee on the resale of all condo units in the Sidewalk Toronto project area as a new source of private funding for affordable housing.

As described on Page 266, one of the barriers to creating affordable rental housing in Toronto today is the need to offset affordable units with high-priced condos to make projects hit target returns. With a resale fee such as the one Sidewalk Labs

proposes to implement in Quayside and across the project zone, condos could help support rental economics, creating a self-sustaining ecosystem for mixed-income housing.

The resale fee could be built in from the start as a land encumbrance — such as with a restrictive covenant or other legal mechanism; it would not be a new government-levied tax — to support affordable housing development. Sidewalk Labs would take a catalyst role by applying the condo resale fee to its condo units in Quayside, aiming to demonstrate that the fee would not impact condo sales or pricing, and thus that such a model is feasible and viable for future developers within the IDEA District.

Research has shown, for example, that resale fees made common in New York City in the 1970s to generate capital for an aging housing stock did not lower prices.<sup>71</sup> But the resale fee in Quayside would not have sufficient time to provide capital sources to support the neighbourhood’s housing program.

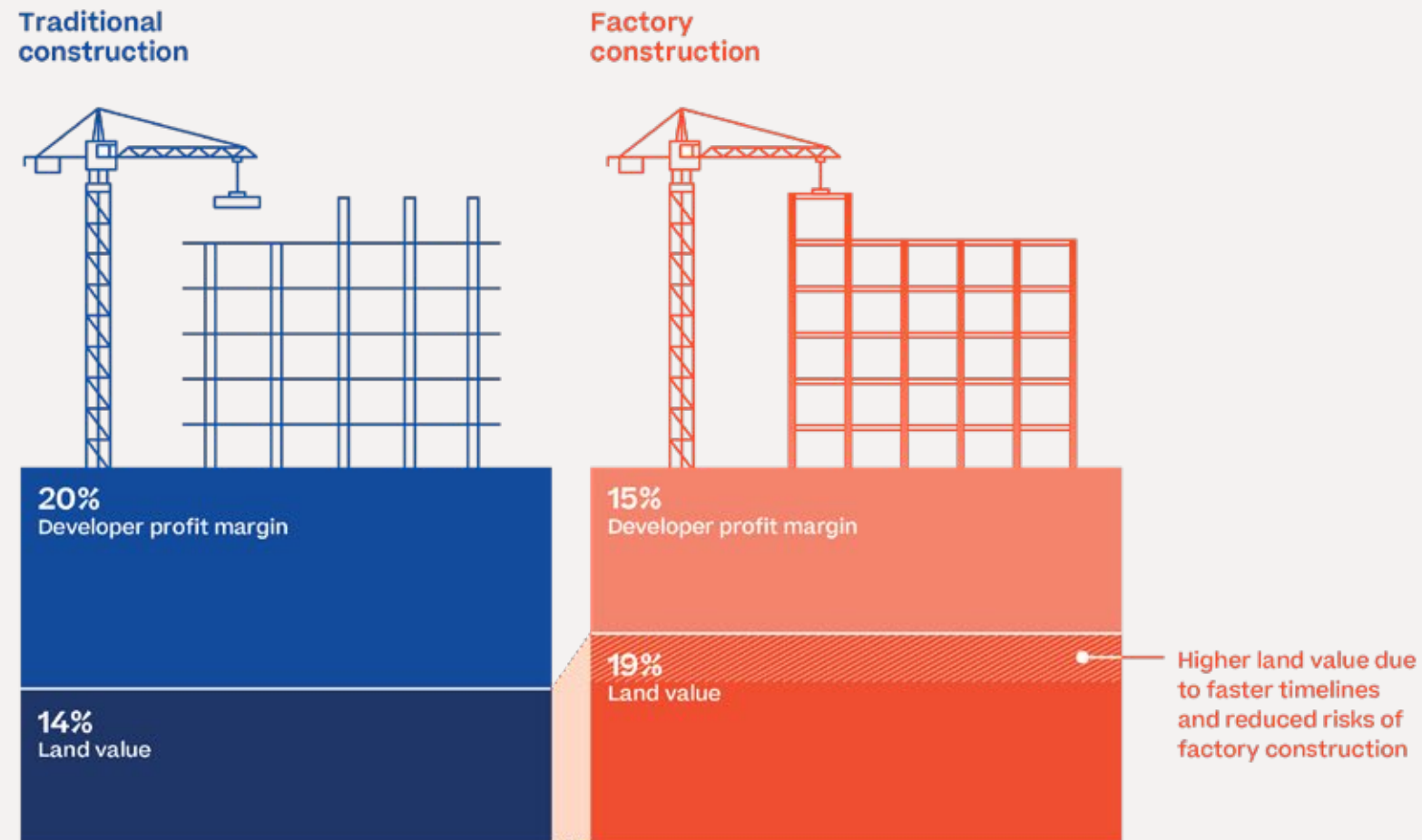
The resale fees generated in Quayside could also contribute to below-market housing at the full scale of the IDEA District. Assuming units in the project area are re-sold every seven years, consistent with existing trends in Toronto, Sidewalk Labs’ proposal of a 1 percent fee on the resale value of each condo could generate a cumulative \$321 million over 24 years for a 40 percent below-market program across the IDEA District.

That estimate would mean that each condo unit developed in Quayside carries the potential to deliver an estimated \$23,000 towards below-market housing through 2048.

A condo resale fee could generate **\$321 million** by 2048.

# How factory-based construction can generate land value

Sidewalk Labs' plan to manufacture building parts could dramatically accelerate timelines and reduce risks for development projects. These benefits, once demonstrated in Quay-side, would enable developers to pay more for land in the IDEA District, unlocking value that could be applied towards ambitious below-market housing programs.



Ground-up developers typically expect higher returns in exchange for taking on significant risk due to unpredictable project timelines and the need to find building materials at the right price.

Developers would be able to adjust their return expectations given faster project timelines and reduced risks. By realizing profits sooner, developers could benefit from higher "net present value" (money today is more valuable than money tomorrow) and have the opportunity to take on additional projects within the same time frame (such as doing three projects in six years instead of two).

Below-market housing impact	
Potential value generated	Developers who recognize this value potential are willing to bid a higher price for the land. Across the proposed full scale of the IDEA District, this ability could generate an estimated \$639 million in value for below-market housing (assuming the value is applied to publicly owned lands).
<b>\$639M</b>	

Note: Represents an illustrative and preliminary analysis on value generated by factory construction.



See the "IDEA District" chapter of Volume 3 for more details on the proposed public administrator role.

## "Lock-boxing" funding with a Waterfront Housing Trust.

To help deliver new funding sources such as factory-based construction value or a condo resale fee, Sidewalk Labs proposes the creation of a housing trust fund: a new financial vehicle to assemble and disburse funding for below-market housing across the Sidewalk Toronto project area. (Sidewalk Labs would not participate in the trust's governance and proposes that it be publicly administered, potentially by the public administrator of the proposed IDEA District.)

The proposed Waterfront Housing Trust could assemble funding from a variety of public and private sources and "lock-box" this funding for below-market housing within the IDEA District, increasing the predictability and certainty of funding for developers from the outset of a project. Sidewalk Labs proposes that the Waterfront Housing Trust provide capital grants and other financial support for developers, both private and not-for-profit, seeking to meet significant affordability commitments.

## The Waterfront Housing Trust would offer a replicable model for harnessing the private sector for affordable housing development.

A key advantage of the trust is flexibility. For example, in collaboration with government, the trust could disburse funding for mid-range (or middle-income) housing units in addition to affordable housing units, expanding the city's ability to meet affordability needs. Should it wish, a housing trust could also explore new funding concepts, such as an enclosed ecosystem for "cash in lieu" payments that ensures such payments go towards developments with below-market housing in the project area.

The trust also could incubate alternative funding sources as needed by the market, in addition to lock-boxing or capturing the value created by factory-based construction and condo resale fees.

For instance, the trust could create new low-cost debt financing products to better support affordable housing developers, or potentially incubate policy innovations less common in Toronto, such as air rights transfers from density bonuses. It could even attract new capital sources, as many North American cities have done, such as the New York City Acquisition Fund, which was launched in 2006 with public-private backing from the city, banks, and private foundations to provide early-stage financing for affordable housing developers.

The success of the Waterfront Housing Trust would offer a resilient and replicable model for harnessing the private sector for affordable housing development, and for creating mixed-income neighbourhoods elsewhere in Toronto, Ontario, and far beyond that could help communities offer more housing options to households of all incomes.

## Traditional public sources

Sidewalk Labs' support of new private sources, including its approach to affordability by design, would reduce the reliance on government sources that would typically be needed to achieve an ambitious 40 percent below-market affordability target. But public programs remain essential to realizing affordable housing projects in Toronto.

### Existing government programs.

To demonstrate one viable scenario, Sidewalk Labs examined two existing government programs that typically assist developers seeking to create affordable units in Toronto:

→ **National Housing Co-Investment Fund.** The federal Co-Investment Fund run by the Canada Mortgage and Housing Corporation provides capital contributions and low-cost financing to developers of affordable rental housing.

→ **City of Toronto Open Door Affordable Housing Program.** This program provides a mix of incentives, such as one-time exemptions from planning fees and development charges, as well as capital contributions.

To estimate the potential contribution of these two programs, Sidewalk Labs conducted financial testing and other analyses to compare their eligibility requirements with the MIDP's proposed housing program. (This analysis was based on past rewards and reasonable scoring performance, but it remains illustrative only.)

In Quayside, Sidewalk Labs estimates that these existing government sources could contribute an estimated \$77 million towards a below-market program, including capital contributions and other incentives provided to developers.

But once new private funding sources become fully viable through the aforementioned factory or the condo resale fee, the proportionate need for these government sources would diminish.

### Land value and other contributions.

To achieve a 40 percent below-market housing vision and truly set a new course for affordability in Toronto, additional public sources are needed after applying existing government sources.

While the government could fill this remaining need with whatever sources it deems appropriate, Sidewalk Labs believes there is precedent in Toronto for this funding need to be covered through adjusted land value, proceeds from land sales, or other contributions.

Land value is an essential component of the public-sector toolkit for affordable housing. In 2018, Toronto took an important step towards leveraging this public asset with the launch of CreateTO, an entity whose mandate includes reviewing the city's surplus land policies for affordable housing. The recent Housing Now initiative releases city-owned land to increase affordable housing, enabling land value to be considered a capital grant going directly to the creation of below-market units.

Today, at least six major revitalization initiatives already underway leverage city-owned lands to revitalize affordable rent-g geared-to-income units. Government worked with Waterfront Toronto to leverage land value in the West Don Lands development;<sup>72</sup> for example, Phase 1 of that project provided "serviced and clean land" at no cost to support the development of affordable housing, ultimately leading to the creation of 243 new rental units.

Given its ambitious objective to deliver affordable housing along the waterfront, Waterfront Toronto's willingness to negotiate a price for the land in Quayside that recognizes these requirements is a critical component of filling the remaining cost gap of the proposed housing program.

At the full scale of the IDEA District, if the public sector chose to provide the remaining need for a 40 percent below-market program, the result would be more than 13,600 units of below-market housing, including some 6,800 units of affordable housing.

Consistent with Sidewalk Labs' proposed role as a catalyst, the new private sources unlocked by this approach to housing innovation would enable the IDEA District to realize far more below-market housing than the current 10 percent requirement for the private parcels on the eastern waterfront and Waterfront Toronto's commitment to set aside land sufficient to accommodate 20 percent affordable housing — providing a new model for other parts of the city and other cities around the world.

## More than 13,600 below-market units across the IDEA District

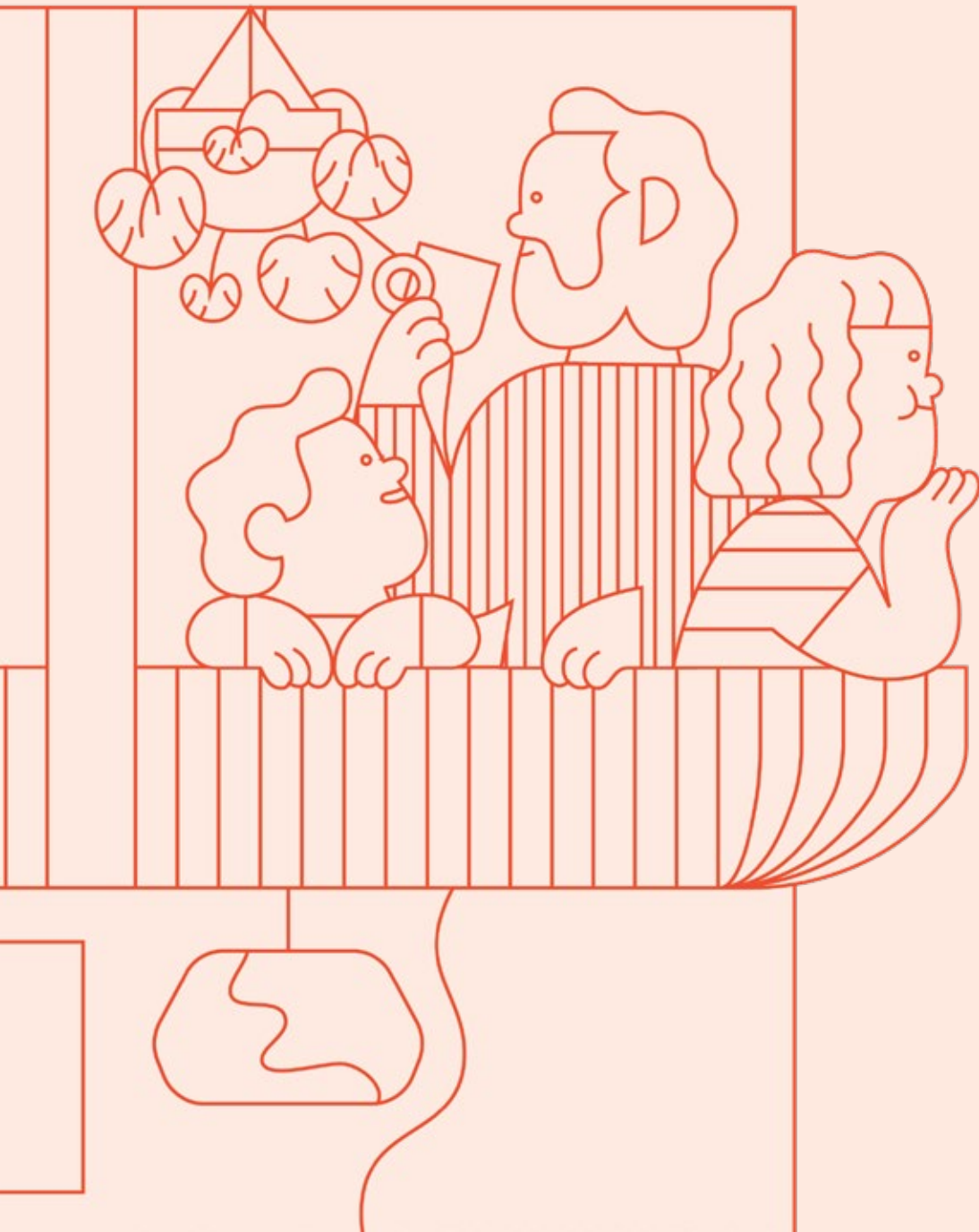
Delivering on a housing program at the proposed full scale of development across the IDEA District could create more than 13,600 below-market units, and roughly 34,000 housing units in all.

	Market housing (e.g. condo)	Below-market housing	Total
Percentage of program	60%	40%	100%
Number of units	20,400	13,600	34,000

A comprehensive approach to affordability could help Toronto maintain its exemplary commitment to inclusion.

# Public Engagement

The following summary describes feedback related to **buildings and housing**, and how Sidewalk Labs has responded in its proposed plans.



As part of its public engagement process, members of Sidewalk Labs' planning and innovation teams talked to thousands of Torontonians — including members of the public, expert advisors, civic organizations, and local leaders — about their thoughts, ideas, and needs across a number of topics.

## 1 Truly affordable housing for lower- and middle-income Torontonians

### What we heard

From the very first Sidewalk Toronto Town Hall, true housing affordability — especially for lower- and middle-income households — was top of mind for participants. Roundtable 4 participants particularly urged Sidewalk Labs to be ambitious with its affordable housing program. They felt units in Quayside should be lived in, rather than being luxury investment pieces.

Torontonians want Quayside to include diverse populations, with the buildings and neighbourhood representing a mix of incomes, ethnicities, and backgrounds. As one Reference Panel participant put it: “Issues of housing costs, community cohesion, making space for new arrivals — these are all really important in today’s world. Toronto has a reputation for inclusiveness. I hope it stays that way.” Participants emphasized the importance of providing a mix of housing options in Quayside, including significant numbers of rental units.

Participants were open to new models for the financing and operating of housing that could stand the test of time and encourage innovation. But Roundtable participants and the Residents Reference Panel wanted more clarity on building ownership and governance and the maintenance of buildings and appliances. The Housing Advisory Working Group generally supported the proposed affordable housing program, the shared ownership model, and the housing trust concept; it



Members of the Sidewalk Toronto Residence Reference Panel discussing content for their interim report, published in September 2018. Credit: David Pike

also encouraged the exploration of a digital affordable housing application and suggested that Sidewalk Labs find ways to empower and partner with non-profit housing organizations, without burdening them.

### How we responded

#### Raising the bar.

Sidewalk Labs proposes that 40 percent of housing be below market, including new rental units specifically for middle-income residents. Sidewalk Labs proposes that 20 percent of all housing be affordable, consistent with the City of Toronto’s definition of “affordable” housing as anything 100 percent of AMR and below (see Page 269).

#### Incorporating deep affordability.

Sidewalk Labs proposes that at least a quarter of affordable units go towards deep affordability for lower-income households at or below 60 percent AMR (see Page 269).

#### Collaborating with non-profits.

Sidewalk Labs plans to work with experienced non-profits to deliver the deep affordability component of its housing programs, inviting these organizations to participate in an exclusive proposal process and bringing them into the design process to help ensure that deeply affordable units meet the needs of inhabitants (see Page 273).

## 2 Explore innovative building designs

### What we heard

Roundtable participants were enthused about mixed-use buildings and open to innovative construction and design. As one visitor to Sidewalk Labs' Toronto headquarters, 307, said: "Every time I go to a meeting, it's been the same design for buildings in the last 30 years. It seems you have the capacity and the interest to push for new innovation and that's exciting."

Torontonians want the neighbourhood to feel human scale (no super high-rises) and be accessible for those with limited mobility. They were also supportive of healthy, natural building materials; they generally liked the biophilic, low-carbon nature of timber, although they expressed concern about the safety, durability, and toxicity of the material.

Participants in the tall timber industry events similarly questioned the long-term maintenance of the material and the extent to which the industry will buy-in and be able to respond to this new demand. But overall, they were excited about the potential of prefabricated timber construction to increase efficiencies, decrease costs, improve and speed up assembly, and generate safe, high-quality buildings.

The Housing Advisory Working Group was similarly excited about the potential of modular housing, while also questioning its viability and cost. They recommended that Sidewalk Labs work closely with the city on zoning regulations to make the mixed-use vision a reality.

### Supporting middle-income households.

Sidewalk Labs proposes that 20 percent of housing go towards middle-income households (100-150 percent AMR), creating new options for households currently left behind by the Toronto market but who do not qualify for affordable housing (see Page 270).

### Helping families build equity.

Sidewalk Labs proposes a shared equity program that would enable middle-income households to own part of a unit (facilitated by a non-profit housing organization), reducing down payment costs and providing a more affordable path to home ownership. Five percent of all units would be earmarked for this program (see Page 274).

### Providing rentals.

Sidewalk Labs proposes making half of all housing in Quayside purpose-built rental housing, improving long-term affordability for the city (see Page 269).

### Enhancing applications.

Sidewalk Labs proposes to work with the City of Toronto to develop a new digital affordable housing application that could provide real-time transparency into the application process (see Page 277).

### Expanding funding sources.

Sidewalk Labs proposes new financial and design tools that would help the private sector support government in delivering an ambitious affordability program, including value unlocked through factory-based construction techniques, a condo resale fee, and efficient unit design. Additionally, it proposes a new entity called the Waterfront Housing Trust to assemble public and private funding sources, "lock-boxing" them for below-market needs. (Sidewalk Labs would not play a part in the trust's governance.) (See Page 280.)

### How we responded

#### Enabling mixed-use.

Sidewalk Labs proposes to use and require a real-time building code system that could enable a mix of residential and non-residential uses without sacrificing safety or quality of life (see Page 251).

#### Designing for adaptability.

Sidewalk Labs plans to include a loft-style approach to buildings, with floor plans and spaces that can be easily adapted for occupancy with many different types of uses, reducing the time and cost of renovating a space (see Page 246).

#### Creating modularity.

Sidewalk Labs plans to create a pre-designed library of parts for construction that would reduce time spent on designing and sourcing materials, improving cost and time predictability while still enabling design excellence (see Page 220).

#### Building green.

Sidewalk Labs commits to using formaldehyde-free glues for its mass timber elements, and to pursuing glues and finishes that are Cradle-to-Cradle certified (see Page 212).

#### Ensuring safety.

To ensure the safety of all structures in Quayside, Sidewalk Labs plans to work with Equilibrium, a Vancouver-based structural engineering firm experienced in timber construction; Aspect Structural Engineers, a firm based in Vancouver; Michael Green Architects; CHM Fire Consultants, based in Ottawa; Vortex Fire Consulting, a global fire-code consulting firm with offices in Toronto; Gensler Architects, with an office in Toronto; Golder Associates LTD, based in Toronto; and Integral Group, a building system engineering firm with an office in Toronto.

#### Scaling for people.

While zoning for the Quayside site permits taller buildings, Sidewalk Labs plans to limit its buildings to around 30 storeys to create a more human-scale neighbourhood (see Page 231).

#### Incorporating accessibility.

Following its accessibility principles, Sidewalk Labs plans to design buildings that make threshold moments accessible (such as using automatic doors) and, when possible, make walkways wide enough for people to talk to each other while signing (see Page 106).

#### Engaging partners.

Sidewalk Labs created a forum for a wide array of players from the mass timber industry — including contractors, designers, manufacturers, and union leaders — to discuss the technical challenges of building with the material, develop potential solutions, identify opportunities for collaboration, and support the growth of this local industry (see Page 217).



Attendees of the "Open Sidewalk: Nature and the City" event explore a mass timber exhibit at 307. Credit: Jenna Wakani

# 3 Create units that can adapt over time and encourage neighbourliness

## What we heard

Participants were enthusiastic about flexible unit designs that could adapt according to different life stages; they also expressed interest in larger units (two bedrooms or more) that could accommodate growing families and generations living together. The Family Lifestyles Research also illuminated some of the challenges facing families, who often desire (but cannot find) apartments with ample kitchens or living rooms, multiple bedrooms, and storage solutions.

Many Torontonians were generally open to sacrificing some square footage within their individual units for shared amenities, spaces (like communal kitchens, laundry rooms), and goods (like strollers or tools),

especially as this sharing could generate more community bonding. Participants in the Seniors Workshop liked the idea of having multiple generations, and an active community, in one’s building. As one senior requested: “Create a porch condition outside my front door.”

Of course, even with a strong community, in-unit storage and enough space for personal expression is crucial, as visitors to the Efficient Unit Prototype at 307 noted. Prototype visitors also recommended making units more accessible by integrating adjustable counter and appliance heights. Others recommended ensuring that finishes are customizable and that partitions are genuinely easy to remove, so tenants can have more agency over their homes.

## How we responded

### Facilitating expansion.

Sidewalk Labs plans to implement a flexible interior wall system, where sections of walls can be easily clipped into place or removed, thus making renovation (expansion or contraction) easier and more affordable (see Page 246).

### Welcoming families.

Sidewalk Labs plans for 40 percent of total units to have two bedrooms or more, creating new options for families (see Page 253).

### Designing flexibility.

Sidewalk Labs has worked with nArchitects to explore efficient unit designs globally and with Toronto-based gh3 on a unit prototype to explore how efficient designs could meet the

needs of shifting demographics in Toronto. This research, coupled with feedback on the Efficient Unit Prototype, would inform final unit design. Current designs include multi-purpose tables that could be raised or lowered when not in use, lofted beds located up short staircases that could double as storage drawers, and countertops that could serve as cutting boards (see Page 255).

### Optimizing storage.

Sidewalk Labs proposes efficient units be designed to have less in-unit storage space than a market comparison apartment, compensated with free in-building storage and additional off-site storage with low-cost, on-demand delivery (see Page 255).

### Exploring co-living.

Sidewalk Labs plans to provide

a co-living option (efficient units with shared building amenities and community programming) for residents who prefer more communal living (see Page 260).

### Strengthening community.

Sidewalk Labs plans to create abundant public space and allocate 90,000 square feet to social infrastructure, providing the spaces and programming tools to inspire a stronger community (see the “Quayside Plan” chapter of Volume 1).

### Incorporating accessibility.

In keeping with its accessibility principles, Sidewalk Labs commits that 20 percent of units would have accessible fixtures and pledges to meet the evolving and growing housing needs of seniors.

# Engagement spotlight



Community members share feedback during the “Re-Imagining Homes for Seniors” workshop. Credit: Sidewalk Labs

In September 2018, Sidewalk Labs convened individuals from 17 non-profits — including leaders in social service provision and housing for women, Indigenous communities, and homeless populations — for a roundtable. Sidewalk Labs Associate Director of Development Annie Koo was eager to learn from these leaders about how best to work with them on a deeply affordable housing program.

Initially, Annie had been considering a kind of non-profit bootcamp or fellowship program — a kind of incubator to which non-profits could apply and then receive funding or support. But one participant explained that the time commitment of such a program — while well-intentioned — would be particularly onerous for resource-strapped non-profits.

“So we course-corrected,” says Annie. “We heard loud and clear. We want to partner with you, but don’t add to our challenges. Meet us where we are.” In response, Annie and her team simplified the concept to be a proposal process — exclusive to nonprofits — for organizations to design and deliver the deep affordability component of housing at Quayside.

## Acknowledgements

Sidewalk Labs would like to extend special thanks to the participants of the Sidewalk Toronto Housing Advisory Working Group, and to the staffs of the City of Toronto, Province of Ontario, and Government of Canada for their time and guidance.

## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full proposed IDEA District scale are inclusive of the entirety of its proposed geography, including all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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# Sustain- ability

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## Introduction

p298

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## Part 1

Creating  
Low-Energy  
Buildings

p304

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## Part 2

Optimizing  
Building  
Energy  
Systems

p314

---

## Part 3

Making Full  
Electrification  
Affordable

p324

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## Part 4

Using Clean  
Energy to  
Heat and Cool  
Buildings

p334

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## Part 5

Reducing Waste  
and Improving  
Recycling

p344

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## Part 6

Managing  
Stormwater  
Naturally and  
Actively

p358

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## Public Engagement

p366





# Introduction

## The Vision

A new standard of sustainability that creates a blueprint for truly climate-positive communities.

Cities are at the forefront of the battle against climate change. They provide the most promising outlets for sustainable living, contributing far fewer greenhouse gases (GHGs) on a per person basis than areas with lower population density.<sup>1</sup> They have also led the charge for “climate-positive” development — an ambitious global push to not only reduce or even eliminate GHG emissions but actually remove carbon from the environment.<sup>2</sup>

Toronto and Ontario alike have both made tremendous strides towards lowering GHG emissions. Today, 90 percent of the power generated in Ontario is GHG-free,<sup>3</sup> thanks to the elimination of coal-fired power generation<sup>4</sup> and other policies. The City of Toronto’s TransformTO initiative aims to expand electrification, improve building energy-efficiency, and nearly eliminate waste — targeting a 65 percent reduction in GHG emissions by 2030, and an 80 percent reduction by 2050.<sup>5</sup>

These and other ambitious programs have helped Toronto reach per capita emissions of 6.3 tonnes per year.<sup>6</sup> But Waterfront Toronto wants to do even better with new developments under its stewardship, and has established a public policy goal of achieving a climate-positive community along the eastern waterfront that can demonstrate a path forward for other large-scale urban developments to follow.

The Sidewalk Toronto project provides a unique opportunity — at a moment of renewed urgency — to tackle climate challenges. Incremental changes have been unable to eliminate GHG emissions, let alone achieve climate-positive development in a replicable way. Instead, reaching this goal requires a comprehensive approach to designing, operating, and managing energy systems that integrates new physical infrastructure with emerging digital tools.

At the core of this approach is using clean electricity for all heating, cooling, and power needs. Today, Toronto’s buildings account for roughly 60 percent of the city’s GHG emissions,<sup>7</sup> with the vast majority of those emissions (87 percent) attributed to burning natural gas for heat or hot water.<sup>8</sup> In other words, the clearest path towards positivity is through full electrification. But electricity could become more expensive for households and businesses, given that electricity tends to cost more than natural gas, unless a system were deployed at a wide enough scale to spread the costs.



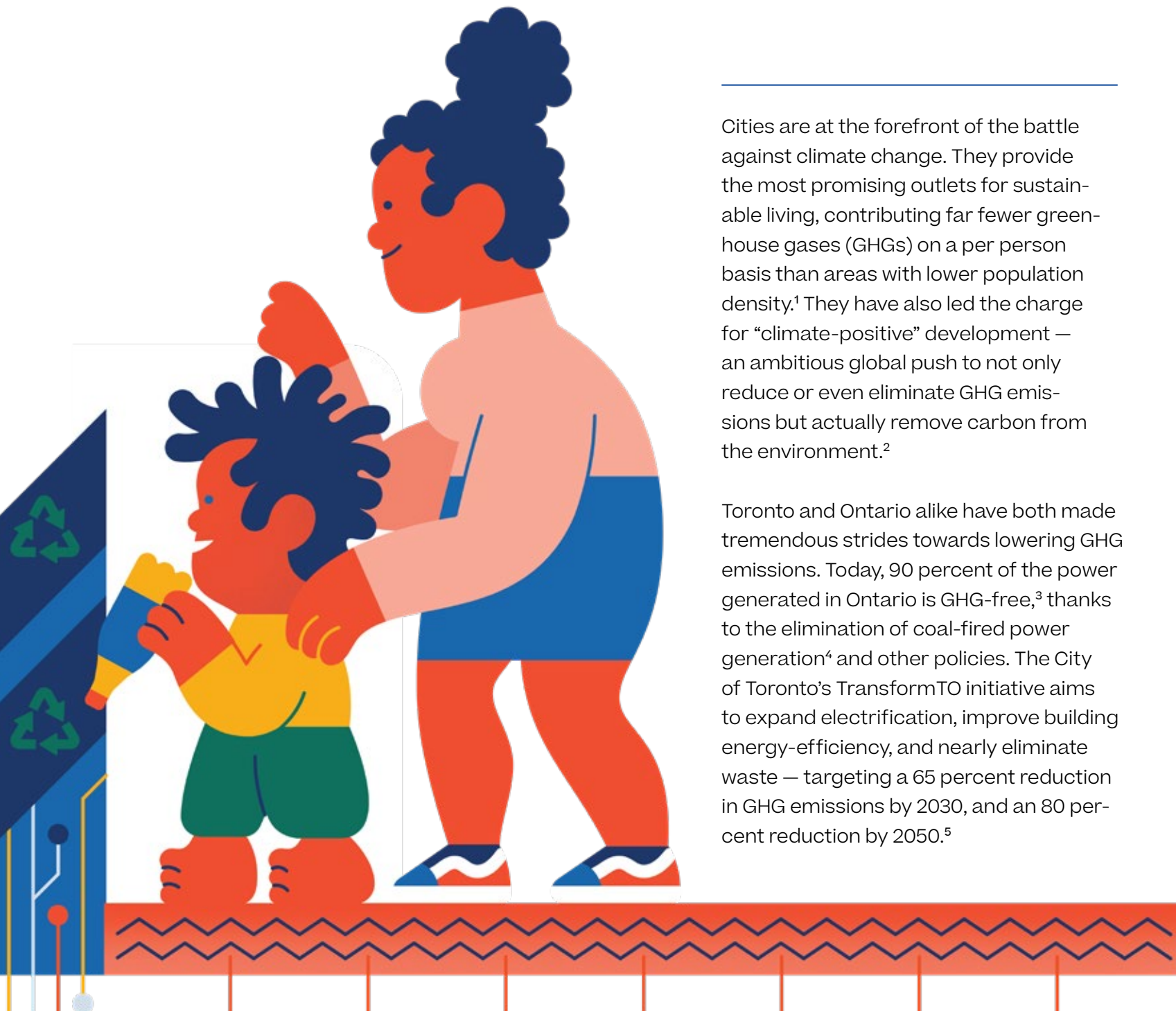
### The innovation plan.

Building on concepts from Waterfront Toronto’s existing precinct plans, Sidewalk Labs proposes a six-part pathway to achieve climate-positive development that can only be effective and financially feasible when applied across a broad area and supported by strong cooperation between the public and private sectors.

First, Sidewalk Labs proposes to reduce overall energy demands through energy-efficient building designs. These designs would maintain interior comfort by incorporating building features inspired by the global “Passive House” movement, such as airtight wall systems. These proposed designs would achieve or exceed the highest levels of the Toronto Green Standard (the city’s energy code) for GHG intensity.

Second, Sidewalk Labs plans to eliminate energy waste through digital management tools. A proposed suite of energy “Schedulers” would actively manage energy systems for residents, businesses, and building operators, ensuring that buildings operate in the most efficient way possible.

Third, Sidewalk Labs plans to use a district energy system called a “thermal grid,” which could provide heating, cooling, and domestic hot water without relying on fossil fuels. This grid harnesses clean energy from a variety of sources — including geothermal (underground) energy, building waste (or excess) heat, and wastewater (sewage) heat — and operates using electric heat pumps, eliminating the need for boilers powered by natural gas.





## Benefits of implementing the vision

- Establish a global model for achieving climate positivity
- Reduce carbon emissions by 89 percent over the current city average
- Improve recycling and organic waste processing, with a landfill diversion rate of 80 percent
- Protect water quality, lower costs, and create a more beautiful public realm through a green stormwater system

Fourth, Sidewalk Labs proposes to **design an advanced power grid that uses solar energy, battery storage, and real-time energy pricing** to reduce reliance on the main power grid during periods of peak demand, when the grid requires fossil fuels to meet needs. This grid could draw on solar or battery energy at peak moments or, combined with the Schedulers mentioned above, defer energy consumption until off-peak hours, when fossil fuel-fired power plants are not in use.

Fifth, to reduce GHG emissions from garbage trucks and the impact of landfill waste, Sidewalk Labs **proposes a smart disposal chain that could dramatically improve recycling rates and organic waste processing**. This chain would include real-time feedback to improve waste sorting, “pay-as-you-throw” chutes that encourage households and businesses to reduce waste, underground vacuum tubes that help reduce contamination and centralize trash hauling, and connections to anaerobic digestion facilities.

Finally, to protect the water quality along the waterfront while also incorporating more nature into the public realm, Sidewalk Labs proposes a **combination of green infrastructure and digital stormwater management systems** that could help capture, reuse, and, if necessary, treat stormwater that might otherwise contaminate the Don River basin.



## The Sidewalk Toronto project could become the largest climate-positive district in North America.



### The impact.

Together with mobility initiatives that encourage cycling, walking, and the use of electric vehicles, this comprehensive plan represents a dramatic reinvention of how major infrastructure systems are built and operated, as well as the way energy is generated, managed, and consumed — all in pursuit of the greater goal of climate-positivity.

**In Quayside, Sidewalk Labs estimates that this integrated plan could make the neighbourhood nearly carbon neutral**, achieving per capita emissions of slightly over 0.9 annual tonnes.<sup>9</sup> That represents a reduction of more than 85 percent from Toronto’s citywide average, the equivalent of removing over 100,000 cars off the road each year. But the initiatives proposed in Quayside are only economically feasible when part of a broader approach that spans a large enough development area to support inventing, implementing, and operating this new sustainable energy ecosystem.

**At the proposed full scale of the IDEA District, Sidewalk Labs estimates achieving emissions of 0.7 annual tonnes per capita, or an 89 percent reduction from the city’s current average.**

That scale represents a sufficient size to amortize the capital costs of major new infrastructure and keep utility bills comparable to existing standards for households and businesses.

This broader scale also makes it possible to achieve Waterfront Toronto’s climate-positive objective. At the full scale of the IDEA District, in collaboration with the city, it could become economically feasible to tap into the Ashbridges Bay Wastewater Treatment Plant, a source of clean energy potential unmatched across North America. The energy potential of Ashbridges would create a surplus of clean energy in the project area that could then be exported to buildings in other parts of the city — fulfilling the mandate of climate positivity by reducing the city’s overall emissions.

With public-sector support, **the Sidewalk Toronto project could become the largest, densest climate-positive district in North America and the third largest in the world<sup>10</sup>** — establishing a credible path forward for cities to follow.



### IDEA District

The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.

# The path to achieving a climate-positive district

Sidewalk Labs has proposed a set of on-site and off-site initiatives that, when combined, would produce the largest climate-positive district in North America.

Sidewalk Labs estimates that, at the proposed full scale of the IDEA District, all the sustainability initiatives described in this chapter, combined with planned mobility initiatives, would reduce GHG emissions to 0.72 annual tonnes per capita, or roughly 89 percent less than the city's current average of 6.3 annual tonnes.

These efforts would make Quayside a nearly carbon-neutral neighbourhood, and make the proposed full scale of the IDEA District even closer to carbon neutrality. But these initiatives alone cannot realize a climate-positive community, because achieving that goal requires exporting clean energy or actively reducing Toronto's current GHG emissions.


Achieving the goal of exporting clean energy would require both a large scale of development and the strong partnership of the city, but it is possible. The best path Sidewalk Labs has found is to tap the large store of energy in Toronto's own wastewater, which would allow the proposed heating and cooling system to serve areas beyond the project borders. Such an effort would be as ambitious as Toronto's "deep lake water cooling" project was 20 years ago, and it would fulfill a climate-positive vision that not only benefits Toronto but provides a model for other cities around the world.

Tapping the full potential of wastewater from Ashbridges Bay would enable the project to give back 70,444 annual tonnes of CO<sub>2</sub>, or nearly 1.31 tonnes per person. Sidewalk Labs could achieve an additional 0.1 tonnes per capita off-set through the creation of biogas from anaerobic digestion.

## The role of mobility plans in reducing GHGs.

Sidewalk Labs' approach to mobility also plays a key role in realizing a climate-positive goal by providing alternatives to private automobile use, which is the second-largest source of Toronto's GHG output.<sup>11</sup>

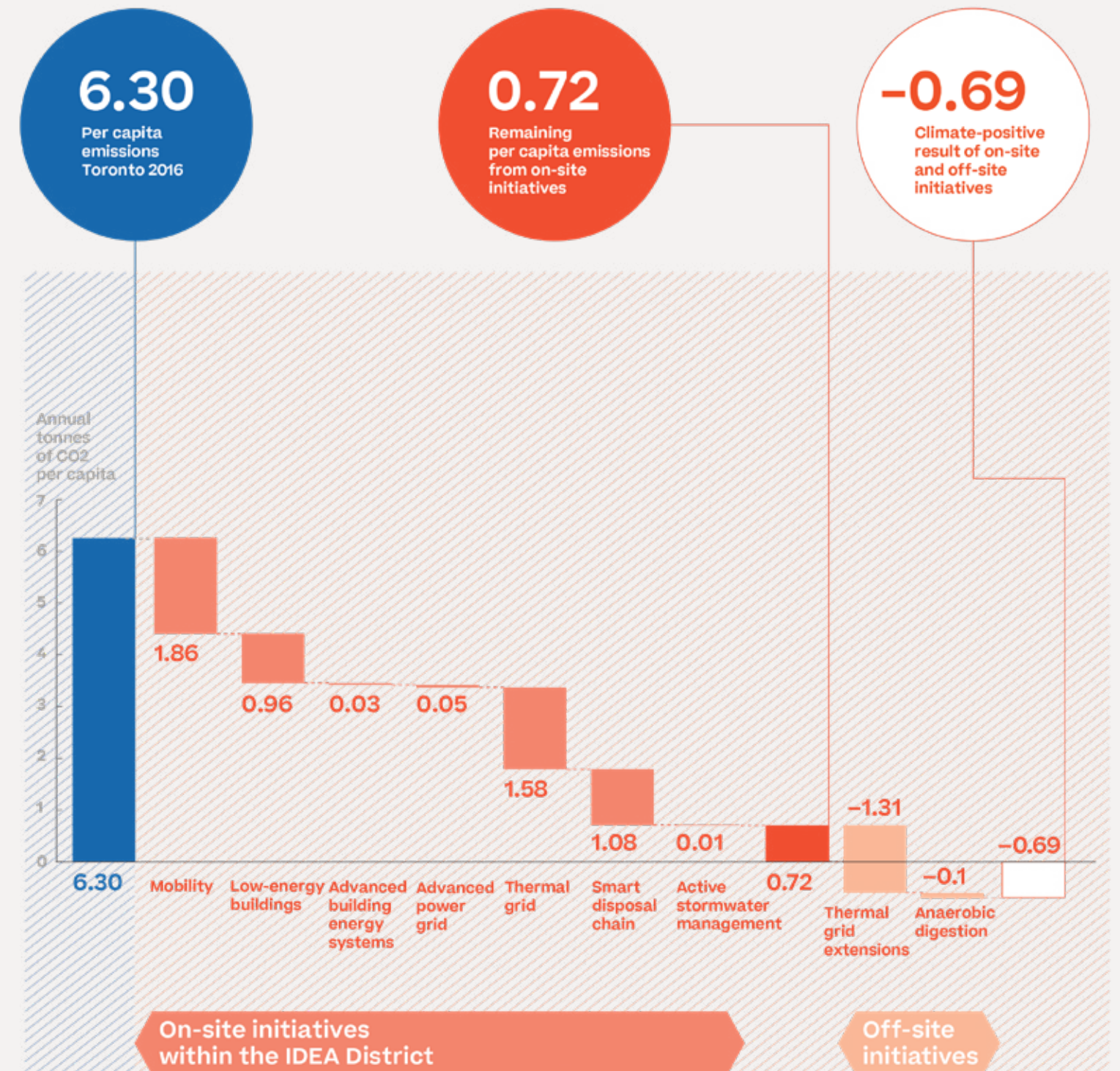
Given the proposed light rail extension, walking and biking options, shared vehicle services, and mobility management system, this plan would translate into an estimated 30 percent reduction due to mobility-related GHG emissions.

Additionally, by encouraging electric vehicles, Sidewalk Labs expects that 30 percent of all the vehicle kilometres travelled by residents would be by electric vehicles in Quayside, and up to 100 percent across the IDEA District over time. 

Altogether, these efforts would reduce transportation-related GHG emissions by 1.86 tonnes per capita at the full scale of the IDEA District.



See the "Mobility" chapter in Volume 2, on Page 22, for the full electric vehicle plan.



Note: Because the estimated GHG reductions shown here are based on a combination of design, technology, and behaviour change, Sidewalk Labs expects unforeseen shortfalls at the neighbourhood scale of Quayside.

The sustainability systems proposed in this plan include self-correction and learning mechanisms (such as advanced energy management tools and a smart disposal chain) that should reduce these variations as development proceeds across the IDEA District.

As a result, Sidewalk Labs has reduced the sustainability plan's expected GHG outcomes 10 percent in Quayside and 5 percent at the full scale of the IDEA District.

# Part 1



## Creating Low-Energy Buildings



### Key Goals

**1**  
Deliver Passive House-inspired buildings

**2**  
Improve modelling through real-time metering

**3**  
Use digital tools to tie energy outcomes to energy codes

The first step towards achieving a climate-positive community starts with reducing how much energy building tenants need to heat and cool their homes and offices.

While there are many potential sources of high energy usage, two stand out. One is inefficient building designs and construction quality, which waste opportunities to conserve energy and improve comfort. The other is the inability of cities to determine how well energy is managed in a building once it is in actual operation. Instead, cities use models based on pre-construction design drawings to determine whether or not a building meets energy code, with no way to ensure a building's *actual* energy performance meets its *expected* energy performance.

Toronto and Ontario have made strides to tackle these challenges. The Toronto Green Standard (TGS), the city's sustainable design requirements for new development, sets targets for measurements such as energy use intensity and GHG intensity that get progressively more ambitious over time. TGS includes

four tiers of performance, with Tier 1 as a code requirement, Tier 2 as a stretch goal with incentives, and Tiers 3 and 4 voluntary higher levels working towards zero emissions. And in February 2017, Ontario passed Energy and Water Reporting and Benchmarking legislation, in an effort to better track building energy use.<sup>12</sup>

But a study commissioned by Sidewalk Labs found that buildings in Toronto have not performed in line with modelled projections, using 13 percent more energy than modelled on average. The study also sampled 95 multifamily buildings that sought code compliance between 2015 and 2017; while these projects were not obligated to meet the new TGS targets, which went into effect in May 2018, only 5 percent would meet the equivalent of today's TGS-Tier 1 target for energy use intensity. (See Page 311 for more study details.)

Such results suggest that buildings in cities around the world, including Toronto, are struggling to keep pace with energy-efficiency goals, let alone exceed them.

## Improving construction quality and tightening building design standards can conserve energy while preserving comfort for tenants.



To help improve building energy performance, Sidewalk Labs proposes to require that all buildings in the Sidewalk Toronto project area meet rigorous energy-efficient building design standards inspired by the Passive House movement, and plans to apply its factory-based approach to improve construction quality. Sidewalk Labs also proposes to develop new digital tools for evaluating energy performance in real time and implementing operational improvements as a critical step towards significantly reducing energy demands within the IDEA District.

At the scale of Quayside, this approach would produce buildings that meet the latest TGS-Tier 3 standard for energy use intensity and Tier 4 for GHG intensity. In Quayside, this achievement would reduce building energy use by 40 percent and GHG emissions by 75 percent over TGS-Tier 1 construction.

At the proposed full project scale, energy-efficient designs — reinforced by real-time energy measurements — could reduce GHG emissions by 0.96 annual tonnes per capita (or 15.2 percent) from the city's current average, on the path towards climate positivity.

# Meeting Toronto's highest building sustainability standards

The Toronto Green Standard sets targets for new development around total energy use intensity, greenhouse gas intensity, and thermal energy demand intensity. Across all three measures, the Sidewalk Labs proposal meets ambitious TGS targets, outperforming the industry standard.



Goal 1

Creating Low-Energy Buildings

## Deliver Passive House-inspired buildings

A Passive House approach to building design maintains a comfortable interior temperature “passively” — that is, with less need for active heating and cooling devices.

A Passive House uses substantial wall insulation, airtight exteriors, and higher-quality windows to maintain a consistent, comfortable interior temperature. Ventilation systems circulate fresh, filtered outside air, while recovering heat from older, stale air before it is removed. Together these efforts reduce the “loads” of buildings — heating, cooling, ventilation, and other systems needed for people to be comfortable.

While this approach is not new, and in fact has deep roots in Canada (see sidebar on this page), Passive House has been applied to multifamily structures more frequently in relatively recent years.

For the IDEA District, Sidewalk Labs proposes to establish construction design standards inspired by Passive House and consistent with TGS-Tier 3 performance targets. These design standards would focus on envelope insulation, thermal bridging, air tightness, balanced ventilation, and unconditioned shared spaces. (See the visual on Page 308.)

Low-load buildings could reduce GHG emissions by 15.2 percent or nearly 95,500 tonnes — equivalent to removing more than 20,000 cars off the road.

Low-energy buildings could reduce GHG emissions by **0.96** annual tonnes per capita.

Innovation case study

## Passive House's Canadian roots

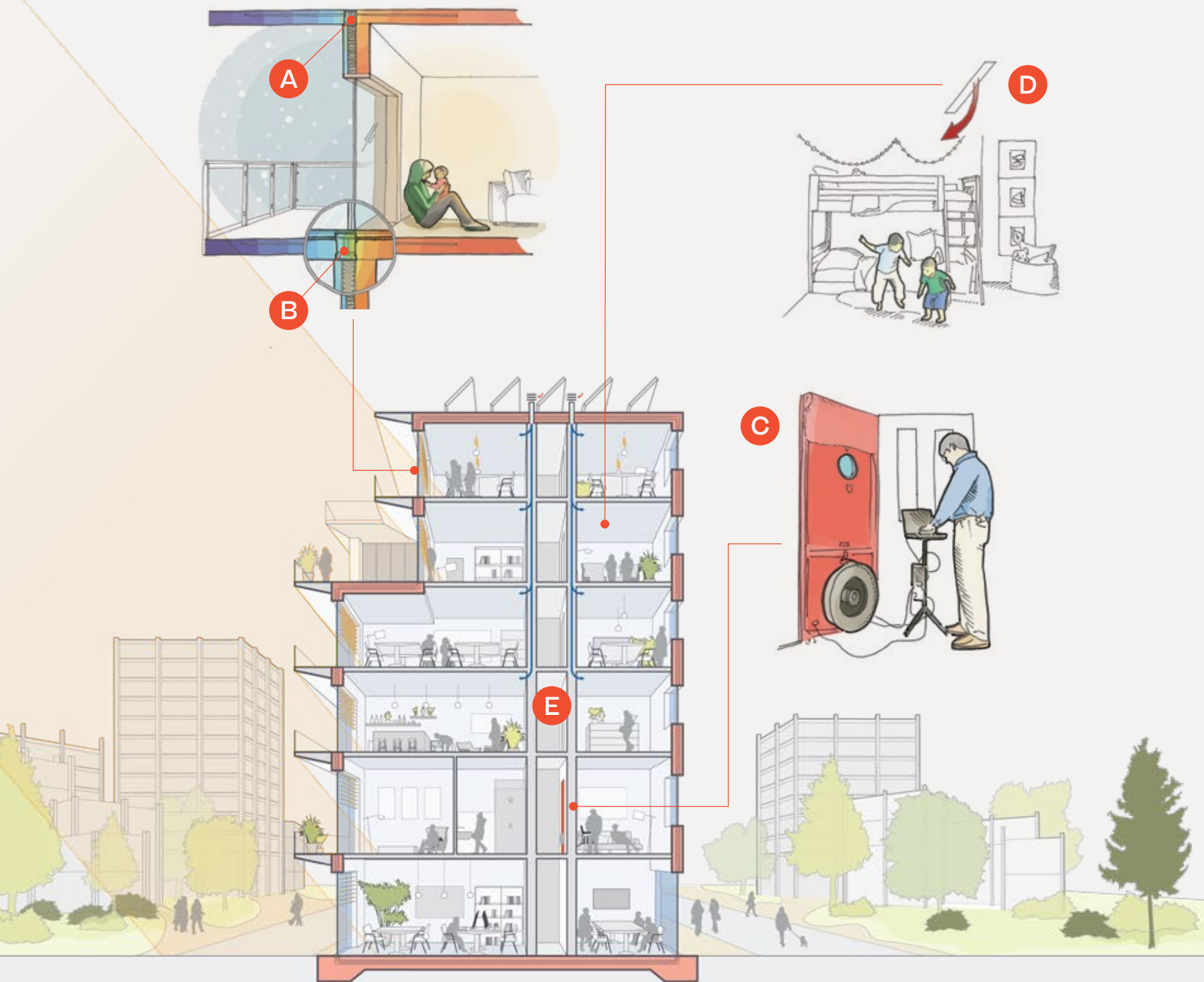
Passive House is the most rigorous voluntary standard for energy efficiency in the design and construction industry. The standard is established, maintained, and promoted globally by the Passivhaus Institut in Germany, with satellite associations in countries around the world.

While the Passivhaus Institut was founded in 1996, the Passive House movement has its roots in Canada — specifically in the 1977 construction of the Saskatchewan Conservation House in Regina, built as a response to the OPEC oil crisis. Using triple layers of insulation and windows oriented to capture sunlight, Conservation House heating requirements were only 1/28th of the average Regina home.<sup>13</sup>

Today, projects built according to the Passive House standard use the latest technologies in window design, panellized construction, insulation, and air sealing, and can range from detached homes to multi-storey towers. The world's largest Passive House building — a 26-storey dorm on the Cornell Tech campus in New York City — opened in 2017.<sup>14</sup>

# Five design strategies to create low-energy buildings

Smarter building designs can lower the amount of energy required to heat, cool, and ventilate buildings, while keeping interiors just as comfortable for tenants. That approach includes improving insulation around the building, preventing unwanted air leaks and heat loss, venting fresh air, and applying passive comfort methods to shared spaces.



## A Envelope insulation.

In standard buildings, gaps in envelope insulation can lead to unintended interior temperature changes. Sidewalk Labs proposes to require highly insulated building “envelopes” — basically, walls designed to resist heat loss and preserve interior temperature, like a thermos. This continuous insulation prevents the unwanted interior-exterior exchange of heat or cooling (known as “thermal bridging”). Sidewalk Labs would also provide criteria for window designs to reduce heat loss in winter and heat gain in summer.

## B Thermal bridging.

Heat in a building finds the path of least resistance to cold outside air. If there is a pathway for the heat to transfer, it transfers — for example, steel-reinforced concrete slabs can transfer heat from the inside of a building to the exterior, which can be the reason some parts of some rooms always seem colder than others. In addition to ensuring continuous insulation, Sidewalk Labs plans to add gaskets and manufactured “thermal breaks” (non-conductive inserts in a chain of conductive materials) to stop building heat from escaping unintentionally.

## C Air tightness.

In standard buildings, even small air leaks can cause drafts and interior temperature changes that lead to greater heating and cooling needs. These leaks often come from basic construction errors, such as incomplete caulking around a window or pipe penetration through a wall.

## D Balanced ventilation.

Sidewalk Labs proposes to require buildings to vent fresh air directly to living areas and bedrooms (in residential units) and to office or retail spaces (in commercial units). One way to achieve this goal is with a ventilation system that has two ducted air streams: one provides filtered, outdoor air to living areas, and one removes older, stale air from warmer rooms, typically bathrooms or kitchens.

To meet Sidewalk Labs’ energy-efficient standards, buildings would need to significantly reduce air leakage around windows, doors, and mechanical systems using airtight designs, along with other measures, such as special tapes and sealants. Factory-produced building parts that snap into place can also help limit air leakage. During construction, infrared cameras can help detect tiny air leaks.

The target rate of air tightness would be a maximum of 0.6 air changes per hour (at 50 Pascals pressure), as prescribed by Passive House.<sup>15</sup> To ensure this rate is achieved, Sidewalk Labs proposes to require Passive House-inspired air infiltration testing after construction. This testing is typically done through a “blower door test”: fans are placed in doorways to blow air inside and pressurize the building, which is then measured for how well it holds this new pressure.<sup>16</sup> If the test fails, the contractor must identify and correct the source of air leakage, or the building cannot be certified.

## E Unconditioned shared spaces.

Traditional buildings provide continual air conditioning or heating to transitional spaces, such as corridors and lobbies, regardless of the actual occupancy of these spaces, wasting an enormous amount of energy in the process. Sidewalk Labs’ buildings would not provide continual conditioning to these spaces, but rather rely on heat exchange in building ventilation systems to keep a comfortable temperature, requiring no additional conditioning. (Corridors would be designed to easily add systems to condition air in these spaces if necessary.) Buildings would include small lobbies that offer a blast of cold-air as people enter or exit.

Additionally, Sidewalk Labs proposes to require building ventilation systems to have “heat recovery” devices to transfer heat between the warm and cool air streams. On cold days, this system would transfer warmth from the older interior air to help the cool outdoor air reach the desired temperature with minimal energy use; on hot days, the system would transfer warmth and moisture from the incoming hot and humid outdoor air to the exhaust air, cooling and drying the new air supply and reducing the need for supplemental air conditioning.



# Improve modelling through real-time metering

Designing Passive House-inspired buildings should reduce their energy demand. But if the design details, construction quality, and systems operation are different in practice from what is initially planned, the building's actual energy use in operation can be far greater than shown by a model submitted for energy code compliance.

This disconnect is known as the “performance gap.” *In its study of nearly 100 buildings in Toronto, Sidewalk Labs found the performance gap to be 13 percent, meaning buildings use more energy when actually up and running than when modelled prior to construction.*<sup>17</sup>

That overall performance gap belies a number of much larger gaps from a variety of sources (see charts). The study found that, on average, multifamily buildings in Toronto are using 39 percent more gas for heating, 21 percent more gas for domestic hot water generation, 61 percent more energy for pumping, and 94 percent more energy for common areas than modelled.

Meanwhile, the study found that residents used 26 percent less electricity than projected — likely due to outdated plug load guidelines in the code, which date back to 1997, but also possibly due to inaccurate occupancy assumptions (meaning units were unoccupied more often than the model suggested). It also found that cooling energy was 26 percent less than modelled.

The diagnosis for these gaps includes optimistic modelling of exterior wall construction and underrepresenting heat loss through metal components that bridge exterior walls and roofs, as well as incorrect assumptions about the operation and energy intensity of building systems and equipment.

To help improve energy modelling, Sidewalk Labs first plans to incorporate findings from its study into modelling assumptions. Further, Sidewalk Labs proposes that buildings in the IDEA District be required to deploy real-time metering of all energy systems (such as heating, cooling, lighting, and equipment). This ongoing measurement could help to improve the accuracy of building modelling two ways: first, by providing feedback on how tenants and operators actually operate systems in practice, and second, by enabling comparisons between the energy performance of those systems and the design-based projections.

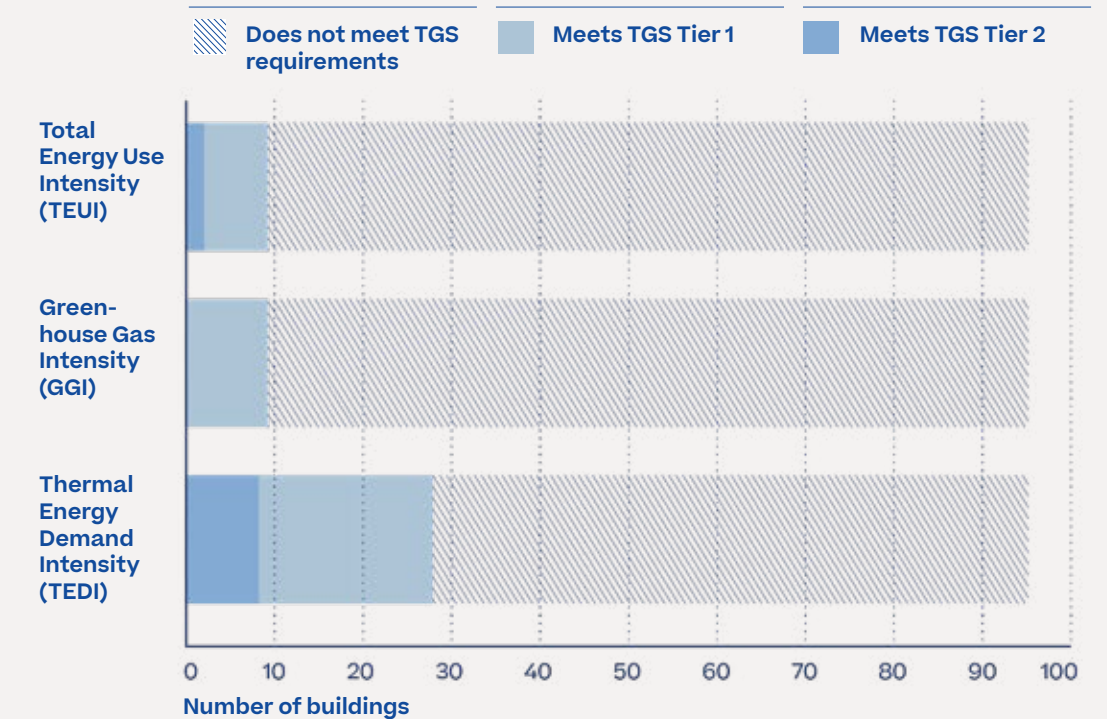
Over time, the availability of real-time building energy data should dramatically improve the accuracy of performance-based models used to validate building codes. It should also create a feedback loop of performance to help architects, engineers, and developers improve their next designs — and, in so doing, help close the performance gap and improve the energy efficiency of buildings.

# Analyzing the challenges to sustainable development

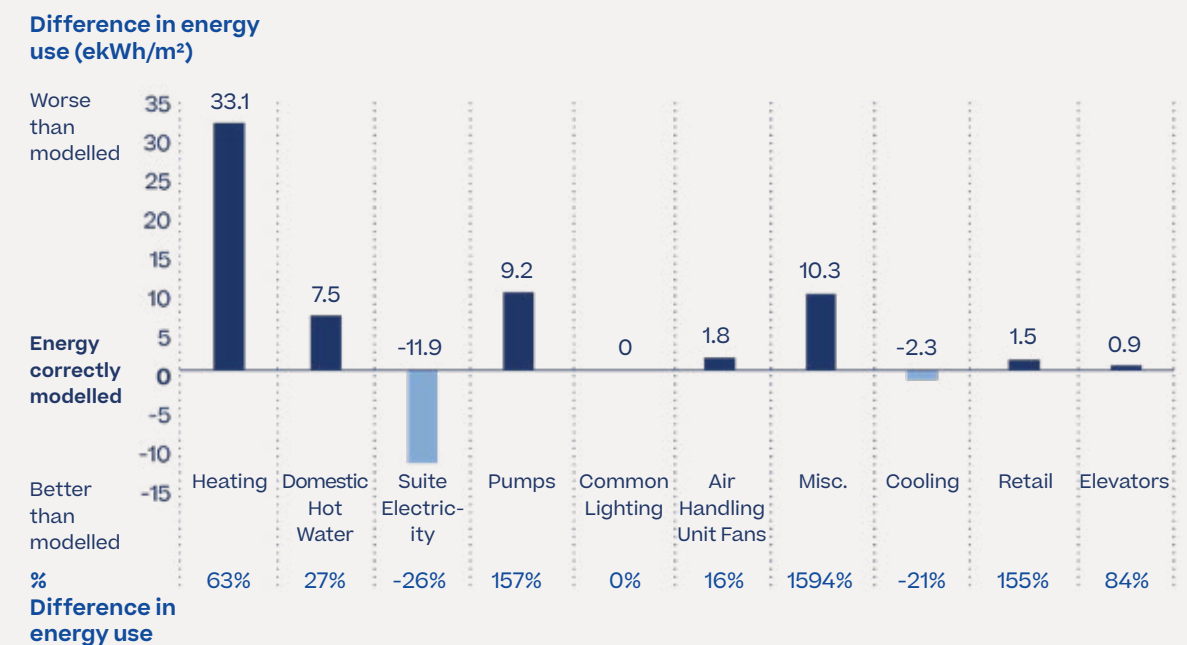
Sidewalk Labs engaged EQ Building Performance and Urban Equation to understand how design-based energy models differ from actual building energy performance in Toronto. The full report can be found at [sidewalktoronto.ca](http://sidewalktoronto.ca).

Only 5% of buildings would meet new TGS-Tier 1

One aspect of the study looked at 95 multifamily buildings whose energy use was modelled between 2015 and 2017. All the buildings conformed to Tier 1 of the Toronto Green Standard code at the time the models were generated. But the study found that only 5 percent of the buildings analyzed would meet the new version of TGS-Tier 1 across categories, and none met all of the criteria for Tier 2, the city's first level of stretch goal beyond code.



Across many building systems, actual energy use does not match predicted use



This chart comes from a sub-sample analysis of 19 buildings already in operation from the Sidewalk Labs building study. For these buildings, the median metered (or actual) energy use intensity was 13 percent higher than the energy use intensity projected by the original models, or a total of about 50 energy units (ekWh/m²). This performance gap was supported by larger data sets: the average energy use intensity of 83 existing buildings (age 1998–2017) was 12.5 percent higher than the average energy use intensity of 95 models (2015–2017). The chart shows the various sources of this gap across building energy systems.



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2, on Page 374.

Real-time building energy data can help architects, engineers, and developers create more energy-efficient designs and close the performance gap between a building's projected and actual energy use.



Goal 3



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2, on Page 374.

Creating Low-Energy Buildings

## Use digital tools to tie energy outcomes to energy codes

Even as real-time metering would help to close the performance gap and inform better building design, cities still need the ability to audit energy performance once a building is in operation, and create more responsive codes.

To help tackle this challenge, Sidewalk Labs proposes to develop and deploy a tool called “Perform” that would enable more effective enforcement of energy targets. Perform could incorporate factors that have an outsized impact on energy use, such as occupancy, tenant type, and weather, to create dynamic targets for acceptable energy use intensity. For instance, the tool would know that if the building is unoccupied in the evening, it should be using a fraction of the energy that it uses during the day.

Creating a system that could account for building use and tenant type would be essential, because some tenants use more energy than others for good reasons. For example, a building floor filled with video graphic artists using multiple screens and high-performing computers all day would likely consume more energy than a painter’s art studio. Measuring precise patterns across various tenant types can help inform more realistic goals for energy usage in buildings that have a mix of homes, offices, and shops, and can help determine how to balance individual tenant goals with overall city and community goals.

If Perform were validated in practice in Quayside, Sidewalk Labs would plan to work with the city to require a tool like it with the IDEA District and to establish operational energy limits based on real-time metering for new buildings — not on pre-construction designs. At the full scale of the IDEA District, with a large number of buildings, this tool could form the basis for a real-time energy code that adjusts dynamically for occupancy, tenant type, and weather to ensure fair and appropriate energy use regulation. [\[1\]](#)





# Optimizing Building Energy Systems



## Key Goals

### 1 Create automated “Schedulers” for offices, homes, and building operators

Reducing overall energy demands through low-energy building designs and real-time energy measurement tools represents an important first step on the path towards climate positivity. But designs are not enough if buildings do not operate in an energy-efficient way — say, if the air conditioning stays on full blast when no one is around.

Three main groups are responsible for a building’s energy use on a daily basis:

**Office tenants** seemingly control their space and all of the energy uses associated with it. But in practice, office tenants actually control very little in their space. Commercial thermostats are often remotely controlled and require a call to the facilities manager or building operator for adjustment. Ventilation fans often run on whatever schedule the building operator has set. And equipment and devices are commonly left on because no one is in charge of turning them off.

**Residents** typically control thermostats for heating and cooling, lighting, and plug loads in their units. Leaving the lights

on or setting a thermostat too high are decisions that can add up to significant energy waste. Additionally, residents may unconsciously operate electric appliances during times of peak power demand (when GHG intensity is highest, and utility prices are also highest) that could run later without impacting their schedule.

**Building operators** make dozens of decisions about how to manage the centralized heating, cooling, lighting, ventilation, and other systems that serve tenant floors as well as common areas in commercial and residential buildings. These systems consist of lots of different equipment, including fans, pumps, motors, dampers, chillers and heat pumps distributed throughout buildings to serve different spaces. Operators commonly set a static schedule for the entire system based upon the building’s regular hours, which assumes that each day is the same and that each tenant floor is the same. This approach can result in unnecessary energy use; for example, a fixed-schedule cooling system might run at times when an office is empty, increasing utility costs and wasting energy.

Currently, none of these groups has the tools to take smart, easy, cost-effective, and energy-efficient actions. While the challenges vary for each group, existing tools share a number of common limitations.

Existing building management systems typically struggle to coordinate (or integrate) every system in a building: one system might control lighting and another might control heating and cooling, making it difficult to use data to improve efficiencies across both systems. They typically have limited ability to incorporate external data streams, such as weather forecasts and utility prices that can help create energy-efficient operation schedules. Energy management overlays that pull data from the building’s myriad systems to provoke operator insights using charts and graphs rarely deliver significant savings, because the information is incomplete and still requires the operator to study, interpret, and act upon it.

**Optimizing building energy systems could reduce GHG emissions by 0.03 annual tonnes per capita.**

To address these challenges, Sidewalk Labs proposes to deploy a suite of energy “Schedulers” for building managers, office tenants, and residents.



**As their name suggests, Schedulers would help schedule and manage systems, equipment, and appliances that impact energy use and GHG emissions. They would do so by integrating relevant data from building systems to improve coordination; incorporating external data sources, such as tenant temperature preferences, operating budgets, building occupancy, weather forecasts, and real-time energy prices; and making decisions to improve equipment control and scheduling consistent with monthly energy cost goals.**

At the small neighbourhood scale of Quay-side, Schedulers would help office tenants, residents, and building operators alike stay within their energy budgets, eliminate energy waste in unoccupied spaces, and help the neighbourhood meet its climate goals. At the full scale of the IDEA District, the power of this suite of Schedulers would grow with a significant amount of baseline information about energy patterns.

Sidewalk Labs estimates that, in addition to conserving energy, the Schedulers could reduce building energy costs — already low thanks to Passive House-inspired techniques — by roughly 20 percent when used in concert. Those savings occur due largely to reductions in waste from turning off equipment when not in use, from turning on equipment just prior to use, and from dynamically controlling set points for heating, cooling, and ventilation equipment to align with demand.

Applied within the IDEA District, Schedulers would enable already highly efficient, low-energy building designs to achieve their full potential — maintaining that low energy usage and reducing GHG emissions by an additional 0.03 annual tonnes per capita (or 0.5 percent) from the city’s current average, on the path toward climate-positive. (These savings include those of the Perform tool described on Page 313.)

Consistent with Sidewalk Labs’ belief in open digital services, Schedulers would be designed to integrate with the existing ecosystem of building control systems, including those made by leading Canadian companies in this area, such as Ecobee, Encycle, and SHIFT Energy. Consistent with its role as catalyst, Sidewalk Labs would aim to leverage or support existing capabilities that could achieve Scheduler objectives, and would only develop its own if the market has not already developed an adequate option.



# Create automated “Schedulers” for offices, homes, and building operators

All proposed Schedulers would share a set of core features, designed to derive insights from a coherent stream of data on building- and neighbourhood-level infrastructure. These insights would build on several initiatives underway in the building controls industry, including the furthering of a standardized naming scheme, the incorporation of external factors, and a shift toward automation.

## Standardized naming system.

Today’s building data is not standardized or integrated across energy and other operational systems, making it difficult, and often impossible, to collect and analyze real-time information in one place. This isolation can make it difficult for a building management system to determine the most energy-efficient practices.

Take a hypothetical example: a company that leases space on the 19th floor of an office building wants to reduce energy

use in its conference rooms by powering off video screens when the room is empty. To do this automatically, a system would need to coordinate information from the audio-video system, the lighting system, and the calendaring system. But since those systems tend to be operated by different vendors, standardizing or integrating this data would be prohibitively time-consuming, costly, and difficult to maintain over time.

Sidewalk Labs proposes to require buildings to adopt a standardized open-data naming scheme called “Brick” that would enable the Schedulers an unprecedented degree of coordination to help achieve building energy goals (see sidebar on Page 317).

## Incorporating external factors.

Existing energy management tools for buildings typically cannot adjust their schedules based on external factors,

because they lack both real-time access to external information and bi-way communication capabilities. Sidewalk Labs’ Schedulers would be designed to consider a range of external factors, including building occupancy, weather forecasts, and energy prices, and to send direction to equipment.

## Automating for energy-efficiency.

Existing energy management tools often come with dashboards that present energy data in new ways and are intended to prompt action on the part of users. But even full-time building operators have little hope of making sense of the thousands of data points a commercial and multifamily building collects every minute and presents on a dashboard — let alone residents or office tenants who rarely wish to think about energy management.

Sidewalk Labs’ Schedulers would have automated capabilities to optimize a far broader set of variables than tenants or operators can, establish new energy practices, respond more quickly to competing demands, and learn preferences over time.

For example, this type of automation could reduce air conditioning on a summer Friday afternoon when an office is closing early. Or it could open or close window treatments while adjusting the lighting levels to balance light and temperature on a sunny day. Or it could turn off the lights, turn down the air conditioning, and “hibernate” all of the screens and video conferencing equipment in a conference room when a central calendar shows no meeting scheduled.

In addition to these general properties, Schedulers have many features that respond to the unique concerns of a particular user group. These are described in the following pages.

## A digital “Brick” in the wall

Smart buildings must be able to recognize every last room, hallway, motion sensor, key fob reader, light bank, thermostat, and appliance inside them and to network them together.

Until recently, establishing such a system typically required massive coordination between the building’s audio-video, lighting, and IT vendors to connect all these systems to a converged internal network — an expensive and time-consuming process. At best, some building subsystems can “talk” among themselves but not to each other, and never to other buildings.

Hence the development of Brick, a “metadata schema for buildings” created and tested in 2016 by research teams from seven universities or institutions (five American, two European).<sup>18</sup> Brick establishes a standardized naming scheme in which all devices are named by floor, room number, device type, and an index, so that TVs are identified as 19-301-TV-1, 19-302-TV-1, and so forth, while thermostats could be identified as 19-301-TSAT-1 and 19-302-TSAT-1. Such a naming schema allows a computer to understand which room a TV is in and how to control the lights and thermostat in that room to prepare for a presentation.

By using standardized labelling and classification, Brick can itself be automated, making the process far less time-consuming. Brick also allows developers to create applications that make building subsystems work together: suddenly, a building can learn to turn down the heat in a crowded mid-winter boardroom before the thermostat rises.

## Standardized building data would give Schedulers an unprecedented ability to coordinate energy systems and improve performance.

# How Schedulers create more energy-efficient buildings

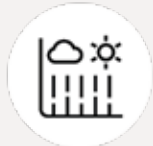
Building Schedulers would manage systems, equipment, and appliances that impact energy use by incorporating real-time data that includes external factors, such as weather, and building system information, such as occupancy levels.

## External data sources

The Schedulers have insight into external data that can impact building energy use, including weather data (such as temperature, precipitation, sunlight, wind, and other forecasts) and electricity prices (which vary across the day with demand).



Weather data



Electricity grid pricing information

## Building Schedulers

The Schedulers combine information from the external sources with insight into the operations of building systems to optimize energy consumption and reduce GHG emissions. The tools then communicate any changes needed back to building systems — for example, to adjust temperatures or control lighting.



Type 1  
Office Scheduler



Type 2  
Home Scheduler

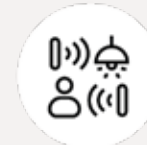


Type 3  
Building Operator  
Scheduler

Automated commands are sent to building systems, optimizing energy use.

## Building systems

Building systems track a variety of real-time metrics about energy use and communicate that information to the Schedulers, including data on occupancy, interior temperature, airflow, and electricity usage. The Schedulers can use this information to help the systems improve energy efficiency.



Lighting and  
occupancy sensors



Plug loads



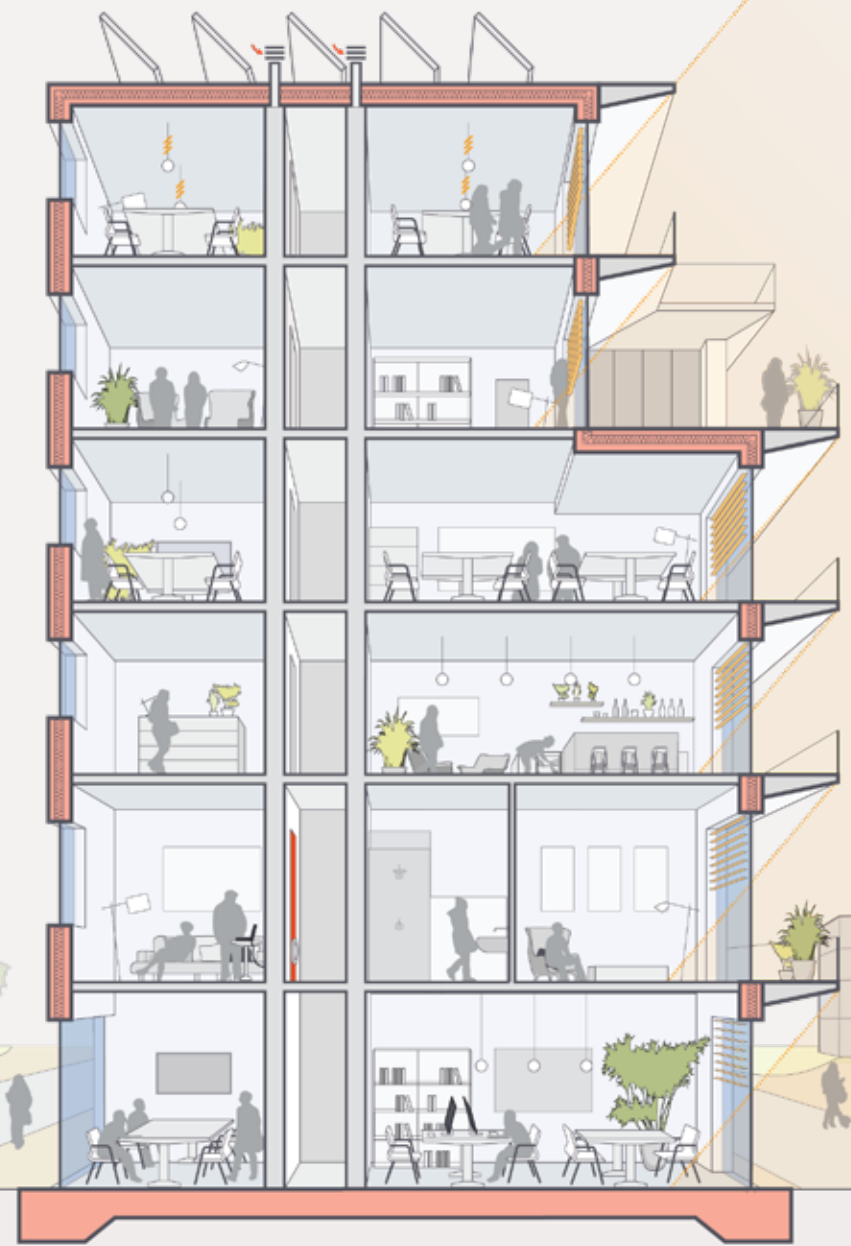
Automated blinds



Ventilation



Heating and cooling  
systems with  
thermal comfort  
user feedback



Scheduler Type 1

# Office Scheduler

The Office Scheduler is designed to manage energy use in offices, where no one is really in control of energy systems and thermostats and there are many competing demands.

Commercial offices provide a great opportunity for energy savings. A study of commercial buildings in Toronto commissioned by Sidewalk Labs found that the 10 percent of office tenants with the highest energy consumption (on a per square basis) used about three times more than average, and the bottom 10 percent used only a third of the average. In other words, there is a wide range of energy consumption among commercial tenants, and a whole lot of waste at the top.

But today, no one is focused on saving energy in commercial tenant spaces. Existing energy management programs that could optimize thermostats and ventilation systems in commercial spaces are under the control of the building operator — not the tenant. The result is that spaces in many commercial buildings are operated based on default system schedules that do not match the tenant’s needs.

For example, an old lease provision might dictate that a cooling system run on Saturdays, because it was envisioned to be a working day by whichever lawyer drafted the lease, when in fact the office is always empty on weekends — incurring unnecessary costs for the tenant and wasting energy. It is rare for tenants

to notice these operational hiccups, and even if they do, the process for updating a setting is complicated. Often it requires communication between office managers (who may not understand the implication of a change or feel empowered to make the decision) and building operators (who may feel similarly disempowered to override a lease).

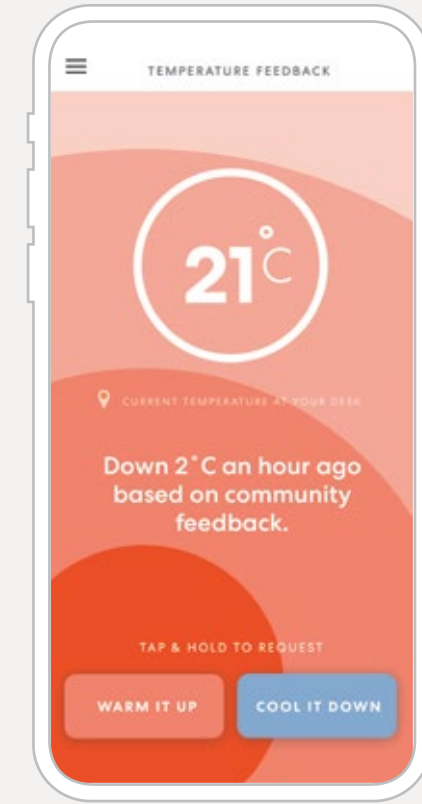
The Office Scheduler would help tenants manage energy consumption and costs by optimizing all the systems under tenant control, based on factors such as energy prices. Some example capabilities of this tool could include:

→ **Adjusting** space temperature set points before, during, and after the day, based on insights such as weekly and daily occupancy trends, number of out-of-office calendar notifications, weather during the morning commute, and hot or cold requests throughout the day.

→ **Detecting** what devices are plugged in and hibernating those that would not be needed for a while, based upon usage trends and occupancy.

→ **Starting up and shutting down** heating, cooling, and ventilation devices based on factors such as how long the space takes to heat or cool relative to the outdoor temperature, when the first occupants are likely to arrive that day, and the desired thermostat setting.

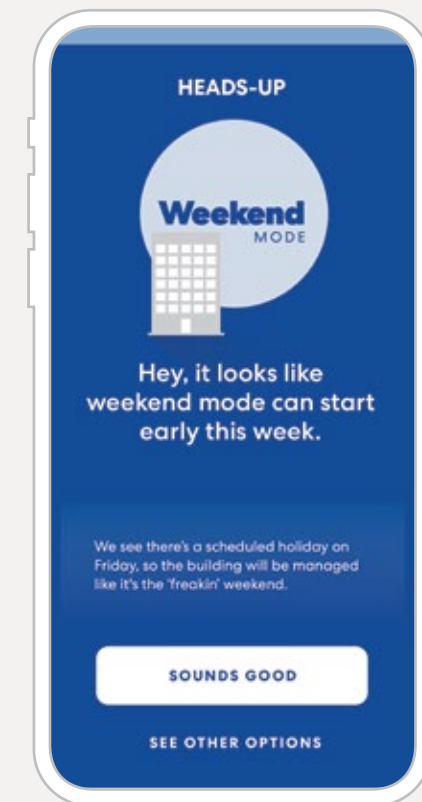
→ **Responding** to tenant hot and cold complaints with an explanation of the action taken, and, if no action can be taken because of competing requests from colleagues or system design limitations, identifying what area of the office might be more comfortable and whether there is a free desk or table there.



The Office Scheduler would be responsive to workers’ needs, enabling them to provide feedback on things like the temperature of their space.



Tenants could get immediate feedback on a request that they make concerning the conditions in their space, and if their demand cannot be met, they could be guided to a new location where they may be more comfortable.



The Office Scheduler could keep facility managers updated about what is happening (and why) in a space while enabling them to override actions if necessary.

Scheduler Type 2

# Home Scheduler

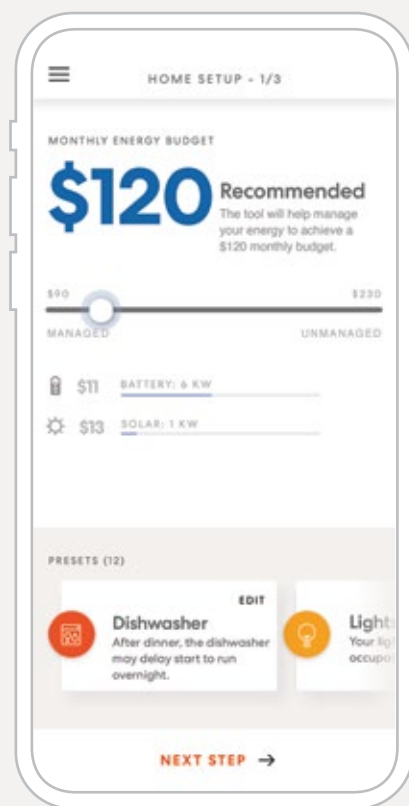
The Home Scheduler is designed to help homeowners manage their utility costs to suit their budgets.

A typical smart home controller can do things like use motion detectors to know when a space is unoccupied and adjust interior temperature accordingly. The proposed Home Scheduler would go beyond these abilities to manage a full spectrum of household energy consumption. The tool could be tied into major appliances and devices that use the majority of the home's most expensive power. It also could have full visibility into the household's energy resources as well as real-time utility rates.

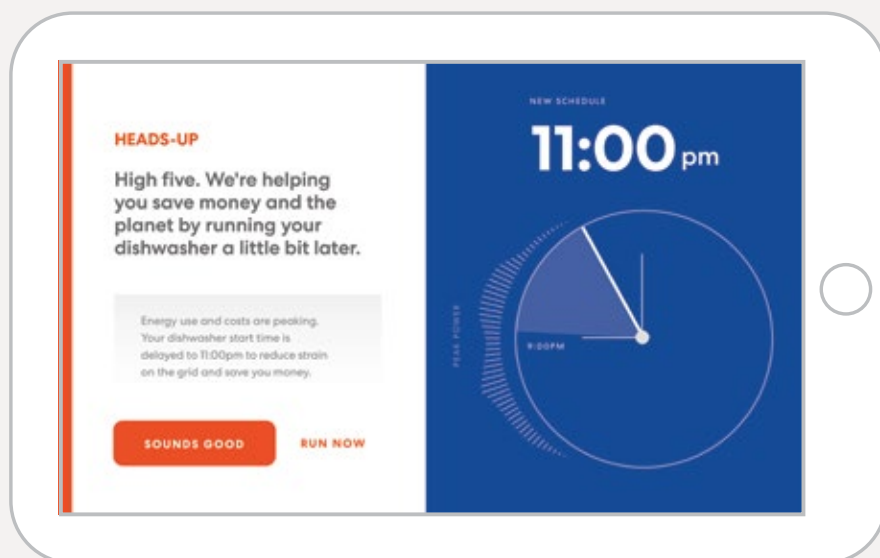
As a result, the Home Scheduler could take a proactive role in managing the home operating systems, devices, and appliances when costs are low or the grid is cleanest (which is usually the same time). The proposed tool would also generate a data feed for households to understand the actions being taken — and to override them, if they wish.

For example, a resident might load the dishwasher, press start, and walk away. Knowing the household's monthly utility budget, the Home Scheduler might automatically delay operation of the dishwasher for a few hours to avoid peak-time power pricing. In that case, the system would then inform the resident, who would have the option to reverse the decision and run the appliance anyway. Over time, the system could learn individual household preferences to reduce

settings it recognizes as undesirable. (See Page 330 for more details on innovative bill structures and monthly energy budgets.)



The Home Scheduler would optimize systems to help households stay within their established monthly budget for energy costs.



Scheduler Type 3

# Building Operator Scheduler

The Building Operator Scheduler is a tool specifically for building operators, designed to work in tandem with an existing building management system by adding all the automated features mentioned on Page 317.

These automated capabilities could free operators from their building management screens, which are cluttered with as many as 100 new system alarms each day — many of which are not urgent but are difficult to distinguish from the important ones. These alarms include notices such as “the outside air fan status has returned to normal.”

One of the primary advantages of the Building Operator Scheduler would be its ability to automate ordinary tasks and distinguish real alarms that require the building operator's prompt attention from the numerous alarms that identify irregularities of no consequence. Rather than rigidly adhere to predefined rules, the Building Operator Scheduler would be programmed to learn by adopting beneficial actions from other buildings connected to the system as well as from the actions of other building operators in resolving similar alarms. As a result, many of today's current “alarms” could be screened and addressed before they are brought to the operator. Reducing the alarm load on operators would enable them to focus on things that require more personal attention, like doing preventive maintenance or addressing tenant complaints.

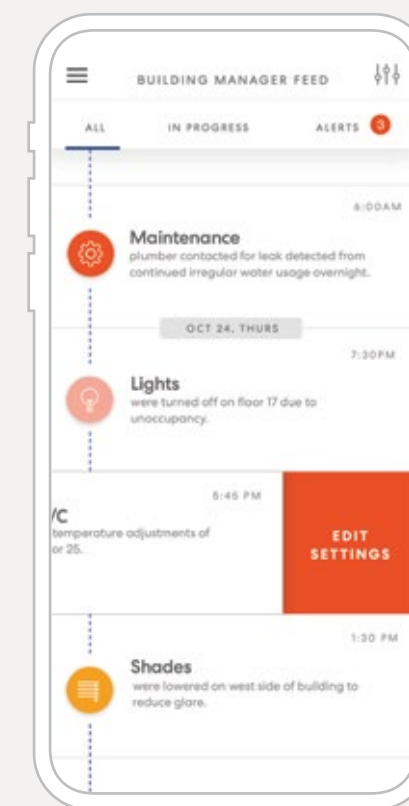
In addition to its broad access to base-building data, the Building Operator Scheduler would use energy more

efficiently by soliciting information from the Office and Home Schedulers and would better predict and respond to the needs of tenants in a dynamic and real-time manner.

The broad ability to share building systems data across a neighbourhood of buildings could help communities benefit from operational best practices and lessons learned. This unprecedented degree of sharing could be transformational for the energy performance and operational efficiency of buildings and their staff as well as for the comfort of tenants.



All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2, on Page 374.



The proposed Building Operator Scheduler would provide a continuous feed of its actions to maintain transparency for building operators, but only important actions would be raised for an operator's attention.

# Part 3



## Making Full Electrification Affordable



### Key Goals

1 **Design an advanced power grid**

2 **Implement an innovative “monthly budget” bill target**

Low-energy building designs and active energy management systems should help reduce energy demand and energy waste, but they would not eliminate the need for heating, cooling, and electricity. As mentioned at the start of this chapter, Sidewalk Labs’ approach towards reducing GHG emissions and creating a climate-positive community involves going 100 percent electric and establishing a viable path towards creating a community that runs exclusively on carbon-free energy.

In Toronto, as in most cities, residents, workers, and visitors draw power from a main, centralized electricity grid. Strong public policy programs have helped Toronto and Ontario achieve very clean electricity generation that is 90 percent GHG-free.<sup>19</sup> At off-peak times (such as overnight), when few people and businesses are using electrical appliances, this grid can run primarily on clean energy sources, including nuclear, hydro, and renewables.

But at peak times, when electricity demand is high, this grid must use a greater portion of natural gas-generated power to meet the task, increasing the GHG intensity of the grid power supply as a whole. In addition to being the most expensive power to produce (in terms of marginal cost), natural gas-generated power also has 15 times the GHG intensity of the Ontario grid’s current average,<sup>20</sup> so increasing its supply would increase both utility costs for households and businesses and GHG emissions for the community.

Adding to the challenge, the modern electricity grid faces new energy-hungry demands, including electric-vehicle charging and 24/7 access to digital streaming and computing power. To accommodate all these new uses, an electricity company typically would expand the size of its grid, which would increase utility bills as the company seeks to recover its investment.



To accommodate total electrification in the Sidewalk Toronto project area without increasing grid size relative to typical development, Sidewalk Labs plans to collaborate with Toronto Hydro (the public electrical utility) and technology providers to design an advanced power grid. This advanced power grid would go beyond a typical neighbourhood grid connection by integrating a novel “monthly budget” bill target, energy management tools, solar power, and battery storage to reduce the need to draw from the main grid at peak times.

**Creating an advanced power grid could reduce GHG emissions by 0.05 annual tonnes per capita.**

At the small neighbourhood scale of Quayside, the advanced power grid could help residents and tenants minimize their use of the grid’s most expensive and GHG-intensive power and serve as a proof-of-concept for new utility rates and automated energy management tools. But as mentioned at the start of this chapter, such a system would require a greater scale of development to make economic sense and spread the cost of electric infrastructure among enough households and businesses to keep costs comparable to current utility bills.

Deployed at the full scale of the IDEA District, the advanced power grid could reduce GHG emissions 0.05 annual tonnes per capita (or 0.8 percent) from the city’s current average, while maintaining comparable utility costs. These GHG benefits would be driven by an increased amount of space suitable for solar panels and batteries, specifically large open roofs on buildings in other development boundaries — as identified and volunteered for use by Waterfront Toronto — whose solar panels could feed into the system. Additionally, a greater share of buildings with automated energy systems would optimize loads and push non-urgent usage to off-peak hours.

At that scale, the advanced grid could also set a new paradigm for how utility companies manage and distribute local power, reducing the use of fossil fuels and the need to expand grid infrastructure while still keeping pace with substantial new electrification needs like vehicle charging, heating, and hot water.



## Design an advanced power grid

Sidewalk Labs' proposed advanced power grid would consist of two connections to the main Toronto electricity grid supplemented by local solar generation and battery storage, as well as by backup biodiesel generators for emergencies. These local options could help the neighbourhood reduce its demand on the larger Toronto power grid, provide clean energy to buildings at periods of high demand, and provide protection against outages.

In recent months, Sidewalk Labs has worked closely with Toronto Hydro to explore potential designs for an advanced power grid with the following capabilities:

- The availability of **community-sited solar and batteries** that can be priced for customers to purchase shares each month based on supply and demand across the neighbourhood
- The **ability to move power** from the site on which it was generated or stored to another site with greater demand for it during a larger grid outage
- The ability to **disconnect** from the larger grid ("**islanding**") through switching and connections, so on-site energy resources could be fully used during a larger grid outage

- The ability to enhance grid reliability with distributed energy management visibility, control, and coordination into the neighbourhood (often called "**behind the meter insight**") through a distributed energy resource management system
- The ability to **use energy storage to handle peak usage** in lieu of larger capacity (and more expensive) distribution infrastructure
- The ability to allow for greater quantities of **intermittent renewable power generation** to be installed or imported into the local distribution grid than typically permitted by utilities
- The ability to have a **dynamic power rate** to better incentivize and reward load shifting and conservation during peak times (see Page 330)

All of these provisions would contribute to the creation of a resilient and affordable all-electric neighbourhood.

An advanced power grid,  
featuring solar panels  
and battery storage,  
could set a new paradigm  
for locally managing and  
distributing electricity.

To help reach its energy targets on the path to climate positivity, Sidewalk Labs proposes that all new construction in the project zone be required to participate in this advanced power grid. Based on ongoing discussions, Sidewalk Labs expects that Toronto Hydro would (at a minimum) build and own the wires connecting Quayside to the main electricity grid. Sidewalk Labs plans to issue a request for proposals for a grid operator (which could be Toronto Hydro) to operate the distributed energy resources outlined below.

#### Solar.

In Quayside, Sidewalk Labs proposes that every tower have a photovoltaic array (solar panels) generating on-site renewable power, with an estimated 40 percent roof coverage. While solar power has extremely low GHG emissions, it is unpredictable: solar panels must receive sunlight to generate power. On a day that is hot and humid but also overcast, the solar panels may not be generating much power, nor would they be generating power after dark. They are also limited by the surface area on a tower.

The expected peak demand of Quayside would be a bit more than 5.4 megawatts. The roofs would support 747 kilowatts of photovoltaic, or solar energy equal to about 14 percent of the total load. At the proposed full scale of the IDEA District, solar energy could cover 19 percent of expected demand (101 megawatts).

#### Battery.

To help handle peak demands, the advanced power grid would use batteries to store power from the main Toronto grid during overnight hours, when it is relatively cheap and clean due to low demand. This battery power could be

consumed during the hours of peak demand when natural gas-fired peaking plants are required and when power is generally the most expensive.

In Quayside, Sidewalk Labs plans to deploy a total of 4 megawatts of battery storage with 4 hours of capacity, totalling 16 megawatt hours of energy. Each battery would range in storage size from 0.25 to 1 megawatt; they would occupy in total 315 square metres of space in and around Quayside buildings. Altogether, the batteries would support about 74 percent of peak load in Quayside and the same share of peak load at the full scale of the IDEA District.

#### Backup power.

As a general rule, buildings that meet Passive House energy standards maintain habitable temperatures longer than conventional buildings without mechanical heating and cooling. If the main Toronto Hydro grid experiences a disruption, each building in Quayside could continue essential operations (such as domestic water pumping, toilet flushing, emergency lighting and limited cooling through fans) using biodiesel generation located at each building. Three days' worth of biodiesel would be stored on site and supplemental sources would be secured for refilling during an extended outage.

#### Grid flexibility and control.

To optimize the use of these community-sited energy resources, Sidewalk Labs plans to work with Toronto Hydro to develop and operate an innovative grid design that includes smart connections to solar arrays and batteries as well as switches. Switching would enable the community to be served by one or both of the Toronto Hydro grid connections; it would also enable the community, or

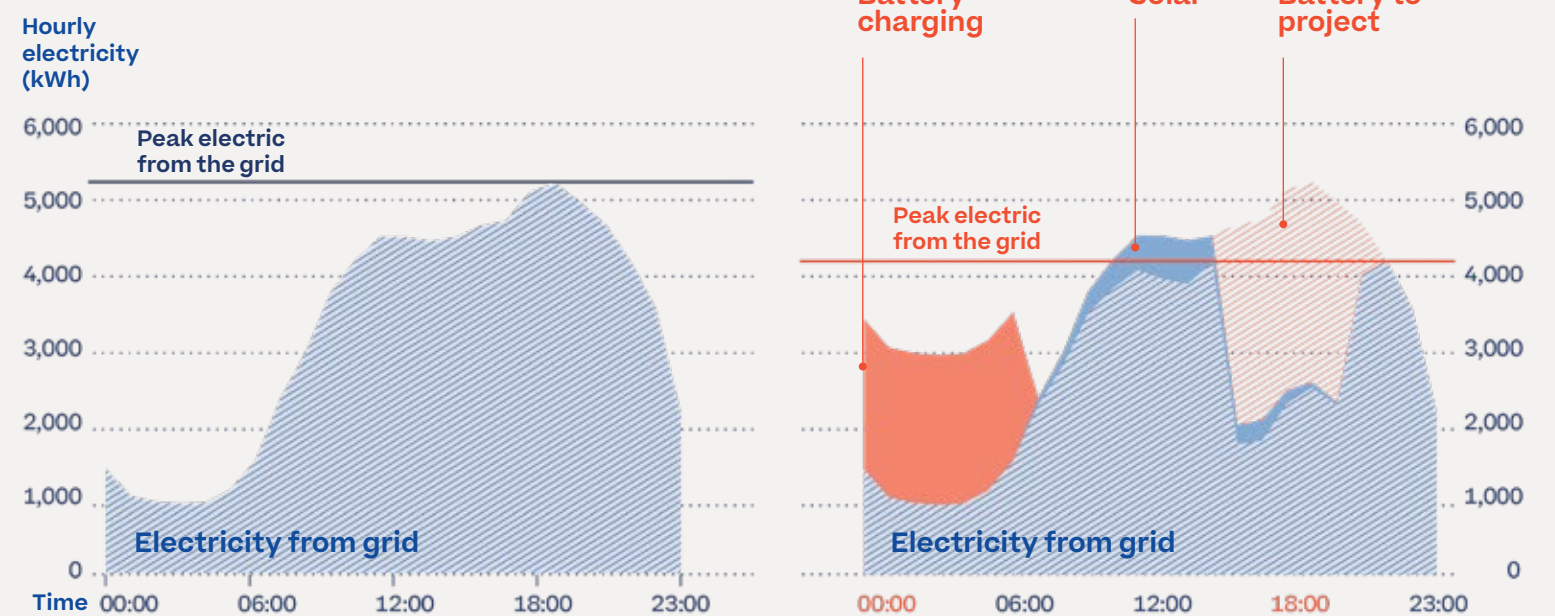
portions of it, to disconnect from the main grid in the event of a broader power outage and share use of on-site solar and battery storage among buildings.

The distributed energy resource management system and other tools could allow the grid operator and Toronto Hydro to manage and control the community-sited energy resources and the thermal grid, and send price and other information signals to the building Schedulers to help manage overall community electricity demand, minimizing utility costs for customers and overall GHG emissions.

This approach to grid design and management could enable Toronto Hydro to integrate the operation of distributed energy resources like solar and batteries into its planning and management of the grid as a whole. These tools, together with the innovative utility bill described on Page 330, also would allow Sidewalk Labs and Toronto Hydro to build an advanced power grid that could be smaller than a typical grid — accommodating an all-electric development and changing electricity uses over time without enlarging grid infrastructure.

## Reducing peak demand on Toronto's power grid

Solar energy and battery power would enable Quayside to rely less on Toronto's main power grid during peak periods, when the main grid uses more GHG-intensive power.



Without battery and solar, a development needs to draw heavily from the electricity grid during peak hours.

Batteries can be charged overnight, when power from the electricity grid is cleaner and cheaper. This stored energy, along with solar power, can be used to reduce demand on the grid during peak hours.





# Implement an innovative “monthly budget” bill target

To enable full electrification in an affordable manner, Sidewalk Labs plans to design an innovative customer bill structure that would give customers the chance to select their budget in advance — just like they do with mobile phone data plans. This bill structure would be designed around the following energy goals:

- **Reducing** GHG emissions that result from power use at peak times, when fossil fuel generators are operating
- **Establishing** transparency into rates and energy supply choices
- **Creating** predictable monthly power costs for customers
- **Ensuring** that residents who manage their energy can have bills equal or lower than business as usual
- **Managing** the demand for electricity to reduce the need for infrastructure expansion and to accommodate the electrification of vehicles and heating systems
- **Offering** customers the ability to own or lease the economic and environmental benefits of community-sited solar and battery

## Onboarding tenants and businesses.

Sidewalk Labs proposes that when residents or businesses move into a building in the Sidewalk Toronto project area, an onboarding team could help them set their utility budgets based on their energy goals around cost and GHG emissions. This team would explain dynamic power rates as well as the other tools used to help manage monthly budgets: solar capacity, battery capacity, and the Scheduler management tools described on Page 314.

## Implementing dynamic rates.

In Quayside, Sidewalk Labs proposes that customers pay for electricity through a dynamic hourly rate that is based on the hourly price of electricity in the Ontario market. Costs would be appreciably higher at times of peak demand, when the grid needs natural gas-fired peaking plants, and prices would be much lower off-peak, when the grid has ample nuclear, hydro, and renewables generation to meet demand.

Existing “time-of-use” rates in Ontario are only an approximation of the true cost of generating electricity, since in reality, the price changes hourly in the market based upon the marginal cost of generation (meaning the cost to generate the last electron, based upon the generator that produced it). The goal of the dynamic rate in Quayside is to provide transparency and encourage actions to reduce electricity use during peak hours.

## Managing monthly budgets.

A combination of Scheduler automation and the availability of shares in the community’s solar and battery capacity for purchase would enable residents and businesses to select their preferred monthly bill within a given scale. Selecting an amount at the lower end of the cost scale would result in a high level of intervention from the automated Scheduler tools, which would steer electricity use towards off-peak, low-cost periods in line with the monthly budget.

For example, a dishwasher turned on at 8 p.m. could automatically wait until 2 a.m. to run the wash, when power would be cheaper and cleaner. Customers would always be able to override the scheduler and pay more for utilities that month. Selecting a budget at the upper end of the cost scale would mean less Scheduler control.

The Schedulers could also recommend and facilitate the purchase of shares of the community-sited solar and battery capacity by customers who typically use electricity while the sun is shining or when the batteries would be discharged. Owning (or leasing) shares of these distributed energy resources would provide customers with the same economic and environmental benefits of having them in their home, reducing their use of peak time electricity.

All told, customers would have total control and visibility into their utility costs, choice of power generation sources and storage, and predictable monthly utility bills — without the headache of having to manage all of it.

## Innovation case studies

# The power of automation to reduce energy bills

In Ontario, since 2014, roughly 90 percent of the province’s 4 million residential customers have been buying their energy through an option that includes a three-period time of use rate.<sup>21</sup> Such a rate structure encourages customers to shift energy use, as they are able, from peak times to off-peak times. Under this scheme, customers have reduced their peak demand by as much as 3 percent<sup>22</sup> as part of the province’s electricity system transformation, which included reducing its need for fossil fuel-based generation and lowering GHG emissions and costs.

In recent years, a number of other North American utilities have piloted or rolled out similar time-varying power rates — some coupled with automated control tools such as smart thermostats. Studies of these programs have shown that the automation produces larger demand reductions by customers.

For example, in 2013, Baltimore Gas & Electric, a Maryland-based utility, began its Smart Energy Rewards program, which couples rebates for peak demand reductions with smart thermostats, opt-in utility-controlled air conditioner switches, smart appliances, and other energy management tools. Some 80 percent of customers have taken advantage of the rebates, reducing their energy demand by more than 16 percent and saving a combined total of \$40 million USD on their utility bills.<sup>23</sup>

In Oklahoma, Oklahoma Gas & Electric initiated a variable peak pricing plan coupled with a smart thermostat. For the approximately 130,000 customers on variable peak pricing, the average peak load has dropped by approximately 40 percent and average bill savings have been as high as 20 percent.<sup>24</sup>









See the “IDEA District” chapter of Volume 3 for more details on Sidewalk Labs’ proposal for a public entity (called the Waterfront Sustainability Association) to oversee rate structures for the advanced power grid.

Sidewalk Labs anticipates that all energy needs would be served by the advanced power grid (and the thermal grid described in the next section). As a result, Quayside residents and businesses would not need gas accounts, which can average \$30 to \$150 a month depending on the season. Although electricity costs more than gas in Toronto, average customers should have utility bills comparable to those of households or businesses in a typical Toronto neighbourhood, with much cleaner energy consumption.

This proposed integrated power plan would cover the majority of commercial and household electricity costs, but not all of them. For example, electric vehicle charging could have a different pricing structure for residential and commercial customers to account for the parking space that the car is taking up while charging and to strongly discourage full charging at times of peak demand.

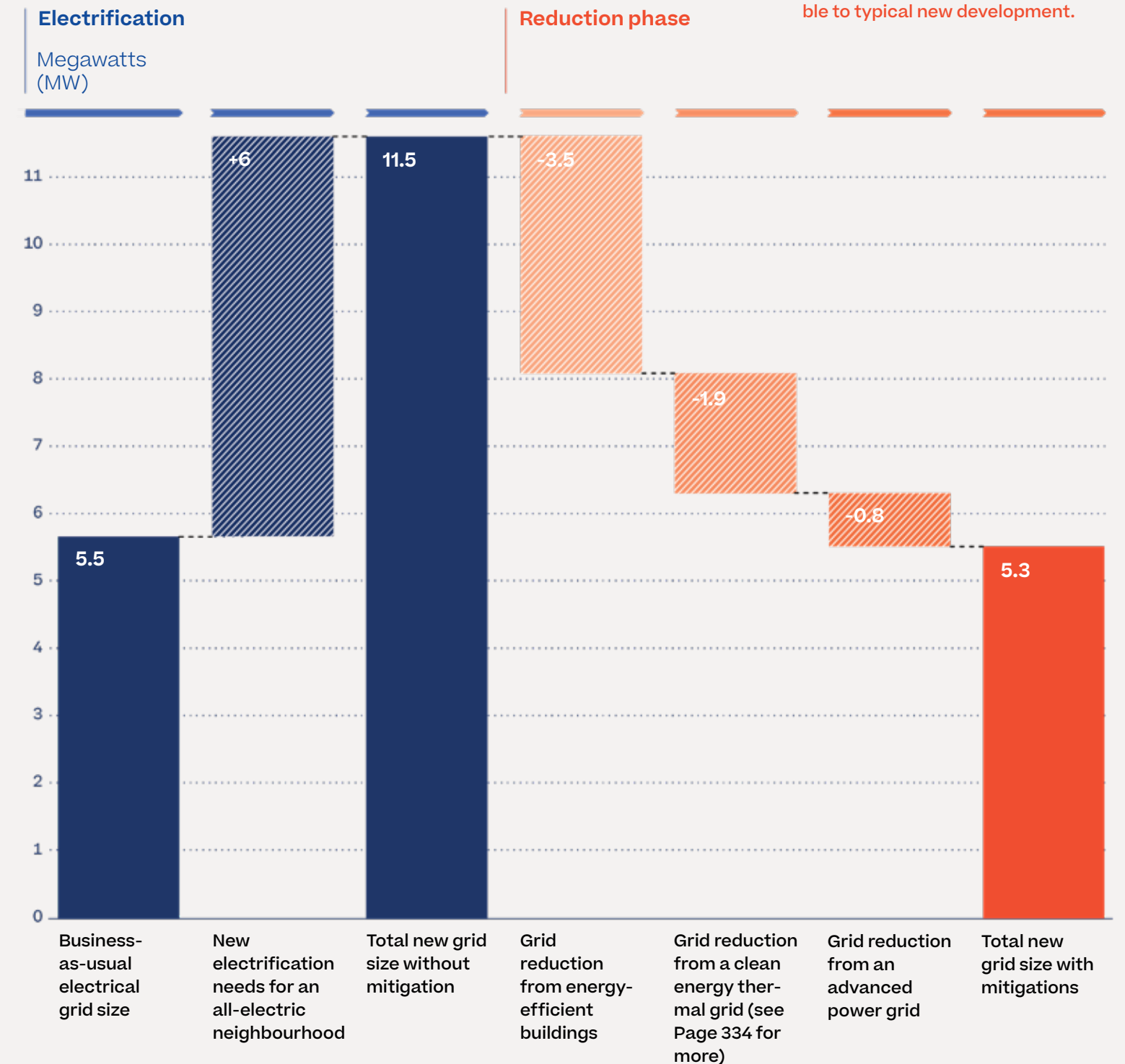
Residents and businesses would be able to set monthly energy budgets and receive clear utility bills that identify power sources and associated costs. (Bill shown here for illustrative purposes only.)

Resident Utility Bill	
<b>On Budget!</b>	
You have selected a budget of \$150 Your total cost this month is <b>\$143.91</b>	
 Electricity	\$84.67
 Thermal Energy Heating, cooling, and domestic hot water	\$44.65
 Community-sited Solar 0.23 kW (\$13.17/kw/month) Your solar shares avoided 1.4 kg of GHG emissions this month.	\$3.03
 Community-sited Battery 5.61 kW (at \$1.87/kw/month) Your battery shares avoided 1.9 kg of GHG emissions this month.	\$10.48
 Advanced Energy Grid Rebate \$3.44 savings was from your solar capacity \$41.59 savings was from you battery capacity	-\$45.03
 Thermal Grid Capacity Charge	\$41.11
<b>Amount due</b>	
\$143.91	

# Achieving affordable electrification without a larger grid

A typical new development would require a power grid of 5.5 megawatts. An all-electric neighbourhood requires electrifying new things like vehicles and heat pumps. Unless mitigated, these additional uses would increase the size of the grid to 11.5 megawatts.

Sidewalk Labs proposes to mitigate the size of that grid while still serving these new electricity demands through efficient building envelopes, a thermal energy grid, and an advanced power grid. Together, these initiatives reduce the grid size necessary to serve the neighbourhood to 5.3 megawatts — comparable to typical new development.



# Part 4



## Using Clean Energy to Heat and Cool Buildings



### Key Goals

1 **Design a thermal grid to distribute clean energy**

2 **Capture building “waste” heat, geothermal energy, wastewater heat, and other clean energy source**

A combination of low-energy buildings and active energy management systems would dramatically reduce the need for heating and cooling, but these efforts alone cannot eliminate that need, especially in a cold-weather climate like that of Toronto. Weather aside, neighbourhoods with a mix of residential and commercial spaces need heating and cooling year-round: residents take hot showers even on the hottest days, and many businesses with lots of computers or on-site fabrication and light manufacturing equipment run air conditioning even on the coldest days.

A handful of cities have long tried to meet some of their heating, cooling, and hot water needs more efficiently by using district-wide energy systems. Very early district energy systems, dating back to the 19th century, burned fossil fuels like coal to boil water in centralized plants to produce steam for heating buildings.<sup>25</sup> Today, a handful of innovative systems aim to tap clean energy sources; for example, Toronto itself uses water drawn from Lake Ontario to help cool about 60 buildings downtown.<sup>26</sup>

But even new district-energy systems face challenges at both the neighbourhood and building levels when trying to reduce or eliminate their reliance on fossil fuels.

Often the systems cannot access sufficient clean energy (in a financially viable manner) to meet peak heating and cooling demands, like in the dead of winter. District energy systems that use a central heat generation plant typically pipe their energy a long way to buildings and back to the plant again, leading to heat losses along the way. Traditional building construction requires substantial heating, which warrants high-temperature water, but high-temp systems cannot make use of available “low grade” (not very hot) clean heat sources, such as wastewater heat.<sup>27</sup>

To deliver heating and cooling to residents and businesses without using fossil fuels, Sidewalk Labs proposes to deploy a type of district energy system called a thermal grid, designed to help realize full electrification in an affordable way and to achieve a climate-positive community.



The proposed thermal grid provides buildings with clean sources of heat energy through a network of water pipes (or loops). Electric heat pumps can use heat energy from these loops to provide tenants with heating or domestic hot water, or the pumps can reject heat energy into these loops to provide cooling. The thermal grid is designed as a zero-fossil fuel system that relies on clean energy from a variety of sources, including geothermal (underground) energy, building waste (or excess) heat, and wastewater (sewage) heat.

The thermal grid has two core design features that help improve its efficiency. One is its distributed network of water-pipe loops at the building, site, and neighbourhood levels, which creates more flexibility in growing the system over time by adding new thermal energy sources. The other is its ambient (or low) temperature water loop, which reduces heat losses through the pipe network, thereby enabling the grid to rely on a wide variety of clean energy sources that might otherwise go untapped.

When exploring the potential for such a thermal grid, Sidewalk Labs took scale into account from the start for three key reasons.

**The thermal grid could reduce GHG emissions by 1.58 annual tonnes per capita.**

### A thermal grid would deliver heating and cooling to residents and businesses without using fossil fuels.

First, such a system would be prohibitively expensive to create without scale, because a five-hectare neighbourhood provides limited opportunity to spread the cost of the upfront investment required to develop, operate, and maintain a large infrastructure system while keeping costs affordable to customers. Second, a thermal grid needs to be able to grow with development and serve new buildings and neighbourhoods as they are constructed and as new energy sources become available. And third, the full scale of the IDEA District creates the potential to tap into clean energy sources that can be exported to other parts of the city — thus fulfilling Waterfront Toronto’s objectives for a climate-positive community.

Deployed across the proposed full scale of the IDEA District, the thermal grid could recover its costs across dozens of development sites and tap into multiple large energy resources in and adjacent to the IDEA District. This approach would reduce the community’s GHG emissions by 1.58 annual tonnes per capita (or 25.1 percent) from the city’s current average.

And if the thermal grid were to be extended to Ashbridges Bay Wastewater Treatment Plant on the eastern edge of the Port Lands, it could secure enough energy to export to existing (and planned) developments in the eastern waterfront, removing carbon from the environment in these areas. With 170 megawatts of energy potential, Ashbridges alone could heat up to 85,000 homes.<sup>28</sup>



Using Clean Energy  
to Heat and Cool Buildings

# Design a “thermal grid” to distribute clean energy

## Key Term

### Heat exchanger

Devices that separate the thermal grid’s building, site, and neighbourhood loops. Heat exchangers enable these loops to transfer heat energy, as needed, across metal plates.

## Key Term

### Heat pump

Electric devices that serve as primary means of controlling the temperature of hot and cold water loops in buildings.

Canada is home to some of the most innovative district energy systems in the world, as exemplified by Toronto’s deep lake cooling system. To build on this foundation while exploring a thermal grid concept, Sidewalk Labs paired the experience of Kerr Wood Leidal, a Vancouver-based district energy design firm, with the research excellence of Lawrence Berkeley National Laboratory, a U.S. national research lab. The goal was to provide Toronto with new heating and cooling approaches that could be pursued in developments across the city.

For Quayside, the initial design under serious study (although not yet finalized) is — in technical terms — a two-pipe, ambient-temperature, water-source system. In simpler terms, the thermal grid consists of a network of water pipes that circulate heat energy across the building, site, and neighbourhood levels. These pipe loops can transfer energy to one another through “heat exchangers,” or devices that enable heat to cross into a new pipe without losing energy.

These separate loops provide several advantages over a single pipe network. They enable the thermal grid to conserve energy, by reducing the need to carry a single heat source long distances. They enable multiple buildings to exchange thermal energy, which is important in mixed-use developments that have simultaneous heating and cooling demands. And they enable the grid to tap a wider variety of clean energy sources across a greater geography.

**Electric heat pumps** in buildings can draw energy from a warm pipe or reject energy into a cool pipe as needed for space heating, space cooling, and domestic hot water. It is the heat pumps that provide the temperature control for the whole system — they are the “brains” of the thermal grid. Sidewalk Labs’ initial designs include heat pumps at the site level (to provide appropriate space heating/cooling water temperatures and share energy between buildings) as well as at the building level (to raise the water temperature enough for domestic hot water).

The sections that follow describe the thermal grid’s core infrastructure in greater detail.



Building loops would heat and cool residential and commercial spaces by circulating through radiant ceiling panels.

### Building loop.

The proposed thermal grid would begin in the buildings, with each building having its own loops of hot and cold water. These building loops would heat and cool residential and commercial spaces by circulating conditioned water through radiant ceiling panels.

For domestic hot water uses that require even higher temperatures (60 degrees Celsius), such as showers, small electric heat pumps in the buildings would provide an extra boost. (Additional heat could be extracted from each building’s sewage lines using these heat pumps.)

### Site loop.

The thermal grid’s second loop would exist at the site level to circulate hot and chilled water to multiple buildings, connecting into the individual building loops via heat exchangers. Heat pumps located at the site-level would get the water in the site loops to their desired temperature (around 45 degrees Celsius for the hot loop, and around 5 degrees for the chilled loop). During off-peak seasons, these temperatures could be adjusted to reduce heat losses and thus reduce the amount of work required by the heat pumps to reach the desired temperature.

Each site plant would use a geothermal field to exchange thermal energy with the ground. These geothermal fields would act much like big thermal batteries. On a cold day, the ground remains warmer than the outside air, enabling site-level heat pumps to draw thermal energy from wells in the fields; on a warm day, the ground is cooler than the outside air, enabling the pumps to deposit heat into the ground. The bedrock beneath Quay-side has excellent thermal properties for geothermal heat exchange.

The buildings connected via the site loops could share energy as necessary. In many cases, the simultaneous heating and cooling needs across these buildings would be sufficient to meet energy demands.

#### Neighbourhood loop.

The thermal grid's neighbourhood loop would connect all of the site plants and allow for the transfer of energy among sites. For scenarios where site-level energy sources proved insufficient, the site heat pump plants could extract or deposit heat into the larger neighbourhood loop via heat exchangers. In some cases, one site would be depositing heat into the neighbourhood loop that another site could use.

The neighbourhood loop would transport heat from a variety of clean energy sources at an ambient temperature (a max of 32 degrees Celsius in cooling season and a minimum of 12 degrees in heating season). The neighbourhood loop also would connect the sites to other clean energy sources (such as industrial waste heat or data centres) and could tie into adjacent neighbourhood district energy systems, which may have complementary heating and cooling demands.

Finally, the neighbourhood loop would have a shared balancing plant to control the movement of heat through the neighbourhood. If the neighbourhood loop had more energy than any site needed — for example, in the peak of summer — the excess would be exhausted via a cooling tower. Connections for a roll-up temporary boiler would be available for emergency backup needs.

The system's two most innovative features are its distributed infrastructure and its ambient temperature loop.

#### Distributed infrastructure.

Some district energy systems heat or chill water in a single central plant before piping it back out to sites and buildings, requiring the water to travel long distances and thus causing it to lose some of its thermal energy prior to reaching the building. Further, if the building does not need the heat, the water is returned in a continuous loop, requiring more energy for pumping. Such a system must also be sized at the master planning stage, making it hard to expand with new development.

In Quayside, Sidewalk Labs plans for each site of buildings to have a mini plant tied into a geothermal field and for excess geothermal capacity to be shared among the sites through the neighbourhood's thermal grid. At a full scale of the IDEA District, the thermal grid could be expanded and tied into new site plants, other neighbourhoods, or additional heat sinks and sources like the Cherry Street sewage pumping station and waste heat from Enwave's deep lake cooling system.

#### Ambient temperature.

The other major advance of this design is its ability to go fossil fuel-free by using ambient temperature. This approach

enables the system to leverage low-grade heat sources that would be considered too cool to be heat sources for a high-temperature hot water system.

In short, the idea behind ambient temperature water loops is to capture as many sources of heat as possible, and the idea behind the distributed system is to get these sources where they need to be with as little loss of energy as possible.

The flexibility of this system enables the grid design to change as the development materializes. For example, if Sidewalk Labs becomes able to tap into a new fossil fuel-free source of energy (or into neighbourhoods with complementary energy loads), it might reduce or eliminate the energy sources from the design that are very expensive, such as geothermal, without any impact on the greater system.

#### Integration with the advanced power grid.

To enable optimal energy and utility cost management, Sidewalk Labs proposes to combine the active energy management capabilities of the power and thermal grids, and to bill customers from a single utility.

This approach stands in contrast to the separation of gas and electric services that is the model in Toronto (and other cities) today. But it also recognizes that, in an all-electric development, thermal energy systems would become a major user of electricity and something that the grid operator (responsible for managing the neighbourhood's peak electrical demand) should be able to control and optimize in concert with other electrical loads. The thermal grid could even become a resource for generating and storing thermal energy when electricity

costs are low and could be used later when electricity prices are high.

As is the case for its management of power, Sidewalk Labs plans to use the Office, Home, and Building Operator Schedulers to manage thermal energy consumption and costs for residents and businesses. The proposed Schedulers would play a critical role in allocating the cost of domestic hot water, heating, and cooling to customers. For example, in summer, a hot shower might effectively operate on "free" heat energy, by drawing on the heat rejected by air conditioning. But in winter, a hot shower might contribute to a peak-period heat demand that should account for the real-time cost to generate that heat. The intent of such pricing is to create transparency around the true cost of energy generation and delivery, which would change based upon the competing or complementary heating and cooling demands of other tenants in the neighbourhood.

Sidewalk Labs plans to issue a request for proposals to design and develop (or co-develop) the thermal grid and anticipates responses from leaders in the field, such as Enwave and Creative Energy, or an established utility in Toronto with a growing geothermal business, such as Enbridge.

#### Ongoing design exploration.

As part of its ongoing consideration into how best to achieve climate positivity, Sidewalk Labs plans to explore alternative thermal grid solutions to those proposed in the MIDP before selecting a final design. Specifically, Sidewalk Labs plans to evaluate alternatives in the hopes of finding systems with equivalent core performance while achieving even better performance in terms of embodied energy, ozone depletion, and lifecycle costs.



Using Clean Energy  
to Heat and  
Cool Buildings

# Capture building “waste” heat, geothermal energy, wastewater heat, and other clean energy sources

To start, the proposed thermal grid would incorporate at least three primary types of clean energy sources: on-site and off-site building waste heat, on-site geothermal heat, and off-site wastewater heat recovery. The system would also be designed to accept off-site industrial waste heat (such as heat rejected by data centres, local manufacturing, and power generation plants) to help reduce costs.

## Building waste heat (on-site and off-site).

Buildings generate all sorts of heat throughout the day. This heat comes from the equipment and appliances residents and tenants use, such as computers and television screens, as well as from hot showers.

Sidewalk Labs plans to capture and repurpose building waste heat to provide energy for heating and domestic hot water systems. For example, buildings would use heat recovered from their own wastewater systems to pre-heat domestic hot water, reducing the amount of energy needed by the building’s heat pump to increase the temperature further.

At the full scale of the IDEA District, Sidewalk Labs estimates that, given its pro-

posed mix of residential and commercial uses within buildings, 27 percent of the cooling and 31 percent of the heating would happen simultaneously.<sup>29</sup> This usage would enable waste heat captured from one space in a building (such as a server room) to be used to heat another space in the same site (such as an apartment), once transferred through the site’s heat pump plant.

If the site has excess heat, it could be transferred to other sites to heat buildings or help generate domestic hot water. It could also be stored in the site’s geothermal wells for use when it becomes colder. Finally, it could be exhausted through a shared neighbourhood cooling tower plant.

An off-site source of building waste heat could be available from the “chilled water return loop” operated by Enwave Energy Corporation, which provides hot and chilled water to many downtown Toronto buildings. Enwave has a sizable portion of customers who require air conditioning even during the winter, and the waste heat extracted by these buildings would be enough to meet the supplemental heating requirements of development in Villiers Island, if tapped for Sidewalk Labs’ proposed thermal grid.

## Geothermal (on-site).

In many ways, the earth is like a big underground battery that stores up energy. The ground is normally 10 degrees Celsius, which means it is warmer than a cold day but cooler than a hot day. Sidewalk Labs’ proposed thermal grid would capture this geothermal energy via underground wells — sometimes called “geoexchange” — and use it to extract heat during the winter and store heat during the summer. Geothermal wells are good at providing heat on a cold day and extracting heat on a hot day.

The amount of building heating and cooling that could be supported by geothermal wells depends on the amount of available and suitable space located beneath buildings or in parks and open spaces. It also depends on the availability of significant upfront investment capital, as geothermal is high cost. In Quayside, Sidewalk Labs expects to serve most of the development’s heating and cooling loads with 0.5 hectares of geothermal field space that would be located beneath the development parcels, as well as parts of Silo Park.

For all its benefits in a small neighbourhood like Quayside, geothermal energy is very expensive to harness, and therefore would not serve as a scalable clean energy source across a significant development area of the IDEA District. Geothermal energy could be used strategically in later phases of development, but as a secondary option to avoid fossil fuels.

## Industrial waste heat (off-site).

Commercial and industrial processes can also generate enormous amounts of waste heat that have the potential to serve as yet another source of clean energy for a thermal grid. Sidewalk Labs

has initiated explorations into accessing the waste heat of a data centre near Quayside, where computer servers generate considerable heat year-round. Another potential energy source is the Portlands Energy Centre, an electrical generating station near the Hearn in the lower Port Lands area.

Due to the flexible and expandable design of the proposed thermal grid, new sources of energy can be connected in as they become available.

## Wastewater heat recovery (off-site).

All the wastewater flushed down dishwashers, shower drains, and toilets travels through sewers at just below 15 degrees Celsius in winter and 25 degrees in summer. As is the case with geothermal energy, this moderate temperature makes sewers good potential sources of heat on a cold day and good potential “sinks” of heat on a hot day.

Sidewalk Labs’ proposed thermal grid could use this wastewater energy to help heat up or cool down buildings in an odour-free and sanitary way. As mentioned, wastewater within buildings could be recaptured to pre-heat domestic hot water. But Toronto’s waterfront is home to broader sources of wastewater energy that could tie into the neighbourhood loop: the Cherry Street Sewage Pump Station and the Ashbridges Bay Wastewater Treatment Plant.

The Cherry Street Sewage Pump Station has the capacity to add pumping equipment for heat recovery purposes right at Lake Shore Boulevard and Cherry Street, near Keating Channel. The size and location of this pumping station would make it an excellent heat source and sink for a development expansion from Quayside further east along the waterfront.

Planning process

# Why biomass is not an initial thermal grid source

Sidewalk Labs explored the use of biomass (such as wood pellets and solid waste) for its thermal grid, but ultimately determined it was not a good fit. Broadly speaking, the process of burning biomass fuel sources creates high-temperature heat that cannot be efficiently integrated with the low-temperature waste heat captured from Toronto’s geothermal and sewer water sources. Individually, the sources of biomass each had challenges that offset their potential:

- Biosolids generally have a high ash and nitrogen content, which can create challenges in managing air emissions.
- Wood pellets are highly processed, which increases their GHG intensity and their environmental cost.<sup>30</sup>
- Existing natural gas demand that could be served instead with biogas well exceeds the potential for commercial biogas production, so biogas is not an ideal climate-positive solution for new development.

For all these reasons, Sidewalk Labs did not select biomass fuels as the preferred source of low-carbon heating.

## Tapping wastewater energy to realize climate positivity.

Sidewalk Labs’ proposed thermal grid could supply energy needs to Quayside and other parts of the IDEA District without the enormous supply of sewer heat that is available from the Ashbridges Bay Wastewater Treatment Plant, the second-largest secondary wastewater treatment plant in Canada, with a service population of roughly 1.5 million people. But this source is important to consider tapping for its potential to remove carbon from the environment in other parts of Toronto.

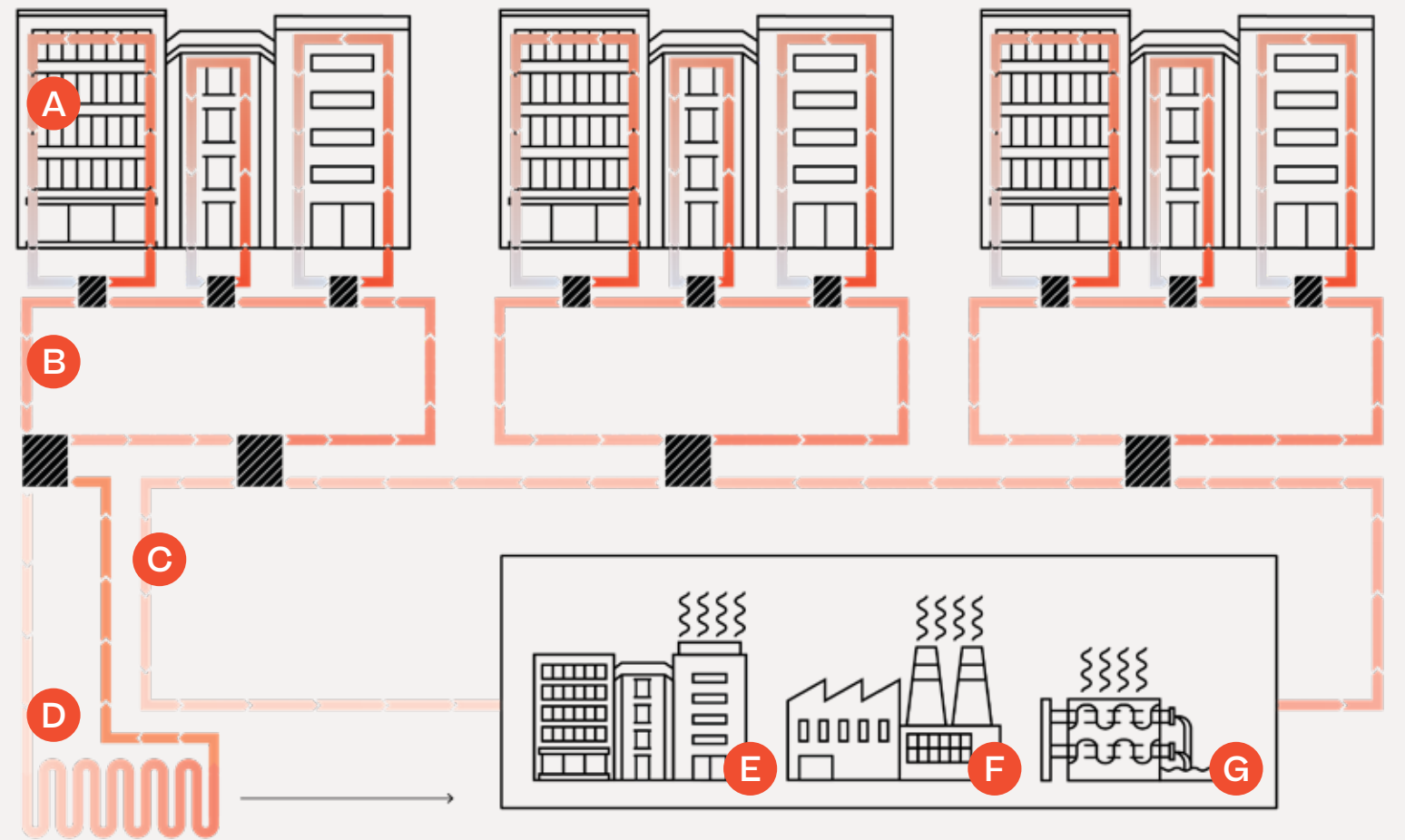
Located within 2 kilometres of the Port Lands, the Ashbridges Bay plant is in continuous operation, meaning it can provide a steady source of heat from treated (or “cleaned”) sewage year-round. With an enormous 150 to 200 megawatts of thermal energy potential, Ashbridges alone contains enough thermal energy to heat some 35 Quaysides. At that scale, Ashbridges would be among the largest sewer heat recovery projects in the world.<sup>31</sup>

Tapping this source, with support of the city, would enable the Sidewalk Toronto project to go from meeting its energy needs to offering a clean source of energy to surrounding neighbourhoods, thereby achieving its climate-positive ambitions.

# Ashbridges would be among the largest sewer heat recovery projects in the world.

# Explainer: How the thermal grid works

The thermal grid’s flexible design uses three loops to exchange energy across a network of buildings and clean energy sources, including geothermal, building waste heat, industrial heat, and wastewater heat.



### Distributed Infrastructure

- A** Building loop
- B** Site loop
- C** Neighbourhood loop
- D** Geothermal
- E** Building waste heat
- F** Industrial waste heat
- G** Wastewater heat recovery
- Ambient temperature
- Heat exchanger

Note: Loop reverses direction in summer.

# Part 5



## Reducing Waste and Improving Recycling



### Key Goals

- 1 **Improve waste sorting through responsive digital signage**
- 2 **Implement “pay-as-you-throw” smart waste chutes**
- 3 **Reduce contamination during removal with vacuum tubes**
- 4 **Convert organic waste into clean energy**

Reducing GHG emissions is not just about consuming less energy associated with heating, cooling, or electricity. It is also about wasting less and diverting recyclable (glass, metal plastic, paper, and cardboard) and organic (food) materials from landfills, where their decomposition has a significant climate impact. For example, food waste that ends up in a landfill produces methane, a GHG 25 times more potent than carbon dioxide.<sup>32</sup>

Toronto’s 2016 solid waste management plan sets a citywide waste reduction target of diverting 70 percent of recyclables and organics from landfill waste by 2026.<sup>33</sup> But mid- and high-rise buildings along the waterfront and downtown have a long way to go to achieve those targets. Multifamily buildings currently divert only 27 percent,<sup>34</sup> and commercial buildings do even worse, at 13 to 19 percent.<sup>35</sup>

The biggest challenge to achieving that diversion rate is what waste experts call “source separation” — making sure that recyclables and organics go into separate containers from the very start and that they stay separated throughout the entire waste removal process. Source separation is essential to reduce the contamination that undermines recycling efforts; for example, paper cannot be recycled unless it is very clean.



Sidewalk Labs proposes to integrate a series of technological, policy, and infrastructure advances to exceed Toronto’s goals for landfill diversion and to demonstrate an innovative path forward for neighbourhood waste. This plan would involve using digital signage to communicate proper sorting practices, deploying “smart” trash chutes in buildings to separate waste and allocate cost fairly by waste stream, and conveying waste to a centralized location through underground tubes to reduce contamination. Finally, this process would incorporate anaerobic digestion, a process in which organic waste is turned into a slurry and digested by microorganisms that dispel biogas, a form of clean energy.

In Quayside, this plan could build on the City of Toronto’s long-term diversion rate of 70 percent and result in a landfill diversion rate of 80 percent. Some multi-family residences in Toronto have already achieved such rates through tenant education and operations. As an added benefit, this plan would dramatically reduce the amount of garbage truck traffic on neighbourhood streets by centralizing waste pick-up.

Applied at the full scale of the IDEA District, Sidewalk Labs’ approach to waste sorting could reduce GHG emissions by 1.08 annual tonnes per capita (or 17.1 percent) from the city’s current average, largely thanks to anaerobic digestion, which controls the release of GHGs for beneficial use instead of emitting it into the atmosphere.<sup>36</sup>

**A smart disposal chain could reduce GHG emissions by 1.08 annual tonnes per capita.**

### Sidewalk Labs pilot

## Using data to improve recycling habits

Much of the contamination of waste streams is believed to be the result of “wish cycling,” in which customers assume that certain materials (such as a bio-plastic container or a coffee cup) are compostable or recyclable, when in fact they are not. These are not unreasonable assumptions, and they can only be corrected with direct feedback. But such feedback is difficult to provide to tenants in multifamily buildings.

Sidewalk Labs plans to conduct a pilot prior to any Quayside development to study how well building residents respond to feedback about their waste sorting behavior, with the goal of helping people recognize the complicated dos and don’ts of correct sorting, and ultimately improve their recycling practices.

For the proposed pilot, the trash, recycling, and organic waste streams of three multifamily buildings in Toronto would be collected by a hauler and brought to the Canada Fibers materials recovery facility. Canada Fibers conducts ongoing waste audits for Toronto, as a regular waste tracking service.

In a conventional waste audit, workers at a recovery facility perform a contamination analysis of waste by categorizing it by hand. For the pilot, the waste would be placed along a conveyor belt and classified by computer vision sensors trained to identify materials and contamination, developed by AMP Robotics.

Continued on Page 347





Goal 1

Reducing Waste  
and Improving Recycling

# Improve waste sorting through responsive digital signage

There is no way around it: recycling correctly is hard. Even the most environmentally-aware person has reasonable questions standing in front of several different waste bins:

“Should I put this bio-plastic container in the organics bin?” (*No, put in the trash. Anaerobic digester preprocessing facilities cannot discern between bio and polymer plastics, and the container will be presorted and sent to landfill.*)

“Do I really need to rinse this honey jar to recycle it?” (Yes!)

“Can I recycle this plastic garden hose?” (*Not in Toronto. Hoses often get caught in recycling machinery, occasionally leading to facility shutdowns.*)

To make matters yet more complicated, recycling rules often vary by municipality, neighbourhood, even home and office, meaning the right bin somewhere might not be the right bin somewhere else. And while many great online resources exist — including Toronto’s Waste Wizard app, which tells building tenants which types of waste go where — office tenants have to seek out that information themselves.

Sidewalk Labs plans to tackle this challenge by meeting people right at the source of the problem — the building trash room — using dynamic signage to

illustrate common sorting mistakes and explain their impact on waste-reduction goals. These digital signage campaigns could be informed by real-time waste characterization data communicated from a materials recovery facility (which sorts recyclable materials) or a recycling processor (which turns sorted recyclables into materials that can be resold).

The City of Toronto currently conducts ongoing waste audits to get a sense of current landfill diversion rates, but these audits are labour-intensive and expensive, and make up only a small sample of the city’s overall waste practices. Sidewalk Labs proposes to automate these audits (sometimes called “waste characterization studies”) using computer vision software developed by a company called AMP Robotics. (Sidewalk Labs is an investor in AMP.) Designed to be installed on waste conveyor belts in material recovery facilities, this software could classify waste and identify common recycling mistakes over time (see sidebar).

For example, the waste software might identify an increased rate of attempts to recycle to-go coffee cups, which are lined with polyethylenes that contaminate the recycling stream. This trend could then inform a digital signage campaign to encourage tenants to put these cups into the landfill trash chute — or better yet, to use a reusable cup! As an added



bonus, this real-time understanding of waste trends could help the city work with manufacturers to reduce or redesign problematic products, an effort that is consistent with the 2016 Waste Free Ontario Act.<sup>37</sup>

Additionally, digital signage could inform building tenants about city waste programs such as trash donations, mobile drop-off deposits, and clothing collections. These signs could also be used to display the pending disposal of specialty items like old appliances or furniture that other residents of the building or the neighbourhood might want to take.

Continued from Page 345

Over the course of three months, signage showing the week’s waste diversion percentage and most common recycling mistakes would be posted to provide residents with feedback on their recycling effectiveness, based on the building’s aggregate waste practices.

Residents who volunteer to have their waste bags individually audited and analyzed would receive personalized feedback on recycling effectiveness, but in general, the feedback would be delivered at an aggregate building level.

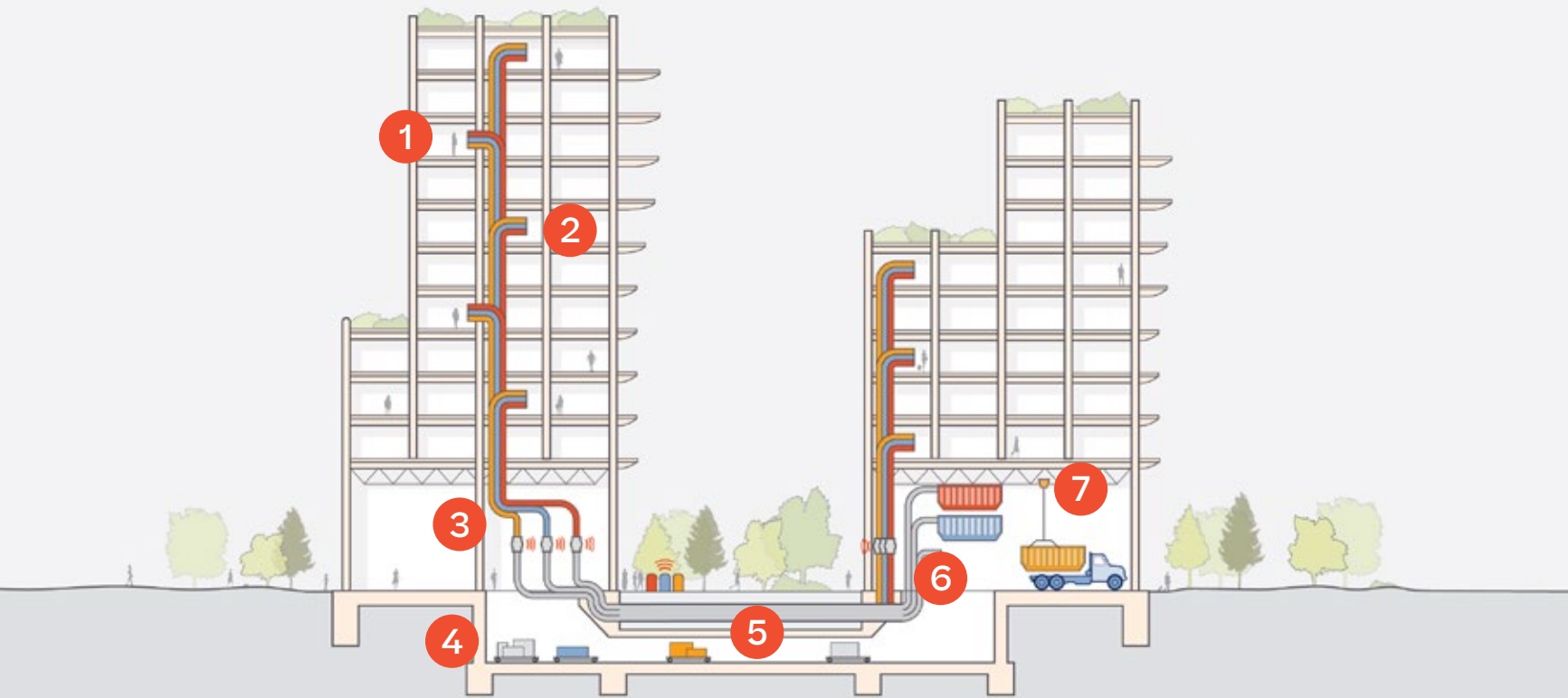
Additionally, the pilot would compare the waste analyses completed by workers at Canada Fibers with those from the computer visualization system to determine the effectiveness of such technology for ongoing waste characterization.

The pilot would conform to the same protocol used by the City of Toronto for its standard waste characterization studies, with the goal of ensuring that no waste could be identifiable to an individual. It would also follow Sidewalk Labs’ proposed Responsible Data Use Guidelines, including by providing transparent signage about the program in participating buildings.

“Wish cycling” is a natural response from people who want to make their cities more sustainable. By helping residents recognize their recycling mistakes, this pilot can help create a real-time feedback loop in Quay-side and beyond, making those wishes a reality.

# Explainer: How the smart disposal chain works

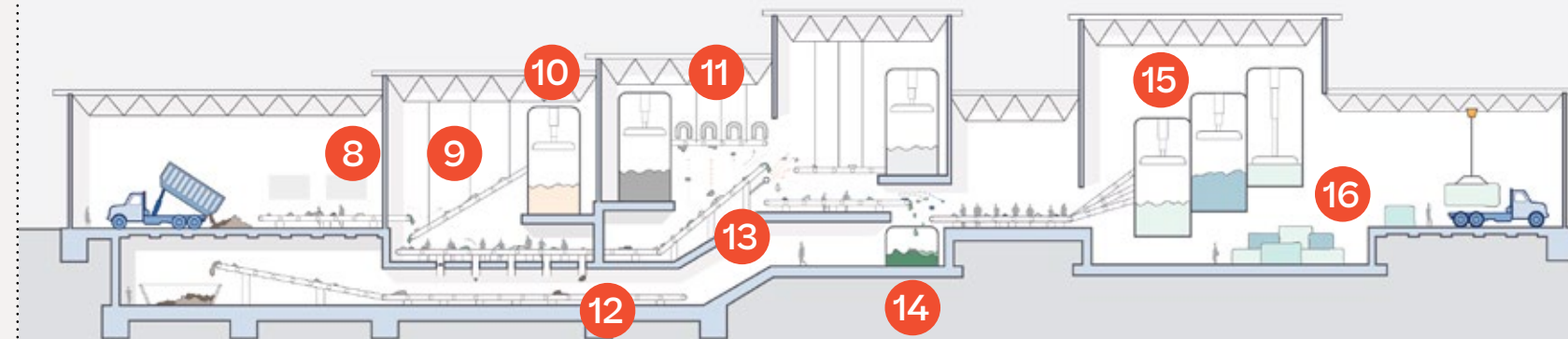
The proposed smart disposal chain begins with a set of three pneumatic waste chutes (one for landfill, recycling, and organic or food waste) that keep these streams separated, reducing contamination. These chutes transport the waste underground to an on-site neighbourhood collection point for truck removal.



## The neighbourhood waste system helps to sort landfill, recycling, and organic waste.

- 1 Tenants unlock smart chutes to deposit their waste.
- 2 Three chutes (recycling, landfill, and organics) keep waste separate to reduce contamination.
- 3 A valve room manages the flow and release of material through the chutes.
- 4 Cardboard and oversized items that cannot go into the chutes are collected separately and transported via underground tunnels.
- 5 Pneumatic tubes transport waste underground.
- 6 Waste arrives at the neighbourhood collection point and is prepared for removal.
- 7 Crane systems load trucks with separated waste streams for off-site transport.

Trucks will transport recycling material to an off-site material recovery facility (MRF). The MRF helps to sort recyclable material further, separating out things like metal, plastic, and glass, as well as any remaining landfill waste. The resulting clean recyclable material then gets sold to manufacturers for reuse.



## Recycling is processed at an off-site materials recovery facility.

- 8 A computer vision system categorizes data on recycling.
- 9 Screens and shakers further separate out small materials.
- 10 Powerful magnets pull metal items out of the recycling stream.
- 11 An eddy current (reverse magnet) pushes lighter-weight metals into a separate container.
- 12 Contaminants removed from the recycling streams are gathered for landfilling.
- 13 An optic eye conveyor is used to sort plastic types.
- 14 Heavy glass pieces remaining in the waste stream are sorted out via gravity.
- 15 Separated materials are compressed into bales.
- 16 The baled, recycled content is sent to market.



Goal 2

Reducing Waste and Improving Recycling

# Implement “pay-as-you-throw” smart waste chutes




All proposed digital innovations would require approval from the independent Urban Data Trust, described more in the “Digital Innovation” chapter of Volume 2, on Page 374.

Like many cities, Toronto has improved its recycling rates with “pay-as-you-throw” waste management program. These programs charge residents for the amount of landfill waste they throw away each week while collecting recycling for free. Residents who fail to sort their waste correctly risk having it left uncollected. In single-family homes and townhouses, pay-as-you-throw is credited with diverting 66 percent of waste in Toronto,<sup>38</sup> achieving similar success rates elsewhere.

Pay-as-you-throw programs have not translated effectively to multifamily buildings, for an obvious reason: unlike in a single-family home, where waste is set out in front of a specific residence, a building garbage chute or trash room has no way of knowing which tenant is throwing out what. To address this challenge, Sidewalk Labs has designed a building “smart chute” that could account for waste by building unit and bring pay-as-you-throw programs into dense urban neighbourhoods.

To adapt pay-as-you-throw for multi-residential settings, Sidewalk Labs proposes that buildings be required to provide three waste chutes consistent with City of Toronto requirements: organics (food), recyclables (glass, metal, plastic, and paper), and landfill garbage. These “smart chutes” could be unlocked from an app or a touch screen to verify a tenant.

Digital devices in the chutes would measure waste volume to charge tenants for what they deposited. 

This approach differs slightly from the current municipal model; instead of no charge for recycling, there would be a lesser charge for recycling than for landfill waste to help avoid “wish cycling,” wherein residents recycle things they should not, potentially contaminating the recycling stream. In suburban areas, such attempts would result in waste collectors leaving a bin behind; in a building waste room, the recycling charge helps keep people honest and encourage source separation. Creating more transparency into the cost of waste per person should also help reduce overall household waste — the ultimate goal.

The cost of the whole recycling system itself could also decrease with such an approach. Currently, the need to truck waste to a materials recovery facility for sorting adds 28 percent to processing costs. But by keeping the waste streams clean, this cost would decline, even as recycling increases.<sup>39</sup>

Cardboard (which can clog chutes) would be collected separately at no cost. Oversized or heavy waste that cannot fit into the chute would also be collected separately.



**Toronto’s pay-as-you-throw program has diverted 66 percent of waste in single-family homes. Sidewalk Labs plans to extend the program to multifamily buildings, with separate chutes for landfill, recycling, and organic or food waste.**

For tenants, pay-as-you-throw costs would be commensurate with the actual cost of collection, transportation, and disposal of waste.

### Enabling extended producer responsibility.

With enhanced capabilities for waste sorting and data collection, Sidewalk Labs can enable brand- or manufacturer-specific tracking of packaging and waste products and subsequently assign disposal costs accordingly, consistent with the direction of the 2016 Waste Free Ontario Act.

Initially, this data would be transparently shared with manufacturers, and could be used to “call out” issues with specific brands. For example, single-use coffee cups lined with polyethylene are known

contaminants of the recycling stream. By tracking this brand-specific waste production data, Sidewalk Labs could help change packaging designs and hold major brands accountable. This approach is in line with the province’s policy goals as well as the city’s long-term strategy for creating a circular economy for waste.

Sidewalk Labs could also work with local retailers and restaurants to restrict the sale of materials that frequently contaminate the organics or recycling waste stream, such as plastic straws or black plastic coffee cup lids. Such efforts would not remove these products from the waste stream, but they could reduce contamination and offer a pilot district for City of Toronto Solid Waste Management Services to implement these restrictions more broadly.



# Reduce contamination during removal with vacuum tubes

Once waste leaves a building, there are still many places where “source separation” can break down before that waste reaches its final destination, potentially undermining landfill diversion efforts.

The standard approach of transferring waste by hand from tenant to buildings to garbage trucks creates the potential to contaminate recyclables and organics — not to mention introduce odours and vermin or taking up limited street or building space. Once recyclables arrive at material recovery facilities, “pickers” stand along conveyor belts and pluck out non-recyclable material, but they miss a lot due to the sheer volume of waste. And foreign objects in the organics and recyclables waste streams can even break the specialized machinery used to process these materials.

Sidewalk Labs proposes to deploy two innovations to help ensure that waste stays separated between the time it enters a trash-room chute and when it reaches an underground neighbourhood collection point: pneumatic waste collection and self-driving dollies.

## 1

### Pneumatic waste collection.

Sidewalk Labs proposes to install an underground pneumatic tube system that would vacuum waste from the three building chutes (recyclables, trash, organics) to the neighbourhood’s collection point. The pneumatic system would use pipes to send waste at up to 70 kilometres per hour.<sup>40</sup> Sidewalk Labs plans to issue a request for proposals to design the network and anticipates responses from leaders in the field, such as Envac, Transvac, and MariMatic.

## 2

### Self-driving dollies.

Sidewalk Labs proposes to have self-driving delivery dollies transport items that cannot go through chutes or underground tubes from buildings to the collection point. These items could include oversized and specialty waste (such as paint), as well as cardboard and paper. Cardboard balers or shredders could be installed at a building level to minimize transportation required. Special building pick-up for disposal could be arranged and charged on an as needed basis.

In Quayside, the proposed collection point would be located on the edge of the neighbourhood. At the collection point,

waste would be shifted into airtight containers (separated by the three types) for pick-up by city or private trash haulers. Recyclables would go to a material recovery facility; compacted landfill waste would go to a landfill; and organic waste would head to anaerobic digesters (see the next section for more details).

In addition to dramatically reducing waste contamination, this underground removal process could reduce the space needed for in-building trash storage and remove truck traffic from local streets.



See the “Mobility” chapter of Volume 2, on Page 22, for more on waste removal via the neighbourhood freight system.

**An underground waste system would dramatically reduce the space needed for in-building trash storage, remove truck traffic from local streets, and create a cleaner waste stream for more effective recycling.**



Reducing Waste  
and Improving Recycling

## Convert organic waste into clean energy

Toronto is already a leader in properly disposing of organic (food) waste, such as banana peels or half-eaten vegetables, to create a more sustainable city (see sidebar). As noted on Page 344, when placed in landfills, organics decompose to produce methane emissions, which have a significantly greater climate impact than carbon emissions. Additionally, if placed in recyclable streams, organics can render recyclables like paper non-recyclable.

But when separated out from the start, food waste can be converted into a clean energy source through a process called anaerobic digestion, which breaks down organic material biologically, just like a stomach breaks down food, creating biogas (or renewable fuel). After the fuel is extracted, the dehydrated material can be used for nutrient-rich compost (or soil amendments).<sup>41</sup>

Sidewalk Labs proposes a two-phase approach to handling organics. In Quayside, organic material separated at a building would travel through pneumatic tubes to the neighbourhood collection point. It would then leave this point and head to an off-site pre-processing facility to remove contamination and (at the same facility) be processed by anaerobic digesters.

At the proposed full scale of the IDEA District, with sufficient food waste to generate an investment return through conversion into fuel, it becomes economically feasible to explore neighbourhood-adjacent facilities capable of fully processing organics. In such a facility, the resulting biogas could be captured and exported to the natural gas grid that serves surrounding neighbourhoods. With an estimated 45,149 tonnes per year of source-separated organics disposed, the anaerobic digestion process would provide clean energy to supplement buildings outside of the IDEA District — thus helping the project fulfill its climate-positive mandate of exporting clean energy to other parts of the city.<sup>42</sup>

# By creating biogas, the anaerobic digestion process could provide clean energy to buildings outside of the IDEA District, helping the project achieve climate positivity.

Best practice

## Toronto: A leader in organics processing

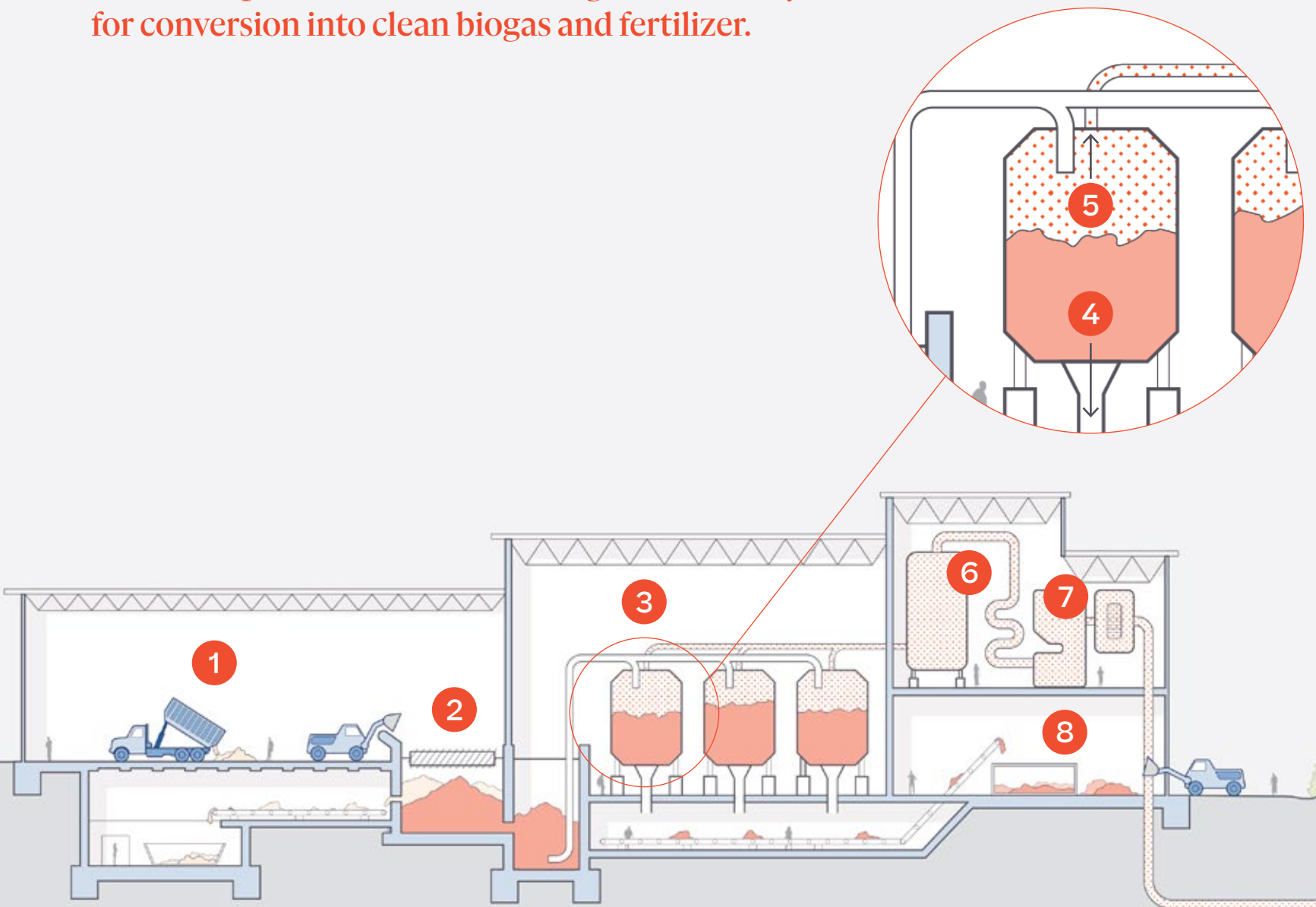
Built on a former landfill, Toronto's Disco Road Organics Processing Facility is a world leader in diverting food waste from landfill, using wet anaerobic digestion to process the city's organic waste. The end products of this anaerobic digestion process include compost, fertilizer, and flammable biogas (typically made up mostly of methane), which can be used as fuel for heating and cooking or compressed and used as vehicle fuel.

Organic material collected through Toronto's green bin program is shuttled daily to the Disco Road facility. After a round of pre-processing to remove plastics and other contaminants, the waste is blended into a pulp and fed to the system's anaerobic digesters, along with rainwater captured and collected on-site. After processing, the dried materials are shipped off for use in commercial compost while the liquids are treated in a wastewater facility. The biogas, meanwhile, is burned in an on-site boiler to keep the digesters operating at a steady temperature of 37 degrees Celsius.

A 24/7 operation, the Disco Road digesters process 75,000 tonnes of organic material each year, the equivalent of 2,800 truckloads.<sup>43</sup>

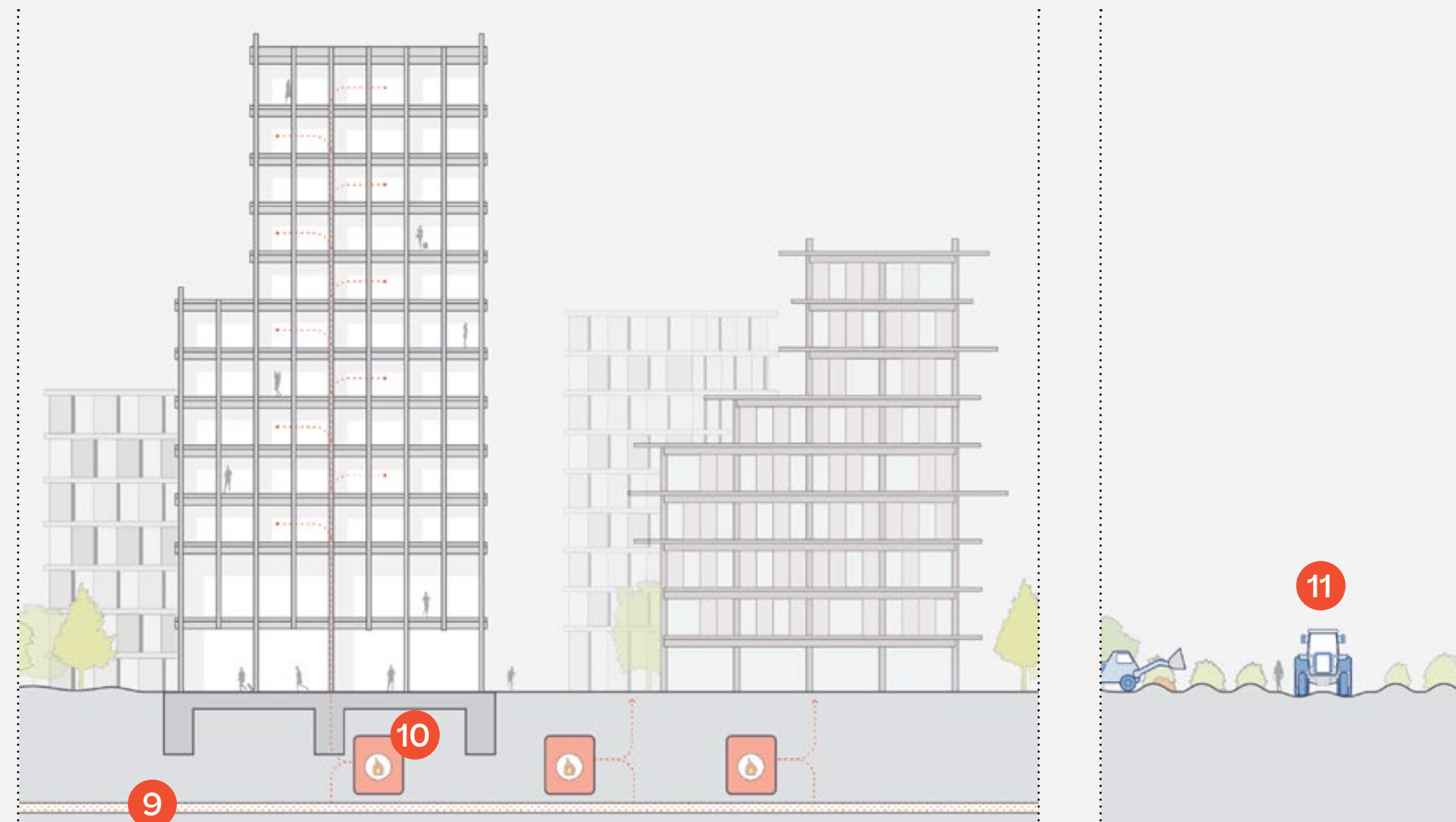
# Explainer: How anaerobic digestion creates clean energy

In the proposed waste system, organic waste would get transported from the neighbourhood collection point to an anaerobic digestion facility for conversion into clean biogas and fertilizer.



## Clean biogas is created from organic waste.

- |                                                            |                                                         |                                                     |
|------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|
| <b>1</b> Organics enter the facility.                      | <b>4</b> Nutrient-rich compost (fertilizer) is created. | <b>7</b> Moisture and corrosive gases are removed.  |
| <b>2</b> Organics are macerated (or softened into a pulp). | <b>5</b> Gas is created by the microorganisms.          | <b>8</b> Nutrient-rich fertilizer is sent to farms. |
| <b>3</b> Macerated organics enter digester tanks.          | <b>6</b> Gas enters holding tanks.                      |                                                     |



## The Toronto energy pipeline could be supplemented by clean biogas.

- |                                                                                        |
|----------------------------------------------------------------------------------------|
| <b>9</b> Pipes carry biogas to off-site neighbourhoods via natural gas infrastructure. |
| <b>10</b> Gas could be distributed in off-site buildings for heating and cooking.      |

## Farm

- |                                                            |
|------------------------------------------------------------|
| <b>11</b> Fertilizers are sent to local farms and markets. |
|------------------------------------------------------------|

# Part 6



## Managing Stormwater Naturally and Actively



### Key Goals

1 **Design green infrastructure into a neighbourhood**

2 **Monitor stormwater levels and quality with digital tools**

No urban climate plan would be complete without a sustainable approach to managing stormwater. In recent decades, storms and rainfall have intensified around the world. Toronto has endured two 100-year storms in the past six years, including a 2013 flood that caused more than \$850 million in property damage.<sup>44</sup>

Toronto has taken important steps to manage stormwater more effectively, given the potential of the city's combined sewer and stormwater infrastructure to contaminate Lake Ontario (whose drinking water serves 9 million people). Waterfront Toronto's groundbreaking \$1.25 billion flood-mitigation program, announced in mid-2017, plans to renaturalize the Don River to help protect against stormwater overflows.<sup>45</sup> The city's Wet Weather Flow guidelines call for new development to reduce outflow of annual rainfall by 90 percent,<sup>46</sup> and the Toronto Green Standard's Tier 1 requirement calls for a minimum of 5 millimetres of stormwater retention.<sup>47</sup>

Building on these efforts can be as challenging as it is essential. Some cities invest in large treatment facilities to filter all stormwater for pollutants before sending it back out into rivers, streams, and lakes. This type of "hard" infrastructure is costly to implement and maintain; it also takes up valuable space that could be used for the public realm or other development uses. Meanwhile, standard practices for monitoring water quality occur manually, or not at all, and risk missing key outcomes.

To make matters tougher, most stormwater management plans occur on a parcel-by-parcel basis, leading urban landowners to build additional hard infrastructure (at great initial and ongoing expense) such as tanks and dual plumbing to meet stormwater regulations, rather to design for natural systems that require district-level planning.

The Sidewalk Toronto project presents an opportunity to think holistically about stormwater management and design *with* nature – rather than trying to control it.



Sidewalk Labs proposes to take a neighbourhood-level approach that integrates green infrastructure designs with digital monitoring tools to incorporate nature into stormwater management while minimizing the need for hard infrastructure. Green infrastructure (such as increased street and sidewalk plantings and green roofs) would help retain stormwater and purify it through natural means. Digital tools and an active control system could free up stormwater containers in advance of storms and monitor water quality in real time.

**Active stormwater management could reduce GHG emissions by 0.01 annual tonnes per capita.**




See the "Public Realm" chapter of Volume 2, on Page 118, for more details on the Open Space Alliance.

In a neighbourhood the size of Quayside, these practices would achieve Toronto Green Standard's Tier 3 for stormwater retention (25 millimetres). Sidewalk Labs estimates the system would reduce downstream energy costs by 50 percent (due to reduced pumping and UV filtration used in treatment facilities) and reduce stormwater moving into municipal

systems by 90 percent (due to greater retention).<sup>48</sup> More broadly, this approach could create a public realm filled with green infrastructure that not only manages stormwater but provides secondary benefits to the community, such as increased tree canopy, landscape beautification, health qualities related to nature, and improved habitat for biodiversity and wildlife.

Deployed across the full scale of the IDEA District, these practices can help prepare the waterfront for a 100-year flood event and reduce GHG emissions by 0.01 annual tonnes per capita (or 0.2 percent) from the city's current average, thanks to expanded green space.

Sidewalk Labs proposes that a new entity called the Open Space Alliance operate and maintain the stormwater system. 





Managing Stormwater  
Naturally and Actively

# Design green infrastructure into a neighbourhood

Green infrastructure encompasses an array of living systems that can include a wide variety of design components, such as green roofs, rain gardens, constructed wetlands, permeable pavement, and rainwater harvesting. Together, these systems can help regulate the flow of stormwater and naturally filter it for “total suspended solids” — particles that can pollute bodies of water.

They can also infuse nature in the public realm in ways that improve health and quality of life. Plants shade surfaces, reflect radiation, and release moisture to cool the urban environment, reducing the urban “heat island” effect. Natural landscapes have “biophilic” properties that can enhance well-being. And improved water quality can encourage people to reconnect with the waterfront. [\[i\]](#)

Sidewalk Labs plans to design a neighbourhood-level stormwater system that recognizes that water should be managed right where it falls — with no single point of failure. The features of this system include:

### Improved bio-retention.

The highest retention requirement of the Toronto Green Standard calls for development to retain 25 millimetres of stormwater, meaning this amount is held back from the municipal treatment

system and reused on site. To meet — or exceed — this standard, Sidewalk Labs plans to incorporate mixed open plantings and expanded soil volumes into its public realm (specifically, along its sidewalks), which would increase infiltration of stormwater into the ground as well as evaporation into the air.

### Expanded tree canopy.

Sidewalk Labs plans to add soil volume in large beds along streets and sidewalks, as opposed to small tree pits, enabling the growth of root structures for a larger tree canopy, as well as the ability to include mixed plantings that promote biodiversity in flora and fauna. These soil cells also maximize the filtration potential for captured water.

### Advanced soil remediation.

Sidewalk Labs plans to incorporate plants known to respond well to salinity (high salt volume in water). For example, poplar trees absorb bacteria and other contaminants, preventing them from flowing into the water — a process known as “phytoremediation.”<sup>49</sup> Building on that insight, Sidewalk Labs plans to use principles for “inoculated phytoremediation,” an approach to soil remediation that uses plantings known to remove toxins in the soil. Such practices have the potential to absorb total suspended solids up to 80 percent, dramatically reducing potential for water contamination.<sup>50</sup>

### Permeable pavement.

The notion of pavement that effectively absorbs rain and melted snow has been around since the Roman Empire, which used stone pavers set in sand to allow for water to seep through the street.<sup>51</sup> Today, precast permeable concrete has gone from a niche technology to a more common one, in line with increased climate awareness and stormwater management needs. Sidewalk Labs plans to incorporate permeability into some of its modular pavers, enabling water to flow through them via pores into native soils or underground systems.

Sidewalk Labs also plans to deploy approximately 3,000 square metres of heated pavers in Quayside, reducing the need for street salting, which poses a threat to the environment (as well as to wheelchair accessibility). Since the 1980s, salt (chloride) rates in the mouth of the Don River have exceeded the Canadian Water Quality Guidelines threshold for long-term effects on aquatic health; in recent years, they have exceeded the threshold for short-term effects on aquatic health. From 2011 to 2015,

the mouth of the Don had the highest 75th-percentile chloride concentration of all river mouths in Toronto since measurement began 50 years ago.<sup>52</sup>

### Extensive blue and green roofs.

On top of its tower roofs, Sidewalk Labs plans to deploy “blue roofs” designed to store rainwater under photovoltaics as one means of retaining and detaining stormwater runoff. On podiums and terraces, Sidewalk Labs plans to deploy green roofs to absorb stormwater, as well as to reduce the urban heat island effect by insulating buildings.

### Minimal cisterns.

Even this extensive amount of green infrastructure may not be enough to retain stormwater at times. For these cases, Sidewalk Labs plans to create a minimal number of underground cisterns to collect and store excess stormwater. These cisterns would be equipped with controls (more details in the next section) that can help re-use the water for site maintenance and irrigation, reducing the need for standard sprinkler systems.

# Green infrastructure can naturally filter stormwater and infuse nature into the public realm in ways that improve health and quality of life.



See the “Buildings and Housing” chapter of Volume 2, on Page 202, for more details on biophilic design.

**3,000 square metres**

of heated pavement would reduce the need for street salting.





Goal 2

Managing Stormwater  
Naturally and Actively

# Monitor stormwater levels and quality with digital tools

To support its green infrastructure and minimal hard storage containers, Sidewalk Labs proposes to deploy an active management and monitoring system across all the aspects of the stormwater system that collect water, including cisterns, blue roofs, and pavement cells.


This system would consist of **active valves** designed to retain water for on-site use (such as irrigation) or empty containers in advance of a storm, as well as non-personal **stormwater sensors** designed to measure the quantity and monitor the quality of stormwater when it leaves the site.

**At the scale of the IDEA District, this combined approach could save Toronto from building physical infrastructure to manage stormwater and prevent flooding, such as large conveyance systems and treatment facilities with large tanks and power-consuming filtration processes. This approach would also offer capital cost savings to building developers of up to 10 percent, because they would no longer need to install large, costly retention tanks and additional plumbing on their properties.**

## Managing stormwater capacity.

Stormwater sensors connected to management software can help neighbourhoods collect real-time data on things like stormwater levels, weather patterns, and water quality as well as manage stormwater infrastructure more actively.

For example, when stormwater software predicts heavy rains coming in a few days, volume meters on cisterns can make sure that valves in a stormwater system direct water to empty storage containers or into green spaces throughout the development, in preparation for the storm. All such storage containers would be connected to help the system coordinate stormwater response appropriately.

Additionally, stormwater management tools enable preventative maintenance by detecting potential leaks. They also enable an approach called “precision agriculture” that could monitor plant health and soil quality and determine when they need to be watered, using the water collected in the cisterns for these purposes rather than using potable water or over-watering via sprinklers. 

Sidewalk Labs proposes to use software developed by OptiRTC, a leader in stormwater infrastructure controls, for its active stormwater system. (Sidewalk Labs is an investor in OptiRTC.)

## Monitoring water quality.

Sidewalk Labs’ proposed stormwater system incorporates water-quality monitors to help identify any anomalies and trigger more aggressive testing. In addition to detecting potential risks related to drinking water, ongoing monitoring could track measures that contribute to ecological health issues, such as salt runoff. These monitors would be located in the soil and on the outflow pipes that would connect to municipal systems, and could potentially tie into Ontario’s broader existing water-quality sensor network.

Stormwater monitors could also help cities understand which water collections need treatment, rather than filtering all water by default — reducing the space needed for the treatment facilities while also saving energy. As a potential alternative to large-scale facilities that treat stormwater with ultraviolet exposure, Sidewalk Labs plans to explore the use of “in-pipe” ultraviolet treatment.

## Ongoing exploration.

Beyond managing stormwater and waste within Quayside or the IDEA District, Sidewalk Labs is also exploring strategies to reduce source contamination and account for water and soil quality. For example, Sidewalk Labs plans to explore the potential to integrate new filtration or vacuuming technologies to reduce debris runoff from light rail tracks. Sidewalk Labs also plans to explore new policies that consider the overall environmental tradeoffs associated with contamination removal and take into account trucking of waste, among other factors.

## Sidewalk Labs pilot

# Using technology to improve green infrastructure

Sidewalk Labs aims to partner with the Natural Sciences and Engineering Research Council of Canada, University of Toronto, and Ryerson University on a stormwater pilot that would research the development, modelling, and maintenance of green infrastructure systems. The proposed pilot would use tools developed by OptiRTC.

Green roofs, for instance, are an increasingly common form of green infrastructure whose impacts have yet to be properly quantified. The pilot proposes to monitor measures such as water inflow, water outflow, and soil evaporation rates of green roofs to assess how they impact runoff volumes. The pilot would also use environmental (non-personal) sensors to assess the effectiveness of soil cells and permeable paving on stormwater retention.

Monitoring stormwater flow quantities could help planners and engineers appropriately size future stormwater retention basins to save both space and infrastructure costs. Meanwhile, monitoring stormwater quality could help manage green roofs and reduce the amount of ultraviolet light treatment used to clean the runoff headed to Lake Ontario. Ultimately, these systems could help create more adaptable and effective water treatment guidelines than the building codes in place today.

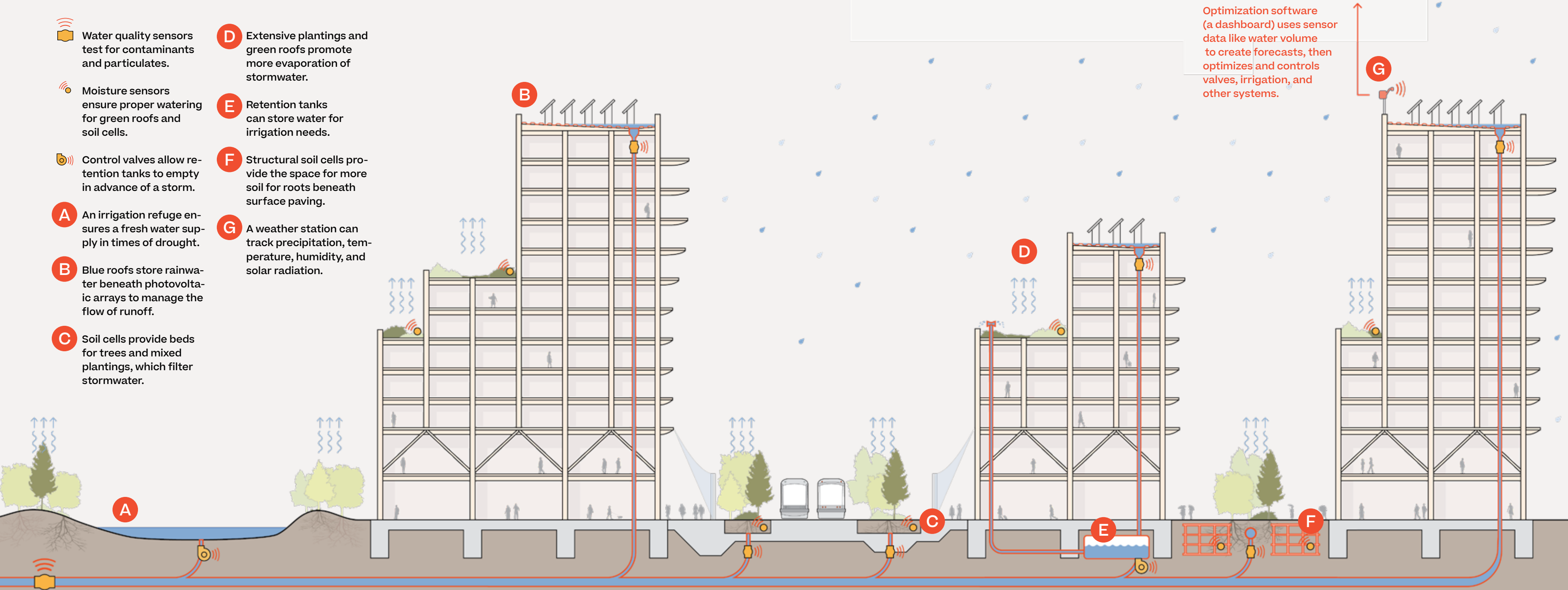
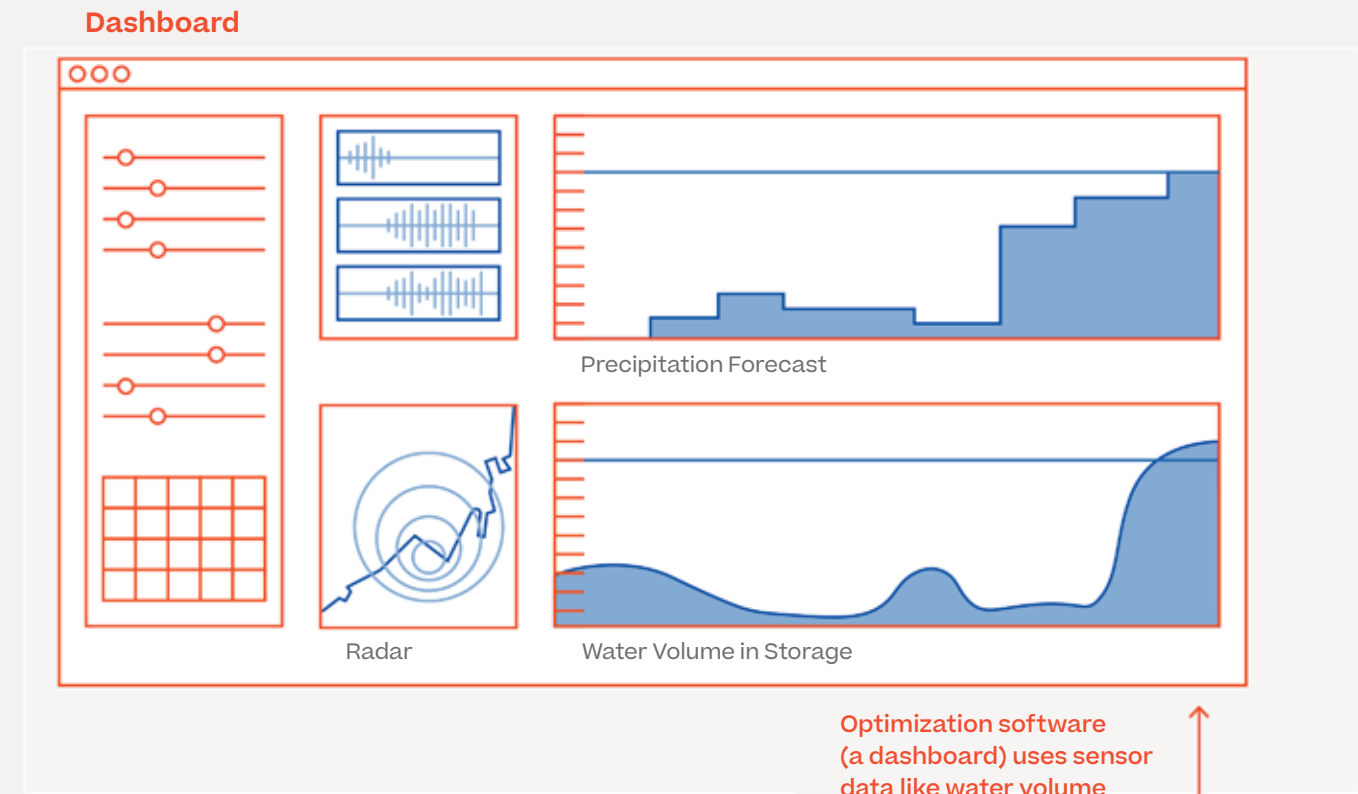


See the “Public Realm” chapter of Volume 2, on Page 118, for more details on preventative maintenance.

# Explainer: How the active stormwater management system works

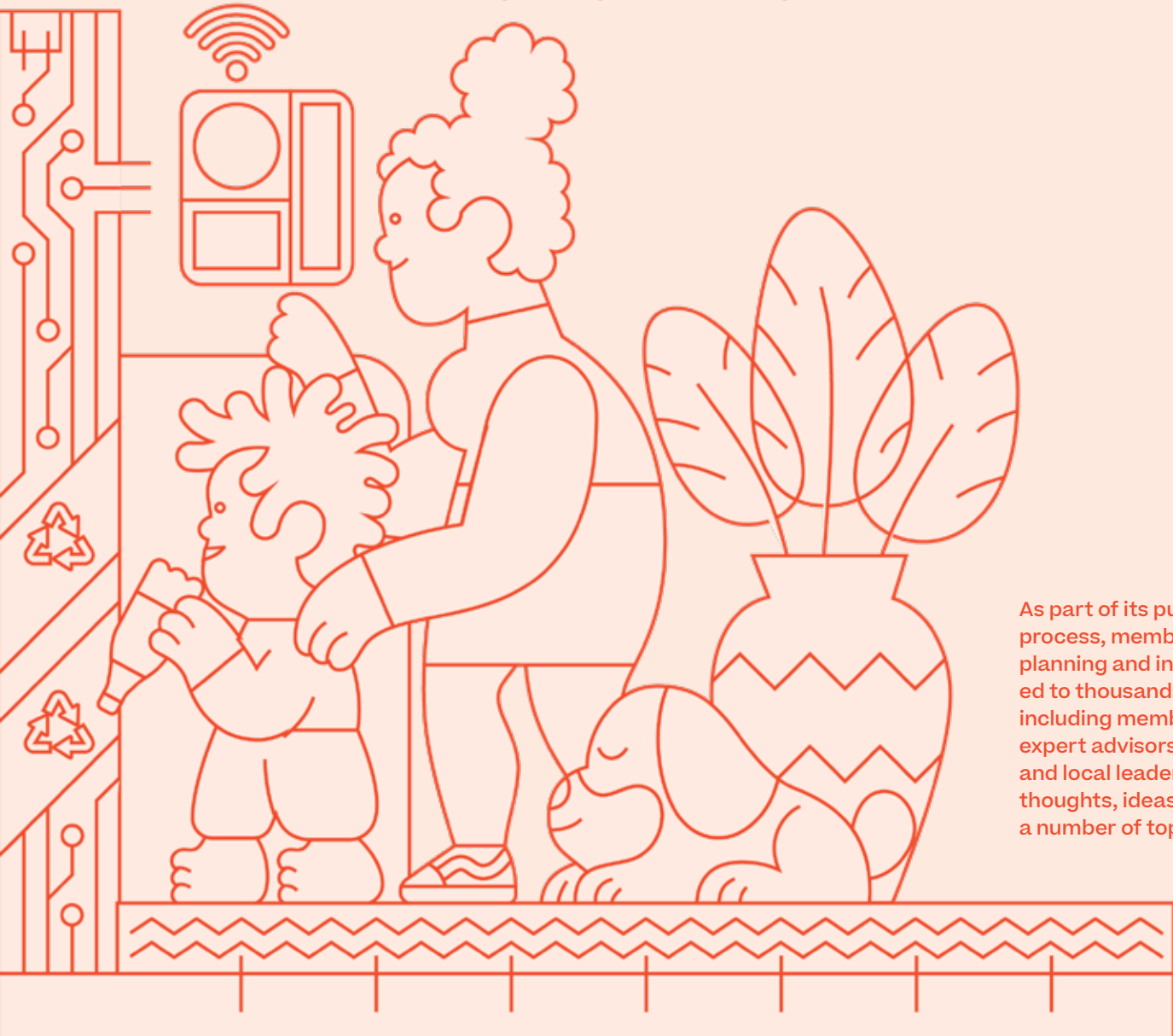
The proposed system reduces the need for large underground tanks and pipes by using green infrastructure (such as tree plantings and soil cells) as a first line of stormwater retention. Digital tools help handle excess stormwater by proactively emptying storage tanks before a storm; they also help reuse stormwater for irrigation and monitor water quality.

- A** An irrigation refuge ensures a fresh water supply in times of drought.
- B** Blue roofs store rainwater beneath photovoltaic arrays to manage the flow of runoff.
- C** Soil cells provide beds for trees and mixed plantings, which filter stormwater.
- D** Extensive plantings and green roofs promote more evaporation of stormwater.
- E** Retention tanks can store water for irrigation needs.
- F** Structural soil cells provide the space for more soil for roots beneath surface paving.
- G** A weather station can track precipitation, temperature, humidity, and solar radiation.



# Public Engagement

The following summary describes feedback related to **sustainability**, and how Sidewalk Labs has responded in its proposed plans.



As part of its public engagement process, members of Sidewalk Labs' planning and innovation teams talked to thousands of Torontonians — including members of the public, expert advisors, civic organizations, and local leaders — about their thoughts, ideas, and needs across a number of topics.

## 1 Be ambitious with sustainability, in Quayside and beyond

### What we heard

At each Sidewalk Toronto public engagement event, participants were passionate about the urgent need to address climate change and invest in cutting-edge, sustainable technologies and infrastructures. As one Residents Reference Panel participant explained: "If we continue at the pace we are going, it will be devastation for everyone. So you have to think about things like renewable energy, like the use of plastic, like prefabricated materials for building. We have to think about a lot of things for the future that we did not think about before."

Sidewalk Labs was especially encouraged with positive responses to its proposed sustainability priorities — particularly its goal to reduce per capita carbon emissions in Quayside by 85 percent and to achieve climate positivity within the IDEA District. Other areas of strong support included proposals for building performance, thermal energy infrastructure, and stormwater.

Participants of the sustainability breakout session at Public Roundtable 4 further validated Sidewalk Labs' ambition for the project to be carbon positive via thermal grids, clean electricity, and other sustainable technologies. Residents emphasized the importance of thinking at scale and ensuring that solutions were not just for one neighbourhood but could be replicated across neighbourhoods to have significant impact. They encouraged Sidewalk Labs to work with the province and existing Toronto-based companies to make this goal a reality.



Sidewalk Labs Director of Sustainability Charlotte Matthews addresses the Sidewalk Toronto Residents Reference Panel about the project's emerging sustainability plans. Credit: David Pike

### How we responded

#### Thinking holistically.

Sidewalk Labs proposes a comprehensive package of innovations that together cut carbon emissions in Quayside to 0.9 tonnes of GHG a year per capita from the city's average of 6.3 tonnes (see Page 301).

#### Exploring scale.

The Sidewalk Toronto project can dip below the carbon-neutral line and into climate-positive territory by scaling its sustainability initiatives; Sidewalk Labs proposes implementation across a larger development area in the IDEA District to achieve this goal (see Page 302).

#### Investing in infrastructure.

Sidewalk Labs proposes to create a thermal grid that would draw energy from a variety of natural and waste heat sources, including geothermal and building wastewater, to provide affordable, fossil fuel-free heating and cooling (see Page 334).

## 2 Empower people to live more sustainably

### What we heard

While recognizing that sustainable systems often require automation, participants encouraged Sidewalk Labs, whenever possible, to empower individuals to act more sustainably in their daily lives.

Participants were particularly excited by the role technology could play in raising awareness and gamifying positive environmental initiatives, such as dynamic signage or other kinds of “nudges” that could customize recycling feedback. Participants and experts also emphasized the need for jargon-free education, fee structures, and design.

As one Residents Reference Panel resident explained: “My condo building is only 10 years old, but it hasn’t been designed to encourage energy conservation or recycling. ... It’s an additional hassle, and not a lot of people do it. But if you can design the building to make it easy to do, and even provide a tangible benefit like a rebate on condo fees, they’ll do it. That’s how people change.”

Residents also emphasized the need for sustainable actions to be accessible to elderly residents and to be affordable, so as not to “hinder lower-income residents from practising sustainable behaviours.” The Sidewalk Toronto Fellows went even further, encouraging the adoption of a system that would allow residents to visualize and manage local neighbourhood energy production and consumption.

### Advancing electricity.

Sidewalk Labs proposes to create an advanced power grid that could provide an alternative source of clean electricity when the main Toronto Hydro power grid is at peak capacity (see Page 324).

### Working with others.

Sidewalk Labs has been in discussions with governmental agencies (including the City of Toronto and the Ontario Ministry of Energy) and private companies throughout the creation and development of its sustainability plans, and would continue to collaborate with the private and public sectors.

### Reducing waste.

Sidewalk Labs proposes to divert at least 80 percent of recyclable or compostable material from landfills (see Page 344).

### Optimizing energy.

Sidewalk Labs proposes to deploy digital energy management systems that could help buildings operate in the most efficient way possible (see Page 316).

### How we responded

#### Setting budgets.

Sidewalk Labs’ proposed Home Scheduler would work within a household’s monthly power budget to operate systems, devices, or appliances when costs are low and clean energy is available. The tool would also generate a data feed for homeowners to understand the actions being taken and to actively manage them, if they wish (see Page 330).

#### Encouraging accountability.

Sidewalk Labs proposes to implement a pay-as-you-throw model of waste that encourages households to reduce overall waste, as well as a modest recycling charge to help discourage “wish cycling” (see Page 350).

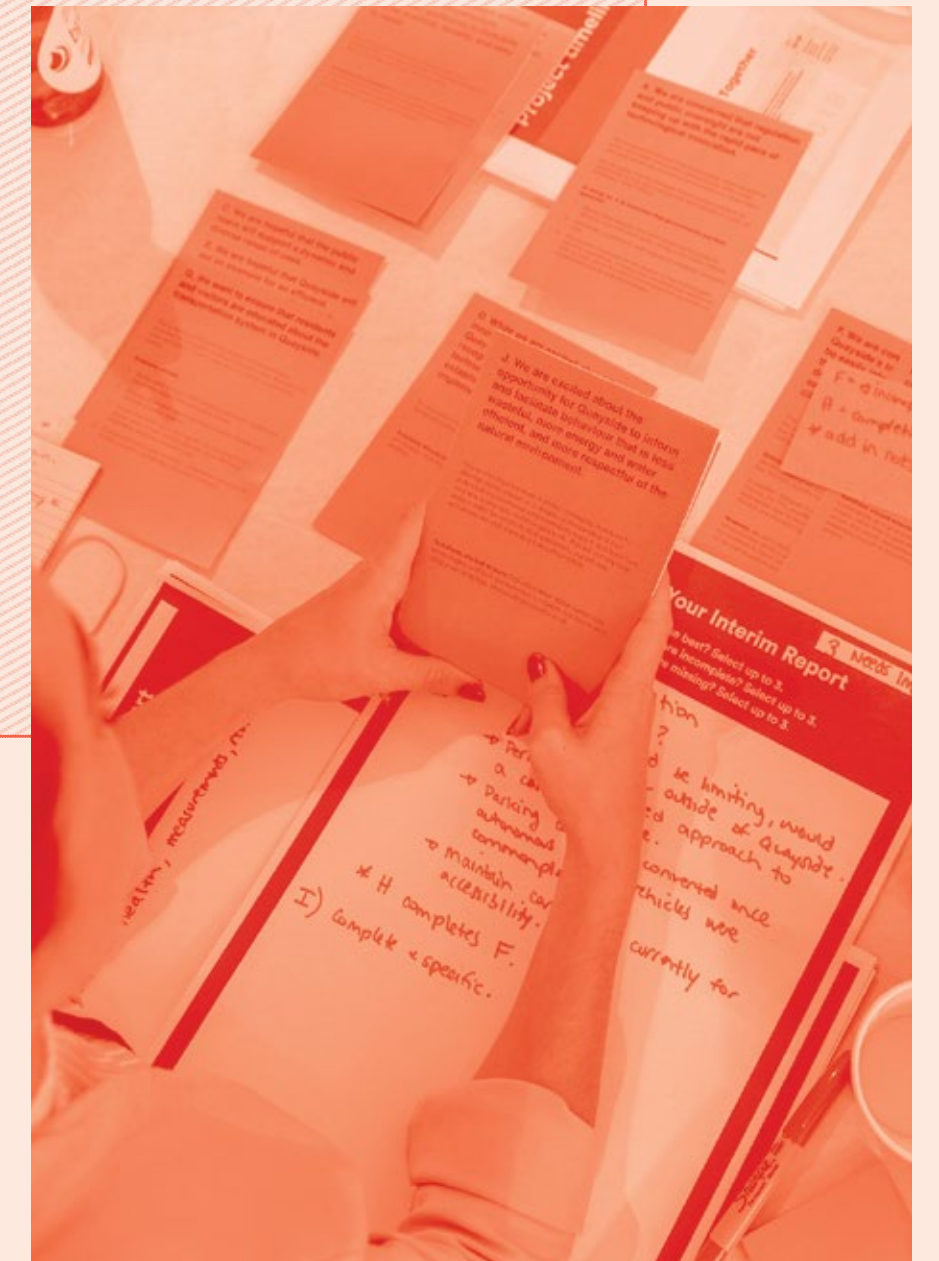
#### Informing decisions.

Sidewalk Labs proposes to run a recycling education pilot in multi-residential buildings in Toronto that are interested in helping residents improve sorting and recycling practices by using real-time feedback. This pilot partnership could help inform dynamic recycling signage in Quayside (see Page 345).

#### Maintaining affordability.

Sidewalk Labs supports a more distributed, resilient, and transparent economy underpinned by 100 percent renewable energy. The proposed advanced power and thermal grids would be designed to serve the community transparently and provide tools to make the right decisions around cost and carbon (see Page 324).

A Toronto resident considers the content of the Residents Reference Panel interim report, published in September 2018. Credit: David Pike



## 3 Be a steward of the environment

### What we heard

The importance of environmental stewardship was a common theme at many public engagement events. Sidewalk Labs was urged by participants in the Indigenous Design Consultation to not only support the land and water ecology of the eastern waterfront but also to revitalize the plant life that originally thrived in the area. Members of the Sustainability Advisory Working Group also encouraged Sidewalk Labs to ensure sustainable forest management practices.

The Residents Reference Panel and participants at Public Roundtable 4 emphasized the need for climate change resiliency, particularly when it comes to creating functional, beautiful, and future-proofed stormwater infrastructure. The residents wanted to see an increase in focus on “softscaping” over “hardscaping.” As one visitor to 307, Sidewalk Labs’ Toronto headquarters, put it: “I see the waterfront as a unique and beautiful resource that should be primarily designated as parkland for the use of all Torontonians. I believe that as concerns about climate change rise, the importance of open green spaces, which can serve to mitigate extreme weather events like floods, will become ever more important.”

### How we responded

#### Integrating greenery.

Sidewalk Labs proposes a public realm in which parks act as green stormwater infrastructure, retaining and filtering stormwater through natural means (see Page 360).

#### Managing stormwater.

Sidewalk Labs proposes that green infrastructure would work in tandem with a digital management system that could, when needed, empty stormwater tanks or cisterns in advance of storms (see Page 362).

#### Planting native.

Sidewalk Labs plans for its plantings to be native wherever possible, with plant life chosen for its capacity for salt mitigation, resilience, evapotranspiration rates, and biodiversity (see Page 360).

#### Ensuring resiliency.

Sidewalk Labs plans to meet and surpass the City of Toronto’s resiliency framework for flood management, as well as for and building services when power is lost.

## Engagement spotlight

In early 2018, the sustainability team at Sidewalk Labs was brainstorming ways to help Toronto divert as much waste from landfills as possible. One big challenge the team identified is that even when consumers want to recycle, they often struggle to recycle correctly because they do not know what goes where. The team had an idea: What if people could just throw everything in one place, and robots in a waste or recycling plant could take care of the rest?

When the team presented this idea to the Sustainability Advisory Working Group, the group cautioned against the tactic for two reasons. The first had to do with contamination at the source: no robot can stop an open can of soup from contaminating and destroying what was once perfectly recyclable newspaper. The second reason was that the City of

Toronto’s entire system is designed to encourage consumers to separate materials; if one neighbourhood were different, it could confuse consumers and jeopardize the real progress being made, invalidating much of the time, energy, and resources the city and other non-profit organizations had expended in educating the public.

The Sidewalk Labs sustainability team went back to the drawing board and decided to ask a different question: How could technology help people to recycle correctly? Taking inspiration from the city’s Waste Wizard app, the team developed a real-time feedback concept for multi-residential buildings that could let communities know how effectively they are sorting, empowering them to recycle better.



Visitors discuss conceptual visualizations of Quayside in the main hall of 307. Credit: David Pike

# Acknowledgements

Sidewalk Labs would like to extend special thanks to the participants of the Sidewalk Toronto Sustainability Advisory Working Group, and to the staffs of the City of Toronto, Province of Ontario, and Government of Canada for their time and guidance.

## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full proposed IDEA District scale are inclusive of the entirety of its proposed geography, including all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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# Digital Innovation

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## Introduction

p376

---

## Part 1

Providing More Affordable and Flexible Digital Infrastructure

p384

---

## Part 2

Setting Data Standards That Are Open and Secure

p400

---

## Part 3

Creating a Trusted Process for Responsible Data Use

p414

---

## Part 4

Launching Core Digital Services That Others Can Build On

p442

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## Public Engagement

p454



# Introduction

## The Vision

Catalyze digital innovations that help **tackle urban challenges** and **establish a new standard** for the **responsible collection** and use of data in cities.

The ability to create the conditions for digital innovation is at the heart of Sidewalk Labs' vision for the city of the future. Digital innovation is the basis for many of the core planning initiatives that Sidewalk Labs has proposed throughout this Master Innovation and Development Plan to improve mobility, affordability, sustainability, and economic opportunity. It is also essential for catalyzing an ecosystem of new services and solutions by individuals, Canadian companies, local Toronto entrepreneurs, and other third parties from around the world.

That ecosystem is thriving in Toronto. Today, digital innovation is powering the region, from the cybersecurity and software startups in the Toronto-Waterloo corridor to local institutions like MaRS Discovery District, Communitech, the Vector Institute for Artificial Intelligence, and Civic Tech Toronto. Together these forces are driving Toronto's future: in 2015, the digital economy generated \$117 billion

nationwide,<sup>1</sup> supported 4,000 new Toronto businesses,<sup>2</sup> and provided 400,000 jobs for the city.<sup>3</sup>

But digital innovation raises a number of challenges that cities like Toronto are just starting to address. These include making sure basic digital infrastructure is affordable and open to everyone, making sure data is standardized and publicly accessible, and making sure there is a transparent process for protecting privacy and the good of the city.

These challenges are especially complicated for "urban data," which Sidewalk Labs defines as information gathered in the city's physical environment, including the public realm, publicly accessible spaces, and even some private buildings.

While Canada has a strong foundation of privacy laws around personal information, and recognizes privacy as a fundamental human right, urban data creates a new set of questions that have surfaced during the Sidewalk Toronto public consultation process.

How can both cities and companies use data in a responsible way in the digital age?

How should the collection of data in public spaces evolve to match the speed of today's digital devices and the rapid development of artificial intelligence?

How can cities continue to engage in a meaningful public dialogue that addresses valid concerns about the impact on personal privacy, or about using urban data for the greater good?

Toronto and Ontario have taken some important initial strides to advance the conversation around data governance principles, including calling for public consultations to discuss how the digital economy can support business while protecting privacy. But while every city faces new barriers in the digital age, no place has yet adopted a comprehensive approach to address these challenges and create the conditions for digital innovation to flourish responsibly. The Sidewalk Toronto project presents a unique opportunity to do just that, and Sidewalk Labs proposes a holistic approach to digital innovation with four core components.



### The innovation plan.

First, Sidewalk Labs proposes to establish **open digital infrastructure** that provides a shared foundation for using urban data to improve quality of life. This core infrastructure would be anchored by ubiquitous, affordable internet connectivity within the IDEA District, consistent with Waterfront Toronto's aspirations for closing the digital divide. It would also include physical mounts that can significantly reduce the cost of launching new digital innovations and help ensure that cities do not get locked into using proprietary solutions.

Second, Sidewalk Labs proposes to outline **clear standards that make data publicly accessible**, secure, and resilient. Today's urban data tends to be scattered across many owners, outdated, or

### Key Term Urban data

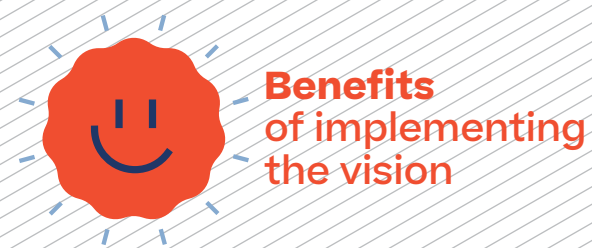
refers to information gathered in the city's public realm, its publicly accessible spaces, and even some private buildings.



stored in messy file formats, making it difficult for the community to use as a foundation for new ideas. Clear standards would make (properly protected) urban data accessible to researchers and the community in real time, and make it easy for third parties to build new services or competitive alternatives to existing ones.

Third, Sidewalk Labs proposes a **trusted process for responsible data use** that would apply to all parties (including Sidewalk Labs). This process would be anchored by a Responsible Data Use (RDU) Assessment — an in-depth review that is triggered by any proposal to collect or use urban data — and guided by a set of RDU Guidelines that incorporates globally recognized Privacy by Design principles. The process, including approvals, would be overseen by an independent Urban Data Trust created to be a steward of urban data and the public interest without stifling innovation.

Finally, Sidewalk Labs proposes to **launch a minimal set of digital services that would catalyze this ecosystem of urban innovation**. These services and applications — all of which would be open to competition and subject to the proposed responsible data use process — represent innovations currently not being pursued by the market but that remain essential to achieving Waterfront Toronto's quality-of-life objectives. Furthermore, the (properly protected) urban data generated by these launch services would be made publicly accessible (on a non-discriminatory basis), enabling companies, community members, and other third parties to use it as a foundation to build new tools.



### Benefits of implementing the vision

- Pilot new digital services that improve quality of life
- Build fast, affordable digital infrastructure for residents and workers
- Help make Toronto a global urban innovation hub
- Establish a new standard for responsible data use



### The impact.

At the small neighbourhood scale of Quayside, Sidewalk Labs' proposed approach would help pilot a range of services that improve daily life for neighbourhood residents, workers, and visitors across its core innovation pillars. These include a mobility management system that could use travel data to improve congestion and safety; an outdoor-comfort system that could use weather data to make the public realm more usable; a building-code system that could use structural and noise data to support a mix of residential and commercial uses; and energy management tools that could use data on energy demand and pricing to reduce peak-hour use, and thus greenhouse gas emissions.

Applied at the full scale of the IDEA District, the conditions of urban data, digital infrastructure, and core services would catalyze a new ecosystem for urban innovation, filled with technological advances by others that make urban challenges easier to tackle. That might include anything from a next-generation bike-share service, to small business tools that help retailers launch a successful pop-up, to civic tools that help families find an affordable home, to improved building designs that reduce energy use, to new apps that bring people together outdoors. The list would be bound only by imagination.



Sidewalk Labs' proposals for digital innovation would make it possible for the IDEA District to achieve key quality-of-life objectives. It would also serve as the cornerstone of a new global hub for urban innovation, estimated by Sidewalk Labs to generate \$14.2 billion in annual economic activity and give rise to 93,000 total jobs, including nearly 10,500 jobs focused on urban innovation — attracting entrepreneurs from all over to the IDEA District.<sup>4</sup>

Above all, Sidewalk Labs' approach aims to demonstrate to Toronto, Ontario, Canada, and the rest of the world that cities do not need to sacrifice their values of inclusion and privacy for economic opportunity in the digital age.



### IDEA District

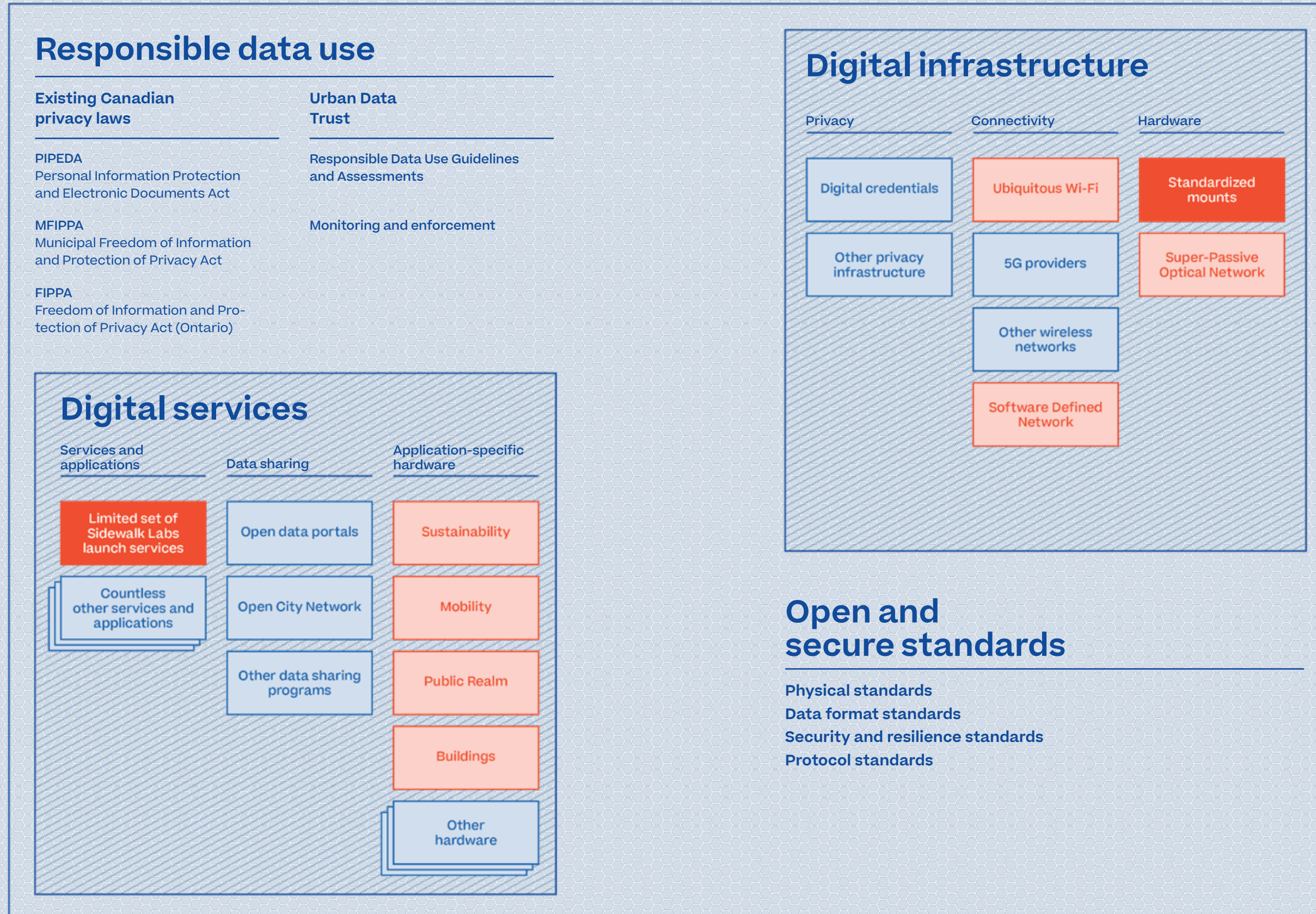
The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.



# Sidewalk Labs' role in creating the core conditions for digital innovation

Sidewalk Labs proposes to establish a set of core conditions that would catalyze an ecosystem of urban innovation along Toronto's eastern waterfront, consistent with Waterfront Toronto's objectives of improving quality of life and creating new economic opportunities in the digital age. These conditions include shared digital infrastructure, an open and secure approach to architecture and standards, a catalyzing set of digital services, and a trusted process for responsible data use.

As the diagram on this page shows, the role that Sidewalk Labs proposes to play would vary across these conditions and would follow a general approach of enabling innovation by others.





### General approach: Buy rather than build, wherever possible.

In keeping with its role as catalyst in the Sidewalk Toronto project, Sidewalk Labs prefers to purchase third-party technology — or partner with third parties to create (or enhance) it — whenever there are existing companies that have the capability and incentives to implement the systems required. Sidewalk Labs plans to give priority to technology that is local to Toronto, Ontario, or Canada.

In cases where technology does not currently exist, and where entrepreneurs or established companies are not building them, Sidewalk Labs plans to build the technology. These are likely to be cases that require significant up-front investment the market is not currently making, or where success focuses on longer-term objectives that other companies are designed to pursue.

In all cases, other entities would be free to develop and provide competing services to those offered by Sidewalk Labs.



### Digital infrastructure role.

Sidewalk Labs plans to develop several components of digital infrastructure related to hardware, connectivity, and privacy, working alongside third parties to build out certain aspects of these systems.

For the proposed Wi-Fi network, Sidewalk Labs hopes to work with existing telecommunications companies with experience on the Toronto waterfront to build out infrastructure and conduct research and development of new technologies. Waterfront Toronto has worked for over a decade to eliminate the digital divide in their new communities, working with

a local telecommunications provider to deliver gigabit service to every residential unit that gets built on public land, including in affordable housing.

For other infrastructure components, Sidewalk Labs expects to play a larger role that still involves others. These include standardized mounts that would reduce the cost of deploying digital innovations and an advanced optical network and software-defined network that makes connectivity faster and more secure.

While Sidewalk Labs does not expect others to have sufficient incentives to create this infrastructure alone, it believes these components would play a critical role in boosting the success of digital innovations that address urban challenges.

Sidewalk Labs also expects third parties alone to provide other aspects of digital infrastructure that include 5G cellular connectivity (at much lower costs thanks to standardized mounts), other advanced communications networks, and additional privacy-enhancing infrastructure.



### Digital services role.

To achieve fundamental quality-of-life goals through innovations the market has not pursued, Sidewalk Labs plans to offer a limited set of core digital services related to its essential programs for transportation, affordability, housing, energy, or public space. These services would rely on application-specific hardware devices created primarily by third parties but adapted or extended by Sidewalk Labs, working closely with these device manufacturers.

These launch services could still involve working with partners and buying existing technology. For example, the proposed

mobility management system (see Page 452) could require computer-vision technology that performs de-identification at source, retaining an aggregate count of travellers but deleting any footage or images. Local companies are working on such technology, and Sidewalk Labs would explore options for purchasing those devices as this mobility system (or other proposed services) may require them.

Sidewalk Labs believes the urban data generated by these services would catalyze third parties to create countless other applications to improve quality of life, along with the application-specific hardware designed to support them.

For that to occur, this data must be shared publicly, and there are many companies and organizations in Toronto and beyond that specialize in making data available, such as ThinkData Works, the City of Toronto's Open Data Portal, and the Open City Network. Sidewalk Labs hopes to work with them to help provide the services necessary for the Sidewalk Toronto project.

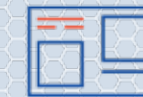


### Open and secure standards role.

Making data publicly available is necessary but not sufficient to catalyze digital innovation. That requires publishing the data in standard formats that third parties can easily build on, with good documentation for both the method of access and for interpreting the data format.

There are a small number of existing data formats for urban data, but Sidewalk Labs would focus on working with partners and standards bodies to develop, refine, and promulgate a much wider range of formats that support quality

of life goals (see Page 403). Sidewalk Labs plans to take the same approach to standard communications protocols (such as software-defined networks), physical standards (such as standardized mounts), and security and resiliency standards (see Page 408).



### Responsible data use role.

All digital innovations that propose to use or collect urban data in the IDEA District — whether developed by third parties or Sidewalk Labs — would be reviewed by and require approval from an independent Urban Data Trust (not controlled by Sidewalk Labs or Waterfront Toronto). These proposals would involve submitting an RDU Assessment to ensure that privacy and security are protected and that the innovations adhere to RDU Guidelines established by the Urban Data Trust. This proposed process would apply in addition to existing privacy laws.

Sidewalk Labs believes the Urban Data Trust could evolve into a public-sector or quasi-public agency over time.

By offering this unique set of catalyzing conditions in a defined geography, Sidewalk Labs hopes to encourage and invite countless urban innovators to view the IDEA District as a global launchpad for urban innovation.

# Part 1



## Providing More Affordable and Flexible Digital Infrastructure



### Key Goals

- 1 **Expand opportunity with ubiquitous connectivity**
- 2 **Reduce installation and maintenance costs with an “urban USB port”**
- 3 **Use distributed credential infrastructure to protect privacy**

Digital infrastructure is a basic building block of the future city — the backbone of connectivity that helps residents, companies, organizations, and local agencies use data to launch new services that improve urban life. Many of the improvements to mobility, housing, energy use, and the public realm described throughout the MIDP are only possible today thanks to advances in digital infrastructure, such as fast internet connectivity and digital devices capable of collecting information.

Digital infrastructure is what enables an adaptive traffic light to prioritize a light rail vehicle that is running late, and what enables a heated bike lane to warm up in advance of a storm so a cyclist can get to work on a snow-free path. It is what enables an extendable awning to cover a ground-floor market space just before it rains, and what enables a small business to launch a pop-up at an affordable cost. It is what enables someone who suffers from asthma to request alerts whenever there is a decline in air quality, what enables a dishwasher to operate when energy is cleaner, and so much more.

Digital infrastructure is what unlocks these innovations, and more importantly, the significant leaps forward in affordability, mobility, sustainability, and opportunity that come with them. It is also the catalyst for new services or businesses no one has thought of yet, and the cornerstone of a digital economy. For the IDEA District to become both an inclusive neighbourhood that evolves over time and a hub for ongoing exploration into the next great idea for urban life, fast and low-cost connectivity should not be a luxury for the few — it should become the new standard.

But today’s digital infrastructure can be expensive and difficult to replace. Too often, cities rely on proprietary hardware and software to collect data and connect people, locking them into using the same tools for years, even when better options become available. That makes it hard for residents, workers, and businesses to take advantage of the latest technologies that promise faster connections at lower costs.



Sidewalk Labs’ proposal for digital infrastructure centres on two core hardware components. One is ubiquitous connectivity that would offer residents, workers, and businesses access to their own secure, super-fast internet network no matter where they are, at an affordable cost. The other is a new type of “urban USB port” that would provide a physical mount, power, and connectivity to digital devices in the public realm — such as Wi-Fi antennae, traffic counters, or air-quality sensors fixed to street poles and traffic signals — at much lower cost than the connected mounts cities use today.

**Fast and low-cost connectivity should not be a luxury for the few — it should become the new standard.**

Additionally, Sidewalk Labs plans to explore the use of a new type of privacy-preserving software infrastructure that would enable people to share only the minimum amount of information necessary to complete a transaction with a digital service or app, with the person’s full consent.

These proposed components would not be exclusive; on the contrary, any third party could provide a competing offering.

At the neighbourhood scale of Quayside, ubiquitous connectivity could draw people outdoors, further bridge the digital divide, and provide secure access across the entire neighbourhood. However, this type of network would only become financially sustainable at a larger service area, given the number of residents or businesses needed to recoup the initial investment. Deployed at the full scale of the IDEA District, this advanced connectivity would dramatically reduce the time and effort required to set up networks

and enable residents to use their own network everywhere — from their couch to a park bench.

Similarly, in Quayside, the proposed urban USB port would make it much easier and less expensive to deploy technology in the service of improving a neighbourhood. But new hardware standards require significant geographic distribution to gain the wide adoption needed for device manufacturers to incorporate the standard into their own designs; for example, a Wi-Fi antenna producer would not change its design for a small handful of cases. Deployed across the IDEA District, however, this standardized mount would reduce the time needed to mount a device in the public realm by 92 percent over current infrastructure.

At the full scale of the IDEA District, this approach to digital infrastructure would enable the creation of many urban innovations described throughout the MIDP — as well as all those waiting to be invented in the future.

### Sidewalk Labs’ role in digital infrastructure.

As explained on Page 382, in keeping with its role as catalyst, Sidewalk Labs would first look to others to help deliver its digital infrastructure proposals, including the proposed connectivity network, standardized mounts, and privacy-preserving software. Other infrastructure components, such as 5G, could be provided entirely by third parties.



Providing More Affordable and Flexible Digital Infrastructure

# Expand opportunity with ubiquitous connectivity

The internet is essential to modern cities: it is needed at all corners of a community at all times. To provide ubiquitous connectivity, Sidewalk Labs proposes a secure, high-speed, uninterrupted network across the IDEA District, both indoors and outdoors, that can support the use of roughly 10 million simultaneous devices.

Toronto's waterfront currently incorporates world-leading internet speeds, thanks to the work of Waterfront Toronto with its telecommunications partners. For example, in places like the Bentway, Waterfront Toronto has collaborated with telecommunications partners to provide free Wi-Fi as a way to extend digital access into the public realm.

Sidewalk Labs proposes to push this work even further by taking advantage of recent advances in fibre-optic technology and new approaches to network management. Sidewalk Labs would provide technical guidance and requirements and work with Waterfront Toronto's procured telecommunications partner to build out the required physical infrastructure and operate the network.

At the core of Sidewalk Labs' proposed network is the belief that residents, workers, and visitors should have continuous access to their own secure Wi-Fi connection everywhere they go, from the basement of an office building to sidewalk underpasses connecting the IDEA District with the rest of Toronto. This ubiquity would mean residents and workers

can stay connected to their own home or office Wi-Fi network no matter where they are, without worrying about joining an insecure network.

This type of ubiquitous connectivity would also create new opportunities for small businesses and entrepreneurs to get up and running faster, and for residents and community groups to focus their energy in new directions, whether that means launching a pop-up retail shop, showing a digital media art installation, or finding a new job.

## Advanced optical network

As part of its network planning, Sidewalk Labs is exploring a new technology called Super-PON (Passive Optical Network).

Conventional fibre-optic networks are constructed with a stranded fibre-optic cable running from the network provider's central office to the user's site, typically a single building. This type of system can reach 32 or 64 users per fibre strand,<sup>5</sup> with 20 kilometres of transmission reach.<sup>6</sup>

In contrast, Super-PON technology is capable of supporting 768 users per strand and extending the reach to 50 kilometres<sup>7</sup> — meaning that a single cable could now provide connectivity to multiple buildings across a neighbourhood or district. Super-PON achieves this improvement by splitting light into many different colours (or wavelengths) over a single strand of fibre-optic cable, with

### Comparison

## How Super-PON technology outperforms traditional fibre-optics on seven key metrics

	Typical network approach	Super-PON approach
Users per fibre strand	32–64	768
Maximum transmission distance	20 km	50 km
Wi-Fi signal interference	Signal interference from neighbouring homes and businesses degrades Wi-Fi connectivity, especially during peak usage	A continuously managed Wi-Fi signal optimizes for speed and coverage to prevent slowdowns, even at periods of heavy usage
Router configuration	Users independently configure their own routers	Configuration is automated and secure to simplify setup and increase security
Security	Firewalls configured per router, making access difficult and often opening security holes	Holistically configured routes that allow access for authorized users only — simultaneously more convenient and more secure
Wi-Fi availability	Few public Wi-Fi access points; most access points configured for private access only; difficult to connect devices like smart switches, thermostats, lighting	Wi-Fi access points situated throughout the neighbourhood, indoors and outdoors, for seamless connectivity and access while remaining secure
Access to home or networks	Difficult to access when elsewhere without complicated, insecure custom configuration	Allows people to connect directly to devices in their homes, schools, and offices easily and securely using software-defined networks

each colour serving as its own signal.<sup>8</sup> In one possible configuration, each light wavelength (for example, red, yellow, or blue) would provide connectivity to a specific building.

This technology infrastructure could result in a higher-bandwidth network with a number of additional benefits. The ability to split cables among more users means the network would require less fibre material and physical infrastructure than traditional networks, enabling it to be constructed faster and at lower cost. The network would also use less electrical power because its extended reach requires fewer “stops” for a signal (a traditional network could require rooms with electric boosters every 20 kilometres).

This Super-PON specification is now being studied by the IEEE Standards Association,<sup>9</sup> the world’s largest technical professional organization, for possible inclusion in its 802.3 international standards for telecommunications. If applied in Quayside, Super-PON would make Toronto the first Canadian city with this technology (it currently exists in San Antonio, Texas),<sup>10</sup> and would help ensure fast connectivity throughout the IDEA District.

## Extensive fibre-optic backbone

Beginning in Quayside, Sidewalk Labs’ proposed design for a fibre-optic backbone would be connected to two major internet Points of Presence (POPs) in downtown Toronto. The proposed designs would support at least 10 times the amount of anticipated bandwidth needed. Sidewalk Labs plans to evaluate whether an additional POP is required to provide sufficient redundancy.

In Quayside, Sidewalk Labs proposes that the conduits holding the fibre have express and local routes, as well as regular handholes (access points). Each building would serve as an aggregation point for outdoor fixtures capable of mounting digital devices, such as street lights or poles, and would have fibre-optic runs to provide additional access if needed.

At the proposed full scale of the IDEA District, further enhancements could be possible, including laying out the fibre-optic backbone as a loop so that a fault at any location would not disrupt access further along the fibre.

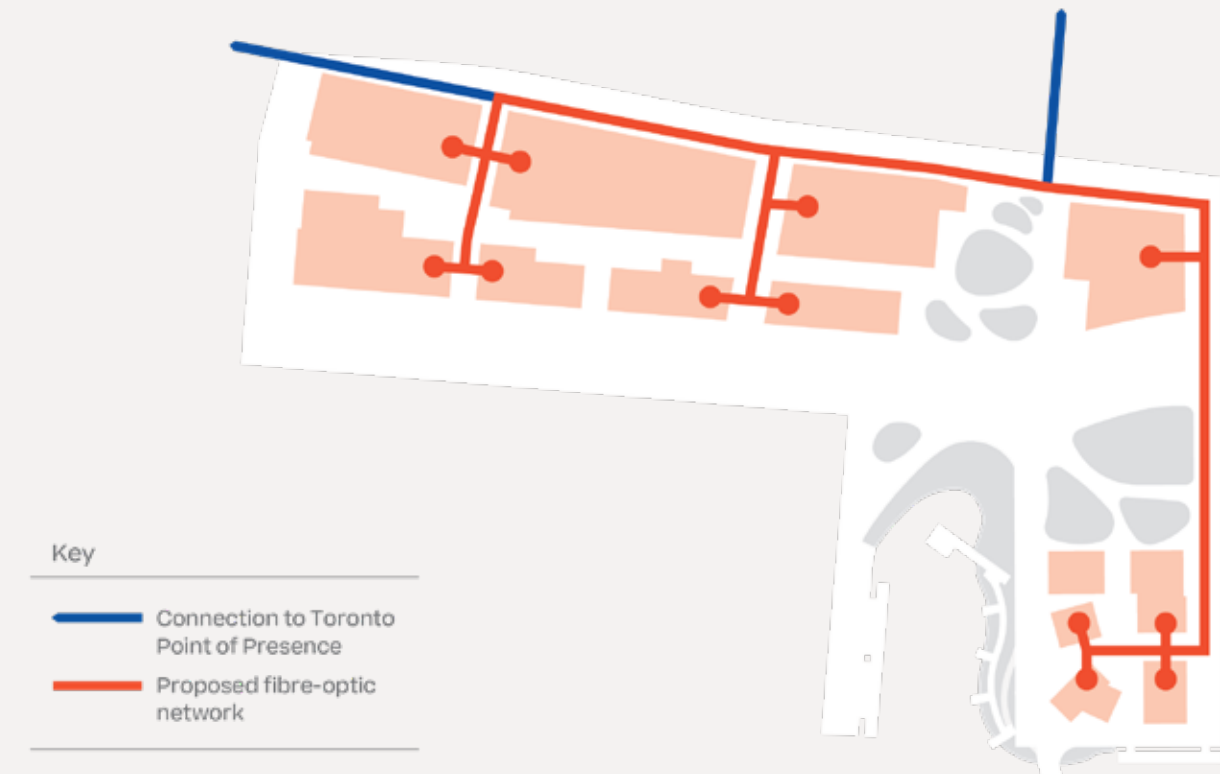
## Flexible building connections

In Quayside, Sidewalk Labs plans to ensure that buildings conform to the following specifications that balance the goals of this Super-PON network with the ability for other providers to offer their own network services:

### Conduits.

Sidewalk Labs proposes that incoming conduits meet a set of specifications provided to all developers, including buried depth, distance from water and sewer lines, slope from buildings, coating materials, size and amount, and duct plug features. These conduits should either run directly to a “Meet Me Room,” or connect with the matching number of horizontal conduits that run to the Meet Me Room.

## The proposed fibre-optic network would be designed to reach every building in Quayside



### Meet Me Room.

This room would be a single location in the building where all communications-related equipment would be installed. It would be dedicated to communications use; other utilities should be located elsewhere to reduce risk of disruption of communications services. This room should have backup power and spare capacity for easy upgrades or new technologies.

### Risers.

A vertical riser, dedicated to communications wiring, should be accessible on each floor and extend from base to the top floor and roof. The riser should be sized for future cabling. Ideally there would be two or more diverse risers that are separated by at least five metres for resiliency. Horizontal risers, on each floor, would connect each vertical riser to each individual unit.

### Cabling.

Sidewalk Labs plans to implement Cat 6A wiring in each room for power-over-ethernet wireless access points, from a central point to form a local area network within the unit. This wiring would allow flexibility for installing additional radios — for example, the forthcoming 60 gigahertz products that offer multi-gigabit speed but whose signals cannot penetrate walls.

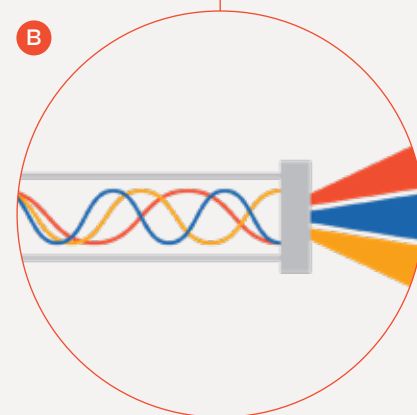
The proposed network could support

**10 times**

the bandwidth needed in Quayside.

# How it works: Super-PON connectivity

By splitting cables using new wavelength technology, Super-PON (Passive Optical Network) is capable of providing connectivity to multiple buildings across a neighbourhood or district.



Each building gets a dedicated wavelength (colour) on a single fibre strand, helping to reduce materials, reduce infrastructure, and increase speed.

**A Third-party Point of Presence.**  
The fibre-optic backbone would be connected to two major internet Points of Presence in downtown Toronto.

**B Super-PON fibre.**  
A single Super-PON fibre strand can serve multiple buildings in a neighbourhood.

**C Meet Me Room.**  
A location in each building dedicated to communications utilities.

**D Vertical riser.**  
A pipe or channel for communications wiring should be accessible on each floor and sized for future cabling.

**E Loop return.**  
A circular structure ensures better access and fewer service disruptions.

## Optimized wireless infrastructure

Next-generation wireless systems could offer amazing speeds, but they actually require significantly more antennae and wired backhaul connections than today's systems. Sidewalk Labs is working to determine the optimal location for antennae, both inside buildings and throughout the public realm, using software that automatically takes the site plans for Quayside and creates a predictive radio frequency study. This study includes locating Wi-Fi access points, mobile phone antennae (such as 4G, 5G, LTE, and 3.5 GHz CBRS), LoRaWAN gateways, and more.

## A seamless and secure neighbourhood-wide network

When the internet was invented in the 1970s, every device could connect to every other device.<sup>11</sup> “Routers” performed the task of getting packets of information from the transmitting device to the receiving one, usually by taking multiple hops. Over time, the internet became less connected: for security purposes, some sub-networks (subnets) walled themselves off by having the router that connected them to the rest of the internet reject most incoming information packets. This was the origin of the internet “firewall” — a now-common feature of an internet router.

For this reason, it is very difficult for people to connect to a home device when they are not at home. Instead, they must engage with a home device (such as a smart thermostat or home-security camera) via a third-party website or app that this device contacts from time to time.

To help address this challenge, Sidewalk Labs proposes to take advantage of an emerging security approach called “software-defined networks.”

As its name suggests, a software-defined network uses software to “define” the way that information travels through the network's hardware (its physical communications links and the routers that connect them). In such a system, users would not need to configure their own routers independently and have those routers reject all incoming communications using a firewall. Instead, the software-defined system would automatically configure the routers to create private networks that would remain available and secure across an entire neighbourhood — providing both greater convenience and heightened security.

### Greater convenience.

In Quayside, these private networks would be available anywhere in the neighbourhood, including in parks and public spaces, using the ubiquitous Wi-Fi network. Using a neighbourhood software-defined network would enable people to connect to all of the same devices regardless of whether they are at home, in the office, in the park, in a light rail vehicle — anywhere. And nobody else (unless authorized) would have access to those devices. A neighbourhood-wide software-defined network could also make set-up easier than the current set of routers and firewalls that internet service providers use.

Consider, for example, a family that wants to check on their pet while they are out. Right now they would normally have to make sure their in-home video camera was cloud-connected, because otherwise they would lose contact with their camera as soon as they were out of range of their home Wi-Fi access point. A better approach would enable the family to access this video using data from their home directly, just as if they were at home, without that data having to be transferred or stored at any cloud provider. And just as some people use a virtual private network (or VPN) to connect to their office network, there would be a way to connect to the neighbourhood SDN when they are outside the neighbourhood to maintain the same access.

### Heightened security.

A further advantage of software-defined networks is security. Because the software network would know what kind of data each device is supposed to be transmitting, it would be able to detect if any of them have been compromised. For example, if a thermostat that normally sends a few bytes every minute starts streaming megabytes per second, the software-defined network could quickly disconnect the device from the network — putting it in a kind of quarantine. This ability could help avoid “distributed denial of service” attacks and other exploits aimed at vulnerabilities in connected devices.

As with all digital infrastructure proposed by Sidewalk Labs, residents and businesses would not be required to use this network.

## Sidewalk Labs commitment

# Digital infrastructure and inclusion

Building on the work of Waterfront Toronto to connect Toronto's waterfront communities, Sidewalk Labs plans to meet all the requirements for digital inclusion outlined by the National Digital Inclusion Alliance, a U.S.-based non-profit. Beyond affordable connectivity, these requirements include access to internet-enabled devices; quality technical support and digital literacy training; and applications designed to enable and encourage self-sufficiency, participation, and collaboration.

For those without smartphones or who require digital support, Sidewalk Labs plans to provide free-to-use devices, tech support staff, and digital literacy programming in the Civic Assembly and the Care Collective. This digital infrastructure would help the population seamlessly leverage digital tools for daily activities, advance in the digital jobs economy, and access critical services, such as government and health-care support. It would also enable service providers to develop digital tools that they know can reach and support every community member.

To further encourage the development of truly inclusive tools, Sidewalk Labs is currently funding an inclusive usability testing program founded by Code for Canada called GRIT Toronto (see Page 443), working with local communities to develop a launch service aimed at participation in community decisions called Collab (see Page 446), and supporting Toronto-based service providers to develop technology solutions (see Page 382).

### Key Term

## Software-defined networks

use software to create secure networks that remain accessible across a neighbourhood, providing greater convenience as well as heightened security.





Providing More Affordable and Flexible Digital Infrastructure

# Reduce installation and maintenance costs with an “urban USB port”

Sidewalk Labs has designed a standardized mount called “Koala” that would make it fast, inexpensive, and safe to install a device on a light pole or other street fixture by providing a sturdy physical mount, power, and network connectivity. Just as USB ports made it easier to connect external devices with computers, this new type of urban USB port would create a standard connection point for cities that drives down the cost of installing and maintaining digital hardware.

Today, according to public records, Toronto has at least 11,000 devices mounted to public infrastructure, including Wi-Fi access points, cellular nodes, environmental sensors, and traffic or public safety cameras.<sup>12</sup> Installing these devices often requires significant disruption to street life, creates risks to workers in bucket trucks, and costs thousands of dollars, because light poles and other street fixtures were never designed to host digital hardware.

Adding a single car-counting device to an intersection requires the city to take the following steps:

- **Shut down** a lane of traffic for hours or even days.
- **Send** a bucket truck with several staff to the intersection.

→ **Devise** a creative mounting solution involving special clamps to adapt to the particular conditions of a traffic pole while maintaining safety standards.

→ **Employ** an electrician to shut down the supply to the pole and possibly run a network wire up the pole, a process that might involve digging a trench to the nearest connection point.

→ **Repeat** much of this labour-intensive process for repairs or upgrades.

Because this process of deploying digital hardware is so onerous, cities (and the private vendors they hire) tend to invest in high-priced, ultra-reliable devices that are expensive to repair and upgrade. If it were possible to deploy, maintain, and upgrade such devices in an inexpensive way, cities could buy much less expensive technology, replace the small fraction of devices that fail, and provide some redundancy of devices to improve reliability around things like Wi-Fi networks. They would also be able to upgrade technology on a much more rapid timeline and have more resources to conduct pilots or explorations for new services.

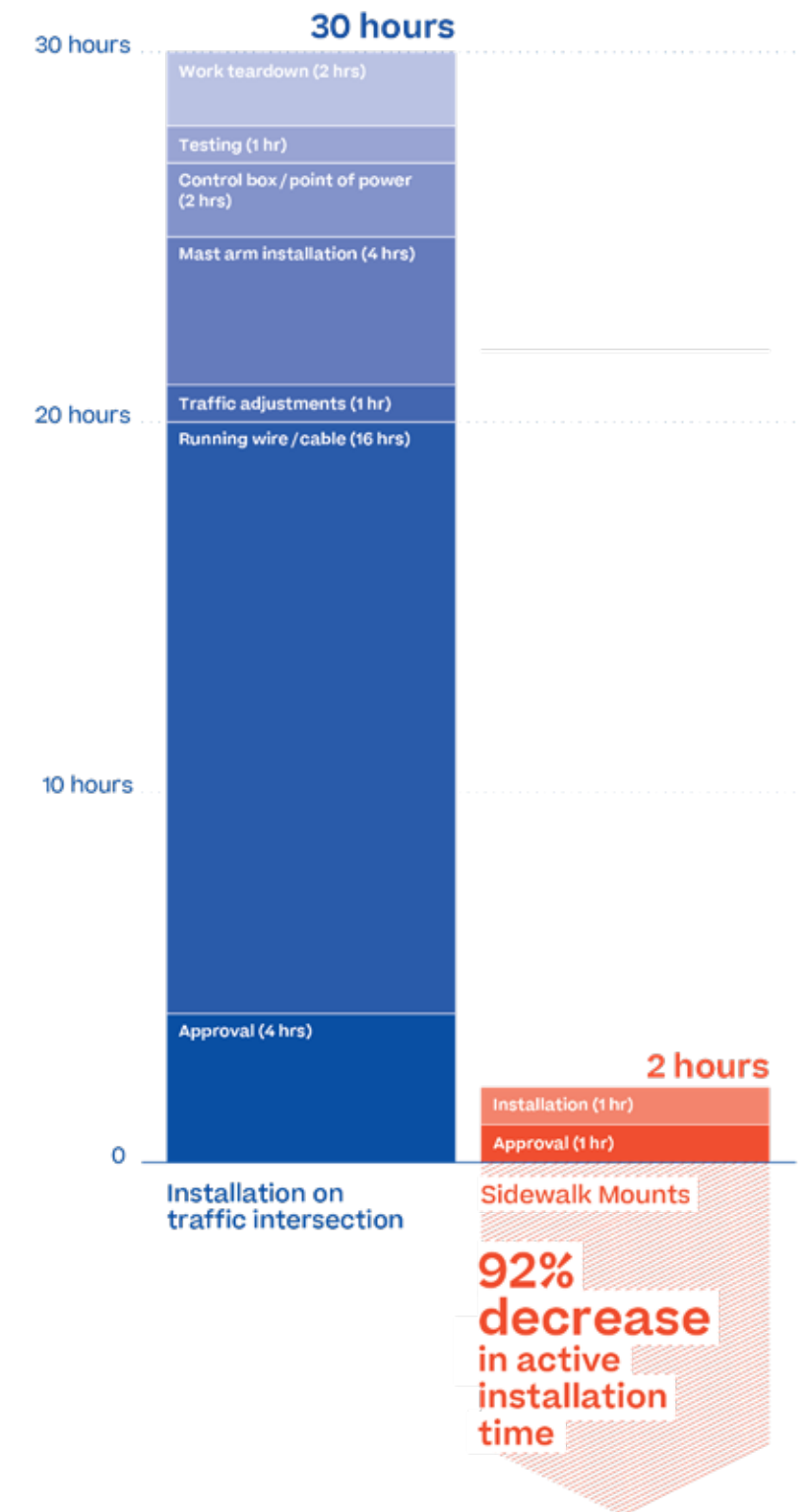
Sidewalk Labs’ Koala mounts would provide a low-cost, low-fuss way for cities or third parties to improve urban life using urban data collected in the public realm.

(All such data use would be subject to the proposed responsible data use process described on Page 414 of this chapter.) Koala mounts would be designed to provide power and connectivity to devices without the need to run new electric wires or close down streets. On the contrary, a device could be installed quickly using a common ladder or even a reacher grabber. Sidewalk Labs estimates its mounts would reduce the time of installation by roughly 92 percent — down from 30 hours today to two hours.

Koala mounts would be designed to work with any devices that meet its published standards, just like a USB port. As with Sidewalk Labs’ ubiquitous connectivity network, companies would be free to use other mount offerings or stick with the traditional approach.

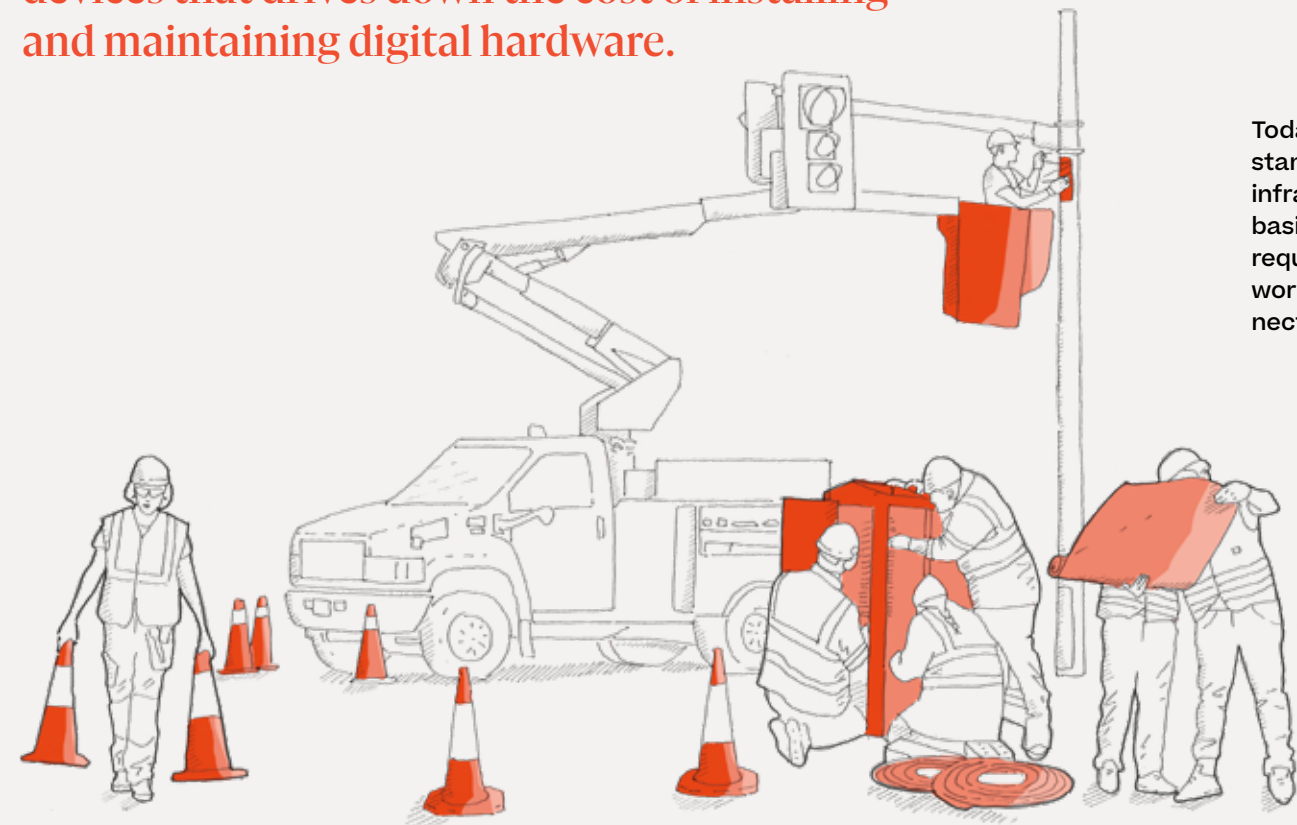
## Device installation time savings of 92%

The proposed mount from Sidewalk Labs could dramatically reduce the amount of time it takes to install a device — down from 30 hours today to two hours. It could dramatically decrease costs, too. Assuming labour costs of \$75 an hour, installing a device on a proposed mount would cost \$150, compared with \$1,980 for a standard traffic installation.

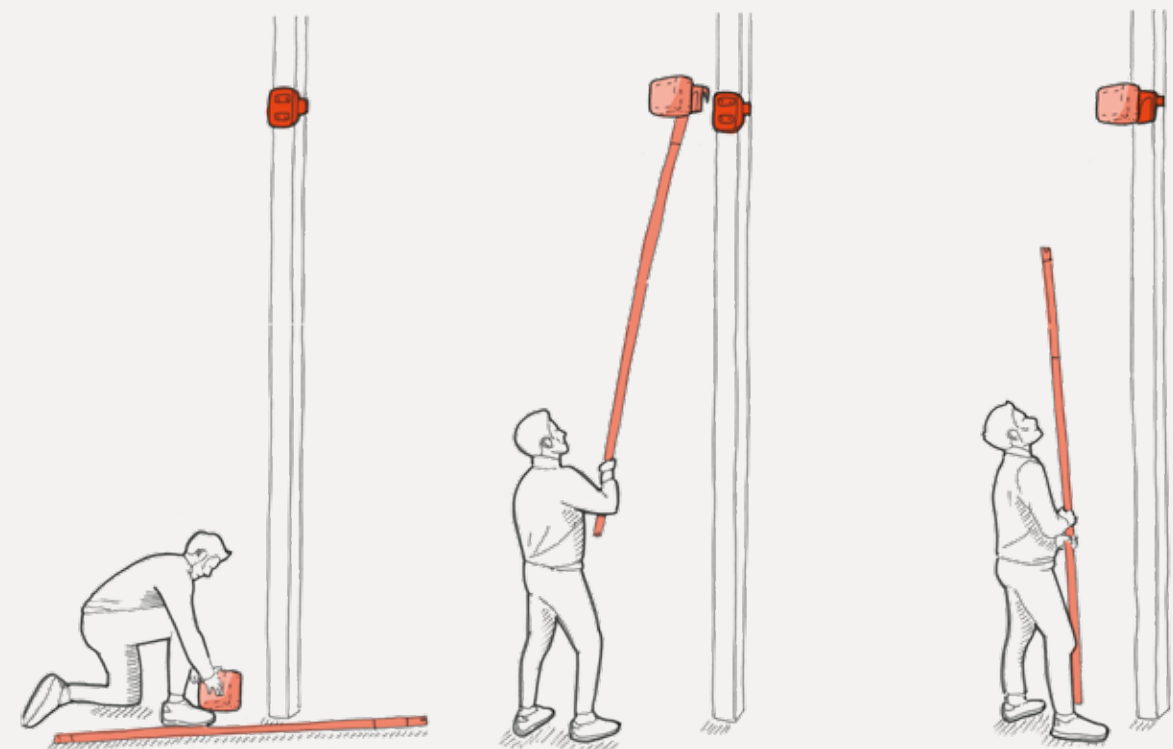


# A standardized mount to reduce disruption

The proposal Koala mount would create a standard connection point for digital devices that drives down the cost of installing and maintaining digital hardware.



Today, without standardized digital infrastructure, even a basic traffic counter requires hours of work to mount, connect, and test.



Koala mounts would make it easy and quick to connect to a ubiquitous network and collect urban data for a multitude of purposes, from bicycle counting to air-quality monitoring to interactive public art installations.

**Koala mounts would provide a low-cost, low-fuss way for cities or third parties to improve urban life using urban data.**



Providing More Affordable  
and Flexible Digital Infrastructure

## Use distributed credential infrastructure to protect privacy

Many products and services in cities require some information about the people using them. But Sidewalk Labs believes that city residents, workers, and visitors should have to share no more information than absolutely necessary to use a digital service, receive a benefit, or conduct common personal or business transactions.

As an example, consider applying to rent an apartment. Potential tenants are often asked to reveal a lot of sensitive personal information as part of the rental application, such as their Social Insurance Number, driver's licence, tax history, and pay stubs.<sup>13</sup> But the minimum amount of essential information would likely include evidence of financial responsibility, such as recent credit history or score. It should not be necessary to include other information about the individual that could be used to discriminate against an applicant, such as their age or ethnicity.

To help tackle this challenge, Sidewalk Labs has been exploring the field of distributed digital credentials. This emerging approach uses privacy-preserving techniques to enable interactions such as the one described above in a way that provides only the minimal amount of information necessary, with a person's full consent over what information is shared.

Such privacy infrastructure is being developed by many groups around the world, including the open-source community, global organizations (such as the consortium piloting the DECODE project in Europe), startups, large financial institutions, and governments (for example, the Province of British Columbia). Sidewalk Labs plans to work with these types of groups to explore ways to incorporate this existing technology into many of its digital services that involve personal information, and to adopt a standard for handling personal data transactions in a trustworthy way.

This structure for digital services enables transactions between two parties that do not involve the creators of the digital services at all (whether Sidewalk Labs or another third party). Instead, credentials would be stored on user devices, not in the cloud (thus distributed, and not centralized), and the credential infrastructure would not act as an intermediary between the two parties. Continuing the rental application example, only the landlord and the rental applicant would ever have access to the information in their transaction.



In the rental application example, such a system could process a credential digitally signed by a trusted financial institution confirming the applicant's financial status without divulging further information that is not required for the application process — and with the applicant having full control over sharing this information.

This interaction is enabled by technological advances in cryptography such as zero-knowledge proofs, digital signatures, and auditable data structures — which together make it possible for the applicant to prove their financial eligibility for an apartment without revealing data such as their name, address, or employer, all of which might bias a reviewer. In this case, zero-knowledge proofs allow the renter to prove their financial information is in an acceptable range without revealing exact values; the digital signature allows the reviewer to guarantee that the data is authentic and confirmed by a trusted counterparty like a bank; and auditable data structures give users the ability to make sure that no one has compromised their account or stolen their identity information.

In other words, only the people providing information about themselves and the service they are interacting with should know what is happening with the data involved — balancing the needs for privacy and authenticity for many types of urban interactions, both digital and physical.

# Distributed credentials can ensure that people share the least information necessary to complete any digital transaction.



# Setting Data Standards That Are Open and Secure



## Key Goals

**1 Enable third-party innovation with published standards**

**2 Use best-in-class resiliency and security**

The ability to collect urban data is the first step to creating the conditions for digital innovation in the future city. But collection alone is not sufficient to use that information to create new services or tools that improve people's lives. To do that requires making the data publicly accessible to others in a way that encourages innovation but remains secure.

Perhaps the best example of a place catalyzing digital innovation via open standards is Estonia (see sidebar). The country's digital services platform, called "X-Road," makes it quick and easy for residents to do everything from apply for a bank loan to contest parking tickets to file their taxes.<sup>14</sup> And because the platform is publicly accessible through a published standard, the capital of Tallinn has become a hub of innovation in areas such as cybersecurity and blockchain technology.<sup>15</sup>

**Standardized data formats, the kind that software developers can easily read and build on, are a key catalyst for digital innovation.**

Of course, to create a vibrant ecosystem of new applications using data, that data must be provided in a standard format, with good documentation for both the method of access and for interpreting the data format. That is typically done through well-designed application programming interfaces, or APIs. APIs are standardized programming tools that enable computer systems to communicate; for example, when a Transit App shows bike-share availability at a nearby dock, it is using an API to connect with the bike-share system's real-time database, process that data, and display it on a phone.<sup>16</sup>

Currently, there is a gap between well-designed APIs and those of a typical open dataset. A well-designed API provides application developers with a clear description of the kind of data they can retrieve, the exact format the data will be provided in, sample code to access and use the data, and example applications that have been built using these same ingredients. That is not the way that the vast majority of open data is provided today. Making urban data available in ways that software developers can readily build on could provide the conditions for significantly increased innovation in city technology.

## Key Term

### APIs

are standardized programming tools that enable computer systems to communicate.

## Global case study

### How Estonia's "X-Road" makes lives easier

At the start of the 21st century, only about one-third of Estonia's population had ever used the internet.<sup>17</sup> Less than 20 years later, this small Baltic nation of 1.3 million people is home to the most advanced civic data system in the world.

Estonia's residents go online to vote, file taxes, apply for bank loans, share education transcripts, view health records, contest parking tickets, and more. Estonians do not need to register their kids for kindergarten; the system does it for them, based on their child's date of birth and home address. The pet e-registry tells them when it is time for another round of vaccinations. Estonians do not even carry driver's licences or vehicle registration papers with them when they drive.

The only thing Estonians need is their e-ID card, which comes with two PINs to ensure security. The first PIN is for personal authentication when citizens log on; the second is for their digital signature, when they need to approve online transactions. And all those transactions take place on X-Road: the secure, government-run data exchange where residents interact with businesses and government.

Instead of notifying multiple government offices of a change of address, Estonians do it once, in the population registry, and give X-Road permission to share it with the voter registry, health ministry, banking institutions, and so on. X-Road shares only what it is instructed to share. And every time a third party views a person's information, it is traceable via a blockchain-style distributed ledger. Estonians can not only view their own health records, but also see which physicians and specialists have accessed them as part of their care.



X-Road processes half a billion queries annually, leading to substantial cost and time savings.<sup>18</sup> Transactions and verifications that used to take hours are completed in seconds. The process of registering a new business in Estonia takes 18 minutes;<sup>19</sup> by contrast, the same process in Ontario takes roughly 20 business days.<sup>20</sup> The country's courtrooms, once backlogged, are now remarkably efficient. Prescriptions flow from physician to pharmacist, and patients need not wait to get them written or filled. A 2015 World Bank report calculated that X-Road saved Estonians a total of 2.8 million annual hours — the equivalent of 3,225 people working around the clock for a full year.

The development of X-Road has given Estonia a competitive advantage in technology industries, helping to foster a robust startup ecosystem and giving the capital city of Tallinn a global reputation as a leading innovation centre. Estonia is also exporting X-Road to countries such as Finland, Moldova, Panama, and others.<sup>21</sup> As former Estonian President Toomas Hendrik Ilves told the *New Yorker*: “It’s very popular in countries that want — and not all do — transparency against corruption.”

Discussions of open data must also recognize the potential security risks that come with it. Addressing these risks begins with the network itself; as described on Page 392, a software-defined network could provide a heightened level of security by monitoring the amount of data that a device is transmitting and shutting off access if it detects anomalous behaviour. But security is not about implementing a single measure; rather, it best occurs with an established process for resiliency, transparency, and vigilance.



*Sidewalk Labs proposes to catalyze innovation through the use of urban data that is both open and secure. First, Sidewalk Labs plans to develop and apply a set of published standards around open architecture, access, and sources that enable third parties to build on top of available information. Second, in support of that effort, Sidewalk Labs plans to use best-in-class security and resiliency techniques that aim to prevent disruptions, detect risks, and rapidly restore services.*

Deployed at the full scale of the IDEA District, this plan for open and secure urban data would enable a vibrant ecosystem of urban innovation for startups, government agencies, researchers, civic organizations, and anyone else.

**Sidewalk Labs’ role in data standards.**

As explained on Page 382, in its role as project catalyst, Sidewalk Labs would aim to partner or rely on existing tools to achieve its goals for standards and security, including working with the many companies and organizations in Toronto that specialize in providing data in standard formats.



Setting Data Standards That Are Open and Secure

# Enable third-party innovation with published standards

At the core of Sidewalk Labs’ approach to catalyze innovation is the belief in the importance of published standards for digital hardware and software, and public access to urban data that can reasonably be considered a public asset.

Openness is essential to provide new services that help improve quality of life and to inspire urban innovation by third parties. Just as no single company owns the web, no single company, organization, or agency should own the data or databases used by cities. They must be publicly accessible to improve upon, build on top of, or even replace.

Sidewalk Labs proposes a three-part plan to achieve its goal of a digitally open city. First, it proposes to provide data in standard formats and via well-defined, public APIs (open architecture), and where relevant standards do not exist, it would work with other companies, researchers, and standards bodies to create those standards. Second, it proposes to make this data publicly accessible by default (open access). Third, it proposes to make the software source code required for others to integrate with each of these systems publicly available under a free software licence (open source).

## Open architecture: Public standards

All too often, today’s cities buy bespoke, proprietary data systems from private vendors. The result is costly lock-in: the city must pay this provider forever for the use and support of the system or throw away the technology and pay a new provider for replacement.

For the Sidewalk Toronto project, any digital hardware and software that Sidewalk Labs creates would use public standards that make it possible not just to access data easily but also to replace aspects of the hardware or software itself, avoiding lock-in from a single technology provider and encouraging innovation.

This approach follows that of the World Wide Web. The reason that someone browsing the web can use any browser to view any web page, and that any web page could be served by any web server, is that the web is based on a collection of public, internationally recognized standards. These standards are a medley of letters: HTTP (how web pages can be requested), HTML (how text and images are specified), CSS (page formatting), SSL (security), and so on. Because these standards are universally followed, anyone with sufficient technical expertise can create a new version of any component of the web, including a new web server, a new web browser, or a new website.

**Open architecture avoids the lock-in costs of proprietary systems.**




See the “Sustainability” chapter of Volume 2, on Page 296, for more details on the Brick standard.

# Public data standards prevent any single company from monopolizing a critical digital system or component.

Such standards have a number of advantages. First, they help ensure that no single company has a monopoly on providing a critical component. On the contrary, standards make it easy to improve — or even replace — any single component without throwing away the entire system.

Second, public standards inspire innovation. Web standards are now used for tasks that the creators never dreamed about. For example, standards originally designed for simple web pages are now used to support email, social networking, video-conferencing, virtual reality, and banking.

Where relevant standards exist, Sidewalk Labs plans to use them. These would likely include:

- [GTFS Realtime](#), a standard for reporting the location of public transit vehicles within the neighbourhood in real time (see sidebar)
- [General Bikeshare Feed Specification \(GBFS\)](#), for reporting the availability of bike-share bikes and docks
- [Brick](#), a standard for describing building infrastructure, including HVAC systems 
- [IFC](#), a standard for building information modelling, along with the Linked Data extensions
- [OpenStreetMap](#), a representation of roads and other public realm infrastructure
- [CityGML](#) and [CityJSON](#), standards for describing building shapes and sizes
- [OpenTraffic](#) and [OpenLR](#), emerging standards for describing traffic and street segments
- [Public Life Data Protocol](#), a standard from Gehl Institute on the use of public space

Sidewalk Labs commits to publishing an ongoing list of standards it uses, and proposes that the Urban Data Trust require other entities using urban data in the IDEA District to do the same.

## Open architecture: APIs

Public data standards provide the lingua franca necessary for open architecture. Another important aspect is the methods by which data is exchanged via APIs.

As explained on Page 401, APIs provide a well-documented way for software developers to access public data. Too often today, even if a city makes its data publicly accessible, that data is too inconsistent and unpredictable to use without significant manual processing.

For example, if two entities collect the temperature in different parts of Toronto, an API would specify that both parties should use Celsius, collect the position of the data using latitude and longitude, and store the time in Coordinated Universal Time. If these parties did not agree to speak this common language before publishing their data, using that data correctly would be time-consuming and error-prone for software developers. The result would be that a startup or organization would have to invest a lot of money to standardize the data or, all too often, abandon an idea that might otherwise lead to a promising new service.

Sidewalk Labs plans to make its own APIs well-documented and publicly available, as well as to use public standards where they exist. Where public standards do not exist, Sidewalk Labs plans to work with others to define formats that could become standards in the future. Finally, Sidewalk Labs proposes that the Urban Data Trust ensure that other organizations and individual developers collecting and using urban data in the IDEA District do the same.

### Innovation spotlight

## GTFS: How transit riders get real-time trip data

Perhaps the best example of the power of open-data standards in an urban context is a format for transit data known as the General Transit Feed Specification, or GTFS. Its technical name notwithstanding, GTFS is easy to understand: it is what makes it possible for a navigation app to show users when the next streetcar, subway, or bus is scheduled to arrive.<sup>22</sup>

Not long ago, bus or subway riders standing on a street corner or platform had only the vaguest idea of when they would be on the move. The schedule posted in fine print on a pole offered no assurance. Their ride could be two, 20, or 200 minutes away.

Today, in most major North American cities, smartphone apps can tell riders when their transit vehicle is coming down to the minute, thanks in large part to GTFS. Initially developed in 2005 as a collaboration between Google and Portland, Oregon’s TriMet transit agency, GTFS allows transit agencies and other developers to integrate static and real-time transit data into a wide variety of apps.<sup>23</sup>

GTFS has since served as the template for bike-share data (known as GBFS) and could do the same for everything from autonomous vehicle fleet movements to parking availability, allowing them to be integrated together. It is all part of a trend: providing better mobility not from more rail lines or asphalt, but from better and timelier information.

## Open access

Publicly available data has enabled innovation across multiple industries by making it easy for students, researchers, and entrepreneurs to try out new ideas. To take one example, the openness of the web turbocharged research on information retrieval by providing access to public web pages. This research led to the creation of search engines, adding to the web ecosystem.

To take another example, in the late 1980s, the U.S. Census Bureau developed the Topologically Integrated Geographic Encoding and Referencing (TIGER) database to support the 1990 census.<sup>24</sup> The TIGER database describes land attributes, such as roads, buildings, rivers, and lakes. By releasing the data publicly, the census bureau enabled new services and products from digital mapping and navigation companies, such as NAVTEQ and TomTom, and eventually from online mapping services, such as MapQuest and Google Maps.

The time has come to prioritize not just the data that is easy to acquire and publish, but to gather and distribute data that will have the largest positive impact on quality of life. Sidewalk Labs believes that providing open access to data that has been expressly collected for the purpose of improving mobility, sustainability, accessibility, economic opportunity, and other aspects of urban life would have an even greater potential impact than much existing open data.


As described on Page 424, in the section on RDU Guidelines, Sidewalk Labs proposes that properly de-identified and non-personal urban data be made publicly accessible by default, enabling others to use it to create new services, tools, or products.

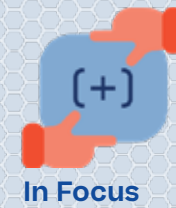
As an extension of this policy, Sidewalk Labs proposes that this information be integrated into existing open-data portals containing relevant urban data, including the Open Smart Cities Framework, the Toronto Open Data Portal, and the Ontario Open Data Catalogue — expanding access even further.

## Open source

Once data is made publicly available in standardized formats through well-documented interfaces, anyone with sufficient expertise could, in principle, create innovations that integrate with urban infrastructure and digital services. But that does not make it easy. Parsing the standard formats, processing public data for particular common purposes, or communicating with APIs often takes a lot of time and effort — and reduces the likelihood that innovators will engage and succeed.

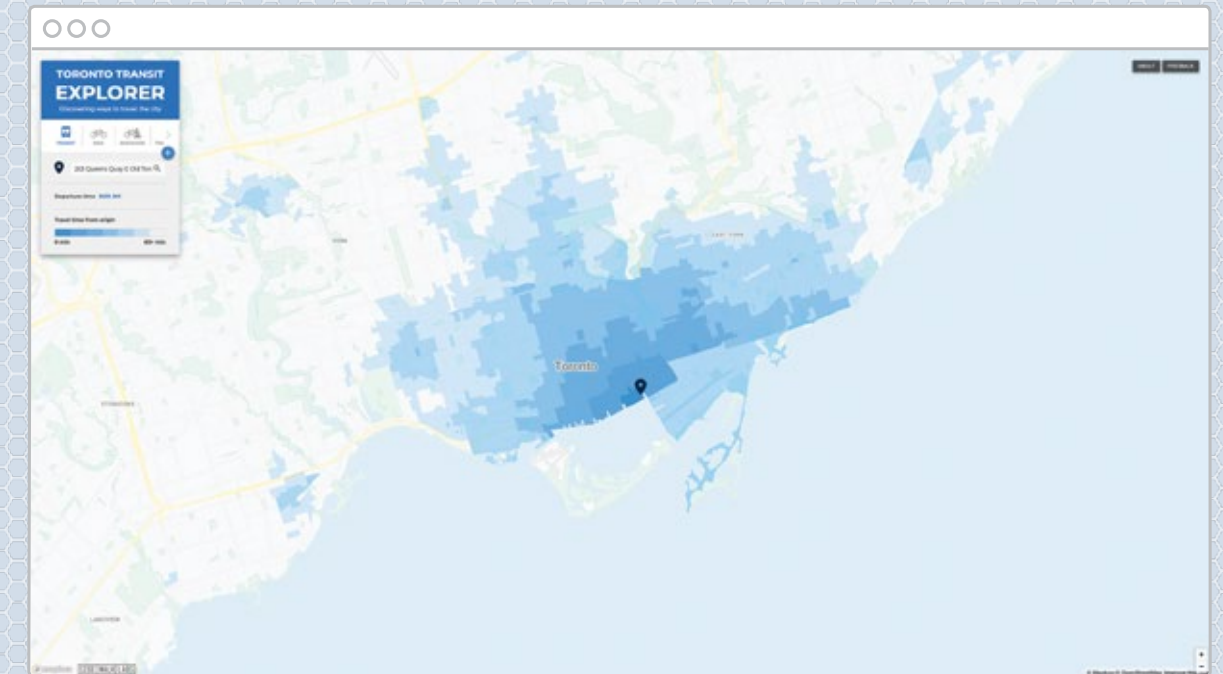
Where there are common tasks like these, Sidewalk Labs plans to share its software code publicly as “open source” — under licences like the Apache License (Version 2.0) or the MIT License — and encourage others to do the same. This approach has become common practice in the software industry, because it increases engagement with software systems. Over time, with contributions from software engineers across the world, this approach creates more robust and useful software.

In keeping with the belief that open-source tools inspire creative new uses, Sidewalk Labs has released several of its tools as open source, including the CommonSpace app for supporting public life studies and the Toronto Transit Explorer prototype (available through the Sidewalk Toronto website). Sidewalk Labs plans to continue doing so in the future and to encourage others to do the same. 



### Sidewalk Labs case study

# Launching an open-source transit tool



**The Toronto Transit Explorer’s open-sourced data format, front-end visualization, and server code enable others to improve the tool over time.**

As an exercise in getting to know Toronto, while using open data and open-source software, Sidewalk Labs developed and launched a tool called the Toronto Transit Explorer in 2018.<sup>25</sup> The tool lets Torontonians explore how easy it is to get from any point in Toronto to any other using a range of travel modes.

To create this tool, Sidewalk Labs improved an existing open-source transit router called R5, adding features such as the ability to combine bike-share and transit into a single trip, as well as the ability to filter for wheelchair-accessible transit. Sidewalk Labs published these changes publicly so others could take advantage of these improvements in the future.

Sidewalk Labs then created a web application for exploring Toronto’s transportation options and a server that used the improved R5 router to calculate data on the fly for the user interface.

Early iterations of the app were shared at the first two Sidewalk Toronto Public Roundtables and at a Civic Tech Toronto meetup. This important community feedback led to a redesign that made it easier for people to choose their origin and destination points.

To enable others to take this work and create new apps and variations along similar lines, Sidewalk Labs open-sourced the Toronto Transit Explorer front-end visualization as well as the server code under the Apache License (Version 2.0). Sidewalk Labs has since received feature requests, code contributions, and ideas for improving the tool from doctoral students, urban planners, software engineers, and members of the Toronto community who saw the potential for using the tool in their own work.



See the “Public Realm” chapter of Volume 2, on page 118, for more details on CommonSpace.



Setting Data Standards  
That Are Open and Secure

# Use best-in-class resiliency and security

The digital systems and services proposed in the MIDP would help improve street safety, clean energy use, construction efficiency, and more. But connecting these systems creates new risks; intentional actions, inadvertent disruptions, even weather-related or environmental events could have a negative impact on digital services or infrastructure.

Planning for these risks requires a high level of security and reliability. Technologists often focus on digital security to prevent intentional acts. Sidewalk Labs plans to build on that foundation to ensure that the digital technology used in the IDEA District is resilient as well as secure. Digital systems should not only be secure from hackers — they should also be reliable in the face of inadvertent actions or environmental effects and maintained in a way that keeps them functioning at a consistent level over time.

resilience of critical systems, and are parallel to the software architecture concept “security by design.” Security by design refers to the principle that rather than being an afterthought, security should be considered at the beginning of the systems design process. This approach avoids designing a system or service in a way that makes security less effective or more difficult to implement.

## Preventing disruption

Digital systems should, wherever possible, use public standards and open-source software with strong institutional and community support. This approach includes using tools like OpenSSL and the Linux kernel, which large organizations and governments around the world already depend on.

By using these tools, if a potential failure mode is discovered, a significant global community with a shared sense of urgency can help to address the issue. If any participating member of the community discovers a problem, all members can contribute to and benefit from the fix. Sidewalk Labs plans to use the Common Vulnerabilities and Exposures system — a public catalogue of security threats used by many other public- and private-sector digital service providers — to learn about and mitigate potential problems.

Additionally, Sidewalk Labs plans to give preference to the modularity of systems whenever possible, making it easier to

isolate any component of a system that might experience a disruption and to replace any individual component with newer technology.

When open-source software is not available, Sidewalk Labs plans to develop tools in concert with the security community. This effort could include inviting security and reliability researchers to test various systems, following the industry practice of issuing “bug bounties” to researchers who responsibly disclose issues or help patch vulnerabilities. Sidewalk Labs plans to run regular tests with a “red team” to simulate security breaches and failures.

As new technology emerges, best practices change. That makes specific recommendations (such as using a certain encryption method) less appropriate, effective, and nimble than having a broad strategy to remain up-to-date with — and be able to adjust in response to — emerging recommendations by the security community. Sidewalk Labs plans to use this broader, more resilient approach for all the technologies it develops or maintains.

For example, when using cryptography, Sidewalk Labs would not develop its own methods of encryption, and instead would use algorithms certified by the Cryptographic Algorithm Validation Program, the cryptographic standards program run by the U.S. National Institute of Standards and Technology and the Canadian Communications Security Establishment. Similarly, Sidewalk Labs plans to follow security and reliability standards defined by the greater community, including two notable benchmark security standards, SOC2 and ISO27001, for applicable products and services.

## Technical spotlight

# Current Sidewalk Labs cybersecurity practices

Though best practices in cybersecurity are always evolving, there are a number that Sidewalk Labs follows today, including:

- **Encrypting** as much data as possible in storage and in transit using AES keys of 256 or 512 bits
- **Storing** keys in a key management system backed by FIPS 140-2 Level 3-certified hardware security modules
- **Enabling** client-managed encryption keys running on top of the same modules for any storage or computing resources to third parties
- **Using** HMAC to ensure message integrity with symmetric encryption
- **Preferring** elliptic-curve-based approaches over RSA for asymmetric encryption and digital signatures
- **Using** SHA-256 for general hashing and bcrypt for passwords
- **Preferring** multi-factor authentication methods over passwords alone
- **Routing** all traffic through TLS and, when that is not an option, physically partitioning devices from other networks

**Key Term**  
**Security by design**  
refers to the principle that security should be considered at the beginning of the design process, rather than being an afterthought.

Sidewalk Labs’ approach to digital reliability emphasizes three design goals. First, as much as possible, prevent disruptions and the loss of functionality. Second, rapidly detect any loss in functionality or increased risk of loss of functionality through audits and other approaches. And third, prepare to rapidly restore functionality to any service that experiences a disruption.

These priorities are modelled after the standard approach taken by government and municipal services to ensure the



## Detection and auditability

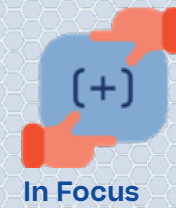
Ongoing auditability is an important way for the security community to confirm the integrity and reliability of a digital system. Sidewalk Labs plans to use auditing systems such as Trillian to achieve this objective and would closely follow the state of security research to maintain best-in-class approaches.

Additionally, Sidewalk Labs would have regular third-party audits of any platforms and code it maintains, not only to confirm that it is consistent in running the same software it shares but also to confirm that it meets the quality expected by the Urban Data Trust. As part of this effort, Sidewalk Labs plans to build both technical and policy-based controls to provide strong assurance to the community that the digital systems it implements are behaving consistently with the Urban Data Trust's expectations.

Another key approach to transparency and auditability is the use of modular systems. Modularity enables a high degree of transparency: even when data itself is encrypted, the amount of data being transferred between systems can be shared, when appropriate, to provide guarantees about what is being saved and transferred. For example, an auditor who sees a very low amount of data leaving a computer-vision camera would know that data is being processed on-site and that the raw video is being deleted — even while the data itself would not be visible to the auditing party.

Finally, Sidewalk Labs is eagerly evaluating the growing field of transparency and auditability for machine learning and artificial intelligence. As the field develops, Sidewalk Labs plans to synthesize findings and principles established as best practices in industry and academia. Broadly, Sidewalk Labs believes that machine learning should be as auditable and transparent in its decisions as traditional software and engineering are (see sidebar).

In the case of a disruption, practicality may require keeping information temporarily contained to the people managing the incident and relevant authorities; for example, security vulnerabilities need to be patched before they are shared. But Sidewalk Labs plans to give strong preference to publication, including regular external audits, and commits to sharing publicly full post-mortems of any incident or report once resolved or stabilized.



# Sidewalk Labs' commitment to "Responsible AI"

Many Canadians interact with artificial intelligence systems on a daily basis. Some applications of AI are as benign as email spam filters. Others carry more significant impacts, such as how banks approve loan applications.

One very common example of AI exists in "recommender" systems, which try to predict the preference or rating an individual would give to an item. Recommender systems function by collecting and analyzing the behaviour or activity of individuals and by comparing individuals to others who are similar to them. Many common recommender systems are considered helpful — for example, they can pre-populate a music playlist based on listening history. But some recommender systems can impact individuals in more significant ways or reveal potentially sensitive information about that individual.

The continued development and use of AI systems raises digital governance challenges that go beyond privacy. It is possible for organizations to be in full compliance with privacy laws yet still use data in ways that could impact people in harmful or unexpected ways.

To help protect against these unexpected outcomes and guide its use of AI, Sidewalk Labs has developed a Responsible AI framework guided by six overarching principles that are contextual, progressive, and applicable to all types of technology (existing and future). This framework is inspired by leading international standards, such as the Declaration on Ethics and Data Protection in Artificial Intelligence, which was signed by the Privacy Commissioner of Canada.<sup>26</sup>

(These principles would work alongside the proposed RDU Guidelines described on Page 424.)

### **Fairness and equity.**

All projects involving AI systems should be designed and developed responsibly from the start and should consider an individual's reasonable expectations and the original purposes of data collection.

### **Accountability.**

Organizations should always remain accountable for the AI systems they create and deploy.

### **Transparency and explainability.**

Individuals should be informed when they are interacting directly with an automated system and when their personal information is being used to make consequential decisions about them. When feasible, AI systems should be designed with the ability to be explained in terms people can understand. In addition, AI inputs (or training sets) and potential biases should be understandable and debuggable.

### **Relevance.**

All AI systems should be developed and designed with high standards of scientific excellence and with a multi-disciplinary approach that includes sharing research and best practices with regard to AI.

### **Value alignment.**

AI systems should be designed, developed, and used in line with international human rights and local community values.

### **Respect for human dignity.**

Individual autonomy and agency should be upheld through a diverse and multi-disciplinary design process. AI systems should be used to empower individuals and communities and enhance public engagement.

## Preparedness and response

Designing plans for detection of or response to incidents requires anticipating potential issues (a practice known as “threat modelling”) and setting up processes for continuous readiness to respond to a service disruption.

Threat modelling is an iterative process that seeks to identify the assets of an application or service that are at risk of disruption. These assets are then reviewed for mitigations of potential issues (or “threats”) against their integrity. The risks posed by these threats are evaluated by taking into account factors such as the likelihood of some external factor triggering a disruption.

Response readiness focuses not only on preparing plans for responding to the threats generated in the modelling exercise, but also on ongoing drills to practice the plan. In many cases, this readiness requires staff, drills, and ongoing collaboration with external stakeholders to ensure that there are clear lines of communication in the event of an incident.

Each digital system that Sidewalk Labs implements for the Sidewalk Toronto project would use a preparedness assessment (see Page 413) to provide clear answers to key questions on threat modelling and response readiness. These assessments would be reviewed by a Sidewalk Labs security team as well as by parties that operate or maintain relevant dependent systems; for example, the potential for a problem with a traffic management system (an upstream system) requires designing a strong line of communication with emergency services (a downstream dependent).

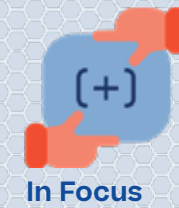
## Prioritize data residency

The decision on where to store data (known as data residency) is based on many considerations, including whether there is sufficient technical and physical architecture to store the data securely, the cost of storing the data abroad versus in the organization’s home country, and applicable laws.

As with all matters relating to data, Sidewalk Labs’ approach begins with a baseline that abides by existing laws. Canada’s federal private-sector privacy law does not require data to be stored or processed solely within Canada. Instead, it seeks to make organizations accountable by imposing obligations to ensure that data is properly safeguarded. Similarly, the federal and provincial public-sector privacy laws that may be applicable do not dictate data residency. Sidewalk Labs continues to monitor developments in this area, including the Office of the Privacy Commissioner of Canada’s consultation on the transborder flow of data, initiated April 9, 2019.

During the development of the MIDP, Sidewalk Labs engaged with numerous stakeholders and community interest groups to guide its approach to data residency, and heard clearly the desire to store data in Canada. For that reason, Sidewalk Labs commits to using its best efforts at data localization — for storage, processing, and communication — as long as there are Canadian-based providers who offer appropriate levels of security, redundancy, and reliability. To the extent that it is deemed infeasible to store data solely in Canada, Sidewalk Labs would be transparent about such a decision.

Information about data residency would be part of the proposed RDU Assessment (see Page 429) required for all parties.



# Preparedness assessments enable faster responses to security risks

To improve security and resiliency for digital systems, Sidewalk Labs plans to use a preparedness assessment. Such documents aim to identify security risks as well as mitigation approaches through questions around threat modelling and response readiness.

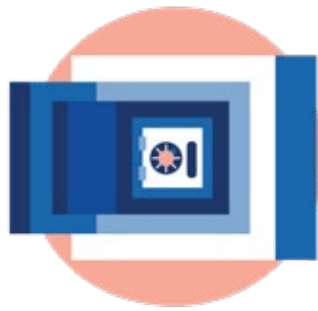
The questions on this page are included here for illustrative purposes only.

## Threat modelling

- What are the ways in which this service could be disrupted (such as partial outage, corrupted data, full outage, and illicit access or control)?
- For each of these scenarios, how will the disruption be detected? Could the disruption avoid detection?
- Assess the likelihood of each disruption and (if available) any potential known ways that each disruption could be triggered.
- For each of these scenarios, are there up-front investments that can lessen their effect?
- For each of these scenarios, will any systems external to the service be affected?
- For each potentially affected service listed above, what is the escalation path for notifying that service of a disruption?

## Response readiness

- For each of the scenarios above, please provide a playbook describing a communication and mitigation plan.
- Will there be “on call” staff available for response?
- How regularly will there be drills practicing the protocol outlined in the playbook?
- **If no**, outline a response plan that obviates the necessity for staffing.
- Do these drills involve downstream and upstream stakeholders?
- **If yes**, outline the responsibilities and training for this staff. Also outline a continuity plan for maintaining this staff.



# Creating a Trusted Process for Responsible Data Use



## Key Goals

1 **Implement the Urban Data Trust**

2 **Establish RDU Guidelines**

3 **Set a clear process for urban data use or collection**

In addition to flexible digital infrastructure and published standards, a third core condition for digital innovation is instilling community trust that information collected in cities will preserve the privacy of individuals and be used for the greater good — while promoting the growth of new businesses and the rise of new tools to improve urban life.

The pace of change for digital technologies such as the internet, social networks, and artificial intelligence has accelerated globally. When Canada established its federal private-sector privacy law, known as the Personal Information Protection and Electronic Documents Act (PIPEDA), some 20 years back,<sup>27</sup> just 42 percent of the population owned a personal computing device and smartphones did not exist.<sup>28</sup>

Canada is poised to lead a change. Canada recognizes privacy as a fundamental human right, with the right to privacy rooted in the Canadian Charter of Rights and Freedoms.<sup>29</sup> On top of that foundation, recent conversations convened by federal, provincial, and municipal regula-

tors have called for stronger national and provincial data strategies that protect individual privacy while enabling companies to create valuable new services using data, rather than competing to own data outright.

All three levels of government are at various stages of consultations with the public. The Government of Canada launched national consultations on digital and data transformation in 2018.<sup>30</sup> Ontario launched its data strategy consultations in early 2019.<sup>31</sup> The City of Toronto also announced it would begin to develop a city-wide policy framework and governance model associated with digital infrastructure.<sup>32</sup>

The Sidewalk Toronto project itself has sparked significant conversations about a new approach to digital governance in cities, generating new ideas from Canadian experts, stakeholders, and the public. This ongoing, comprehensive engagement and consultation has shaped the ideas Sidewalk Labs is proposing in this MIDP and would continue to help them evolve with the project.

## How public consultation shaped Sidewalk Labs' ideas

To receive guidance on a full range of issues relating to responsible data use, Sidewalk Labs convened a Data Governance Working Group made up of independent experts and community representatives. Sidewalk Labs and this group have benefited from other insights, including those of Waterfront Toronto's Digital Strategy Advisory Panel.<sup>33</sup> Sidewalk Labs also consulted with all levels of government, and met with the Office of the Privacy Commissioner of Canada, the Information and Privacy Commissioner of Ontario, and various departments within the City of Toronto.

Such collaboration has been critical, because there is no comprehensive and unified digital governance model in Canada for the type of community Sidewalk Labs hopes would emerge within the IDEA District. The aforementioned consultations being driven by the three levels of government represent important starts to this conversation, and Sidewalk Labs offers the proposal in this chapter for consideration.

Over the course of its own public consultation to date, Sidewalk Labs has heard three key themes that have helped shape its proposal.

## Canada is poised to lead a global change when it comes to data governance strategies.

# 1

## What we heard: Protect more data.

The first theme was a recognition that while it is paramount to protect personal information, as Canada's privacy laws currently do, individual privacy is only part of the discussion around responsible data use.

Existing privacy laws only apply to or protect "personal information," meaning information about an identifiable individual. Sidewalk Labs heard through its consultations that Torontonians are also concerned about the collection and use of data gathered in the city's public realm, publicly accessible spaces, and even some private spaces — whether or not that data identifies specific individuals.

This type of data collection merits special focus for a variety of reasons. Its collection in public spaces raises concerns about surveillance that are exacerbated by computer processing power and the proliferation of sophisticated digital tools, such as cameras and sensors. Certain types of this data might reasonably be considered a collective public asset. Individuals are also not always aware of either the collection or use of such data. For example, in the case of on-street pedestrian counters or lobby cameras, collection and use notices often lack adequate information to fully inform individuals, are not visible until the individual is within the field of view, do not consider language barriers, or are absent altogether.

Furthermore, Torontonians are concerned about how the collection and use of non-personal information could impact groups of people or the community.

For example, federal privacy commissioner guidance encourages companies to consider the potential impacts that

aggregated or de-identified data can have on individuals or communities at large, but companies could benefit from further guidance and comprehensive standards.<sup>34</sup>

## How we responded:

### A new category of "urban data."

For all these reasons, Sidewalk Labs proposes a new category of data called "urban data" that includes both personal information and information that is not connected to a particular individual. The term "urban data" nods to the fact that it is collected in a physical space in the city and may be associated with practical challenges in obtaining meaningful consent. Urban data therefore seems worthy of additional protections.

Urban data would be broader than the definition of personal information and include personal, non-personal, aggregated, or de-identified data (see sidebar) collected and used in physical or community spaces where meaningful consent prior to collection and use is hard, if not impossible, to obtain. In that sense, urban data would be distinct from more traditional forms of data, termed here "transaction data," in which individuals affirmatively — albeit with varying levels of understanding — provide information about themselves through websites, mobile phones, or paper documents.

The proposed responsible data use process would protect urban data while building on existing protections for personal information — knowing that both urban data and transaction data must be handled responsibly for a better city.

Of course, the creation of a new term creates positives and negatives for companies and regulators alike, and Sidewalk Labs welcomes additional discourse on this term and its use in the context of the Sidewalk Toronto project.



## In Focus

There are different ways urban data can be categorized, each with different impacts on individuals and groups of people.

Non-personal data is data that does not identify an individual and can include other types of non-identifying data that is not about people. Some examples of non-personal data are aggregated data sets, machine-generated data (such as weather and temperature data), or data on maintenance needs for industrial machines. There are many benefits for consumers and members of industry to processing this type of data. The European Union recently passed a regulation protecting the free flow of non-personal data.<sup>35</sup> Even though non-personal data is not about identifiable individuals, it can still have unintended harmful impacts on people — for example, if AI systems use aggregated data sets to make predictions or recommendations to individuals.

Aggregate data is data that is about people in the aggregate and not about a particular individual. Aggregate-level data is useful for answering research questions about populations or groups of people. For example, aggregate counts of people in an office space can be used in combination with other data, such as weather data, to create an energy-effi-

## Explainer

# Four types of urban data

ciency program so consumption is controlled, with the goal of saving money and reducing energy use. As with other types of data, the use of this data can have bias and fairness consequences.

De-identified data is data about an individual that was identifiable when collected but has subsequently been made non-identifiable. Third-party apps and services may wish to use properly de-identified data for research purposes, such as comparing neighbourhood energy usage across a city. When data is de-identified correctly — using principles including k-anonymity, and frameworks such as differential privacy — it is no longer personal information. While de-identification of data may not completely eliminate the risk of the re-identification of a data set, when proper guidelines and techniques are followed, the process can produce data sets for which the risk of re-identification is very small. The Information and Privacy Commissioner of Ontario has released a set of De-identification Guidelines for Structured Data, which provide basic concepts of and techniques for de-identification. The guidelines highlight the key issues to consider when de-identifying personal information and provide a step-by-step process for removing personal information from data sets. The

biggest risk of using de-identified data is that it is sometimes possible to link pieces of information together to re-identify the individual.<sup>36</sup> This risk can be mitigated by having trusted external experts regularly attempting re-identification in a controlled environment, in order to harden the system.

Personal information has a legal definition in Canada and is the subject of privacy laws, including PIPEDA.<sup>37</sup> The broad legal definition of personal information includes any information that could be used, alone or in combination with other information, to identify an individual or that is associated with an identifiable individual. Individuals routinely share their personal information with governments and businesses, whether applying for a licence or business permit, shopping, or ordering a ride-hail service. In some cases, personal information has to be shared to receive the service; for example, when people order food for delivery, the restaurant needs to know where to deliver it. Individuals often receive benefits from sharing their personal information, but society has seen many of the harms from illegal or unethical uses of personal information.

# 2

## What we heard:

### Consider urban data a public asset.

A second big theme heard during public consultation was that, in addition to personal and collective privacy, Torontonians are concerned with the ownership and stewardship of urban data.

Increasingly, some types of urban data can be understood as a community or collective asset. Take the example of traffic data. Since that data originates on public streets paid for by taxpayers, and since the use of that data could have an impact on how those streets operate in the future, that data should become a public resource.

In its extensive consultations with the public, stakeholders, government, and expert advisors, Sidewalk Labs heard that data collected in the public realm or in publicly owned spaces should not solely benefit the private or public sector; instead, it should benefit multiple stakeholders, provided any privacy risks have been properly minimized.

Part of using data responsibly involves making sure that no one entity — Sidewalk Labs or another — controls urban data that could reasonably be considered a public asset. The opportunities to use urban data to create new digital innovations must be available to everyone, from the local startup to the global corporation.

## How we responded:

### An independent Urban Data Trust.

If urban data is a common good, it should not be exclusively “owned” in the traditional sense. The question then becomes: Who should be the steward of urban data? Sidewalk Labs proposes that an independent entity called the Urban Data Trust manage urban data and make it publicly accessible by default (if properly de-identified).

As described on Page 420, part of this entity’s responsibilities would involve establishing an accountable and transparent process for approving the use or collection of urban data in the first place, given the potential of urban data to impact people’s daily lives.

# 3

## What we heard:

### Apply consistent guidelines.

A third major theme emphasized by public consultation was that Sidewalk Labs should not have a special advantage in the development of urban innovations. Quayside and the IDEA District must welcome all kinds of local companies, entrepreneurs, researchers, and civic organizations using urban data to improve life.

## How we responded:

### A single process for all parties.

The process proposed applies to all entities that seek to collect urban data in the IDEA District, including Sidewalk Labs.

## The result: A proposed process for using urban data managed by an independent entity

These insights formed the basis of Sidewalk Labs’ proposal for responsible data use, which builds on the strong foundation established by privacy laws and aims to establish an enhanced privacy standard.



Provincial and federal privacy commissioners would continue to oversee compliance with all privacy laws. Additionally, this proposal calls for the establishment of an independent Urban Data Trust, tasked first with establishing a set of RDU Guidelines that would apply to all entities seeking to collect or use urban data in the IDEA District and, second, with implementing and managing a four-step process for approving the responsible collection and use of urban data:

### 1 2 Step 1:

#### 3 4 Classify the data.

Does the proposed data activity involve urban data, and if so, does it involve personal information?

### 1 2 Step 2:

#### 3 4 Submit an RDU Assessment.

How would the data be used and collected? What measures, such as consent or de-identification, would be taken to ensure privacy and avoid harm?

### 1 2 Step 3:

#### 3 4 Receive a decision.

Do the benefits outweigh the risks enough to merit approval by the Urban Data Trust?

### 1 2 Step 4:

#### 3 4 Meet post-approval conditions.

Have devices been registered? How would access be facilitated? How would auditing occur?

The following sections describe the proposed implementation of the Urban Data Trust in greater detail, propose initial RDU Guidelines for consideration, and describe each of the proposed steps required when applying to use or collect urban data. This description is followed by two examples of how the process could work for digital innovations.

(This particular proposal is just one of many that should be considered on this important topic. Sidewalk Labs also supports the consideration of other recent proposals, including from MaRS<sup>38</sup> and the Toronto Region Board of Trade,<sup>39</sup> calling for independent entities whose mandate could be to govern data collection and use, provide oversight of digital technologies, enhance radical transparency for the placement of sensors in the public realm, and encourage that standards are published to enable third-party innovation.)



# Implement the Urban Data Trust

**Key Term**  
An independent  
**Urban  
Data Trust**  
would oversee all  
requests to use or  
collect urban data.

Sidewalk Labs proposes that the Urban Data Trust oversee matters of the digital governance of urban data for the IDEA District, including the approval and management of data collection devices placed in the public realm, as well as addressing the challenges and opportunities arising from data use, particularly those involving algorithmic decision-making. (Note that this entity is not intended to be a “trust” in the legal sense; see sidebar on Page 423.)

Sidewalk Labs believes the Urban Data Trust should be managed through a democratic process, but also recognizes that the novelty, complexity, and scale of this approach means that it could take some time to figure out how to appropriately implement the entity. For these reasons, Sidewalk Labs proposes that the Urban Data Trust could be implemented in two phases.

A first phase would be focused on getting the entity up and running quickly to establish the rules and give it experience working through use cases, perhaps first working through Sidewalk Labs’ proposed use cases in Quayside; a second phase would work towards a more long-term solution.

## Initial implementation period

Sidewalk Labs proposes that initially the Urban Data Trust be implemented through the final agreement between Waterfront Toronto and Sidewalk Labs. The agreement would call for the creation of the Urban Data Trust as the independent digital governing entity for the Sidewalk Toronto project (not controlled by either Sidewalk Labs or Waterfront Toronto). A key component of the agreement would require any organization requiring a permit to build or operate in the IDEA District to consider whether they plan to engage in data-gathering activities. If those activities would involve the collection or use of urban data, the agreement would require that the organization apply to the Urban Data Trust and obtain its approval before urban data collection and use could occur.

The agreement would also set up the structure of this initial Urban Data Trust and authorize that a non-profit entity be created with the charter to address the digital governance challenges related to urban data while also promoting data-driven innovations that benefit individuals and society. Sidewalk Labs proposes that this entity would have a board consisting of five members. The board initially could include a data governance, privacy, or intellectual property expert; a community representative; a public-sector representative; an academic representative; and a Canadian business industry representative.

The board could act in ways similar to Internal Review Boards or Research Ethics Boards in academic institutions for research, or to content moderation boards set up in-house at social media companies. In these examples, a team of experts are assembled to review and assess whether certain decisions should be made while balancing different interests. The independence of the board would be ensured by the application of best practices such as diverse representation of interests, term limits, staggering term lengths to ensure balanced succession, maintaining appropriate boundaries with clear conflict of interest policies, and other measures.

The proposed board would also hire (as an employee of the Urban Data Trust) a Chief Data Officer to run the entity’s daily operations. This position could be filled by a data governance and privacy expert, potentially similar to the type of experience a former privacy commissioner might have.

Under the direction of the board and requiring its approval, the Chief Data Officer would be responsible for developing the charter for the Urban Data Trust; promulgating RDU Guidelines that apply to all parties proposing to collect urban data, and that respect existing privacy laws and guidelines but also seek to apply additional guidelines for addressing the unique aspects of urban data (see Page 424); structuring oversight and review processes; determining how the entity would be staffed, operated, and funded; developing initial agreements that would govern the use and sharing of urban data; and coordinating with privacy regulators and other key stakeholders, as necessary.

Sidewalk Labs anticipates that the Chief Data Officer would use a number of resources to inform its decisions, including the RDU Guidelines, the RDU Assessments (see Page 426) completed by proposed data collectors, published guidance from privacy regulators, and input from the board. The Chief Data Officer’s decisions would be made to ensure that all actors in the IDEA District comply with applicable laws, such as PIPEDA and provincial or municipal privacy laws. The Chief Data Officer and the board would also develop protocols on when and how data could be stored outside of Canada.

## Urban data agreements.

During the initial implementation period, the Urban Data Trust entity would enter into contracts with all entities, institutions, and organizations that are approved to collect or use urban data in the IDEA District. The contracts (“urban data agreements”) could be similar to data sharing agreements or data licence agreements and include parameters that govern the collection, disclosure, storage, security, analysis, use, and destruction of urban data. Since these terms would be stipulated in the contracts, the breach of any term would be legally enforceable, with breaches actionable in court by the Urban Data Trust entity. The Urban Data Trust could also publish breach notifications about data collectors who fail to comply with the contract, and the contracts could potentially provide the entity with the right to enter onto property and remove sensors and other recording devices if breaches are identified.

### Funding.

While the details on funding the initial implementation of the Urban Data Trust would need to be worked out in a consultation process, Sidewalk Labs proposes that as part of each contract, each party that desires to collect and use data in the designated geography pay a data collection and use administration fee to cover the costs of the Urban Data Trust. These costs would include salaries for the Chief Data Officer and the staff to manage applications, reviews, audits, and enforcement, as well as honoraria and other customary expenses for the board.

### Longer-term options

After a certain period of time — once the Urban Data Trust has overseen the collection and use of data in the IDEA District and has gone through multiple use cases with provincial and federal privacy regulators — it is possible that other, more enduring arrangements could be implemented.

*Looking long-term, Sidewalk Labs puts forth that the Urban Data Trust could be transformed into a public-sector agency or a quasi-public agency, either of which could give it more long-term viability or broader coverage.*

Public-sector agencies receive their mandate from enabling legislation, are responsible for performing a public function or service, and are accountable to the minister responsible for that legislation. An advantage of transforming the Urban Data Trust into a public-sector agency is that the concept and process could then be applied to a wider group of organizations and places where similar technologies are being deployed. A disadvantage is that housing the Urban Data Trust in a public-sector entity would require new or amended legislation, and the passage of legislation can take time and would need to account for emerging technologies.

Sidewalk Labs notes that the Toronto Region Board of Trade recommended that the Toronto Public Library (a public-sector agency) be charged with the responsibility and authority for a Toronto Data Hub, citing the library's expertise in managing data and its credibility and trustworthiness to put the public interest first.<sup>40</sup> Sidewalk Labs supports a further review of this proposal.

Quasi-public bodies include entities that have been granted authority to act in the public interest, but that are at arm's length from government. For example, in Ontario, certain professions are governed by self-regulatory colleges, which regulate those professions in the public interest.<sup>41</sup> These colleges are responsible for ensuring that their regulated professionals act in a safe, professional, and ethical manner. They have the power to set practice and competency standards, investigate complaints about members, and, where appropriate, discipline members. The advantages of a quasi-public body include that it can act independently of government and that its reason for existence is to protect the public interest. A disadvantage is that these agencies are usually publicly funded until they can be fully self-funded.

Sidewalk Labs believes each of these options to be credible and worthy of further discussion in collaboration with Waterfront Toronto's Digital Strategy Advisory Panel, government, the community, academia, and industry.

### Consultation spotlight

## Why the “Civic Data Trust” became the “Urban Data Trust”

One of Sidewalk Labs' initial proposals for responsible data use called for an independent Civic Data Trust to be the steward of urban data.<sup>42</sup> Sidewalk Labs heard consistent feedback from many advisors and critics who felt that calling this entity a “trust” raised questions such as: “Who would be the trustee, and who are the beneficiaries?”

Sidewalk Labs notes that this entity is not intended to be a “trust” in the legal sense — legal trusts are not designed to benefit the general public. Instead, Sidewalk Labs aligns with the definition of a data trust from the Open Data Institute, a U.K. non-profit, as “a legal structure that provides for independent stewardship of data,” as articulated in the institute's 2019 report, “Data trusts: lessons from three pilots.”

While Sidewalk Labs proposes a non-profit entity, the final legal structure (and name) would be determined based on input from government, the community, researchers, and industry. Sidewalk Labs also now calls this entity the “Urban Data Trust” to clarify the proposed responsibilities.

Additionally, Sidewalk Labs heard that some people prefer to use the term “digital” rather than “data,” as the considerations of an entity like the trust extend beyond data to all digital matters. Sidewalk Labs agrees and believes that the proposed RDU Guidelines and Assessment embrace this concept by assessing the broader issues arising from digital innovations and data ethics.





Goal 2

Creating a Trusted Process for Responsible Data Use

# Establish RDU Guidelines

Sidewalk Labs believes that an essential early step for the Chief Data Officer would be to create a set of RDU Guidelines that establish clear, common standards for responsible data use and can be applied consistently to all parties engaged in the collection and use of urban data.

The RDU Guidelines should address the concerns around privacy and data ownership that have been raised about the Sidewalk Toronto project, recognizing that similar concerns apply to other entities engaging in similar work. Rather than being constrictive, these rules should provide greater clarity and transparency to all innovators who want to set up shop and use data in a responsible way.

Sidewalk Labs believes the RDU Guidelines should build on the world-renowned approach to privacy called Privacy by Design, which outlines principles that should be implemented from the very beginning of a data activity to embed privacy protections into the design, operation, and management of a product, project, operation, or service.<sup>43</sup> But the proposed RDU Guidelines should go beyond privacy to address key areas of digital governance, ethics, and open access to information, as well as the ways in which aggregate or de-identified data can impact individuals and groups of people through the use of advanced analytics, such as artificial intelligence.

Sidewalk Labs believes the Urban Data Trust would be in a position to determine the most appropriate RDU Guidelines. For consideration as an initial set, however, Sidewalk Labs submits the following guidelines, which it has implemented internally for pilots that undergo privacy assessments:



### Beneficial purpose.

All proposed uses of urban data must incorporate Canadian values of diversity, inclusion, and privacy as a fundamental human right. To meet this standard, there must be a clear purpose and value to any proposed use of urban data, as well as a clear, direct connection to the ways in which the project and proposed data collection activity would benefit individuals or the community. A proposal or project should not be collecting data for the sake of having data.



### Transparency and clarity.

Organizations should inform individuals of how and why data would be collected and used, and should do so in a way that is proactive, clear, and easy to understand. Organizations should provide examples of how they plan to inform individuals about the data-collection activity.



### Data minimization, security, and de-identification by default.

Organizations should collect the minimum amount of data needed to achieve the beneficial purpose and use the least invasive technology available to achieve the beneficial purpose. Organizations should seek to use up-to-date de-identification techniques to reduce the amount of personal information that they collect and use. Organizations should demonstrate the need for the amount of data to be collected and should be prepared to detail what, if any, personal information is desired; what they are planning to do with it; what safety and security safeguards would be used to protect individuals; and how these efforts would be audited.



### Publicly accessible by default.

Organizations should make properly de-identified or non-personal data that they have collected publicly accessible to third parties by default, formatted according to open standards. This approach would help to ensure that individual privacy is preserved while also enabling data and source code to be accessible by others to catalyze innovation. Organizations should be prepared to detail their methods for making such data publicly accessible, and to justify any plans to restrict data access.



### No selling or advertising without explicit consent.

While there would not be proposed prohibitions placed on data collectors who would like to sell data containing personal information or to use such data for advertising, a higher level of scrutiny should be placed on projects that want to use personal information for these purposes. Organizations that want to engage in this activity have an obligation to follow all applicable privacy laws; they should also provide clear justifications for this activity and demonstrate (with examples) how they plan to obtain explicit consent from the affected individuals. Such precautions are necessary because individuals often do not know when their personal information is being sold or used for such purposes.

*(Sidewalk Labs has already committed publicly that it would not sell personal information to third parties or use it for advertising purposes. It also commits to not share personal information with third parties, including other Alphabet companies, without explicit consent.)*



### Responsible AI principles required.

To ensure that issues around the use of artificial intelligence systems are being considered and addressed by data collectors and developers, organizations should be required to detail if they are going to be developing AI systems. If so, they should be required to show how they have incorporated Responsible AI principles into their development and decision-making to reduce the likelihood of biased and unethical outcomes. (See Page 411 for more information.)

Key Term

## Privacy by design

is a world-renowned approach to privacy that outlines principles that should be implemented from the very beginning of a data activity.





# Set a clear process for urban data use or collection

Sidewalk Labs proposes that once the Urban Data Trust and RDU Guidelines have been established, a transparent, four-step process should be created for any proposals seeking to collect or use urban data in the IDEA District.

## 1 2 Step 1: 3 4 Classify the data

Step 1 would involve the person or entity determining whether or not its proposal involves urban data, transaction data, or both types.

### Urban data.

If the data activity involves the collection or use of urban data, then Sidewalk Labs proposes that the data collector must move on to Step 2 of the process, which calls for submitting an RDU Assessment to the Urban Data Trust (see sidebar on Page 428).

Urban data can include information collected in the public realm — defined as commonly shared spaces not owned by a private entity, such as streets, squares, plazas, parks, and open spaces — by devices such as pedestrian counters or traffic cameras. It can include information collected in privately owned but publicly accessible spaces, such as building lobbies, courtyards, some parks, ground-floor markets, and retail stores. And it can include information collected by a third party in private spaces, such as data on tenant or building noise, air quality, and energy use.

### Transaction data.

If the data activity solely involves the collection and use of transaction data, then no assessment is required.

Transaction data is information that individuals consent to providing for commercial or government-operated services through a direct interaction, such as apps, websites, and product or service delivery. This data includes things like the credit card information a customer provides when signing up for a home delivery, an email address given to sign up for a local business's e-newsletter, or a phone number submitted to a banking app for text updates.

*Sidewalk Labs believes that transaction data should not be under the Urban Data Trust's purview for several reasons. First, the data collector is already accountable under applicable privacy laws either to obtain consent to the collection and use of such data if the data is personal information or, if it is a public-sector entity, to ensure they have the proper legislated authority. Second, this type of data arguably is not uniquely connected to public spaces, nor is it generally considered a public asset requiring additional protections within the public interest.*

This proposal to remove transaction data from the purview of the Urban Data Trust does not dismiss any ongoing concerns or questions that people have about the collection and use of transaction data in the areas of consent, transparency, and accountability, among others. Instead, it reflects the belief that incorporating transaction data into a governance model for the Sidewalk Toronto project would be unworkable given the lack of a relationship between this kind of data collection and a specific geography.

Sidewalk Labs appreciates that there would be ongoing dialogue about the scope of data collection and use under the Urban Data Trust's purview, and welcomes that dialogue.

(Even though this proposal does not place transaction data under the purview of the Urban Data Trust, Sidewalk Labs commits to applying the RDU Guidelines to any of its own commercially launched products and services that involve transaction data.)

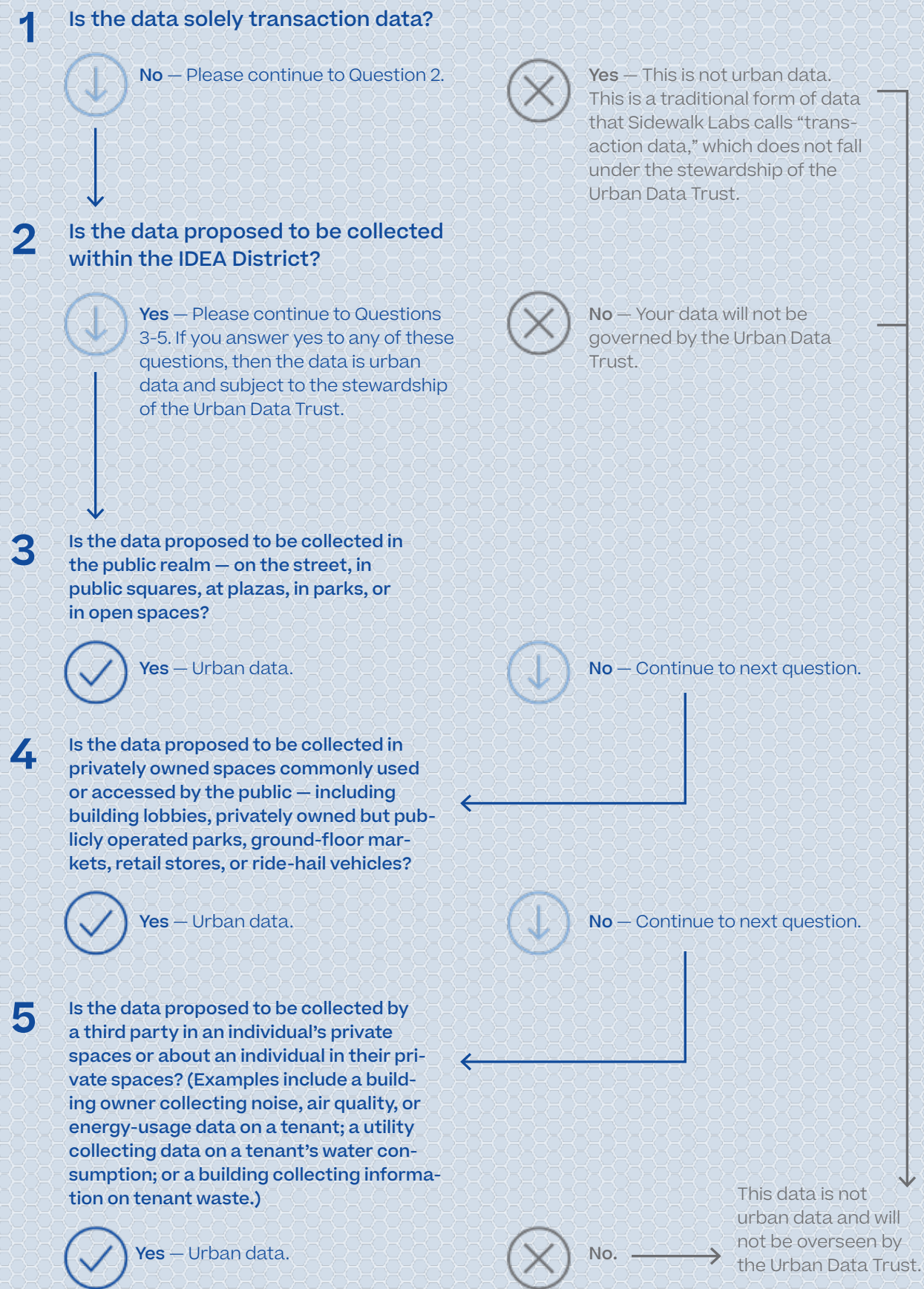
### Both types of data.

If the data activity involves the collection and use of both types of data, such activity would fall under the stewardship of the Urban Data Trust. One realistic example is an app-based ride-hail service whose vehicles are equipped with sensors or cameras capable of collecting data on passengers or the environment. While this organization's collection and use of data through the app would not fall under the jurisdiction of the Urban Data Trust, its collection and use of urban data through sensors and cameras would fall under that jurisdiction, thus requiring an RDU Assessment to be filed.



# Is it urban data?

The following questions can be used by public- or private-sector entities to ascertain whether the data they want to collect and use is subject to the Urban Data Trust process.



## Step 2: Submit an RDU Assessment

As a second step in the process, Sidewalk Labs proposes that entities, both public and private, seeking to collect or use urban data complete an RDU Assessment — an in-depth review outlining the purpose of the digital proposal, the type of urban data it aims to collect, its potential impact on the community, and its risks and benefits. This step would also apply to entities proposing to use urban data collected by an existing device for a new purpose. RDU Assessments would be conducted during the design phase, prior to urban data collection or use.

(Sidewalk Labs has been developing an RDU Assessment template since the summer of 2018, and it is currently used internally to assess the privacy compliance and responsible data use of pilots, projects, services, and products. This process requires collaboration from different teams to ensure that privacy is not just a compliance exercise and that privacy is truly done “by design” from the start.)

The entity applying for data collection would submit the RDU Assessment along with an application to the Urban Data Trust for review and approval. The Urban Data Trust would use the RDU Assessment to assess how the proposal conforms to the RDU Guidelines, privacy laws, Privacy by Design principles, and any other relevant factors or applicable laws. If necessary, the Urban Data Trust should help startups, companies, and organizations understand these factors when preparing the RDU Assessment.

**The RDU Assessment would incorporate and build on one of the strongest existing data governance tools for protecting individual privacy: the “privacy impact assessment.”** A privacy impact assessment identifies any privacy and security risks associated with new digital technologies or data-related services, as well as how they are mitigated in the design of the project. All three orders of government currently require or encourage privacy impact assessments. Similar assessments are also a cornerstone of the General Data Protection Regulation, Europe’s 2018 privacy initiative, which has raised the bar on responsible data use.

The proposed RDU Assessment would follow the same guidelines as a privacy impact assessment, attempting to identify potential privacy risks of new programs or services, to begin such an analysis at the outset of development, and to be adjusted and refined through stakeholder feedback. The RDU Assessment would exceed current privacy compliance requirements because it would consider the broader social and ethical considerations of new and existing technologies and their potential impact on people.

# How the RDU Assessment relates to the RDU Guidelines

When assessing whether to approve a digital proposal, the Urban Data Trust would review an RDU Assessment and consider many factors, including how well the proposal conforms to the RDU Guidelines. Many of the example questions on this page have a close tie back to the guidelines.



Beneficial purpose



Transparency and clarity



Data minimization, security, and de-identification by default



Publicly accessible by default



No selling or advertising without explicit consent



Responsible AI principles required

## Sidewalk Labs' proposed RDU Assessment includes four primary components:



### Purpose.

The first section of the RDU Assessment would ask for a description of the purpose of the project, service, or product, including its objectives and goals, as well as the urban challenges it hopes to address. Examples of questions that might be asked in this part of the RDU Assessment might include:

- What is the objective for this project? Clearly state the problem that is being solved.
- Clearly state the measurable goal or outcome of the project.
- How likely are the proposed technology and collection and use of data to solve the problem as described?
- What are the alternatives to the technology or method of collection? Why are they not sufficient?



### Data sources.

The second section of the RDU Assessment would require a description of the technology or data-collection methods, the data sources or types, and the parties who have access to the data. Some of the questions asked in this section might include:

- What are all the sources of the data, internal and external?
- Does the data activity involve personal information?
- Does this project involve the collection or use of data about people?
- Is the data stored in Canada? If not, is there a reason beyond business case or financial considerations that the data would not be stored in Canada?
- Is the data, or a subset of data, going to be used for advertising purposes?
- Is the data going to be sold to third parties?
- Will the data be matched against, combined with, or augmented by other data sets?



### Legal compliance.

The third section of the RDU Assessment would capture conformance to applicable privacy laws. Examples of questions asked in this section might include:

- Have individuals been given choices about the collection of their personal information?
- Describe how the data activity complies with applicable privacy laws.
- If the data activity involves personal information, there must be explicit, express consent for collections, uses, or disclosures that: (i) involve sensitive information; (ii) are outside the reasonable expectations of the individual; and/or (iii) create a meaningful residual risk of significant harm. Please explain how you have achieved this requirement.
- Does the data activity include mechanisms that explain how data is used, how benefits and risks to individuals are associated with the processing, and how individuals may participate and object where appropriate?
- If the data activity includes personal information, how has it been de-identified?
- Is there a less privacy-invasive way to achieve the goals of the data activity (including potential insights)?
- What are the safety and security safeguards (such as encryption or internal access controls)? Is internal access audited?



### Risk-benefit analysis.

The fourth section of the RDU Assessment would ask the proposing entity to detail and rate the risks and benefits associated with the project and data collection activity, and how any risks have been mitigated. Example questions might include:

- Could the anticipated use of technology harm or benefit certain individuals, groups of people, or communities in unintended or unexpected ways?
- What are the benefits to the individual or groups of individuals?
- How will this data-collection activity impact the community?
- Will the de-identified or non-personal data be made publicly accessible? If not, why?
- If personal data is being de-identified, when in its lifecycle is this done? How long is identifiable data retained on devices?
- Explain your external threat model and countermeasures.
- What format will the data be made available in? Is this format a public standard? If there is no relevant standard currently available, where is the documentation for the format that you will use? What partners or standards bodies do you plan to work with to promulgate this format?
- In this project, is the project owner using analytics-driven models, insights, or algorithmic decision-making that could impact individuals?

① ② **Step 3:**  
③ ④ **Receive a decision**

Once the RDU Assessment is completed, the proposed data collector would submit it to the Urban Data Trust for review, assessment, and decision by the Chief Data Officer.

**Balance benefits and risks.**

Sidewalk Labs proposes that the Chief Data Officer look at all of the information the data collector provided in the RDU Assessment and determine whether the data activity should proceed based on the organization's attestation of compliance with applicable laws, as well as a subjective and objective assessment of the RDU Assessment that takes into account the appropriateness of the proposed data collection and uses and the resulting net balance of impact.

The Urban Data Trust would assess the balance of the proposed benefits and the potential harms, weighing their significance and likelihood of occurring against any mitigation efforts. The entity could also make use of published guidelines from the privacy commissioners regarding personal information; for example, if a data collector indicates that it plans to receive consent for the collection of personal information, the Urban Data Trust could look to the Office of the Privacy Commissioner of Canada's guidelines on meaningful consent to determine how closely they align with the data collector's proposed methods.

Similarly, if the data collector indicated that it plans to de-identify the data, the Urban Data Trust could look at the Information and Privacy Commissioner of Ontario's guidelines on de-identification for structured data, among other industry standards, to assess the techniques used by the data collector, as well as any standards established by the entity.

The Urban Data Trust could also interact with the data collector in a consultative process to the extent that additional information is needed to make the assessment or to assist the data collector in improving its data activity.

**Final decision.**

Sidewalk Labs proposes that a final decision be issued as "denied," "approved," or "approved with conditions."

*Because the RDU Assessment is highly contextual and does not lend itself to black-and-white rules, several case studies have been included on Pages 436-440 to help readers understand how approval decisions could work in practice. Ultimately, the decision-making standards would be set by the Urban Data Trust.*

**A note on legal compliance.**

An organization's approach to legal compliance would be part of the Urban Data Trust's decision-making process, but the organization itself would ultimately be responsible for legal compliance. Failure to abide by relevant privacy laws could result in enforcement action by the appropriate regulator and legal remedies imposed by the Urban Data Trust.

Of note: if personal information (as defined by PIPEDA) is involved in a proposal, the "legal compliance" section of the RDU Assessment would collect information detailing how the data is in compliance with privacy laws. The Urban Data Trust would not assess whether the organization is in compliance with Canadian laws, because under PIPEDA, organizations must remain accountable for the personal information they collect, use, and disclose. There are also practical reasons involving accountability and liability that account for why the Urban Data Trust should not be responsible for this compliance.

The Urban Data Trust could deny applications based on overt or apparent non-compliance. But the Urban Data Trust's opinion on legal compliance — for example, through the acceptance or rejection of an RDU Assessment based on PIPEDA compliance — should not be taken as validating compliance or as evidence or a ruling on legal compliance.

① ② **Step 4:**  
③ ④ **Meet post-approval conditions**

As a final step in the process, Sidewalk Labs proposes that, once an entity or organization receives approval to collect or use urban data in the IDEA District, the Urban Data Trust should meet a set of post-approval conditions around transparency, device registration, data access, data sharing and licencing agreements, and auditing.

**RDU Assessment transparency.**

*Sidewalk Labs proposes that the summaries of approved RDU Assessments be made publicly available by the Urban Data Trust to ensure transparency and encourage accountability by the public, privacy advocates, and regulators alike.* Proprietary or confidential information, such as intellectual property or trade secrets, would not be published.

**Device registry.**

Sidewalk Labs proposes that, as part of the RDU Assessment filing and application process, entities must submit a map with the proposed locations of all data-collection devices, such as sensors or cameras. (This requirement would not apply to private owners or tenants of residential units or houses, such as those installing home security cameras for personal safety reasons.) Once the application including these locations has been approved, the entity must register these devices with the Urban Data Trust, which would upload the devices' locations and fields of view to an interactive map that would be publicly accessible. This registry would provide the public with a real-time inventory of information on what kind of data is being collected, as well as why, how, where, and by whom.

### Facilitating access.

Sidewalk Labs believes that, in line with its proposed RDU Guidelines, properly de-identified, aggregate, or non-personal urban data should be made publicly accessible by default. Public access to urban data is crucial to innovation, equity, and the provision of digital services that improve quality of life.

If the data or source code were to be made publicly available, the Urban Data Trust would manage this access through data sharing agreements and facilitate integration with existing open-data portals and tools.

Facilitating access could be accomplished in a variety of ways, from having the Urban Data Trust actually hold the data to having it set rules that require collectors to publish de-identified, aggregate, or non-personal data in real time. This access should be free for basic use, but reasonable fees could be applied for commercial purposes or heavy use.

### Access restrictions.

Data sharing agreements would also include information about any access restrictions approved by the Urban Data Trust. There could be cases when urban data cannot be released publicly for a variety of reasons. These cases could involve data that contains personal information — for example, a government organization that collects transponder data or images of licence plate numbers for enforcement.

Other cases could involve proprietary data collected at great cost to a company. The public release of such data would undermine investment and competitive advantage, discouraging businesses from locating within the IDEA District.

For example, consider a company building an alternative robotic delivery system for transporting packages and items to and from a storage facility. For robots to be able to navigate tunnels, sidewalks, building entrances, lobbies, elevators, and hallways, they would need to know where they are at any given moment with a high level of precision. Existing positioning technology like GPS or Wi-Fi triangulation would be too coarse — especially in urban environments, where GPS signals are often blocked by buildings. Recent developments in positioning technology can provide accuracy within a few millimetres, but significant investment would be required to deploy transmitters throughout the neighbourhood.

While this type of location data would technically occur within the public realm, the considerable cost of compiling it — and the likelihood that the company would either choose to pursue the project elsewhere, or not at all, if forced to make the data available, in real time, to its competitors — could merit a proprietary restriction in the view of the Urban Data Trust. The entity would still be able to audit the data collection and use, and the RDU Assessment summary would be publicly accessible.

### Data sharing and licencing agreements.

As described on Page 421, Sidewalk Labs proposes that the Urban Data Trust facilitate access to urban data via data sharing agreements, including the terms of any potential restrictions or licencing fees.

In these cases, the Urban Data Trust would first make a determination about whether or not access to the data should be restricted, and then negotiate the terms of this restriction with the company or entity. These terms might include making the data accessible through an agreed-upon licencing fee, endowing the Urban Data Trust with rights to facilitate access based on certain specifications, requiring permission from the original entity for another party to access the data, or potentially even prohibiting access.

From that point forward, any entity seeking access to this data would have to apply for approval through an RDU Assessment, agreeing to abide by the negotiated access or licencing terms.

Data sharing agreements would also include a copy of the RDU Assessment and application, fees payable to the Urban Data Trust, the rationale for retaining any data in an identifiable manner, details on how the organization or entity would be audited, details on any certification marks the organization has obtained for its practices or project, and a limitation of liability and indemnification to the Urban Data Trust.

### Auditing and enforcement.

The Urban Data Trust should retain the authority to audit all collections and uses as needed and order the removal of digital devices in the event it discovers a violation. The terms of auditing would depend on factors such as the sensitivity of the data, the track record of the organization, and the uses of the data, including whether advanced data analytics would be run on the data and whether the organization plans to use the data for ads based on consent obtained.

The Urban Data Trust would be able to seek legal remedies for violation of agreed-to conditions of data collection and data use.

The question of more traditional enforcement authority should be considered as part of the ongoing consultation for this work — for example, auditing could occur with the assistance of privacy regulators or via contractual agreements.

# How it works: RDU Assessment case studies

It can be hard to talk about digital governance in the abstract. While the proposed Urban Data Trust would ultimately create its own governance standards and guidelines, the following illustrative examples are presented here to help guide readers through the responsible data use process and to give a broad sense of how decisions around responsible data use could be made. The process described here would apply to any public or private entity proposing to collect or use urban data in the IDEA District, including Sidewalk Labs.

## 1

### Example #1: A mobility management system

A private company proposes to launch a mobility management system, working in collaboration with the city's transportation department.

The proposed mobility management system could help coordinate all the roads, traffic signals, curbside loading zones, and trip options, ensuring a safe and efficient travel experience for residents, workers, and visitors. To work properly, such a system would need to collect real-time information on mobility-related measures such as traffic volume (for pedestrians, cyclists, transit riders, and cars alike), transit delays, curb demand, parking demand, route closures, emergency dispatches, weather patterns, and more. This information would help the system do things like set prices for pick-up and drop-off zones to reduce congestion, or hold traffic signals for pedestrians who need more time to cross the street.

#### ① ② Step 1: ③ ④ Classify the data

The proposed mobility management system would operate in Quayside. It would require the placement of sensors and devices in public spaces, including on traffic signals, such that individuals would not have the practical opportunity to provide prior meaningful consent for the collection and use of this data.

For these reasons, the data collected would be considered "urban data." The proposal should advance to Step 2.

#### ① ② Step 2: ③ ④ Submit an RDU Assessment

Because the mobility management system seeks to collect and use urban data, it must complete an RDU Assessment. This assessment, plus an application, must be filed with the Urban Data Trust and approved before the service can launch.

The RDU Assessment would help the Urban Data Trust assess how well the proposed mobility management system conforms to relevant decision factors, such as the RDU Guidelines, applicable privacy laws, and Privacy by Design principles. Some of the relevant details from the assessment could include:

- The proposed system has a clear **beneficial purpose**, with an aim toward improving public safety, traffic congestion, and travel times.
- Much of the **data required** to run the system is **non-personal**, such as sensors to detect available curb spaces. The system also uses **de-identified data** by computing aggregate counts of pedestrians, cyclists, and vehicles directly on the camera and immediately deleting any raw video footage, safeguarding the privacy of individuals who might be visible in the raw footage. Together these efforts reflect **Privacy by Design** principles and **data minimization**.
- The city also proposes to collect some personal information (such as transponder information or licence plate images) for enforcement of curb rules; the city would attest to compliance with the applicable laws, including the Municipal Freedom of Information and Protection of Privacy Act.

- The information collected by the system would not be sold for **advertising purposes** or used for behavioural tracking purposes.
- While direct consent would not be possible for traffic signal information, the system would submit a map with the proposed placement of all mobility-related sensors to the Urban Data Trust so people could know the locations and purposes of the devices, improving **transparency**.
- **Non-personal data** would be made **publicly accessible** to others. Some access to de-identified data is proposed to be restricted as the system trains and tests its algorithm, to safeguard privacy and security.
- The system's cameras would use computer vision to de-identify pedestrians, cyclists, and vehicles at the source. Some de-identified information would be kept for an indefinite period to help train the algorithm to properly de-identify images. The data would only be accessible by key personnel with valid reasons to access the data for quality assurance and security purposes. Because data would be used by an algorithm and to influence decisions, **Responsible AI** guidelines should be considered in the assessment of this technology and proposed data use.

① ② Step 3:

③ ④ Receive a decision

As a next step, the Urban Data Trust would review the RDU Assessment and the application. Again, the Urban Data Trust should establish its own decision-making guidelines, but based on the proposed RDU Guidelines, this particular proposal would seem to meet criteria for approval, given the balance of benefits to risks.

**Benefits:** The system proposes to help achieve a reduction in traffic congestion, an increase in public transit ridership, and reductions in carbon emissions related to driving. The resulting accessibility of aggregate, non-personal, and de-identified data made publicly available would ease traffic and provide new opportunities to develop safety devices and applications. The data controllers would plan to store data in Canada.

**Risks:** The personal information collected as part of the system could be used to identify location patterns and schedules, including access by law enforcement and civil discovery. Other risks could include the de-identification process and the retention period of some of the images for calibration.

**Decision:** Given the proposed RDU Guidelines, the Urban Data Trust would likely approve this data activity, given its clear benefits and its proposals to effectively manage risks, which would include using the minimum amount of data, de-identifying data at the source, and ensuring any personal information collected by the city is secured and encrypted. The data controllers would also attest that the data activities are in conformance with applicable privacy laws.



① ② Step 4:

③ ④ Meet post-approval conditions

Once approved, the data collectors would register the data-collection devices to the publicly accessible device registry. The data collectors would still work with the Urban Data Trust to meet post-approval conditions around transparency, data access, and auditing.

**Transparency:** The summary RDU Assessment would be made publicly available.

**Device registration:** All devices would be registered with the Urban Data Trust and placed on a publicly accessible map.

**Data access:** Non-personal and aggregate data is made publicly accessible via the city's open-data portal. For example, a researcher could study this data to detect near misses between cars and pedestrians, and evaluate the performance of intersection designs on street safety.

**Data sharing agreements:** While access to properly de-identified data would be restricted to train the algorithm, the Urban Data Trust recommends that once testing is complete, the data and source code be made open so the benefits can spread. For example, a self-driving technology startup could use the same type of insights to create an improved pedestrian detection system. Personal information that would be collected and used by the city would not be made publicly accessible.

**Auditing:** The Urban Data Trust could decide that it would audit the system's de-identification techniques once in the next year. The Urban Data Trust could also recommend that the company retain an external auditing company to assess its de-identification techniques.

# 2

## Example #2: An automated parking payment system

A private parking garage owner proposes to install CCTV cameras for security purposes, and to use the data to create an automated payment system as drivers enter and leave the garage. The cameras are capable of reading licence plates and capturing images of drivers and passengers. The garage owner does not plan to de-identify these images. The garage owner also plans to share the data with a data broker for a fee.

Individuals who are regular users of the parking garage could opt in to this system for automatic payment. Individuals who use the garage as one-offs and who do not opt in to (or even know about) this service would also have their licence plates captured, although these customers must pay for parking using a parking app or with cash.

① ② Step 1:

③ ④ Classify the data

The proposed parking payment system would operate within the IDEA District. The placement of cameras would be in a privately owned public space, and individuals would not have the opportunity to provide explicit consent for the collection and use of their data. Additionally, the payment system would be linked to an individual's credit card or parking app account.

For these reasons, the data collected would be considered "urban data" as well as "transaction data," and the proposal should advance to Step 2.

① ② Step 2:

③ ④ Submit an RDU Assessment

Because the proposal seeks to collect and use urban data, the parking garage owner must file an RDU Assessment and an application with the Urban Data Trust for approval before the service can launch.

For this illustrative example, some of the relevant details from the assessment could include:

→ The garage owner claims a beneficial purpose for the proposal related to security and automated billing for customers. The garage owner would like to sell the data to a data broker, claiming this would benefit customers by offsetting fees to help keep parking prices low. However, selling data to third parties without explicit consent from the individual is in violation of RDU Guidelines.

→ The garage owner intends to provide notice of the cameras with "CCTV signs" posted around the garage, achieving some transparency. There would also be information printed on the back of the parking garage ticket on how the data is used and directing the user to the garage website, where a more complete description of the data practice would be available.

→ The garage owner attests compliance with PIPEDA and any other applicable law on the application form accompanying the RDU Assessment.

→ The video stream would be available to the parking lot attendant when in the office and would be kept in the case of an incident and subsequent examination by authorities for a period of two weeks. Because the purpose for data collection is to deter or investigate safety and security incidents, there would be no obligation to de-identify the footage, and this use would be permissible by Canadian laws, as long as the Office of the Privacy Commissioner's guidance on video surveillance is followed. But the parking garage owner also proposes to use the video footage for another purpose (selling to data brokers) without obtaining consent and would not de-identify this data.

→ While the parking garage owner acknowledges that sharing personal information with a data broker would likely be surprising to individuals, the owner does not detail any risk mitigation efforts, claiming that the risks would be necessary and justified by the benefits.

① ② **Step 3:**

③ ④ **Receive a decision**

As a next step, the Urban Data Trust would review the RDU Assessment and the application. Once again, the entity should establish its own decision-making guidelines, but based on the proposed guidelines, this particular proposal would likely be denied, given that its risks outweigh its benefits and that the data activity does not comply with RDU Guidelines.



**Reasons:** The data activity, as a whole, would stand in violation of the RDU Guidelines by selling data for advertising purposes or to third parties without consent and not de-identifying the data used for this purpose by default. The rationale for not de-identifying by default would likely not be compelling, as there were no actions taken to mitigate the risk.

The Chief Data Officer would likely consider the data activity, as a whole, in violation of PIPEDA, as the garage owner did not specify in the legal compliance law section of the RDU Assessment that they had obtained consent from the vehicles' owners, and also proposes to sell personal information without consent.

**Conditions:** The garage owner would have the opportunity to resubmit the RDU Assessment and application after consultation with the Urban Data Trust. Unless and until the RDU Assessment and application gains approval, the garage owner would not be able to install the CCTV cameras and begin collecting data. If an audit discovered that CCTV cameras had been placed in the garage and had started to collect data, the garage owner could be sued for breach of the contract entered into upon leasing the garage in the IDEA District.

① ② **Step 4:**

③ ④ **Meet post-approval conditions**

In this case, failure to gain approval would mean the proposal would not advance to Step 4.

**The Urban Data Trust would help ensure privacy protections, make urban data a public asset, apply consistent and transparent guidelines, and be publicly accountable to all Torontonians.**



# Part 4



## Launching Core Digital Services That Others Can Build On



### Spotlights

- 1 **An outcome-based building code system to enable a safe, vibrant mix of uses**
- 2 **An Office Scheduler to optimize energy use**
- 3 **A mobility management system to reduce congestion and improve safety**

Digital infrastructure, published standards, and a trusted responsible data use process together set the foundation for digital innovation. But a true ecosystem of urban innovation requires a catalyst that makes it possible for third parties to build new digital applications, services, products, or tools that improve people's lives.

To serve as that catalyst, Sidewalk Labs proposes to launch core digital services that are essential to achieving quality-of-life objectives from Day One in Quayside (see table on Page 444). These launch services would not only deliver improvements to affordability, mobility, sustainability, and economic opportunity, but also would make the urban data they generate accessible to others — enabling countless subsequent innovations to emerge from local companies, entrepreneurs, startups, researchers, agencies, civic groups, and others.

These proposed core digital services would have a multiplier effect, since making their non-personal, aggregate, or de-identified urban data publicly acces-

sible would catalyze digital innovations by a wide and growing range of third parties, inspiring a new generation of tools for city living:

- **The shipping company** that uses micro-location data to develop a robot that can deliver packages straight to a person's door
- **The mobility entrepreneur** who uses trip data on shared rides to launch a shuttle service with on-demand beach chairs and umbrellas
- **The retailer** who pairs foot-traffic data with weather information to identify the best locations or times for pop-up vendors to set up shop
- **The environmental researcher** who uses building data to recognize common recycling mistakes and teams up with a digital fabrication studio to design a more sustainable coffee-cup lid piloted by local restaurants

The list is truly endless. Just as no one could have expected that a satellite-positioning system would eventually change the way people hail a cab, ride a bike, order food, meet with friends, take pictures, or even find romance — digital services have the power to enable new ideas no one can imagine.

The following pages provide an overview of several core services proposed by Sidewalk Labs, as well as a description of the urban data they use, an illustrative sense of what their RDU Assessments could emphasize, and the types of third-party innovations that they might make possible.

Merely collecting urban data is not an end to itself. Urban data should only be gathered as a means of creating a new application, use, service, or product that can improve the lives of city residents, workers, visitors, and businesses.

### Sidewalk Labs' role in digital services.

As explained on Page 382, Sidewalk Labs plans to offer this limited set of core digital services in cases where achieving fundamental project goals around transportation, affordability, housing, energy, public space, and other areas would require an innovation the market has not pursued.

Some of these launch services could still involve working with partners or buying existing technology, and other entities would be free to develop competing services. All proposed digital services would be subject to the proposed responsible data use approval process overseen by the Urban Data Trust, which would include completing RDU Assessments to ensure privacy is protected.

### Digital pilot

## GRIT Toronto: Involving the community in digital tool development

Traditionally, user testing has taken the form of market research: a small group of people is recruited to come to an office during working hours to give feedback on a new technology. This method can result in narrow or even biased feedback.

To explore a more inclusive kind of user testing, Sidewalk Labs is currently funding GRIT Toronto (Gathering Residents to Improve Technology), a program founded by Code for Canada. The program meets people of all digital skill levels, cultures, ages, and backgrounds where they are — in community spaces outside of working hours, for example — and incorporates their feedback into the creation of new digital services and products, helping to ensure these tools reflect the needs of the populations they are intended to support.

Launched in late 2018, the GRIT Toronto pilot has recruited over 350 residents from Toronto's 25 wards, representing a diversity of backgrounds, lived experiences and technical skill levels. What unites them is a desire to shape the digital products and services that could impact their lives and their city. This initiative could help software developers in Quayside collaborate with a broad range of community members and ensure that their digital solutions truly have neighbourhood needs in mind.

# Sidewalk Labs' proposed launch services

This table seeks to provide an overview of the initial digital services proposed by Sidewalk Labs as part of the Sidewalk Toronto project, including a sense of their purpose, data sources and access, and potential to catalyze third-party innovation. All digital innovations (whether created by Sidewalk Labs or others) would be subject to the independent responsible data use approval process described on Page 424, as well as applicable privacy laws. The information here should be viewed as illustrative but not necessarily exhaustive.

Sidewalk Labs' proposed service or application	What urban data it proposes to use and/or publish	Possible third-party applications that could build on this data	What existing ecosystem the innovation supports (Names are illustrative only.)
<b>Mobility management system</b> To reduce congestion and encourage shared trips, this proposed mobility management system would coordinate all travel modes, traffic signals, and street infrastructure, and apply demand-based pricing to curb and parking spaces.	<b>Non-personal:</b> Curb space availability (e.g., occupancy sensors)  <b>Non-personal and/or de-identified at the source:</b> Pedestrian and cyclist detection and counts; vehicle detection, counts, speed  <b>Restricted data (not published for privacy reasons):</b> Vehicle identification data, such as license plates or transponders, collected and used directly by the city for parking enforcement	A <b>policymaker</b> could create more informed policy decisions around parking availability and transit service.  A <b>self-driving technology startup</b> could improve its pedestrian-detection system.  A <b>researcher</b> could detect pedestrian near misses and evaluate the performance of intersection designs on street safety.  <b>Employers</b> could start programs that encourage workers to shift commute times to decrease congestion.	<b>Self-driving vehicles:</b> Aptiv, Cruz, Lyft, Uber, Waymo  <b>Sensor and traffic management:</b> Axilion, Brisk Synergies, GRIDSMART, LeddarTech, Miovision, NoTraffic, Numina, P3Mobility, RapidFlow, SMATS Traffic Solutions  <b>Parking:</b> Cloudpark, Curbway, Jrop, Passport, Pay by Phone, Sensys  <b>Routing apps:</b> Apple/Bing/Google Maps, Transit App, Waze
<b>Outdoor comfort system</b> A proposed system of outdoor-comfort tools, deployed in real time, could dramatically increase the amount of time it is comfortable outside, including building "raincoats" to block rain, awnings to provide shade, and fanshells to provide group cover.	<b>Aggregated and/or non-personal:</b> Hyper-local temperature, humidity, wind speed, rainfall, and sunshine levels  <b>Non-personal:</b> Raincoats and fanshell status	A <b>retail startup</b> could build an app that identifies the best locations or times for a pop-up store based on weather patterns.  <b>Health organizations</b> could build apps that show residents a jogging route that avoids wind and snow and maximizes sun and interesting views. (These apps could also draw from the mobility sensors to avoid congested areas.)	<b>Weather data:</b> Ambience Data, Earth Networks, IBM, The Climate Corporation  <b>People flow:</b> Ecocounter, Numina, PeopleFlow

Sidewalk Labs' proposed service or application	What urban data it proposes to use and/or publish	Possible third-party applications that could build on this data	What existing ecosystem the innovation supports (Names are illustrative only.)
<b>Flexible retail platform (Seed Space)</b> A proposed leasing platform called Seed Space would help small businesses and other retailers book a wide range of ground-floor space sizes, from anchor-tenant spaces to micro stalls, for short- or long-term uses.	<b>Aggregated and/or de-identified:</b> Footfall and rate data, aggregated tenant turnover rates  <b>Non-personal:</b> Space size, availability  <b>Restricted data (not published for privacy reasons):</b> Leasing, rent, or transactional data collected with clear consent	A <b>retail startup</b> could create an app that determines the best times of the year or day for an entrepreneur to set up in the area. (This use could also draw on hyper-local weather data from the outdoor comfort system.)  An <b>economic development firm</b> could conduct (or have a startup create an app to conduct) retail industry analyses of neighbourhood turnover rates by size of space.  <b>Business Improvement Areas</b> could use this data to understand the economic impact of events or policy decisions.	<b>Location mapping:</b> InnerSpace, MappedIn  <b>Space mapping:</b> A Retail Space, Chatter Research, POTLOC  <b>Space availability:</b> Booqd, Breather, Harbr, PiinPoint
<b>Open space usage and management (CommonSpace)</b> A proposed digital application called CommonSpace (created with the local organization Park People and the Gehl Institute) would make it substantially easier, faster, and less expensive to collect more reliable data on how people use public spaces — helping park operators better respond to community needs.	<b>Aggregated and/or non-personal:</b> Gehl public realm activity categories, usage counts  <b>Non-personal:</b> Extremely high-level demographic details	<b>City planners, community groups, and others</b> could use this information to research park spaces and equipment that show the highest use in different parks throughout the city.  <b>Community-based groups</b> could develop planning apps and tools that allow community members to better suggest park uses for all ages and abilities in their neighbourhoods.	<b>Open space management:</b> Range of government, non-profit, and community groups  <b>Park operations:</b> Gehl Institute and other urban planning and design groups  <b>City operations:</b> mySidewalk, Namara, Stae, and other platforms supporting city operations insights
<b>Public realm maintenance map</b> A proposed real-time map of public realm assets — from park benches to drinking fountains to landscaped gardens — would enable proactive maintenance and keep spaces in good condition.	<b>Non-personal and/or aggregated:</b> Evapotranspiration, plant health, moisture, waste bin volume, air quality  <b>Non-personal and/or de-identified:</b> Public realm asset location, usage, damage detection; decibel meter (e.g. only volume level, not recording audio)	<b>Software developers</b> could use this information to create automated maintenance services, such as precision agriculture systems or landscaping bots.  <b>Industrial manufacturers</b> could use data on utility maintenance to identify more durable materials or component designs.  <b>City officials, business improvement districts, and others</b> could use this information to better schedule core operations, such as waste collection or green-space watering, to lower costs and improve quality of life.	<b>Physical asset location:</b> Bench Mark, BeWhere Inc., Estimote, Tekt  <b>People flow:</b> Eco-Counter, Numina, PeopleFlow  <b>Autonomous equipment:</b> BigMow, Husqvarna, Kobi  <b>Predictive maintenance:</b> AI Incorporated, Arable, Mero Technologies, Nanophyll, Opti, Plantix, Sensoterra

Sidewalk Labs' proposed service or application	What urban data it proposes to use and/or publish	Possible third-party applications that could build on this data	What existing ecosystem the innovation supports (Names are illustrative only.)
<p><b>Civic engagement (Collab)</b> A proposed digital application called Collab (prototyped with local communities and Digital Public Square, a non-profit spun-out of the University of Toronto) would aim to engage community members in local decisions that could shape their neighbourhood, such as programming in a central public space, through a transparent process that reveals the decision-making framework and all community inputs. (Try the prototype at collab.sidewalklabs.com.)</p>	<p><b>Non-personal:</b> Program choice selections, pre-populated and user-generated options</p> <p><b>Aggregated and/or de-identified:</b> Broad demographic information (only upon clear opt-in / consent)</p>	<p>A <b>neighbourhood association</b> could clearly explain the tradeoffs associated with a decision about public space programming: for example, a farmers market provides fresh produce and draws a lot of foot traffic, but the space may feel too congested for a community picnic.</p> <p>A <b>research team</b> could analyze data to see if inputs are inclusive and representative of the community.</p> <p>A <b>community group</b> could evaluate user-generated inputs without revealing personal information.</p>	<p><b>Public input support:</b> Range of government, non-profit and community groups such as neighbourhood associations, business improvement areas, public realm management organizations, and planning departments</p> <p><b>Community engagement and decision making:</b> Decidem, Neighborland, Ethelo, and other platforms</p>
<p><b>Outcome-based building code</b> This proposed real-time building code system could monitor noise, nuisances, and structural integrity to help a mix of uses thrive without sacrificing public safety or comfort.</p>	<p><b>Non-personal, aggregated, and/or de-identified:</b> Strain gauges, vibration, odour, sound pressure, decibel meter (e.g. only volume level, not recording audio)</p> <p><b>Aggregated and/or non-personal:</b> Safety sensors (e.g. sprinkler pipe pressure, fire pump diagnostics, heat, smoke, CO2, CO PM 2.5, PM10, VOC, lead detection)</p> <p><b>Restricted data (not published for privacy reasons):</b> Individual measurement data for the safety metrics above</p>	<p><b>City government</b> could use this information to develop new outcome-based regulatory systems for code compliance.</p> <p><b>Planning researchers</b> could use this information to study the relationship between mixed-use development and local economic growth.</p> <p><b>City agencies or architectural groups</b> could create apps to visualize building structural integrity issues.</p>	<p><b>Environmental collection:</b> Aclima, AQMesh, Awair, Concrete Sensor, Fibos, Koto Labs, NoiseAware, Safehub</p> <p><b>Building outcomes mapping:</b> The Black Arcs, Map Your Property, RATIO.CITY</p>
<p><b>Active stormwater management</b> A proposed active stormwater system would rely on green infrastructure and digital sensors to retain stormwater, reuse it for irrigation, and empty storage containers in advance of a storm to avoid combined sewer overflow.</p>	<p><b>Non-personal and/or aggregated:</b> Stormwater tank level, stormwater flow meter, total suspended solids, valve and gate status, underwater water quality near shore</p>	<p><b>Environmental researchers</b> could design an app to determine the number of plantings and amount of greenery needed to reduce stormwater flows and the need for secondary treatment.</p> <p><b>City planners</b> could use this information to better plan (and minimize) hard infrastructure needs for stormwater, such as tanks and treatment facilities.</p>	<p><b>Digital management:</b> Aquatic Informatics, IBM, Innovyze, Opti, Parjana, RainGrid, SUEZ, Veolia North America</p> <p><b>Water quality:</b> Acoubit, FREDsense, Orb, Xylem, ZwitterCo</p>

Sidewalk Labs' proposed service or application	What urban data it proposes to use and/or publish	Possible third-party applications that could build on this data	What existing ecosystem the innovation supports (Names are illustrative only.)
<p><b>Energy management system (Schedulers)</b> This proposed system of Home, Office, and Building Operator Schedulers would automate energy use to optimize residential, commercial, and building heating, cooling, and electricity systems — reducing energy waste and relying on clean energy while increasing tenant comfort.</p>	<p><b>Non-personal:</b> Outdoor weather</p> <p><b>Aggregate and/or de-identified:</b> Data on room temperature and humidity; energy use by type (e.g., from plug loads, lighting, HVAC); motion or occupancy; ambient light; comfort levels / complaints</p> <p><b>Restricted data (not published for privacy reasons):</b> Individual measurement data for the metrics above (e.g. timestamped data about particular plug loads, occupancy detection for particular rooms) and any data about individual residential units</p>	<p><b>Energy researchers</b> could use this data to compare neighbourhood energy usage across a city.</p> <p><b>Architects and designers</b> could use this information to improve building designs.</p> <p><b>Regulators</b> could use this information to create a dynamic energy code system based on actual operators instead of design-based models.</p> <p><b>Climate organizations</b> could create apps to help individuals or households gamify their energy savings (provided users consent to share their data).</p>	<p><b>Building management systems:</b> Automated Logic Controls, Johnson Controls, Schneider, Siemens</p> <p><b>Niche building analytics providers:</b> Basking Automation, Comfy, eleven-x, Encycle, Parity, Peak Power, Cortex, Raybased, SensorSuite, SimpTek, SHIFT Energy, Thoughtwire, Density, InnerSpace</p> <p><b>Energy use measurement:</b> VoltServer, Enertiv, Sense, Wemo, Currant</p> <p><b>Thermostats:</b> Ecobee, Honeywell, Google Nest, Samsung</p> <p><b>Smart switches, lighting, appliances, and other hardware:</b> Lutron, Enlighted, LG, TZOA</p>
<p><b>Building waste management systems</b> To help divert landfill waste, a proposed program of responsive digital signage would help residents and businesses sort their trash, recyclables, and organics (foods) by illustrating common sorting mistakes. “Pay-as-you-throw” waste chutes would support this recycling program while helping to reduce overall waste.</p>	<p><b>Aggregated and/or de-identified:</b> Trash volume, pressure scales (weight), waste classification for sorting using computer vision, contamination issues</p>	<p>An <b>environmental researcher</b> could team up with a fabrication studio to design a more sustainable coffee-cup lid based on disposal habits.</p> <p><b>City planners</b> could use this information to understand best practices in buildings and to test new systems and strategies to scale to other buildings.</p> <p><b>Computer-vision startups</b> could use information on common recycling errors to design augmented-reality apps that could help people classify waste.</p> <p><b>Environmental groups</b> could design an app that provides feedback to consumers, both residential and commercial, encouraging higher recycling rates.</p>	<p><b>Smart waste:</b> AMP Robotics, Anaconda, CleanRobotics, Compology, Enevo, Recycle Track Systems, Rubicon Global, Zerocycle</p>



Launching Core Digital Services  
That Others Can Build On

# An outcome-based building code system to enable a safe, vibrant mix of uses

For most of the 20th century, cities separated residential, commercial, and industrial uses geographically to protect homes from noise, air pollution, and other nuisances.<sup>44</sup> This approach made sense in a world without reliable tools to monitor the environmental nuisances of commerce and industry. But it also discouraged an active mix of home, work, and retail into the same neighbourhood — let alone the same building.

Working alongside local government, Sidewalk Labs proposes to create a real-time building code system designed around the premise that buildings should be able to house a diverse range of tenants — residential, commercial, and light industrial alike — so long as everyone adheres to agreed-upon “outcomes,” such as minimizing noise, air pollution, and other public nuisances.

### What urban data it proposes to use.

The proposed outcome-based building code system would monitor several types of building regulations on an ongoing, real-time basis via environmental sensors that collect non-personal data. The environmental information collected is considered “urban data,” because it would be data collected in a privately owned common space in the IDEA District.

Devices would be placed in building hallways to collect information on structural integrity and vibration, odours, interior air quality, and noise levels. This system

would be designed to collect only the specific data pertaining to building codes. Additionally, buildings would implement non-personal safety sensors to measure things like sprinkler pipe pressure, fire pump diagnostics, heat and smoke, and particulate matter.

This information would be provided from the third-party owners of these devices to an outcome-based code datastore. Any violation detected in this datastore would be sent to building managers for next steps and resolution.

In the case of an emergency (e.g., fire) or non-compliance, municipal officials could query the database directly.

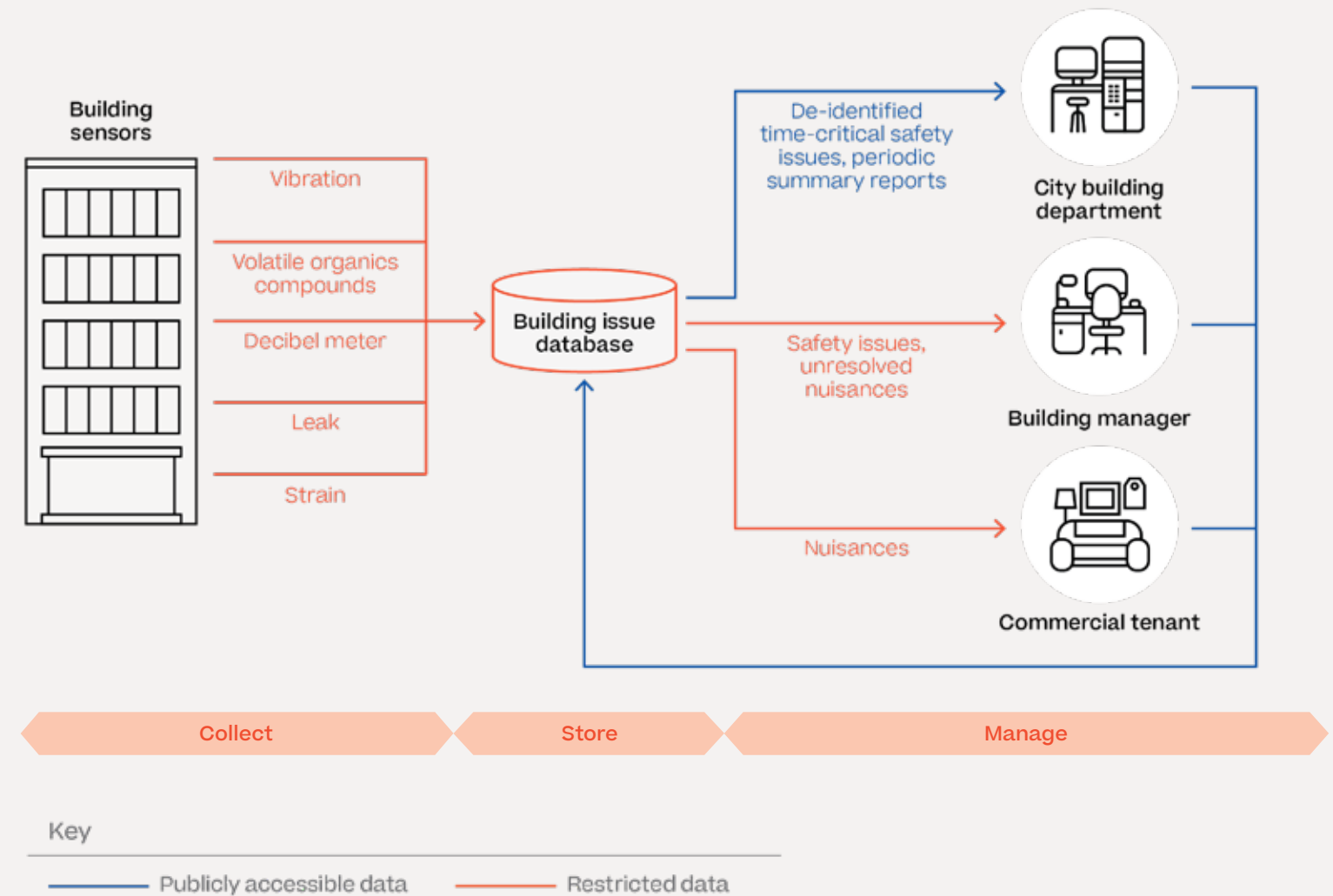
### What the RDU Assessment could consider.

The **beneficial purpose** of this proposed innovation would be to enable a greater mix of residential, commercial, and light industrial spaces, helping to create a lively local economy and achieve Waterfront Toronto’s **goals for complete communities**. The **collection of urban data** would be necessary to ensure the industrial spaces would comply with regulatory conditions, such as noise and odour requirements, thus enabling both commercial and residential tenants to coexist safely.

The proposal would be developed in accordance with the RDU Guidelines. The expected impact on people would be small, given that the sensors involved

## How it works: Outcome-based code

Building sensors that detect code violations could send these issues to a restricted database accessible by the city, building managers, and tenants, with only aggregated data publicly accessible to third parties.



in this initiative would collect **non-personal information** related to building codes. Because this data could be linked to individual building hallways, however, this data would be considered restricted and not publicly accessible. For these reasons, Sidewalk Labs believes the **balance of impact** of collecting the environmental data would weigh in favour of the proposal.

### What it makes possible by others.

The non-personal data collected by the outcome-based code system, as well as information aggregated by neighbourhood level, would be shared with a pub-

licly accessible API, enabling third parties to build on top of it.

A potential future innovation could include the adoption by city government of a new system for code compliance or zoning based not on pre-existing, rigid standards but rather on real-time performance to help Toronto achieve its goals for mixed-use development. Additionally, city agencies or their private vendors might create an app to visualize a building’s structural-integrity issues in real time. Such a tool could save money by efficiently identifying problems and catalyzing proactive maintenance. [\[Link\]](#)



See the “Buildings and Housing” chapter of Volume 2, on Page 202, for more on outcome-based building codes.



Launching Core Digital Services That Others Can Build On

# An Office Scheduler to optimize energy use

Today, no one is focused on saving energy in commercial tenant spaces, such as offices. Existing energy management programs that could optimize thermostats and ventilation systems in commercial spaces are under the control of the building operator, not the tenant.<sup>45</sup> The result is that offices often operate based on default system schedules that do not match the tenant's needs.

To help commercial tenants manage energy consumption and costs, Sidewalk Labs proposes to use a tool called the Office Scheduler that would optimize all the systems under tenant control, based on factors such as energy prices. This tool is part of a suite of Scheduler tools that together would reduce greenhouse gases compared with standard downtown buildings, consistent with Waterfront Toronto's ambitions for achieving a climate-positive community.

### What urban data it proposes to use.

To achieve this goal, the Office Scheduler would need visibility into electricity usage and cost, as well as real-time metering of all building energy systems, such as heating, cooling, lighting, and equipment. An encrypted building-energy datastore would aggregate information and automatically determine any optimization steps across systems for both occupant comfort and energy savings.

The proposed Office Schedulers would incorporate data from a set of energy management sensors (such as ambient

lights, motion sensors, plug load monitors, room temperature gauges, and digital thermostats) as well as from computer systems (such as calendar notifications) to reduce energy use when rooms are unoccupied or already comfortable. This information would be provided from the third-party owners of these devices to a data format translator.

To register requests for temperature changes from workers, the Office Scheduler would use some personal information by direct consent through an app (making this transaction data). This information could be used to respond to worker complaints, and if a change could not be accommodated due to competing requests, it could be used to guide workers to areas of the office that might be more comfortable.

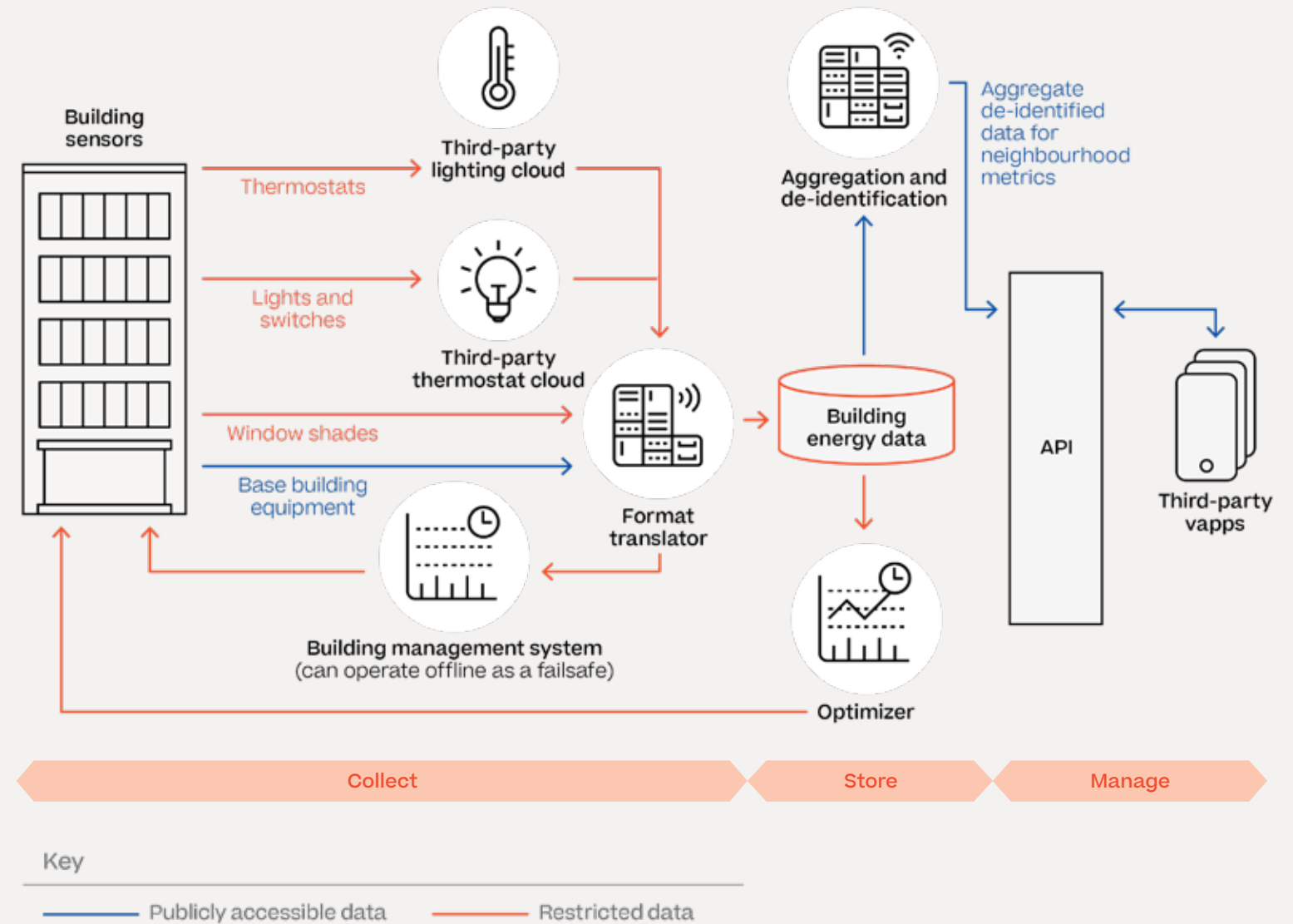
### What the RDU Assessment could consider.

The **beneficial purpose** of the Office Scheduler is to help achieve a climate-positive community through reducing energy consumption in commercial spaces and to optimize for clean energy use. Other benefits include a 20 percent reduction in building energy operating costs (when used in concert with the other Scheduler tools) and greater comfort for workers.

The expected negative impact on people would be small, given that minimal personal information is required and would be de-identified or aggregated for its

## How it works: Office Schedulers

Information from energy-related sensors would help the Office Scheduler tool optimize building energy use, with aggregated and de-identified data made publicly accessible to third parties.



intended use. Non-personal and **de-identified** data, including neighbourhood-level metrics, would be made **publicly accessible** so that others could use this data. Personal information (which is subject to Canadian privacy laws) would be stored in a secure database with access restricted to certain employees and agents and only be kept as long as necessary to fulfill the original purpose.



See the "Sustainability" chapter of Volume 2, on Page 296, for more on the proposed Office Scheduler.

While the Office Scheduler proposes to automate some energy actions, tenants would have the ability to override the automated system, and the algo-

rithm would also undergo a **Responsible AI** assessment. Sidewalk Labs believes the balancing of the risks of collecting the data in offices would weigh in favour of the data collection activity.

### What it makes possible by others.

Third-party apps and services would be able to use de-identified and aggregated data for research purposes, such as comparing neighbourhood energy usage across a city to improve building designs or evaluate energy policies, or to create new tools, such as behavioural apps that help families gamify their energy savings.



# A mobility management system to reduce congestion and improve safety

Sidewalk Labs' proposed mobility management system would use non-personal and de-identified urban data (such as trip counts, traffic congestion measures, and curbside availability information) to help manage the transportation network in line with objectives around street safety, shared trips, and travel times. This tool would be able to understand how people are using the entire system (including all trip modes), analyze these travel patterns, and encourage trip choices that do not rely on private cars — all in real time.

### What urban data it proposes to use.

To estimate traffic flows or prioritize pedestrian safety, lidar, radar, and cameras would need to be able to detect all travellers and vehicles at an intersection, de-identifying that information on the device and providing only an aggregate count. To manage congestion around curbside spaces, in-pavement occupancy sensors would need to detect the presence of vehicles without identifying specific vehicles. A separate licence plate reader could capture parking data about vehicles violating parking rules to send it directly to the city for municipal enforcement.

Municipal enforcement could be performed via traditional methods used by the City of Toronto today, or improved by providing enforcement agencies with better information and tools (such as recommended areas where violations are more likely) or systems that enable the

city to perform automated enforcement (such as vehicle transponders or license-plate readers).

The data collected by the mobility system could flow to two key databases. All non-personal and de-identified information could flow to an open datastore, publicly accessible via an API. Private data could flow to an enforcement datastore, with access restricted to municipal officials only.

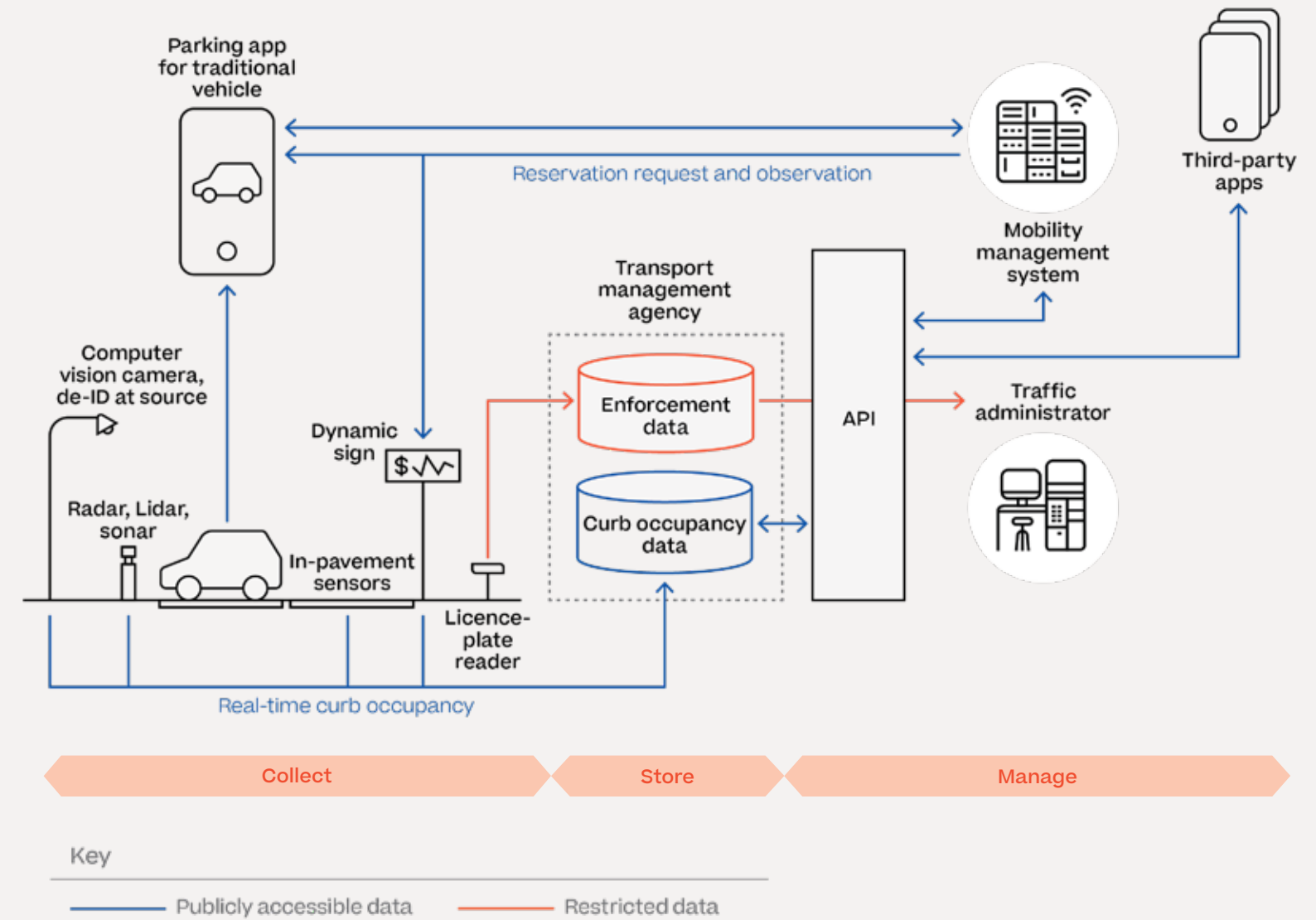
### What the RDU Assessment could consider.

This mobility management system formed the basis for the illustrative RDU Assessment case study on Page 436. As noted there, Sidewalk Labs believes that under the proposed RDU Guidelines, this proposal would gain approval for having a **beneficial purpose** related to travel time and increased public transit use, helping to achieve Waterfront Toronto's objective for sustainable transportation. Privacy risks would be mitigated through **de-identification**.

If necessary, some of this data could be collected by a public entity that is authorized to enforce relevant bylaws and regulations. In these cases, only the city would have access to this data. As such, this collection and use would be governed by the Municipal Freedom of Information and Protection of Privacy Act, and the city would follow its own privacy practices.

## How it works: Mobility Management System

To operate a “dynamic curb,” a mobility management system collects information about curb availability, stores that information in databases, and makes non-restricted data publicly accessible to third parties.



### What it makes possible by others.

This mobility management system — along with third-party developers who create navigation apps or ride services — would be able to pull publicly accessible data from the API to provide travellers with information that helps them make trip choices, such as public transit arrival times, bike-share availability, or prices for curbside space. Such publicly accessible data would also enable third parties to create new services in the future.

For example, a navigation app might use the aggregate trip patterns and available mode options to provide users with the fastest, cheapest, or greenest routes from A to B. Self-driving vehicle companies could use the information on intersection movement to improve technology that detects pedestrians or cyclists. Local officials would be able to use the curbside availability data to propose new guidelines for ride-hail services.



See the “Mobility” chapter of Volume 2, on Page 22, for more details on the proposed mobility management system.

# Public Engagement

The following summary describes feedback related to **digital innovations**, and how Sidewalk Labs has responded in its proposed plans.

As part of its public engagement process, members of Sidewalk Labs' planning and innovation teams talked to thousands of Torontonians — including members of the public, expert advisors, civic organizations, and local leaders — about their thoughts, ideas, and needs across a number of topics.

## 1 Protect people's privacy and use data to serve the public good

### What we heard

Throughout the public engagement process, Torontonians were loud and clear: data privacy matters. Residents were wary about third-party access to data collection and the commercial sale of data. The Data Governance Advisory Working Group recommended that "Privacy by Design" principles be incorporated into the project. The Sidewalk Toronto Fellows advised Sidewalk Labs to ensure that, as a first principle, data be collected and used with the public good in mind.

Public Roundtable 4 participants who took part in a data-focused discussion were particularly helpful in defining the use cases they were comfortable with. For example, as long as data was de-identified, residents felt comfortable with data being collected and used for transit and mobility purposes. As one Reference Panel resident said: "Cities need aggregate data. ... They need to know which modes of transportation people take when it's raining. They need to know how many people went through an intersection, not who went through it. And if they can legitimately anonymize the data they collect then I would accept that."

The Residents Reference Panel had many data-related concerns, including the need to ensure that algorithms would not perpetuate existing biases. They also wanted to ensure the cyber-security of this tech-enabled neighbourhood would be state of the art.

### How we responded

#### Designing for privacy.

For all its projects, Sidewalk Labs plans to incorporate Privacy by Design, an approach that requires thinking about potential privacy impacts at the very start of a project lifecycle and proactively embedding privacy measures into the design of a project (see Page 424).

#### Creating a steward.

To protect personal privacy and the public good, Sidewalk Labs proposes the creation of an independent entity called the Urban Data Trust to oversee digital matters and approve (or deny) proposals to collect or use urban data in the IDEA District (see Page 420).

#### Establishing guidelines.

Sidewalk Labs proposes that the Urban Data Trust establish a set of RDU Guidelines that apply to all parties engaged in the collection and use of urban data in the IDEA District. These guidelines would build on the strong existing framework of Canadian privacy laws (see Page 424).

#### Increasing transparency.

Sidewalk Labs proposes that all entities complete RDU Assessments with any proposal to collect or use urban data to ensure that digital services abide by the RDU Guidelines. RDU Assessments would be filed and publicly registered with the Urban Data Trust before a project or service could launch (see Page 429).

## 2 Earn public support through transparent policy, clear language, and data education

### What we heard

Participants were concerned that Torontonians needed more education to advance their data literacy and that companies and organizations needed to be more transparent in the ways they collect data. They wanted to know more about how data collection would happen in a place like Quayside.

The Sidewalk Toronto Fellows, Reference Panel residents, and Roundtable participants urged Sidewalk Labs to proactively disclose when (and what kind of) data is being collected and used in clear language. As one roundtable participant noted: “Data privacy and responsible data use needs genuine commitment — that includes being specific and transparent about how it will be used.”

Participants also wanted to ensure ways to consent or opt-out of data collection and use, especially in public spaces, where meaningful consent is a challenge. The Data Governance Advisory Working Group suggested that signage alerting the public to what data is being collected and how it is being used could be helpful.

### Benefiting people.

Sidewalk Labs commits to applying Canadian values of diversity, inclusion, and privacy as a fundamental human right to its digital projects, providing a clear purpose and benefit to any proposed collection and use of urban data. No data for data’s sake (see Page 424).

### De-identifying by default.

Sidewalk Labs proposes that one of the RDU Guidelines state that personal information must be de-identified by default at first use, so it cannot be traced back to any individual (see Page 424).

### Enhancing security.

Sidewalk Labs proposes to deploy a new security approach called “software-defined networks” capable of detecting security compromises and isolating impacted devices from the network (see Page 392). Sidewalk Labs also proposes to base all security and reliability standards on best practices and to emphasize resiliency across its systems (see Page 408).

### Being proactive.

To establish a proactive approach to security, each digital system Sidewalk Labs proposes would use a preparedness assessment to provide clear answers to key questions on threat modelling and response readiness (see Page 412).

### Protecting from ads.

Sidewalk Labs commits that it would not sell personal information to third parties or use it for advertising purposes. To encourage such behaviour from other companies or entities operating in the IDEA District, Sidewalk Labs proposes that the Urban Data Trust place greater levels of scrutiny on projects wishing to use personal information for ad purposes, including the need to justify this decision and to obtain explicit consent from users (see Page 425).

### How we responded

#### Being transparent.

Sidewalk Labs proposes that all projects aiming to collect or use urban data must inform individuals of how and why their information is being collected and used, and do so in a way that is proactive, clear, and easy to understand — not written in legalese (see Page 424).

#### Providing clarity.

For the collection of urban data in public spaces, where meaningful consent cannot reasonably or reliably be achieved, Sidewalk Labs proposes that entities provide clarity of usage through efforts such as physical signs notifying people of a data device or informational websites describing a service or program in greater detail (see Page 424).

#### Improving design.

Sidewalk Labs released via Github a draft of new design patterns co-created with more than 100 participants from several cities worldwide. The goal of the new patterns was to build on the consent and notice requirements that exist under current privacy laws in a way that increases digital transparency and helps people quickly get a sense of the privacy implications associated with responsible urban data collection.

#### Registering devices.

Sidewalk Labs proposes that the Urban Data Trust not only approve the placement of data-collection devices but also publish and maintain an online registry and map of device locations, with easily accessible information on what kind of data is being collected, why, how, where, and by whom (see Page 433).

#### Supporting literacy.

In Quayside, Sidewalk Labs proposes to establish a Tech Bar that would provide community members with small-group or one-on-one assistance with digital tools, with the goal of improving digital literacy among the local community.



Attendees of the “Digital Transparency in the Public Realm” workshop are hard at work. Credit: Sidewalk Labs



### 3 Tech should be an enabler and an accessible amenity



#### What we heard

Residents were excited about the opportunity for Quayside to be a world leader in urban technology and to encourage and enable future tech innovations.

Torontonians hoped the Sidewalk Toronto project would improve existing public services, potentially by leveraging technology. As one Reference Panel resident explained: “The challenge is to find ways for technology to help foster a sense of community. That seems utopian but it’s possible... I think Toronto can be a global model for a new kind of technology that helps keep us human.” Participants were also open to new tools or options that would give community members more of a voice in decisions on programming and services.

Other residents were excited by new potential services, such as enhanced Wi-Fi connectivity. Still others wanted to see technology that would make Quayside more accessible, such as customizable tech that could be experienced in multiple ways.

The Data Governance Advisory Working Group encouraged Sidewalk Labs to pursue open data whenever possible, and the Sidewalk Toronto Fellows recommended that Sidewalk Labs develop an open data portal to encourage innovation for the public good.

#### How we responded

##### Connecting people.

Sidewalk Labs proposes to create a super-fast, ubiquitous connectivity network that would provide residents, workers, and businesses access to their own secure, personal high-speed network — no matter where they are — at an affordable cost (see Page 384). For people without smartphones or computers, devices and Wi-Fi kiosks would be available and free to use in communal spaces.

##### Standardizing data.

Sidewalk Labs plans to publish data in standard formats and via well-defined, public APIs. Where standards do not exist, Sidewalk Labs plans to work with companies, researchers, and standards bodies to create those standards (see Page 405).

##### Opening data.

To encourage innovation, Sidewalk Labs plans to make publicly accessible all urban data that could reasonably be considered a public asset. Sidewalk Labs plans to work with organizations and companies that are already building open data portals to provide access to this data, and also proposes that the Urban Data Trust facilitate integration with existing open data portals and tools (see Page 406).

##### Opening code.

Sidewalk Labs plans to make software source code public under free software licences and to encourage other entities creating services in the IDEA District to do the same (see Page 406).

##### Avoiding lock-in.

Sidewalk Labs proposes that any digital infrastructure it deploys be open to competition and alternatives. As one example, it proposes to deploy a new type of standardized mount that would make it easier for cities to swap in new digital tools and avoid relying on proprietary services (see Page 380).

##### Prioritizing accessibility.

In keeping with its accessibility principles, Sidewalk Labs commits to offering technology in multiple modes and maintaining best accessibility practices. (For further reading on accessibility, see Volume 1.)

##### Supporting inclusive usability testing.

Sidewalk Labs is currently funding GRIT Toronto, a program founded by Code for Canada that incorporates community feedback into the creation of new digital services and products, helping to ensure these tools reflect the needs of the populations they are intended to support (see Page 443).

##### Enabling civic engagement.

Sidewalk Labs is developing a prototype with Digital Public Square called Collab that would allow community members to propose ideas for events in their neighbourhood. The tool is designed to walk users through the tradeoffs associated with various proposals, including how their individual choice would impact the community (see Page 446).



Sidewalk Labs’ Director of Design Michelle Ha Tucker describes the co-design process during a “Digital Transparency in the Public Realm” workshop at 307. Credit: Sidewalk Labs

## 4 Establish an ethical data governance model for the long-term

### What we heard

The Sidewalk Toronto Fellows recommended that Sidewalk Labs establish an independent entity to ensure data stewardship, and the Residents Reference Panel suggested that, when possible, data be stored, regulated, and analyzed in Canada.

Residents wanted to know more about the Civic Data Trust initially proposed by Sidewalk Labs in 2018, including how the trust would integrate into existing legal and regulatory frameworks and ensure compliance for all. (The entity has now become the Urban Data Trust; see Page 423 for details on this shift.)

Residents also wanted to better understand the data-governance model overall — including how long-term data management and storage would work — and how the government could provide appropriate oversight over the project.

### How we responded

#### Implementing an entity.

As noted earlier, Sidewalk Labs proposes the creation of an independent entity called the Urban Data Trust with the capacity to approve all proposals for use and collection of urban data and with a mandate to balance the public interest and the need for innovation (see Page 420).

#### Building on laws.

Sidewalk Labs proposes that the Urban Data Trust coordinate with privacy regulators and that the responsible data use process build on (not replace) existing privacy laws (see Page 419).

#### Ensuring accountability.

Sidewalk Labs proposes that the Urban Data Trust uphold data agreements through contracts that are legally enforceable and actionable (see Page 421).

#### Thinking long-term.

Looking long-term, Sidewalk Labs puts forth that the Urban Data Trust could be ultimately transformed into a public-sector agency or a quasi-public agency, either of which could give it more long-term viability or broader coverage (see Page 422).

#### Localizing data.

Sidewalk Labs commits to using its best efforts at data localization, as long as there are Canadian-based providers who offer appropriate levels of security, redundancy, and reliability. To the extent that it is deemed infeasible to store data solely in Canada, Sidewalk Labs would be transparent about such a decision (see Page 412).

## Engagement spotlight



Attendees talk during the first “Digital Transparency in the Public Realm” workshop in Toronto. Credit: Sidewalk Labs

Alyssa Harvey Dawson heads privacy and data governance for Sidewalk Labs. When she first started at the company, she knew that the challenges facing a company whose mission is radically improving urban life through the use of technology would be unique. This realization came into greater focus in conversations with the Data Governance Advisory Working Group.

The working group pushed Alyssa and her team to consider how data privacy, use, and management take on new meanings when the source of that data is the public realm. “You can’t just focus on personal information, which is where most privacy laws begin and end,” says Alyssa. “The scope of data that could be collected from a private actor in public spaces, where you don’t have all the usual protections, makes the concerns much more heightened. You have to think more broadly about the impact on people.”

In response, Alyssa and her team coined a term, “urban data,” that refers to aggregate, non-personal, de-identified, or personal data gathered in the physical spaces of a city, including its public realm, its publicly accessible spaces, and even some private spaces. They then proposed the creation of an independent entity that would represent the public interest and serve as the steward for the collection and use of all urban data across the IDEA District.

With these proposed initiatives, Alyssa and her team hope to advance the conversation about responsible data use in cities in new directions and inspire local solutions to this critical — and growing — challenge.

# Toronto can demonstrate to the world that cities do not need to sacrifice their values of inclusion and privacy for economic opportunity in the digital age.

## Acknowledgements

Sidewalk Labs would like to extend special thanks to the participants of the Sidewalk Toronto Data Governance Working Group, and to the staffs of the City of Toronto, Province of Ontario, and Government of Canada for their time and guidance.

## Endnotes

*General note: Unless otherwise noted, all calculations that refer to the full proposed IDEA District scale are inclusive of the entirety of its proposed geography, including all currently privately held parcels (such as Keating West). Unless otherwise noted, all currency figures are in Canadian dollars.*

*Charts note: Sources for the charts and figures in this chapter can be found in the accompanying copy for a given section; otherwise, the numbers reflect a Sidewalk Labs internal analysis. Additional information can be found in the MIDP Technical Appendix documents, available at [www.sidewalktoronto.ca/midp-appendix](http://www.sidewalktoronto.ca/midp-appendix).*

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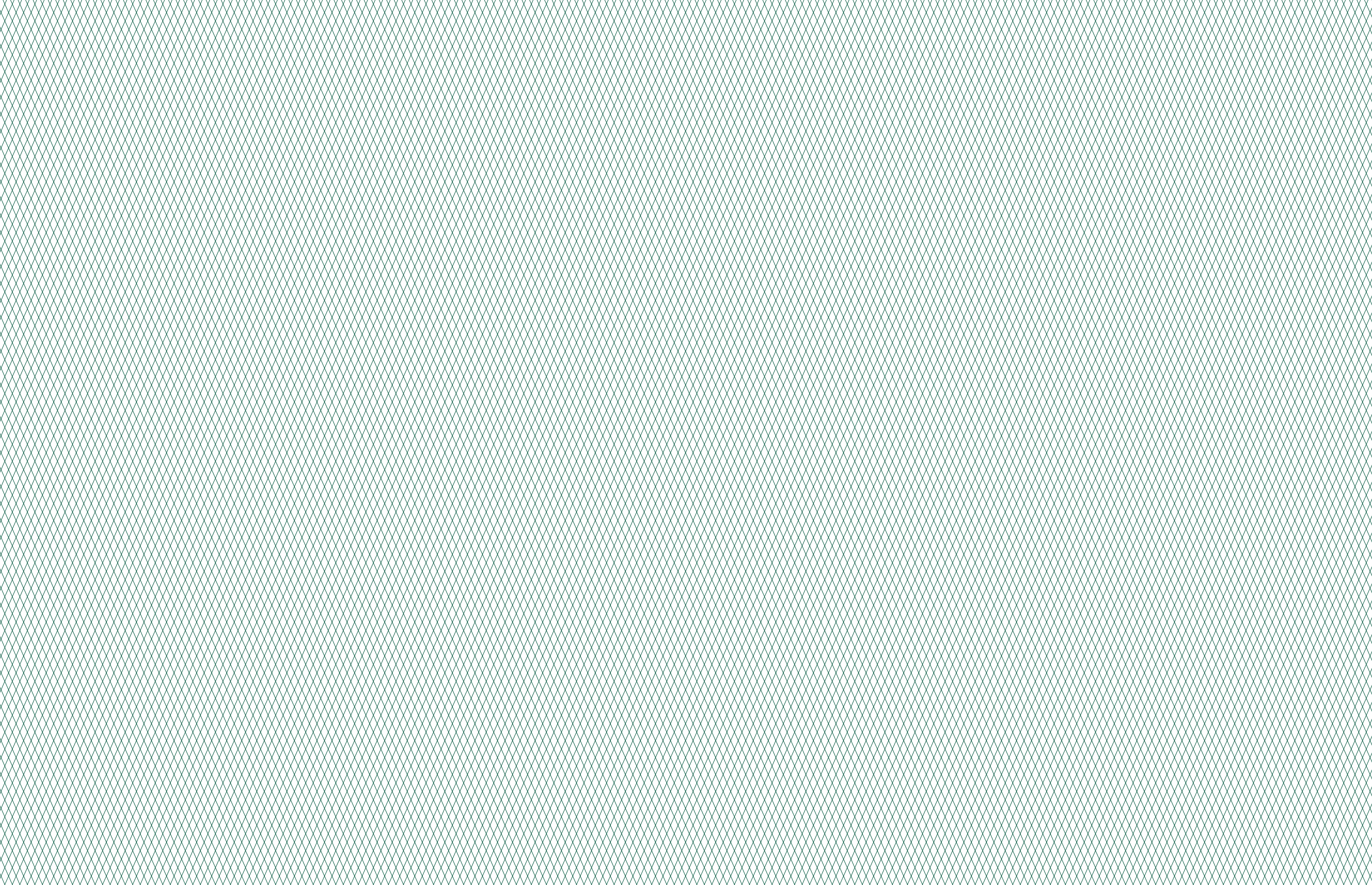
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# Toronto Tomorrow

A new approach for  
inclusive growth





**The Partnership**

# Land Acknowledgement

Sidewalk Labs recognizes that this land we now call Toronto has been the site of human activity for over 15,000 years; we are within the Treaty Lands and claimed Territory of the Mississaugas of the Credit. Toronto is now home to many diverse First Nations, Inuit, and Métis peoples. It is the responsibility of all people to share in wise stewardship and peaceful care of the land and its resources. We are mindful of a history of broken treaties, and of the urgent need to work continuously towards reconciliation, and we are grateful for the opportunity to live and work on this land.

# The Partnership Contents

---

## Partnership Overview

p16

---

### Chapter 1

The Innovative  
Design and  
Economic  
Acceleration  
(IDEA) District

p50



---

### Chapter 2

Innovation  
and Funding  
Partnership  
Proposal

p82



---

### Chapter 3

Transaction  
Economics

p148

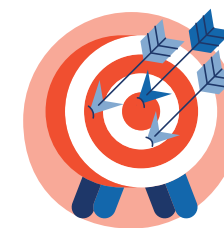


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### Chapter 4

Achieving  
Waterfront  
Toronto's  
Priority Outcomes

p180



---

### Chapter 5

Implementation

p194



---

### Chapter 6

Stage Gates and  
Risk Mitigation

p206



---

### Chapter 7

Overview of the Participants  
in IDEA District Development

p216



---

### Supplemental Tables

p220

---

### MIDP Acknowledgements

p240

# The Partnership Contents

---

## Partnership Overview

	Introduction	p18
Part 1	Harmonizing the Objectives of Waterfront Toronto, the Public, and Sidewalk Labs	p22
Part 2	Seven Principles Guiding the Proposed Partnership	p26
Part 3	Overview of Innovation and Funding Partnership	p28
Part 4	How the Proposal Reflects the Seven Transaction Principles	p36
Part 5	A Partnership Proposal Intended for Ongoing Refinement	p45
	Overview of Volume 3	p48

---

## Chapter 1 The Innovative Design and Economic Acceleration (IDEA) District

	Introduction	p52
Part 1	IDEA District Component 1: A Public Administrator	p62
Part 2	IDEA District Component 2: The Innovation Framework	p72
Part 3	IDEA District Component 3: Financing	p80

---

## Chapter 2 Innovation and Funding Partnership Proposal

	Introduction	p84
Role 1	Development of Real Estate and Advanced Systems	p86
Role 2	Innovation Planning, Design, and Implementation	p114
Role 3	Technology Deployment	p120
Role 4	Optional Infrastructure Financing	p128

---

## Chapter 3 Transaction Economics

	Introduction	p150
Part 1	Sources and Uses of Funds	p156
Part 2	Public Sector Impact	p166
Part 3	Sidewalk Labs' Returns	p174

---

## Chapter 4 Achieving Waterfront Toronto's Priority Outcomes

	Introduction	p182
Part 1	Job Creation and Economic Development	p184
Part 2	Sustainability and Climate-Positive Development	p186
Part 3	Housing Affordability	p188
Part 4	New Mobility	p190
Part 5	Urban Innovation	p192

---

## Chapter 5 Implementation

Part 1	Approval Process, Transaction, and Implementation Timeline	p196
Part 2	Phase 1 Project Delivery Timeline: Quayside Plan	p202
Part 3	Phase 2 Project Delivery Timeline: Villiers West Urban Innovation Campus	p204

---

## **Chapter 6**

### **Stage Gates and Risk Mitigation**

Stage Gates and Risk Mitigation p208

---

## **Chapter 7**

### **Overview of the Participants in IDEA District Development**

Overview of the Participants in IDEA District Development p218

---

## **Supplemental Tables**

Management Entities p222

Regulatory Adjustments p224

Initial Innovation Design Standards and Guidelines p227

Upfront Permissions p230

---

## **MIDP Acknowledgements**

p240

# Partnership Overview

---

## Introduction

p18

---

**Harmonizing  
the Objectives  
of Waterfront  
Toronto, the  
Public, and  
Sidewalk Labs**

p22

---

**Seven Principles  
Guiding the  
Proposed  
Partnership**

p26

---

**Overview of  
Innovation  
and Funding  
Partnership**

p28

---

**How the Proposal  
Reflects  
the Seven  
Transaction  
Principles**

p36

---

**A Partnership  
Proposal Intended  
for Ongoing  
Refinement**

p45

---

## Organization of Volume 3

p48

# Introduction

Toronto's eastern waterfront represents one of the greatest tracts of undeveloped or underdeveloped land in any major North American city. It presents Waterfront Toronto, the City of Toronto, the governments of Ontario and Canada, and the people of Toronto with an extraordinary opportunity to shape the future of Toronto and serve as a model for how cities around the world manage growth. The Master Innovation and Development Plan represents a comprehensive proposal for how to realize that potential in a portion of the eastern waterfront.

---

For over a century, public officials and developers have looked to the eastern waterfront to help address the land-use problems of the day.<sup>1</sup> Early last century, they envisioned the waterfront as a new home for Toronto's growing industrial base. For a variety of reasons, including economic timing and a lack of supporting infrastructure, the eastern waterfront never lived up to its lofty expectations.

After World War II, Toronto's economy shifted away from manufacturing — as was the case in many cities across North America — leaving the waterfront's industrial areas to enter a long period of decline and neglect.<sup>2</sup> Towards the close of the 20th century, Toronto's waterfront remained underutilized and in need of the critical infrastructure necessary for a post-industrial revival, but there was no single entity tasked with creating a cohesive vision for the waterfront's future. Today, beyond the important Film District, the eastern waterfront is largely a storage ground whose remaining industrial structures serve as a testament to the difficulty of large-scale urban development. As the 21st century beckoned, public

leaders took the first steps towards bringing the long-neglected waterfront to life. This effort began as part of an Olympics bid, with the bid committees strategically locating many proposed venues along the waterfront.<sup>3</sup>

Although the Olympics never materialized, the waterfront's economic potential became a focal point of Toronto's civic imagination, and a new resolve emerged from all three orders of government to revitalize the waterfront. In 2001, they formed Waterfront Toronto, a public corporation whose mission was to revive the waterfront as an economic engine.<sup>4</sup> From its inception, Waterfront Toronto's mission was about more than economic growth for its own sake — seeing innovative development as a way to advance core public priorities, such as economic opportunity, sustainability, and affordable housing.

Over the years, Waterfront Toronto has made significant progress. Waterfront Toronto has guided roughly 2.5 million square feet of

An aerial view of Toronto's waterfront looking east towards the Port Lands, from circa 1933, shows the industrial area created by filling in Ashbridge's Bay marsh. Credit: City of Toronto Archives



development (completed or planned) and leveraged initial government funding to spur \$4.1 billion in economic output for the Canadian economy.<sup>5</sup> The agency's achievements also include attracting a privately funded fibre-optic gigabit network, leading the creation of new public transit corridors and active streets, guiding over 36 hectares of parks and public spaces, and helping secure roughly 600 units of affordable housing.<sup>6</sup> The waterfront revitalization area under Waterfront Toronto's scope is 800 hectares, and to date, the agency has overseen the transformation of nearly 100 hectares of waterfront lands.<sup>7</sup>

In 2017, Waterfront Toronto took the first key step towards unlocking the eastern waterfront by securing an extraordinary \$1.25 billion investment in flood mitigation by all three orders of government. This project will help to unlock a new swath of land for future development.

At this point, Waterfront Toronto could have continued using a traditional model, bidding out a series of development parcels, with market-rate condos dominating the mix. But several emerging trends rightly led Waterfront Toronto to choose a different path.

Owing to its rapid growth, the Greater Toronto Area has become increasingly unaffordable for middle- and low-income Torontonians.<sup>8</sup> Rapid transit infrastructure has failed to keep pace with growth, increasing traffic and pushing Torontonians farther and farther away from centres of opportunity.<sup>9</sup> Open space is in high demand with limited supply.<sup>10</sup> These trends, in turn, have exacerbated the city's environmental challenges, which mirror those of other major North American cities.

The result is that the more traditional model of development — with its low levels of affordability, lack of public realm, lack of commercial space — is no longer viewed as an economic panacea, but as one symptom of the problem. Nor does the usual approach meaningfully address greenhouse gas emissions or other serious 21st century challenges.

Waterfront Toronto began to study innovative solutions to these increasingly complex sets of urban challenges — with many new approaches made possible, in part, by emerging digital capabilities. Those challenges start with affordability and extend to sustainability, inclusivity, economic opportunity, and mobility. In spring 2017, seeing an opportunity to leverage the land within its jurisdiction to greater purpose, Waterfront Toronto issued a Request for Proposals (RFP) for an Innovation and Funding Partner to work alongside Waterfront Toronto to devise, finance, and implement a bold vision of urban progress for the eastern waterfront.<sup>11</sup>

Waterfront Toronto issued the RFP to unlock the potential of the eastern waterfront as an engine of urban progress and economic development.

Centred on the five-hectare Quayside parcel, the RFP sought proposals for achieving a series of objectives that went far beyond

narrow economic goals. Waterfront Toronto was looking for proposals to create a “globally-significant community that will showcase advanced technologies, building materials, sustainable practices and innovative business models that demonstrate pragmatic solutions toward climate positive urban development.” The RFP also recognized the potential constraint of scale at Quayside, including a requirement to “describe your team’s ability and readiness to take the concepts and solutions deployed on Quayside to scale in future phases of waterfront revitalization.”

Instead of a more traditional plan, which might lead mainly to single-use condos, the RFP sought to forge a new model for a complete, mixed-use community, with outsized levels of affordable and below-market housing. Rather than looking to Quayside for incremental improvements on past development, the proposal sought to use the area as a demonstration for how advances in technology and design can yield substantial improvements in quality of life for Torontonians and for urban residents. And instead of seeking modest sustainability gains, the RFP sought plans to deliver an extraordinary level of sustainability: a climate-positive community.

Thus, the Innovation and Funding Partner would serve as more than the developer of Quayside, but as a partner to work alongside

**“Waterfront Toronto is seeking a unique partner, one with invention ingrained in its culture, which can transform conventional business practices and help to establish a benchmark climate positive approach that will lead the world in city building practices.”**

Waterfront Toronto Quayside RFP  
(March 17, 2017)

Waterfront Toronto to conceive and execute a forward-looking vision for Quayside and the eastern waterfront — a partner with the right level of ambition, technical expertise, and financial resources.

Sidewalk Labs is an Alphabet company founded in 2015 for the very purpose of delivering dramatic improvements in urban life — on the belief that tackling urban challenges is possible with a careful integration of emerging innovations and forward-thinking urban design.

From its founding, Sidewalk Labs’ goal was to create an urban district to show the broad value of applying innovations across multiple dimensions in an integrated strategy. Sidewalk Labs assembled a team of planners, architects, developers, technologists, and experts in finance and policy — with the combined expertise to deliver a large-scale project that achieves multiple, complex objectives in a public context. The result is a mission-driven company uniquely capable of rethinking urban systems with the goal of improving city life.

Following its formation, Sidewalk Labs entered a period of intensive research and development, including: consulting outside experts from around the world to advise on the impact of technology on urban life; evaluating hundreds of emerging urban innovations; reviewing 50 years of attempts to plan “smart cities” or “urban innovation districts”; and creating the framework for planning a large-scale district with innovation and quality of life built into its foundation.


Sidewalk Labs undertook feasibility studies based on this concept with several key assumptions. The district would have to be socio-economically diverse, closely connected to the surrounding metropolitan area, and of sufficient scale to support key infrastructure systems. Sidewalk Labs concluded that it could create the most innovative urban district in the world, which would materially improve on nearly every measure of quality of life and attract a vibrant mix of residents. And that it could do so in a financially viable manner.

As Sidewalk Labs was studying specific sites around the world, Waterfront Toronto was evaluating its approach to unlocking the

potential of the eastern waterfront. Sidewalk Labs immediately recognized that Toronto could be an ideal place to start.

The city is remarkably diverse, with nearly half its population foreign-born.<sup>12</sup> It is experiencing rapid growth; the City of Toronto is projected to add 1 million people by 2041.<sup>13</sup> Toronto’s university system is extraordinary, and Toronto is home to one of the most dynamic technology ecosystems in the world.<sup>14</sup> The city’s history is one of civic engagement, thoughtful urban planning, and policy innovation. And with the current development trajectory threatening Toronto’s inclusiveness, Sidewalk Labs saw Torontonians as potentially open to exploring new ways to manage growth.

Sidewalk Labs responded to the RFP and six months later was honoured to be selected by Waterfront Toronto as its Innovation and Funding Partner, launching the Sidewalk Toronto project in October 2017. This designation gave Sidewalk Labs the exclusive right to work, at its own expense, with Waterfront Toronto and governmental partners to develop a plan and partnership proposal to demonstrate what could be possible. This plan would still need to be reviewed and approved by Waterfront Toronto and, as relevant, by the three orders of government.

Sidewalk Labs is honoured by the opportunity to present this third volume of its Master Innovation and Development Plan (MIDP) and by the prospect of working alongside Waterfront Toronto and the three orders of government it represents to dramatically improve urban life in the 21st century. This volume presents a proposal from Sidewalk Labs for a new kind of public-private partnership. 

Resulting from more than a year of planning and outreach, Volume 3 lays out Sidewalk Labs’ proposal for how it can play the role of Innovation and Funding Partner first contemplated in Waterfront Toronto’s RFP. It attempts to harmonize the ambitions and concerns that Sidewalk Labs, the three orders of government, Waterfront Toronto, the private sector, and thousands of Torontonians have expressed in thousands of conversations over the past year.



See Volume 1 for more details on the plans.

See Volume 2 for more details on urban innovations.



# Harmonizing the objectives of Waterfront Toronto, the public, and Sidewalk Labs

Sidewalk Labs has reflected deeply on the objectives in Waterfront Toronto's RFP and solicited feedback from the people of Toronto through an extensive public engagement process, including concerted outreach to the business, academic, non-profit, and institutional sectors, as well as engagement with all three orders of government.

To date, Sidewalk Labs has heard firsthand from more than 20,000 Torontonians, including at a town hall kickoff, four public roundtables, dozens of community meetings and programs, six topic-specific advisory boards, hundreds of one-on-one or small group meetings, and a Residents Reference Panel.<sup>15</sup> Additionally, in June 2018, Sidewalk Labs opened a Toronto office and innovation workspace in Quayside called 307, welcoming thousands of people to learn more about the Sidewalk Toronto project and engage with early explorations into a variety of urban innovations.<sup>16</sup> Sidewalk Labs has also engaged extensively with Waterfront Toronto and public officials at all three orders of government to advance a plan that draws on the expertise of those who work in this area.

## Objectives for the people of Toronto

Through the various touchpoints, Torontonians have expressed the following objectives:

**Focus on priority outcomes.** Overwhelmingly, Torontonians want the project to deliver results linked to Waterfront Toronto's priority outcomes: to create jobs, develop a climate-positive community, attain new levels of housing affordability, increase mobility options and reduce traffic, expand open space access,

and, where appropriate, use digital innovations to improve outcomes while meaningfully protecting privacy and the public interest.

**Make sure the public sector has a strong role.** Torontonians stressed the importance of public entities having clear mandates and adequate resources to negotiate with Sidewalk Labs effectively and then to provide strong ongoing oversight and accountability of the public-private partnership as it unfolds.

**No tech for tech's sake.** While recognizing that technology alone is not capable of solving all city problems, technology's potential to improve urban life appeals to Torontonians. But they want technology that targets significant urban challenges, not technology for its own sake.

**Be inclusive and make room for others.** Torontonians want to see a broad group of businesses, non-profits, and innovators actively participate in the new opportunities created by the project, especially Canadian companies and entrepreneurs. Consequently, they also want to see open standards ("no technology lock-in"), where multiple parties can develop technology that is flexible enough to respond to tastes, trends, and technological advances.

**Present a transparent business model.** Torontonians highlighted transparency as key to gaining public trust, particularly with respect to the financial obligations and benefits in any agreement, initially and over time. The complex and long-term nature of the transaction increases the need for clarity about roles and responsibilities, and about how Sidewalk Labs intends to earn a return.

**Prove out the concept.** Torontonians are concerned about the potential that a complex, large-scale, long-term plan could fail. They support achieving a big vision through a phased approach, to prove out the model in Quayside, as a demonstration project before extending to successive phases.

**Build on what has been done.** Over time, Toronto has made considerable headway in developing the waterfront and in trying new ways to solve urban challenges. Torontonians emphasize the importance of building on this record, and of recognizing and expanding approaches that have been successful.

## Requirements for Sidewalk Labs

While Torontonians generally recognize the potential of the Sidewalk Toronto project, Sidewalk Labs' motives for pursuing the RFP and its overall business model have been subject to speculation, even a fair amount of cynicism. Many of these concerns can be addressed up front with a few clear statements:



See the "Digital Innovation" chapter of Volume 2 for more detail on Sidewalk Labs' data governance strategy.

**Sidewalk Labs is not seeking to sell personal information or use it for advertising.** Sidewalk Labs made a commitment to not sell personal information to third parties or use it for advertising purposes. It also commits to not disclose personal information to third parties, including other Alphabet companies, without explicit consent. Finally, Sidewalk Labs has proposed that an independent entity approve proposed collections and uses of urban data in the project area by all parties, including Sidewalk Labs.

**Sidewalk Labs is not motivated by a desire to export Canadian talent or intellectual output to the United States.** Sidewalk Labs is not an internet company that can exist anywhere. An important part of its business model involves going "all in" on physical places. This proposal seeks to make Toronto such a place. And Sidewalk Labs has committed to sharing with the public sector the profits of certain technologies deployed in Toronto.

**Finally, Sidewalk Labs is not trying to develop the Port Lands.** Sidewalk Labs' role as a real estate developer would be restricted to Quayside and Villiers West, and undertaken for the

limited purpose of proving out the model — and even in those locations, Sidewalk Labs expects to have local partners. In total, Sidewalk Labs proposes leading development on less than 7 percent of the eastern waterfront.

Sidewalk Labs' actual goals are quite simple.

### Demonstrate the impact of innovation on quality of life in cities.

Sidewalk Labs is a mission-driven company. That mission is to combine forward-thinking urban design and cutting-edge technology to radically improve urban life. Sidewalk Labs is motivated to pursue this project by a desire to create places that apply 21st century concepts in design and technology to achieve improvements in nearly every dimension important to quality of urban life, from creating jobs and reducing the cost of living, to increasing mobility and advancing sustainability. This calls for an urban district of sufficient scale to demonstrate the value of an integrated approach for achieving measurable benefits on critical priorities.

### Earn a reasonable return.

Sidewalk Labs is a commercial venture, and although mission-driven, a subsidiary of a publicly-owned company. As per its commitment under its Plan Development Agreement with Waterfront Toronto, Sidewalk Labs has already invested more than \$50 million USD, with no guarantees of being repaid, to develop this MIDP. This, however, represents a small share of the overall cost to the company if the project is approved. The company will seek to earn a reasonable return on its investment.

## Sidewalk Labs' unique capabilities

When it selected Sidewalk Labs as Innovation and Funding Partner, Waterfront Toronto recognized that Sidewalk Labs brought a range of unique capabilities that sets it apart from other potential partners. Several attributes, in particular, make Sidewalk Labs the ideal partner for delivering an urban project to match the ambitions of Waterfront Toronto and the three orders of government it represents.

**Key Term**

**SIP**

**Sidewalk Infrastructure Partners**

is a new company created by Sidewalk Labs to finance next-generation infrastructure systems that can help unlock sustainable development. See Chapter 2, on Page 147, for more details.

These include:

**Cutting-edge urban design and technology.**

Sidewalk Labs was formed to work with governments and private parties to build 21st century urban districts. The company has assembled a team unlike any other, drawing leading professionals from the diverse disciplines necessary to plan and execute an innovative development project of this scope and magnitude, including urban planning, technology, policy, architecture, engineering, development, and finance. Moreover, Sidewalk Labs has developed, and continues to refine, critical pieces of technology for improving cities. Just as importantly, Sidewalk Labs, as a subsidiary of Alphabet, has close familiarity with many of the technological assets in development by its sibling companies. Many of these technical resources are highly relevant to urban innovation, from digital infrastructure and geospatial mapping, to autonomous vehicles and energy management.

**Patient capital.**

Too often, outside pressures tempt companies to sacrifice long-term opportunities to meet quarterly market expectations. Sidewalk Labs’ parent company, Alphabet, has a demonstrated commitment to taking a long-term view of investing, where warranted. Sidewalk Labs can likewise take a longer view. This approach is critical to the innovative urban model sought in the RFP, which calls for

a longer investment horizon than traditional real estate. Accordingly, it requires financial backers committed to seeing it through — to prove out the technologies and ultimately achieve economic viability.

Sidewalk Labs established a new company, Sidewalk Infrastructure Partners (SIP), for the purpose of investing in next-generation infrastructure systems, such as those proposed in the MIDP. This allows Sidewalk Labs to commit more resources to research and development than a typical real estate developer, and to invest in hard assets with higher capital requirements than a typical technology company.

**Economic driver.**

Sidewalk Labs’ sister company Google has a well-documented history of acting as a catalyst to economic development when it experiences growth in a region. When it reaches a critical mass of employees in a city, time and again, significant growth follows. For example, Google’s decision to open a New York City office in 2000 and the subsequent growth of that office paved the way for the city’s emergence as a major hub for tech companies and jobs.

As reflected in the table below, an analysis of four U.S. cities found that, in the five years after Google opened office space, the value of nearby commercial assets increased at a faster rate than in each city’s central business district.<sup>17</sup>

Fig. 0.1

**Growth in commercial space over a five-year period after Google’s entrance**

City	Central Business District Growth Post-Google	Micro-Market Growth Post-Google
New York City (Chelsea, 2005–2010)	-0.1%	30.6%
Chicago (Fulton Market, 2013–2018)	19.0%	108.0%
Austin (Shoal Creek, 2015–2018)*	23.6%	64.4%
Los Angeles (Playa Vista, 2012–2017)	0.0%	21.8%

\* Because Google’s presence in Austin began in 2015, the commercial inventory analysis for this location is based on a three-year period rather than a five-year period.

**Key transaction terms**

The following terms are critical to understanding the proposed transaction.

**Advanced systems:** Nine urban solutions described in the MIDP that are needed to deliver on Waterfront Toronto’s priority outcomes. They are:

→ **Advanced power grid.** Advancement on Toronto Hydro’s typical electricity service, which, among other elements, incorporates rooftop photovoltaic generation, battery storage, and dynamic demand management.

→ **Advanced stormwater management system.** District-scale stormwater management using continuously monitored green infrastructure and active controls to reduce infrastructure needs and enhance the public realm.

→ **Digital communications network.** Fibre-optic internet network using Super-PON technology to support ubiquitous internet connectivity.

→ **District parking management system.** System incorporating space-efficient on- and off-site parking, high-density parking equipment, attendant-based vehicle retrieval, and electric vehicle charging.

→ **Dynamic streets.** Innovative hex paving that incorporates dynamic lighting and signage, heating for snow melt, and digital infrastructure for traffic management.

→ **Freight management system.** System allowing most deliveries to arrive at a single freight consolidation centre and to be sent on to recipients through tunnels using self-driving delivery dollies.

→ **Mobility subscription package.** Specialized, app-enabled mobility service bundle spanning public transit, ride-hail, parking, shared services, and micro-mobility programs.

→ **Pneumatic waste system.** Pneumatic waste collection system with a dynamic pay-as-you-throw rate structure, a user interface at the chute, and downstream monitoring of contamination.

→ **Thermal grid.** Thermal energy grid that could incorporate geothermal heat exchange, building heat recovery, sewage heat recovery, and other clean energy sources.

**Horizontal development / infrastructure:** The construction and stabilization of infrastructure, improvements, systems, and services that affect and support multiple real estate parcels in a given area. These include municipal infrastructure, such as sewers and parks; transit infrastructure, such as a light rail extension; and the advanced systems.

**Lead developer:** The party responsible for delivering horizontal or vertical development to agreed-upon specifications and performance standards. To carry out this responsibility, the lead developer would engage third-party development partners, contractors, and operators.

**Public administrator:** Public entity serving as revitalization lead for the IDEA District with well-defined powers to advance a comprehensive innovation and development strategy.

**Vertical development:** The construction and operation of private residential, commercial, and mixed-use buildings on individual real estate parcels. Vertical systems refer to heating, water, and other in-building systems.

# Seven principles guiding the proposed partnership

Sidewalk Labs considered its own objectives and capabilities, and reflected deeply on the objectives detailed in Waterfront Toronto's RFP and the feedback it received from the public. Sidewalk Labs distilled this 18-month engagement process into a series of seven transaction principles that seek to harmonize the priorities of Sidewalk Labs with those of Waterfront Toronto and the public at large, including:

# 1

## Devise a transaction that would achieve Waterfront Toronto's priority outcomes.

Any proposal must first achieve Waterfront Toronto's priority outcomes through an innovative approach to both development and partnership:

- **Job Creation and Economic Development:** Catalyzing economic growth for Toronto, Ontario, and Canada, including by bolstering the innovation ecosystem, creating new growth opportunities for Canadian firms, and expanding jobs and training across the socio-economic spectrum.
- **Sustainability and Climate-Positive Development:** Creating neighbourhoods with below-zero annual greenhouse emissions and dramatically improving sustainability overall.
- **Housing Affordability:** Exceeding Waterfront Toronto's affordable housing requirement, with minimal reliance on public funding, and otherwise enabling access to housing for all income groups.

- **New Mobility:** Strengthening connections to the city's public transit network, reducing the cost and climate impact of transportation options, and increasing convenience for travellers and goods movement.
- **Urban Innovation (including robust data privacy and digital governance):** Tackling complex urban problems, from traffic congestion to energy use, using emerging physical and digital tools.

# 2

## Scale the project to achieve the desired outcomes.

Understanding that making progress on its project objectives could require a scale broader than Quayside, Waterfront Toronto invited proposals at a district scale. Waterfront Toronto recognized that certain promising approaches can only be supported financially or deliver a material public benefit when applied to a broader geography. Ultimately, the project should be scaled such that the public policy outcomes are met and the project can be commercially viable.

**Key Term**  
Implementation Agreements would be developed following approval of the MIDP. These contracts, which would involve Sidewalk Labs, Waterfront Toronto, and, in certain cases, government, would govern all aspects of the transaction.

# 3

## Phase development to manage risk.

The ability to extend new approaches to innovation beyond Quayside should depend on Sidewalk Labs first hitting milestones that demonstrate it is likely to succeed in future phases.

# 4

## Establish strong public sector oversight.

No urban project of sufficient scope or complexity can succeed without meaningful public oversight and an administrator capable of moving it forward. This is especially true for projects bringing new ideas and approaches to bear.

# 5

## Structure the role of Sidewalk Labs to leverage its strengths.

The role for Sidewalk Labs should capitalize on its unique combination of strengths, including a multidisciplinary team that spans urban planning, finance, design, and technology; its access to capital and technological resources, including from its parent, Alphabet; and its willingness to take calculated risks to advance its mission. The flipside is also true: Sidewalk Labs should not take on roles where it does not add special value.

# 6

## Use proven approaches where possible.

Deal terms, financing mechanisms, and Implementation Agreements should rely on existing local precedents whenever possible, to simplify and de-risk the transaction.

# 7

## Align financial interests.

As with any company seeking to invest in Toronto, it is appropriate that Sidewalk Labs seeks to earn a return on its investment. But the transaction structure must ensure that Sidewalk Labs is financially successful only when the public sector is financially successful and also achieves its objectives.

# Overview of Innovation and Funding Partnership

Guided by the core set of principles, Sidewalk Labs proposes a transaction to accelerate the development of Quayside, accomplish Waterfront Toronto's priority outcomes, and spur growth in the eastern waterfront. This proposal strives for a forward-looking public-private partnership, in which the public sector leverages outside expertise, technology, and resources to spur economic growth and deliver extraordinary benefits for the people of Toronto.

Waterfront Toronto or another public entity would have accountability for the project, set its objectives, and advance a forward-looking vision for the eastern waterfront. And as Innovation and Funding Partner, Sidewalk Labs would serve as a catalyst for innovative urban development — bringing expertise, financial resources, economic development assets, and a willingness to invest to pioneer a forward-looking, integrated, progressive, and sustainable model for improving urban life.

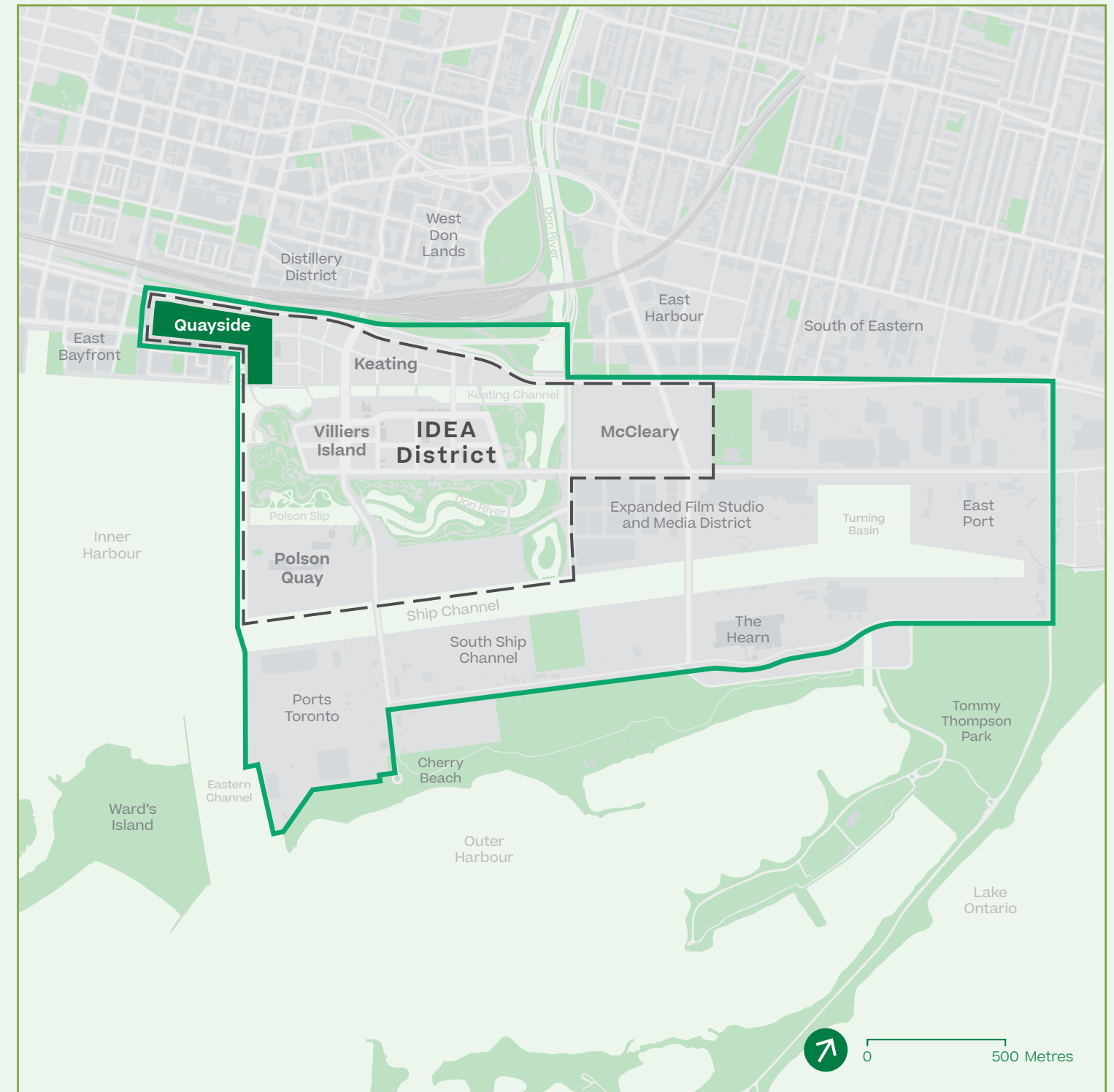
The ambition of the proposed transaction follows from the objectives identified in Waterfront Toronto's RFP and later articulated as "MIDP Targets" in its [Plan Development Agreement \(PDA\)](#) with Sidewalk Labs. As laid out in prior volumes of the MIDP, the result is an overall plan that offers an opportunity for the City of Toronto, the Province of Ontario, and the people of Canada to lead the world and show how to leverage cutting-edge technology and design, address fundamental urban challenges, and improve quality of life.

Responding to the broad challenge of the RFP, the MIDP consists of a blueprint for an integrated, multiphase project to transform Quayside into the centrepiece of a vibrant mixed-use, mixed-income district dedicated to using the best of design and technology to fuel improvements in urban life. [The result would be a scalable proof of concept for the ideas that will drive economic growth, achieve urban progress, and deliver on Waterfront Toronto's priority outcomes.](#)

The proposal requires Sidewalk Labs to achieve key project milestones and, based on its success, earn the right to develop the western portion of Villiers Island and later to advise on innovative development in a portion of the eastern waterfront. The MIDP refers to this area — which is depicted on the following map — as the Innovative Design and Economic Acceleration (IDEA) District. The project, when fully extended, is scaled to deliver on Waterfront Toronto's priority outcomes. Sidewalk Labs proposes to lead vertical development in about 16 percent of the IDEA District, or about 7 percent of the eastern waterfront, and to serve as a catalyst for sustainable development by others in the broader waterfront area.

## Key Term PDA Plan Development Agreement

The Plan Development Agreement between Sidewalk Labs and Waterfront Toronto established a planning roadmap for completion of the MIDP and identified a series of MIDP targets.



Map  
The IDEA District

— Eastern waterfront  
- - - IDEA District

## Sidewalk Labs would make the following commitments:

### Advance a bold innovation agenda.

Sidewalk Labs would apply a range of new solutions to pressing urban challenges. The project would pioneer affordable and sustainable building techniques that can also significantly speed up construction times and reduce construction costs, including factory-built mass timber construction of up to roughly 30 storeys.<sup>18</sup>

New weather-mitigation strategies would make it comfortable to be outside for twice as much time each year in some areas.<sup>19</sup>

Mobility would be profoundly improved, including a subscription package that provides convenient and affordable options for every trip and saves households thousands of dollars a year. Dynamic streets could reduce traffic congestion, improve comfort and safety for cyclists and pedestrians, and dramatically expand public space.<sup>20</sup>

Cutting-edge energy infrastructure — including a thermal grid system that uses clean energy to heat and cool buildings, and an actively controlled green infrastructure solution to stormwater management — would result in remarkable levels of sustainability, with the potential to establish the largest climate-positive district in North America.<sup>21</sup>

### Develop Quayside as a complete and inclusive community.

In Quayside, Sidewalk Labs would deliver 2.65 million square feet of developed space — with a strong commitment to working with local partners. This would include delivering roughly 2,600 units of housing, half of which would be purpose-built rentals. More than 40 percent of units would have two or more bedrooms, responding to the acute need for family-size housing. And the project would set a new high-water mark for affordability, with below-market housing accounting for 40 percent of residential units. Non-residential uses, such as commercial, office, retail, and community activities, would account for 33 percent of floor space (870,000 square feet),

with space for 3,900 full-time jobs. From the outset, Quayside would be designed to be a complete community.<sup>22</sup>

### Deliver a major economic development project.

By successfully advancing the plan for Quayside, Sidewalk Labs would earn the right to lead development of the Villiers West urban innovation campus — with a similarly strong commitment to working with local partners. Alphabet commits to establishing a new Canadian headquarters for Google at Villiers West, as part of an agreed-upon transaction within the IDEA District. Alphabet would target up to 500,000 square feet, sufficient to accommodate as many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring will depend on market conditions and business requirements). This would both allow Google to accommodate its growth in Toronto and provide the city with significant economic development opportunities driven in part by the new employment being generated. The campus overall would have about 1.5 million square feet of commercial space.

To further spur the creation of a new urban innovation cluster, Sidewalk Labs would provide \$10 million in initial seed funding for an Urban Innovation Institute, a new graduate applied research institution modelled on the success of Cornell Tech in New York — but focused on developing urban innovations — working in partnership with local post-secondary institutions. Sidewalk Labs would also commit \$10 million to a venture fund (side by side with other institutional funding partners, including one or more local venture firms) that would invest in local startups focused on urban innovation.<sup>23</sup>

### Serve as lead developer of advanced systems.

At both Quayside and Villiers West, Sidewalk Labs would serve as lead developer of a range of advanced systems; among other responsibilities, this role would include identifying and overseeing sophisticated third-party operators and partners. These systems are essential to achieving Waterfront Toronto's priority outcomes, especially sustainability and new mobility; to delivering the innovative development model proposed in the MIDP; and to proving the practical and financial viability of these advanced systems in the broader marketplace.

### Serve as a technical partner and advisor.

From the outset, Sidewalk Labs would provide a suite of technical advisory and management services to expand sustainable economic growth and use innovative strategies to address urban challenges in the eastern waterfront. This includes preparing the technical specifications and performance requirements to guide innovative development; integrating new solutions and strategies for achieving public objectives at the project planning stage; and, if the project extends to later phases, assisting in procuring partners and operators for advanced systems, such as an advanced power grid, a new stormwater management system, and dynamic streets. This role starts at Quayside and would expand to the broader geography upon accomplishing a series of project milestones.

### Deliver essential technology.

To achieve core project objectives, Sidewalk Labs proposes to identify key technology products on the market for use in the project. Sidewalk Labs would foster an urban innovation ecosystem open to entrepreneurs and inventors from across Canada and around the world, and work with the governments to design a structure to support Canada's capacity to build and retain intellectual property (IP) locally. Sidewalk Labs would also develop a limited number of services or products that do not exist in the current market but are needed to advance Waterfront Toronto priorities and improve digital infrastructure — identified by Waterfront Toronto in its RFP as “purposeful solutions.” These would be provided by Sidewalk Labs at cost. For certain technologies that Sidewalk Labs develops and deploys at scale in connection with the project, Sidewalk Labs also proposes to share 10 percent of the profits with the public sector.

### Optional financing for critical infrastructure.

Adequate provision of public transit is key to the economic success of the eastern waterfront. If needed, Sidewalk Labs is prepared to explore options with government to finance the LRT to ensure this project can move ahead in the near term.<sup>24</sup> Sidewalk Labs would also offer optional financing support for municipal infrastructure (such as parks and sewers) needed for the development of the IDEA District. Finally, to achieve Waterfront Toronto's objectives beyond Quayside and Villiers West, Sidewalk Labs could help to facilitate the financing of advanced systems through SIP, a company it formed focused on technology-enabled infrastructure.

### Unlocking \$29 billion in third-party investments.

In total, Sidewalk Labs would catalyze up to \$3.9 billion in real estate investments in Quayside and Villiers West. With third parties, Sidewalk Labs would also enable optional financing for municipal infrastructure, transit, and advanced systems totalling up to \$1.6 billion, and spur economic growth through a series of targeted investments, including in a tall timber factory and a venture fund targeting Canadian startups. This capital would come from various sources, including outside investors and asset-level debt for both real estate and infrastructure. This includes an estimated \$900 million investment from Sidewalk Labs and its local development partners; an additional \$400 million of financing that Sidewalk Labs would offer to the public sector as an option to expand the LRT and deliver municipal infrastructure; and additional capital (equity and debt) that Sidewalk Labs expects to facilitate for the delivery of advanced systems.

These investments would unlock more than \$29 billion in additional third-party real estate investments and catalyze a project that, when fully implemented, would substantially exceed the objectives Waterfront Toronto has set forth, by being home to 44,000 permanent jobs (93,000 total jobs, including direct, indirect, and induced);<sup>25</sup> about 34,000 units of housing, with an estimated 13,600 units of below-market housing (with the vision extended to full IDEA District);<sup>26</sup> an 89 percent reduction in GHG emissions; and a world leading climate-positive district.<sup>27</sup>

## To enable these commitments, Sidewalk Labs seeks the following public sector commitments:

### Governance.

A project of this scope, complexity, and duration requires strong public oversight and a regulatory framework predisposed to new approaches. Building on Canada's success with targeted geographic governance strategies, the proposal calls for government to designate a public entity to serve — or, if Waterfront Toronto is so designated, to continue to serve — as revitalization lead for the IDEA District with certain additional powers. A carefully targeted package of regulatory reforms and development standards would apply in the IDEA District. Under this approach, this public administrator would be empowered to hold Sidewalk Labs and others working in the district accountable for performance, to steer innovation strategy, and to oversee the governance structures needed to manage new district systems.

### Financial.

The proposal incorporates several key terms. First, Sidewalk Labs expects to purchase (or long-term lease) the land in Quayside and Villiers West from Waterfront Toronto at a price such that the innovation risk and cost will be borne by Sidewalk Labs, but that also fairly accounts for the heightened public policy outcomes required, such as levels of sustainability and affordability unprecedented in any commercial development.

Second, Sidewalk Labs expects to be reimbursed, over time, for its advisory and implementation services and repaid for Sidewalk Labs' optional financing or credit support

for transit and municipal infrastructure. The financing would be repaid at a fixed annual rate of return at market rates, to be negotiated — with a commitment from Sidewalk Labs to work with government, pension funds, and other institutional investors to develop transaction structures that reduce the rate as much as possible while still attracting the necessary financing. With funds expected from several sources, Waterfront Toronto would repay financing fronted by Sidewalk Labs and other partners; cover Waterfront Toronto's ongoing operations; and reimburse expenses Sidewalk Labs incurs in its delivery of technical and advisory services.

Finally, Sidewalk Labs is seeking performance payments to compensate for non-standard upfront costs and for serving as a catalyst to deliver on Waterfront Toronto's priority outcomes and accelerate development across the eastern waterfront. The amount of these payments would be negotiated in closing the transaction and earned if (and only if) Sidewalk Labs reaches a series of performance and **growth targets** directly tied to Waterfront Toronto's priority outcomes.

The proposed financial structure is designed to align the interests of Waterfront Toronto, Sidewalk Labs, and the public; to compensate Sidewalk Labs for serving as a catalyst for a new approach to urban development; and to account for the special challenges underlying the project, such as an extended repayment timeline and complexities associated with integrating next-generation systems that are new to Canada or the market. This structure includes a proposal to pay the public sector a share of the upside value if Quayside and Villiers West prove more profitable than expected; an approach where Sidewalk Labs only begins to earn performance payments after Waterfront Toronto and the public sector

reach their objectives; and a profit-sharing proposal, through which the public sector would receive a share of the profits generated by certain technologies first tested and deployed at scale in the IDEA District.

A third-party report commissioned by Sidewalk Labs forecasts that, in total, the project would generate approximately \$4.3 billion in annual municipal, provincial, and federal tax revenues, \$14.2 billion annually in Canadian gross domestic product (GDP), and a total of 44,000 permanent jobs (93,000 total direct, indirect, and induced) by 2050. As shown on the table below, this represents \$2.8 billion more in annual tax revenues, a \$9.0 billion increase in GDP, and 27,000 more jobs than the baseline scenario, which assumes development proceeds based on the current set of government-created planning documents for the project geography (including zoning where it exists, precinct plans, and the Port Lands Planning Framework).

Fig. 0.2  
**Summary of economic impact over baseline in 2050**

	Baseline Scenario	IDEA District	Improvement Over Baseline
Total Tax Revenues (Annual)	\$1.5 billion	\$4.3 billion	+\$2.8 billion (187% increase)
GDP (Annual)	\$5.1 billion	\$14.2 billion	+\$9.0 billion (178% increase)
Direct Job Growth (Total)	17,000 jobs	44,000 jobs	+27,000 jobs (159% increase)

Note: The above figures are from an economic analysis urbanMetrics prepared for Sidewalk Labs, presenting tax and GDP forecasts in 2019 dollars.

## Sidewalk Labs' approach to partnering with local firms

Sidewalk Labs recognizes the value of local partners in delivering on the vision of the MIDP and achieving Waterfront Toronto's priority outcomes. Toronto has a vibrant local development community, including developers eager not only to build projects on the waterfront, but to embrace new, sustainable ways of building and to advance innovative approaches to design.

Sidewalk Labs proposes to lead the development of real estate and advanced systems in a portion of the eastern waterfront, initially at Quayside and potentially expanding to Villiers West with the achievement of project milestones. This constitutes the extent of Sidewalk Labs' vertical development, representing 16 percent of the IDEA District and 7 percent of the eastern waterfront overall; if Sidewalk Labs is successful, its role in the IDEA District would then shift to serving solely as a catalyst for sustainable development by others. Just as importantly, Sidewalk Labs is committed to seeking capable local partners to participate in the vertical development of Quayside and Villiers West, the development of horizontal infrastructure (including traditional and advanced systems) and other project areas. By adding local knowledge, know-how, and relationships, these local businesses would supplement Sidewalk Labs' skillset and lead to a better overall project. This extends to Canada's sophisticated base of investors, including pension funds, that could invest capital for real estate, infrastructure, and other project elements. Whether specifically stated or not, Sidewalk Labs is committed to identifying appropriate partners to deliver many of the elements described in the MIDP.

Concurrent with negotiating the transaction and seeking public approvals, Sidewalk Labs therefore intends to identify appropriate local partners to participate in various aspects of project delivery. The actual business arrangements could take various forms, including partnerships, joint ventures, and licence arrangements.

### Key Term

## Growth target

A type of project milestone, in which Sidewalk Labs is required to increase development above a negotiated baseline.

Fig. 0.3

## Summary of Innovation and Funding Partnership proposal

The proposal involves a set of mutual commitments for an incremental, multiphase project to establish the eastern waterfront as a global leader in using cutting-edge technology and design to achieve significant progress in tackling urban problems.

Commitments from Sidewalk Labs	Public Sector Commitments
<ul style="list-style-type: none"> <li>→ Vertical development of Quayside to deliver a new model for using cutting-edge design and technologies to improve urban life.</li> <li>→ Vertical development of the Villiers West Urban Innovation Campus to further prove out the innovations initiated in Quayside, spur economic development, and cultivate an urban innovation cluster.</li> <li>→ Horizontal development of the advanced systems for Quayside and Villiers West needed to deliver on Waterfront Toronto's objectives.</li> <li>→ Deployment of Sidewalk Labs' technologies (e.g., "purposeful solutions"), including sharing the profits associated with certain technologies with the public sector.</li> <li>→ Optional financing at a fixed interest rate for enabling infrastructure, including credit support for Waterfront East LRT extension; financing for municipal infrastructure; and funding "supplemental innovation investments" to make the advanced systems financially viable in the early phases.</li> <li>→ Major economic development investments, including a new Canadian Google headquarters on Villiers West, a tall timber factory, seed funding for an Urban Innovation Institute (\$10 million), and a venture fund (\$10 million) focused on Canadian startups.</li> <li>→ Payment to Waterfront Toronto of a share of upside value, above an agreed-upon threshold, from the Quayside and Villiers West proceeds.</li> <li>→ 15-year agreement to provide ongoing technical, advisory, and management services for planning, design, and implementation in the IDEA District, including for advanced systems and certain other horizontal infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>→ Partnering with Sidewalk Labs to implement a comprehensive innovation and development strategy, with corresponding fees.</li> <li>→ Establishment of the IDEA District with a public administrator, including regulatory adjustments to enable critical infrastructure and innovative strategies.</li> <li>→ Disposition of land for Quayside and Villiers West at price that accounts for additional Waterfront Toronto requirements.</li> <li>→ Source a limited number of Sidewalk Labs' products (at cost) to enable prototyping and deployment at scale, with corresponding IP sharing provisions for certain technologies.</li> <li>→ Payment of performance payments upon Sidewalk Labs achieving a series of negotiated growth and performance targets.</li> </ul>

**Sidewalk Labs proposes a multiphase transaction to accelerate the development of Quayside, accomplish Waterfront Toronto's priority outcomes, and spur inclusive growth across the eastern waterfront.**

# How the proposal reflects the seven transaction principles



See Chapter 4 for tables summarizing how the various elements of the MIDP would achieve Waterfront Toronto's priority outcomes.

The proposed transaction has been structured to reflect the seven transaction principles articulated earlier:

## 1

### Devise a transaction that achieves Waterfront Toronto's priority outcomes

Sidewalk Labs prepared the MIDP and an overall transaction structure that delivers the priority outcomes for Waterfront Toronto and activates billions of dollars in outside financing and investment. On job creation and economic development, the MIDP lays the groundwork for a true mixed-use neighbourhood and proposes substantial investments to cultivate an urban technology cluster — including a new Google Canadian headquarters as a powerful economic driver, seed funding for a new applied research institute in Villiers West, and a new venture fund to target Canadian startups. On sustainability and climate positive development, a series of advanced systems would reduce GHG emissions by 89 percent and achieve the ambitious goal of a climate-positive neighbourhood; divert more recyclable and compostable waste away from landfills; reduce the discharge of untreated stormwater into municipal systems; and better address a host of other environmental challenges. To advance housing affordability and create a complete community, the plan would allocate 40 percent of units to affordable or below-market housing and prove out new construction approaches that would speed up project timelines and reduce costs. To improve mobility, among other outcomes, Sidewalk Labs would provide optional credit support to accelerate the city's planned Waterfront East LRT, and would construct dynamic streets and establish a mobility management system to ease traffic and expand transit

options, which would lead to a 17 percentage point reduction in solo car trips.<sup>28</sup> Finally, the plan would advance urban innovation using a range of technologies — from an advanced digital communications network to outdoor comfort systems — that would enable more dynamic use of the IDEA District and power future advances.

## 2

### Scale the project to achieve the desired outcomes

Sidewalk Labs performed an intensive analysis first of what could be achieved in Quayside alone and then of what could be achieved at a broader scale in terms of sustainable infrastructure, buildings, the public realm, mobility, economic development, and social infrastructure. What became clear was that achieving the priority outcomes required infrastructure, investment, and advanced systems that become economically viable only over a broader geography, and are impossible at Quayside alone.<sup>29</sup> These include:

#### Substantially improving sustainability.

The RFP established an ambitious goal to create a climate-positive neighbourhood that sets a new global benchmark for sustainability and resiliency. The development of Quayside alone cannot justify the cost of the infrastructure systems and other approaches essential for dramatically reducing GHG emissions, such as an advanced power grid and a thermal energy grid. This costly infrastructure becomes affordable across a larger area as a result of the cumulative benefits of smarter energy management; new and increased sources of clean energy; economies of scale

in infrastructure development and maintenance; and a larger customer base across which to spread the costs of setting up and administering a business.

#### Delivering 40 percent below-market housing.

The MIDP proposes several new private sources of value, including factory-built timber construction and a condo resale fee, that can help deliver on the aggressive affordable and below-market housing targets called for in the MIDP. Quayside would consist of only 10 buildings, and therefore cannot support the estimated 6 million square feet of buildable area needed to catalyze the wood construction supply chain. A condo resale fee would likewise require time and unit resales to generate value to redeploy towards the below-market housing program. These new private sources, together with affordability by design, could support up to 37 percent of the cost of a 40 percent below-market housing program at the scale of the IDEA District — nearly triple the impact they would have at Quayside.



See the “Buildings and Housing” chapter of Volume 2 for more detail on the affordable housing program.



See Chapter 4 for the specific elements underlying these aggregate impacts.

#### Providing sustainable mobility options.

Following through on the RFP's mobility objectives, the MIDP proposes a set of convenient options for every trip that reduces or eliminates the need for households to own a car, including new mobility options such as self-driving vehicles; the expansion of public transit into the eastern waterfront; and a mobility management system capable of coordinating the street network to prioritize pedestrian and cyclist safety while maintaining traffic flow. But while Quayside's four blocks can serve as an effective demonstration project, these solutions only begin to meaningfully affect mobility patterns when linked to a larger street and transit network. Additionally, Quayside alone is not large enough to support the financing of the proposed LRT extension, a major, new public work; the density across a larger area is needed to cover the projected cost. As part of an integrated mobility package at the scale of the IDEA District, the new mobility options could reduce solo car trips by more than 16 percentage points and save a two-person household that goes car-free roughly \$4,000 a year.

Generating sustained job growth and economic activity. The RFP calls for the development of an urban innovation cluster, which would seek to use Quayside as a focal point for technology firms, academic institutions, and non-profits dedicated to improving urban life and advancing sustainable technology. The MIDP would deliver jobs at all skill levels, including through the establishment of the Sidewalk Works program, which would build an inclusive talent pipeline and support on-site employers in filling real-time needs; broaden the construction workforce by targeting at least 10 percent of construction hours for racialized youth, women, and Indigenous people; and catalyze a mass timber factory, which would support an estimated 2,500 person-years of full-time employment over a 20-year period.<sup>30</sup> But delivering this level of job growth and economic activity requires a critical mass of space, resources, and investment, and a holistic approach to economic development that extends into the broader geographical area.

As summarized in Figure 0.4, Sidewalk Labs believes that the outcomes achievable within the IDEA District would have meaningful positive impacts for Toronto.

Critically, and consistent with the RFP, this analysis illustrates why Sidewalk Labs has not offered a proposal exclusively involving Quayside. As the table summarizes, a Quayside-only development project would not achieve Waterfront Toronto's priority outcomes and would not be commercially viable. By contrast, the broader IDEA District can support the carrying costs of the innovative solutions proposed, while applying them to a geography sufficient to demonstrate their benefits.

For the same reasons, Quayside alone would not achieve Sidewalk Labs' core business objective: to demonstrate that integrating cutting-edge design and technology into a comprehensive district strategy can radically improve urban life. This strategy depends on concentrating innovative solutions in a single area, including a series of costly advanced systems. The IDEA District overall provides enough scale and density to make these early innovation investments — investments inextricably linked with achieving Waterfront Toronto's priority outcomes — financially feasible.



Fig. 0.4

## Impacts at the Quayside scale and when extended into the River District

Waterfront Toronto Priority Outcome	Phase 1: Quayside	Phase 2: River District
<b>Job Creation and Economic Development</b>	<p>Creating 3,900 direct jobs and 12,000 short-term construction jobs to generate a one-time construction impact of \$1.6 billion in value added to the Canadian economy.</p> <p>At the scale of Quayside, the disproportionate funding contribution of Sidewalk Labs is economically infeasible. The main drivers of this impact, such as the expansion of a Google Canadian headquarters and the cultivation of an urban innovation cluster, could not exist without the space, resources, and investment possible in the River District.</p>	<p>Creating 44,000 direct jobs (93,000 total direct, indirect, and induced) and catalyzing \$14.2 billion in annual value added to the Canadian economy.</p>
<b>Sustainability and Climate Positive Development</b>	<p>A nearly carbon-neutral neighbourhood that generates 85 percent fewer greenhouse gas (GHG) emissions per capita than downtown Toronto, representing 24,000 tonnes of avoided carbon annually.</p> <p>Financially infeasible at the scale of Quayside due to insufficient economies of scale and customer base to enable affordable rates that cover capital and operating costs for thermal and advanced power grid infrastructure, control centres, billing technology, operations, and maintenance.</p> <p>Specifically, to keep Quayside resident energy bills in line with Toronto averages (within 10 percent), the power and thermal grid requires a \$19 million supplemental innovation investment — which is not financially sustainable. No additional supplemental innovation investment would be required to extend operations (including control and billing platforms and staff) into the River District beyond Villiers West; the systems scale in a financially sustainable way.</p>	<p>A climate-positive community that generates 89 percent fewer GHG emissions per capita than downtown Toronto (representing nearly 300,000 tonnes of avoided carbon annually) and that includes the ability to export clean energy to neighbourhoods outside the project area to achieve climate positivity.</p>
<b>Housing Affordability</b>	<p>A 40 percent below-market housing program, generating over 1,000 below-market units.</p> <p>Financially infeasible alone due to insufficient sources of value, such as the mass timber project pipeline needed to justify factory.</p> <p>The project relies on three new private funding sources to make public housing dollars go farther: affordability by design; increased value of public land due to factory-built timber construction; and a condo resale fee. At the Quayside scale, however, only affordability by design would add value (achieving a 7 percent below-market program). Funds from the resale fee, which requires ongoing condo turnover, and the timber factory — which requires at least 6 million square feet of wood construction to break even, far more than possible at Quayside alone — would not yet generate any value.</p>	<p>A 40 percent below-market program, creating an estimated 13,600 units of below-market housing if the vision is extended to the full IDEA District with government support.</p>

Waterfront Toronto Priority Outcome	Phase 1: Quayside	Phase 2: River District
<b>New Mobility</b>	<p>Use of transit or active modes for 73 percent of trips, and reduction in drive-alone trips by nearly 16 percentage points from a standard development.</p> <p>Financially infeasible alone due to inability to finance Waterfront East LRT from a single development; the proposed segments within the IDEA District cost an estimated \$406 million. Promising methods for financing the LRT, such as tax-increment financing, rely on funding from the growth area, which is far larger than the 10 buildings proposed for Quayside and the cost is far more than they can sustainably support.</p> <p>Minimal ability to affect traffic patterns in four-block development. Quayside's limited street network means that all streets must allow vehicular access, while the River District's network of complementary streets enables 90 percent of streets to be primarily car-free.</p>	<p>Use of transit or active modes for 77 percent of trips, and reduction in drive-alone trips by nearly 17 percentage points from a standard development.</p>
<b>Urban Innovation</b>	<p>Beginning to tackle urban problems, from traffic congestion to energy use, using emerging physical and digital tools that incorporate a series of requirements, such as making data open by default to ensure equitable access by third parties and enhance data security and privacy.</p>	<p>Tackling a greater set of urban problems using emerging physical and digital tools, with an ability to deploy advanced connectivity, such as lower-cost Super-PON technology, across the IDEA District as the foundation for countless new services and solutions.</p>

**Achieving Waterfront Toronto's priority outcomes requires the scale of the River District.**

# 3

## Phase development to manage risk

The MIDP advances a structural approach in which Sidewalk Labs would shoulder certain upfront investment risks and employ a gradual approach to technology deployment, with the value of new solutions being proven before they are deployed more broadly. These structural safeguards include a structure that ensures that Sidewalk Labs develops and proves the effectiveness of solutions before they affect other developments, off-ramps allowing Waterfront Toronto or Sidewalk Labs to terminate the relationship under certain circumstances, and a clear accounting methodology should costs need to be recouped prior to project completion. Perhaps most significantly, the proposal incorporates an incremental, carefully phased implementation strategy, in which Sidewalk Labs must earn the right to participate in future aspects of the project.

To proceed beyond Quayside, Sidewalk Labs would be required to first achieve a series of project milestones as part of a stage-gate approach which would be refined through negotiation. As proposed in Chapter 6, these would include devising and submitting a development application for Quayside that would implement the detailed innovation roadmap from the MIDP, including mixed-use space and minimum percentages of affordable housing; preparing an Infrastructure and Transit Plan for Waterfront Toronto; and investing in an Ontario-based wood-construction factory. Failing to achieve the required milestones at Quayside would mean Sidewalk Labs would proceed no further; it could neither participate in development beyond Quayside nor receive any funds beyond what it earns from Quayside. Accordingly, if Sidewalk Labs falls short, it bears the entire risk of its outside investments in the vertical development at Quayside needed to prove out the model.

Additional project milestones apply incrementally thereafter and determine whether Sidewalk Labs can proceed to subsequent stages. The project milestones dictate when Sidewalk Labs' role would shift from leading vertical development at Quayside and Villiers West to serving principally as an advisor to the public administrator and catalyst for sustainable growth in the broader IDEA District. To move beyond Villiers West and shift to this role, Sidewalk Labs must achieve milestones linked with, among other things, performance targets tied to Waterfront Toronto's priority outcomes. Only upon achieving these milestones at Quayside and Villiers West — milestones that establish both the market viability and effectiveness of the solutions in the MIDP — would other parts of the IDEA District potentially become subject to Sidewalk Labs' innovation strategy. By failing to perform, Sidewalk Labs would not serve in an advisory capacity for the rest of the River District, would not see its solutions more broadly adopted, and would not receive performance payments.

Of particular note, the proposal provides that the new development standards and guidelines for the IDEA District would initially apply exclusively to Sidewalk Labs' development of real estate and advanced systems at Quayside and Villiers West, if Sidewalk Labs first satisfies relevant project milestones. And unless and until Sidewalk Labs demonstrates the commercial feasibility and the effectiveness of its solutions for achieving Waterfront Toronto's priority outcomes, no other developments would deploy them.

[Both the contours of the IDEA District and the tiered involvement of Sidewalk Labs at different geographies are depicted in the map on the opposite page.](#)




## Map Sidewalk Labs' role across phases of the IDEA District

- IDEA District
- Phase 1: Quayside
- Phase 2: River District
- ▨ Optional participation in Phase 2
- 🏢 Sidewalk Labs develops real estate and advanced systems
- Existing
- Approved extension
- Optional
- Light rail

# 4

## Establish strong public sector oversight

Dedicated public oversight and control are essential to propelling growth and fostering the urban innovations contemplated in the MIDP. Following Waterfront Toronto's directive to think holistically about the structures required for achieving the MIDP vision, Sidewalk Labs' proposal centres on a potential solution: to designate Waterfront Toronto or another public entity to lead a new geographically targeted strategy in the eastern waterfront. The proposal for an IDEA District includes a modified regulatory framework designed to advance public objectives and enable key innovations, including through the use of certain financing mechanisms and the new role of public administrator. 



The IDEA District proposal is presented in detail in Chapter 1 for the consideration of the three orders of government and would require government authorization.


# 5

## Structure the role of Sidewalk Labs to leverage its strengths

Sidewalk Labs structured its Innovation and Funding Partnership Proposal to capitalize on its own unique combination of strengths, including a team that spans urban planning, technology, policy, architecture, engineering, development, and finance; its exceptional technological resources; its access to patient capital that is able to take a long-term view of investing, where warranted; and its ability to serve as an economic catalyst.

Together, these capabilities inform a general approach in the MIDP, in which Sidewalk Labs agrees to shoulder a disproportionate share of the cost of investments in infrastructure and innovation — and to receive its compensation in later stages. As reflected in the table below, these capabilities also inform the inter-related “Innovation” and “Funding” responsibilities that the Innovation and Funding Partner role comprises.

While Sidewalk Labs proposes to focus on the roles where it can add the greatest value, the converse is equally important: others should lead areas where they can uniquely contribute. For example, Sidewalk Labs proposes to provide optional financing support to advance the Waterfront East LRT extension but would not construct, own, or operate it.

This approach holds true across all aspects of the project, including technology and other horizontal infrastructure. It is especially evident with real estate development, where Sidewalk Labs proposes to lead vertical development only at Quayside and Villiers West, to prove to the private market that its innovation hypotheses are commercially viable. The expectation is that other developers would lead all other vertical development. 



See Chapter 7, on Page 218, for a summary of the roles of all participants in the IDEA District, including the three orders of government, the real estate development community, and third-party vendors.

Fig. 0.5

## Responsibilities as Innovation and Funding Partner

Role	Scope
<b>Innovation Partner</b>	<p><b>Support and advise the public administrator on achieving innovation objectives.</b> Sidewalk Labs would provide advisory, technical, and management services to implement the MIDP's innovation strategy, including designing technical specifications and design standards to meet Waterfront Toronto's objectives; integrating advanced systems with municipal infrastructure; and, in later phases, advising on the development of advanced systems.</p> <p><b>Deliver Quayside as a demonstration.</b> Sidewalk Labs would serve as lead developer, with local partners, of the vertical development of Quayside and advance associated horizontal infrastructure. Relying on Sidewalk Labs' willingness to undertake and finance mission-driven investments, Quayside would serve as the starting point of the project to demonstrate the benefits and feasibility of the innovative approaches, systems, and design elements.</p> <p><b>Deliver advanced systems in Quayside and Villiers West.</b> Sidewalk Labs would serve as lead developer of most advanced systems and therefore would assume the responsibility of identifying operators and partners to implement the advanced power grid, thermal grid, and other systems identified as vital to the success of Quayside and the Villiers West urban innovation campus, and to achieving the priority outcomes identified by Waterfront Toronto.</p> <p><b>Deploy key technology products.</b> Sidewalk Labs would identify or develop critical urban technology solutions, including a small number identified as “purposeful solutions.” Building off Sidewalk Labs' technological expertise and assets, the resulting products would incorporate enhanced privacy protections and use published standards to avoid technology “lock-in.”</p>
<b>Funding Partner</b>	<p><b>Serve as economic development catalyst.</b> Sidewalk Labs would serve as lead developer for a major economic development project: an urban innovation campus on Villiers West. This role relies on a commitment from Alphabet to establish a new Canadian headquarters for Google on Villiers West, as part of an agreed-upon transaction within the IDEA District, and making a series of other strategic investments to cultivate an urban technology cluster. This would include seeding a new applied urban technology research institution, investing in Canadian urban tech startups, and developing an innovation-oriented workforce.</p> <p><b>Provide optional financing and credit support for critical infrastructure.</b> At the option of Waterfront Toronto and the relevant government participants, Sidewalk Labs has offered to provide various types of financial support to facilitate the construction of essential infrastructure, including credit support to accelerate the delivery of the Waterfront East LRT and financing for municipal infrastructure throughout the project area. It would also seek to facilitate financing for operators of advanced systems through a newly formed company (with outside partners) focused on next-generation infrastructure.</p> <p><b>Fund supplemental innovation investments.</b> To catalyze innovation, Sidewalk Labs is prepared to make “supplemental innovation investments” to support the advanced power grid and thermal grid, and possibly other advanced systems. These early investments help achieve Waterfront Toronto's sustainability outcomes without significant increases to user rates, until the systems reach a scale and operational efficiency sufficient to be economically viable on a standalone basis.</p>

# 6

## Use proven approaches where possible

Over the past 18 months, Sidewalk Labs was encouraged to apply strategies, tools, and practices that have already proven successful in Canada and beyond. Rather than reinvent the wheel, the MIDP seeks to build on what has worked. This principle informed the proposal for an IDEA District, which builds on Waterfront Toronto's existing authorities and Canada's success with geographically targeted development strategies.

This principle is also why Sidewalk Labs proposes to finance the roads, transit, and other municipal infrastructure the project requires through existing Canadian project financing strategies. These include using development and other developer-paid charges for infrastructure; reinvesting the proceeds from the sale of public lands in the area; and applying other value-capture approaches.

Together, these strategies aim to deliver a project that is largely self-contained and self-financed.

# 7

## Align the interests of Sidewalk Labs, Waterfront Toronto, and the Public

The Innovation and Funding Partnership Proposal seeks to align the interests of Sidewalk Labs, Waterfront Toronto, and the public, to ensure that Sidewalk Labs only profits if the public sector does. The table below highlights a few of these structural alignments.

These terms and the project economics are further described in Chapter 3.

Fig. 0.6  
**Alignment of interests between Sidewalk Labs and Waterfront Toronto**

Proposed Deal Term	Proposed Structural Alignment
Sidewalk Labs would receive a discount on the sale prices of Quayside and Villiers West lands to account for the additional requirements imposed by Waterfront Toronto.	If profits from Quayside and Villiers West exceed an agreed-upon threshold, Sidewalk Labs would pay Waterfront Toronto a share of the upside value.
Sidewalk Labs would make various forms of financing and credit support available for municipal and transit infrastructure.	Such financing is optional and offered at a fixed rate of return; the public has the ability to choose this financing if it finds that this option is the best way to achieve the project's objectives.
To compensate for upfront investments, for achieving core public outcomes, and for accelerating inclusive growth, Sidewalk Labs would receive performance payments if specific performance and growth targets are met.	Because these payments are linked directly to Sidewalk Labs' success at spurring growth beyond baseline expectations, the payments would arise only after Sidewalk Labs has generated significant value for the public sector.
Sidewalk Labs would test and deploy certain technology products within the IDEA District.	The public sector would share profits generated by certain technologies first tested and deployed in the IDEA District.

# A partnership proposal intended for ongoing refinement

Just as the MIDP is unprecedented, the Innovation and Funding Partnership Proposal also breaks new ground; it outlines an integrated, multidisciplinary approach to urban innovation and its regulation, land use, governance, data use, and financing.

The Innovation and Funding Partnership Proposal constitutes a proposal. It is subject to further negotiation with Waterfront Toronto and, for certain elements of the proposal, the three orders of government. Ultimately, the proposal's success will require Sidewalk Labs and government to work together collaboratively and to adapt to unanticipated conditions that could arise.

The MIDP offers a holistic path for achieving the critical outcomes identified by Waterfront Toronto, which are the driving force for this project. As this process moves forward, Sidewalk Labs is fully prepared to work with Waterfront Toronto, the three orders of government, and the people of Toronto to further refine the solutions and approaches contained in the MIDP.

In particular, Sidewalk Labs expects to enter into detailed transaction documents with Waterfront Toronto (and other levels of government, as appropriate) that include customary terms to govern the project, consistent with similar public-private partnerships. While it is not necessary to detail all of the terms of

such transaction documents in the MIDP, they can be expected to include market-standard provisions intended to protect the interests of all parties, including:

→ **Partners.** As noted earlier, Sidewalk Labs anticipates working extensively with local partners that can bring relevant expertise as well as additional capital to the project. This is likely to include Toronto-based co-developers that share Sidewalk's vision for using innovative approaches to improve the quality of urban life. It is also likely to include domestic co-investors willing to invest significant amounts of equity capital alongside Sidewalk Labs to catalyze transformative growth. It is expected that the transaction documents will permit Sidewalk Labs to strike such partnerships; in turn, it is expected that Waterfront Toronto will retain customary governmental approval rights (not to be unreasonably withheld) to ensure, for example, that co-developers or co-investors are appropriately qualified and reputable.

→ **Financing.** As with any such project, Sidewalk Labs anticipates using debt to finance a majority of the capital required. In typical real estate projects in Toronto, such financing represents at least 50 percent of the capital and as much as 70 percent, depending on the type of asset, the number of pre-leasing or pre-sale agreements, and other such factors (the amount of financing is

typically even higher for projects backed by loans from Canada Mortgage and Housing Corporation). It is expected that the transaction documents will permit Sidewalk Labs to enter into market-standard financing arrangements, while the government can expect to receive usual protections from lenders (such as in the event of foreclosure) with respect to any obligations the project may owe to the public.

→ **Pre-sales / pre-leasing.** Real estate developers in Toronto often mitigate their capital outlays and risk exposure by entering into either pre-sale or pre-lease agreements early in the development process. In fact, for typical residential condominium developments in Toronto, lenders generally require the sale of approximately 70 percent of expected condominium proceeds prior to entering into committed financing.<sup>31</sup> These agreements may be with individuals or with institutions; for example, a pension fund may choose to acquire a multifamily rental building or a university may elect to pre-lease a building for student housing. It is expected that the transaction documents will permit such agreements, again subject to usual protections that the government may seek to ensure the achievement of the promised outcomes.

→ **Delay provisions.** It is expected that the transaction documents will include provisions requiring both Sidewalk Labs and the public sector to move expeditiously to meet their respective obligations in order to achieve the outcomes, with appropriate consequences for the failure to do so. However, it is expected that the documents will provide appropriate, market-standard relief in the event either party is unable to meet those obligations due to factors outside of their control. In the case of Sidewalk Labs, this would include the ability to delay in the event, for example, that the real estate financing markets in Toronto suffer a disruption that results in such financing not being available at reasonable rates. In the case of government, this would include relief from certain obligations in the event of third-party litigation.

The items above are meant to represent only a sample of the key terms of definitive transaction documents that Sidewalk expects to enter into with the public sector, for the benefit of all parties. Notwithstanding the innovative nature of the partnership, Sidewalk expects that virtually all of the key terms — whether referenced above or not — will mirror terms that are reflective of terms commonly accepted by all parties in the Toronto market, including in prior Waterfront Toronto transactions.

**The MIDP offers a holistic path for achieving the critical outcomes identified by Waterfront Toronto, which are the driving force for this project.**

# Organization of Volume 3

The chapters that follow provide substantial detail on the overall transaction structure, the proposed roles and responsibilities of the various participants, the financial and legal terms, the preconditions needed to deliver the business case for the transaction outlined and the vision set out in Volumes 1 and 2, and the anticipated implementation of the project and its various components.

## Chapter 1: The Innovative Design and Economic Acceleration (IDEA) District

The success of this plan depends on strong public-sector oversight and a regulatory framework that allows new advances to take root. This chapter discusses a proposal for the consideration of government to achieve these aims by designating a public administrator with the development authorities needed to administer a new targeted innovation strategy for the IDEA District.

## Chapter 2: Innovation and Funding Partnership Proposal

This chapter provides an in-depth review of the four proposed roles that Sidewalk Labs would play as Innovation and Funding Partner. The chapter includes the following sections:

### Role 1: Development of real estate and advanced systems.

With a commitment to work with local partners, Sidewalk Labs would vertically develop two sites with build plans and programming that serve complementary functions within the IDEA District. Together, these developments, and the advanced systems needed to deliver on Waterfront Toronto's priority outcomes, are designed to catalyze inclusive economic growth throughout the eastern waterfront.

→ [The Quayside Plan](#). This section describes Sidewalk Labs' proposal to construct a complete, mixed-use, mixed-income community at the five-hectare parcel known as Quayside. The development seeks to show how to harness cutting-edge design and technology to radically improve urban life and to pave the way for sustainable development throughout the eastern waterfront.

→ [Villiers West urban innovation campus](#). This section describes Sidewalk Labs' proposal to extend the innovations proven at Quayside and deliver a significant economic development project: an urban innovation campus on Villiers Island, anchored by a new Canadian headquarters for Google and a new Urban Innovation Institute.

→ [Advanced systems](#). This section describes Sidewalk Labs' proposal to serve as lead developer for a range of advanced systems needed for Quayside and Villiers West and essential to achieving Waterfront Toronto's priority outcomes.

### Role 2: Innovation planning, design, and implementation.

This section discusses Sidewalk Labs' responsibilities supporting the public administrator in carrying out the MIDP's comprehensive innovation strategy, including by providing various advisory, technical, and management services.

### Role 3: Technology deployment.

Sidewalk Labs would deliver new technological approaches for solving urban challenges. This chapter describes this role, Sidewalk Labs' principles for technology deployment, and three "purposeful solutions." It also discusses a proposal for allowing the public sector to share profits from certain technological solutions and Sidewalk Labs' patent pledge.

### Role 4: Optional infrastructure financing.

Achieving Waterfront Toronto's priority outcomes requires infrastructure investments, including traditional municipal infrastructure like sewers and parks; transit infrastructure, specifically the Waterfront East LRT extension; and advanced systems like an advanced power grid and dynamic streets. This chapter details the three types of anticipated infrastructure, how they would be delivered, and the optional financing Sidewalk Labs is prepared to offer to support their construction.

## Chapter 3: Transaction Economics

This chapter comprehensively reviews the financial terms associated with the proposed project, including the assumptions underlying

the expected revenue, expenses, and returns associated with the overall transaction.

## Chapter 4: Achieving Waterfront Toronto's Priority Outcomes

The MIDP and the Innovation and Funding Partnership Proposal seek to achieve the specific objectives Waterfront Toronto first identified in its RFP and elaborated on in the PDA. This chapter presents a series of tables indicating how the various elements of the MIDP advance those objectives.

## Chapter 5: Implementation

This chapter describes how the MIDP would be implemented, describing the Implementation Agreements, timelines, and approval processes.

## Chapter 6: Stage Gates and Risk Mitigation

This chapter addresses the mechanisms in the transaction designed to ensure that the project advances in phases and limits risks to government and the public, including by requiring Sidewalk Labs to achieve a series of project milestones before advancing to successive stages of the project.

## Chapter 7: Overview of the Partic- ipants in IDEA District Development

This chapter summarizes the roles and responsibilities proposed for Sidewalk Labs, Waterfront Toronto, the public administrator, the City of Toronto, and other third parties in the success of the MIDP.

## Supplemental Tables

This addendum provides informational tables with further details related to certain aspects of the proposal.

# The Innovative Design and Economic Acceleration (IDEA) District

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## Introduction

p52

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### IDEA District Component 1: A Public Administrator

p62

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### IDEA District Component 2: The Innovation Framework

p72

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### IDEA District Component 3: Financing

p80

# Introduction

Governments at the federal, provincial, and city levels have long recognized that the Toronto waterfront is an area of uncommon scope and promise that calls for a comprehensive, geographically specific strategy. Years ago, this recognition inspired the creation of Waterfront Toronto “to oversee all aspects of revitalization of Toronto’s waterfront.” Today, it informs Sidewalk Labs’ proposal to establish an innovation district to unlock the potential of the waterfront as an engine of economic growth and a demonstration ground for urban innovation.

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Canada has had remarkable success using innovative strategies to spur the revitalization of struggling or underdeveloped urban areas.

In 1970, Canada pioneered the use of Business Improvement Areas (BIA), when the business owners of Bloor West Village approved the first BIA.<sup>32</sup> The Ontario BIA law became a national and international model for how to upgrade local services, improve public space, and otherwise breathe new life into distressed commercial districts.

In 1972, just shortly after the founding of the first BIA, Granville Island in Vancouver began its turnaround from a derelict former industrial area to a vibrant centre of arts and commerce.<sup>33</sup> In a targeted strategy, Canada Mortgage and Housing Corporation assumed control of development and infrastructure; negotiated a modified regulatory framework with the City of Vancouver; and cultivated a spirit of public-private partnership and experimentation that turned the area into a dynamic world-class community.

In 1996, the City of Toronto focused its attention on the moribund Two Kings industrial areas.<sup>34</sup> By all but eliminating zoning and density restrictions, and easing parking and loading zone requirements, the city spurred rapid economic development, including the addition of over 40,000 desperately needed residential units.<sup>35</sup>

And in 1996, the City of Toronto also used a Community Improvement Plan in a novel way to advance the revitalization of the beleaguered Yonge-Dundas Square. Creating the Yonge-Dundas Community Improvement Project Area, the city set a series of geography-specific policy objectives, established a new management entity for programming and generating revenue, implemented a building-improvement incentive scheme for private landowners, and imposed new signage rules — resulting in a vibrant new public open space and entertainment hub.

Targeted geographic strategies have transformed former working waterfronts throughout the world. In the 1980s, for example, the United Kingdom established an “Enterprise Zone” in the London Docklands. The government eased certain legal restrictions in the zone, created incentives for desirable development, and assigned overall responsibility for the then-abandoned waterfront to a powerful administrator: the London Docklands Development Corporation. The result is that the Docklands, which includes Canary Wharf, is now one of the most prominent and successful business districts anywhere.<sup>36</sup>

Another example is HafenCity along the Elbe River in Hamburg, Germany. To revive the decommissioned port area, the Senate of Hamburg created a new district dedicated to cutting-edge urban and architectural design. Run by a public administrator, HafenCity GmbH, the area followed a comprehensive master plan and made substantial investments in transportation and advanced systems, such as a district energy thermal grid. Today, HafenCity is a world-renowned model of urban revival and sustainable, mixed-use development.<sup>37</sup>

What these strategies have in common is the recognition that a smart, targeted approach to development in a particular geographic area — in which certain restrictions are adjusted and, in return, developers and others are expected to achieve priority outcomes — can jumpstart development, ensure that social needs are met, and pay other dividends. As the formation of Waterfront Toronto attests, the Toronto waterfront offers an ideal

location for a similar zone-based strategy. It also presents an opportunity for Torontonians to again break new public policy ground — this time with a development strategy that does not focus narrowly on economic growth, but also on harnessing cutting-edge design and new technologies to improve quality of life, protect the environment, and take on other longstanding urban challenges, from traffic congestion to runaway housing costs.

The preceding volumes of the MIDP set out an innovative, integrated approach for how the City of Toronto, in collaboration with Waterfront Toronto and Sidewalk Labs, can finally realize the waterfront’s promise as a hub of economic activity, a proving ground for innovative urban strategies, and a spur for social progress. Each of the proposed advances, standing alone, could benefit Torontonians. But their true value emerges when they join together in a series of interconnected, forward-looking, mixed-use, mixed-income neighbourhoods.

Achieving this vision requires a multi-faceted strategy for innovation and development on the waterfront — a strategy that, to a greater degree than in other parts of the city, enables and rewards successful experimentation and, in turn, demands more from developers to address public priorities. That is what the proposed Innovative Design and Economic Acceleration (IDEA) District seeks to accomplish, setting out a comprehensive vision and a specific set of rules and incentives for spurring innovation and development across a defined but limited geography on the eastern waterfront.

The governance strategy proposed in the following chapters emerges from the need to ensure strong public control and oversight of the project, and the specific request of Waterfront Toronto to develop a comprehensive plan for carrying out the vision set forth in the MIDP. The proposal reflects one way to realize an integrated and effective growth and innovation strategy for the waterfront.

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## Key Term

## IDEA District

**The 77-hectare Innovative Design and Economic Acceleration (IDEA) District, consisting of Quayside and the River District, provides sufficient geographic scale for innovations to maximize quality-of-life impact and to become financially viable.**

**This proposal builds on Canada’s remarkable success at using smart, targeted approaches to jumpstart development in particular geographic areas.**



# Three global examples of revitalizing industrial areas through innovation designations

The following geographically targeted development strategies have leveraged innovative approaches to successfully transform and revitalize former industrial areas in Canada and around the world:

**Granville Island (Vancouver).** Granville Island is a 15-hectare peninsula adjacent to downtown Vancouver. In the early 1970s, the site was an industrial brownfield site controlled by the Government of Canada. In 1973, Canada Mortgage and Housing Corporation assumed control of the site's development and infrastructure, rehabilitating the roads, sewers, and flood controls; negotiated a modified regulatory framework with the City of Vancouver, exempting Granville Island from municipal regulation; and cultivated a spirit of public-private partnership and experimentation, for example, introducing shared streets (unprecedented in North America at the time).

Today, Granville Island is home to about 275 businesses, a popular public market, art galleries, retail spaces, a community centre, and multiple performing arts spaces; employs over 3,000 people; and attracts over 12 million visitors a year, making it a major tourist attraction for Vancouver. The cost of the project was \$19.5 million; it now generates over \$215 million a year in economic activity.

**Two Kings (Toronto).** Following the departure of much of Toronto's garment industry in the 1990s, the "Two Kings," about 162 hectares of historically industrial land on either side of Toronto's downtown core, were left nearly derelict.

To spur rapid economic development in the area, the city designated the site a "regeneration area," largely eliminating use zoning (any non-noxious use was permitted), density regulations, and most parking and loading zone requirements. The area has since experienced an extraordinary pace of development.

Today there are over 51,000 jobs in the area; employment is up 69 percent in King-Spadina and 32 percent in King-Parliament since 1996, compared with 19.9 percent citywide.

**HafenCity (Hamburg).** HafenCity is a 157-hectare district comprised of two islands, located within walking distance of downtown Hamburg. The area's ports had become largely vacant by 1990, when the Senate of Hamburg adopted the HafenCity Master Plan to turn the site into a new district dedicated to cutting-edge urban and architectural design. The master plan included substantial investments in transportation and infrastructure, such as a district energy thermal grid, as well as an approvals process, governed by the Priority Area Status of the district, which required all investors and development partners to abide by the district mission and set high architectural standards. Aside from the subway, all infrastructure, development, and management of HafenCity is overseen by HafenCity GmbH, a fully municipally owned company.

Today, HafenCity is a true destination — home to residents, shops, businesses, museums, outdoor exhibits, public squares, parks, and promenades — that beautifully mixes open spaces, historic buildings, and contemporary architecture. By 2017, HafenCity employed over 12,000 people. In the coming years, HafenCity will become home to Germany's tallest wooden structure, self-driving buses, and Hamburg's first fintech hub.



Granville Island.  
Credit: iStock



Two Kings.  
Credit: David Pike



HafenCity.  
Credit: iStock

# IDEA District structure

As conceived, the IDEA District has three essential components.

## 1

### A public administrator.

The district depends on a public administrator with a mission to promote innovation and development within the geography and the mandate to oversee and steer key real estate, infrastructure, and technology decisions — all with a focus on better addressing the core urban challenges facing Toronto. To be effective, this administrator must be accountable to the public; possess well-defined powers over development activity and the deployment and operation of innovative infrastructure and systems within the jurisdiction; and obtain priority treatment when interacting with and seeking approvals and cooperation from other government agencies.

## 2

### A modified regulatory framework.

At the centre of the IDEA District is a modified regulatory framework, an “Innovation Framework.” The framework — which the public administrator could adopt for the broader IDEA District if Sidewalk Labs achieves key project milestones — is designed to foster the necessary conditions for delivering on the promise of the MIDP and using its success as a catalyst to spur inclusive economic growth and social progress throughout the waterfront.

In practical terms, this framework constitutes a package that can be divided into two parts:

→ a limited number of targeted adjustments to existing legal requirements that are necessary to implement aspects of the MIDP (for instance, to permit the dynamic curb)

→ the Innovation Design Standards and Guidelines (IDSG) — a series of enhanced requirements for new developments in the IDEA District arising out of Waterfront Toronto’s priority outcomes (for instance, to meet increased environmental sustainability specifications)

Because the IDEA District would only encompass lands that are publicly owned or where owners opt in, the public administrator would have the authority to mandate the IDSG through contract. Accordingly, the IDSG requires no change in law or regulation. This differs from the limited number of targeted regulatory adjustments, which would require government action such as administrative agreements or legislation.

## 3

### Financing mechanisms.

To finance the construction and operation of novel infrastructure and approaches, the IDEA District calls for financing mechanisms that propel growth and technological advancement across the geography without diverting scarce public resources from other priorities or from elsewhere in the city or province. This calls for harnessing various “value capture” mechanisms. These financing strategies — including city fee and development charge credits, municipal infrastructure contributions, local infrastructure contributions, the use of local land proceeds, and, potentially, tax-increment financing — leverage the area’s economic growth to fund infrastructure and innovation.

The IDEA District would advance a multi-faceted economic growth strategy that enables and rewards successful innovation, while demanding more from developers to address public priorities.

# IDEA District geography



## Map The IDEA District within the Greater Waterfront

The first step in establishing the IDEA District is defining its geographic scope. This could be accomplished through enabling legislation or through existing legislative tools, such as the use of Section 28 of the Planning Act to establish a Community Improvement Project Area.<sup>38</sup> As depicted on the map above, the district would encompass 140 hectares.

- Eastern waterfront
- IDEA District



## Map IDEA District neighbourhoods

The public administrator and the three orders of government will determine whether to extend the IDEA District beyond Quayside and Villiers West. At its full anticipated scope, the IDEA District would consist of three sub-districts, which are further divided into seven neighbourhoods. The neighbourhood names in the map above were drawn largely from the Port Lands Planning Framework and other city planning documents.

- IDEA District
- River District
- Phase 1: Quayside
- Phase 2: River District
- Optional participation in Phase 2

Fig. 1.1

## IDEA District sub-districts

Sub-District	Size* (hectares)	Description (Main Planning Documents)
Quayside	6.9	Toronto Official Plan, Central Waterfront Secondary Plan, East Bayfront Precinct Plan, Keating Channel Precinct Plan, Zoning Bylaw 1049–2006, Zoning Bylaw 1174–2010
Keating West	7.9	Toronto Official Plan, Central Waterfront Secondary Plan, Keating Channel Precinct Plan, Zoning Bylaw 1174–2010
<b>River District (62 hectares)</b>		
Villiers West	7.8	Toronto Official Plan, Central Waterfront Secondary Plan, Villiers Island Precinct Plan, Port Lands Planning Framework
Villiers East	11.7	Toronto Official Plan, Central Waterfront Secondary Plan, Villiers Island Precinct Plan, Port Lands Planning Framework
Keating East	5.9	Toronto Official Plan, Central Waterfront Secondary Plan, Keating Channel Precinct Plan, Port Lands Planning Framework
McCleary	13.6	Toronto Official Plan, Central Waterfront Secondary Plan, Port Lands Planning Framework
Polson Quay	23.0	Toronto Official Plan, Central Waterfront Secondary Plan, Port Lands Planning Framework
<b>Total</b>	<b>76.8</b>	

\* The size of each district in the table includes open space and rights of way within its borders. For instance, this is why Quayside is described as 6.9 hectares, while including only 4.9 hectares of developable land.

The table on the previous page summarizes the size of each sub-district and neighbourhood in the IDEA District, and the governing planning documents.

The Planning Policy Justification Report, a detailed assessment of the conditions imposed under the planning documents governing each area, is included in the MIDP Technical Appendix.

The IDEA District — which could be established through a [Community Improvement Plan \(CIP\)](#) — encompasses just 32 percent of the lands incorporated in the Port Lands Planning Framework. As proposed, the IDEA District excludes 5 of the 11 districts in the Port Lands already experiencing economic activity (Media City, Turning Basin District, Warehouse District, East Port, and South Port East). The proposal seeks to augment, not impair, positive development underway in the Film District, including multiple proposed studio expansions. The proposal further recognizes the ongoing role of East Port as a site for large-scale industrial uses, including those that may be relocated from other areas within the Port Lands.

### Opt-in for private landowners.


The vast majority of land in the proposed IDEA District (78 percent) is publicly owned, and initially, the district would encompass only those publicly owned parcels. The landowners of the remaining 22 percent of privately owned parcels would be permitted to voluntarily opt in to the IDEA District.

As a strong incentive to join, commit to the objectives to be outlined in the Innovation Framework (See Page 72), and take on the additional development requirements in the district, existing private landowners would be eligible to access proposed regulatory adjustments and reforms included in the Innovation Framework and receive other inducements. If private landowners choose not to join the IDEA District, they would be responsible for delivering enabling infrastructure to their own sites.

Because precinct planning and zoning for the two private parcels making up Keating West are complete (Zoning Bylaw 1174–2010), they present a special situation, and the public administrator of the IDEA District may elect to engage in direct negotiations as to how they might participate.

For analysis purposes, the MIDP assumes that all private landowners opt in to the IDEA District.

### Phased application.

The project and the Innovation Framework would initially apply exclusively to Quayside. These would extend to a greater portion of the overall IDEA District in stages, based on Sidewalk Labs achieving clearly defined project milestones. After Quayside, the Innovation Framework would extend to the proposed Villiers West urban innovation campus, where Sidewalk Labs also proposes to serve as lead developer. Only after achieving project milestones for both Quayside and Villiers West, which include hitting certain performance targets tied to Waterfront Toronto's priority outcomes, would the public administrator, at its discretion, potentially extend the scope of the IDEA District and the Innovation Framework to other sites. The premise of this incremental approach is that before the Innovation Framework would apply to other development parcels, the solutions proposed in the MIDP must prove economically viable and effective at Quayside and Villiers West — the two vertical developments led not by third-party developers, but by Sidewalk Labs, which would bear the financial risk. 

### Key Term

## CIP Community Improvement Plan

A revitalization strategy City Council establishes for a designated district with special policies for advancing identified development objectives.



See Chapter 6, on Page 208, for more detail on the proposed stage gates.

# IDEA District

## Component 1: A Public Administrator

The capacity of the IDEA District to galvanize economic growth and foster productive exploration turns on its administration. The district requires the oversight and management of a dedicated, nimble, and empowered public administrator. The success of the public administrator, in turn, depends both on having the ability to set the innovation and development priorities for the district, alongside the three orders of government, and on having the tools to ensure that those priorities are achieved.

Specifically, the public administrator should be granted the authority to:

- 1 Set innovation and development objectives for the IDEA District;
- 2 Impose additional requirements on developments within the district, consistent with the objectives described in Item 1;
- 3 Determine whether new developments can access the regulatory relief approved for the district;
- 4 Perform precinct and infrastructure planning for waterfront development;
- 5 Certify development and construction permit applications before their submission to city agencies;
- 6 Develop a master transportation and infrastructure plan for approval by relevant city authorities, in phases, and give final approval before construction;
- 7 Receive and direct infrastructure contributions for the infrastructure proposed for, or built in, the district; and
- 8 Enter into and oversee agreements with developers, vendors, and partners, including Sidewalk Labs as Innovation and Funding Partner.

Importantly, the mandate of the public administrator would not, and should not, displace the oversight of the city departments currently responsible for development and infrastructure approvals on the waterfront. Nor would it replace the approvals required from provincial or federal authorities. Rather, the proposed authorities together would seek to give the administrator a greater voice and control within existing processes. The result is that, as revitalization lead for the IDEA District, the public administrator would have a greater ability to collaborate with all orders of government to streamline the development process and advance an integrated innovation strategy.

### Designation of the public administrator

In 2002, Waterfront Toronto was formally charged with spearheading the waterfront's development. But as the Auditor General of Ontario recently observed, until now, Waterfront Toronto has lacked the authority needed to fulfill its mission.<sup>39</sup> In her 2018 annual report, the Auditor General recommended that Waterfront Toronto's mandate "reflect the public and government's vision for a revitalized waterfront."<sup>40</sup>

**The district requires the oversight and management of a dedicated, nimble, and empowered public administrator with the ability to set innovation and development priorities.**

Consistent with this recommendation, Waterfront Toronto is well positioned to serve as administrator of the IDEA District. Waterfront Toronto's structure already incorporates the three orders of government. Its statutory responsibilities extend to the entirety of the proposed district. Based on its 2006 memorandum of understanding (MOU) with the City of Toronto, Waterfront Toronto already has the scope and certain powers needed over development on public lands on the waterfront.<sup>41</sup> And by granting the public corporation a discrete set of additional authorities to manage development, technology, and infrastructure, Waterfront Toronto could better achieve its mission to direct and accelerate development across the waterfront.

For context, Waterfront Toronto's statutory and contractual authorities with respect to publicly owned land, including under its 2006 MOU with the City of Toronto, include the authorities listed in the previous section in Items 1, 2, 4, and 8, with an advisory role with respect to Items 5 and 6. Only Items 3 and 7 would be entirely new authorities.

Alternatively, a different public entity could assume the additional responsibilities of public administrator, or a new entity could be established — either of which would necessarily work closely with Waterfront Toronto. Ultimately, the proper governance of the IDEA District is a matter within the sound discretion of the three orders of government, and its success depends less on where the public administrator sits within government and more on ensuring proper public accountability as well as granting the administrator a clear mandate and the tools to be successful. Importantly, where the MIDP refers to those responsibilities of the public administrator that Waterfront Toronto has today, in the event a different public administrator is selected, Sidewalk Labs anticipates that Waterfront Toronto would retain those responsibilities and would coordinate closely with the designated public administrator in carrying them out.

# Public administrator role in planning and implementation

The IDEA District proposal calls for a public administrator to oversee a comprehensive innovation and development strategy. The goal is to cultivate and expand the diverse ecosystem of real estate developers, service providers, employers, design firms, public agencies, research institutions, non-profits, and others — all working together in the IDEA District to advance job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation.

Whether Waterfront Toronto or another entity, the public administrator would work closely with the City of Toronto, including CreateTO, City Planning, and others, to lead planning efforts. Notably, as conceived, this role would incorporate some of Waterfront Toronto's current responsibilities and authorities, including those established in its MOU with the city. But the public administrator would assume certain additional responsibilities in connection with both planning and implementation.

The sections that follow describe, respectively, the planning deliverables and implementation responsibilities for the public administrator under this approach. Importantly, the role of the public administrator would be entirely supplemental to existing public approvals processes.

## Planning deliverables

### Infrastructure and Transportation Framework Plan.

Similar to Waterfront Toronto's current role in infrastructure planning, the public administrator would prepare an Infrastructure and Transportation Framework Plan (ITFP) for

areas of the IDEA District with no existing infrastructure master plan. The ITFP would identify the primary street, transit, infrastructure for advanced systems, and municipal servicing networks to achieve the objectives for the IDEA District, as well as other public objectives. The administrator would perform servicing and transportation analysis using population and employment estimates based on the MIDP.

The administrator would coordinate with, and obtain consent from, relevant city agencies and otherwise proceed through the standard approvals process, including City Council approval and, where necessary, an Environmental Assessment. The ITFP would then serve as a blueprint for subsequent Infrastructure and Transportation Master Plans (ITMP) to be prepared at the precinct level as part of the precinct planning process.

### Innovation Design Standards and Guidelines.

The public administrator would approve and implement the IDSG as a set of development requirements for the IDEA District. Consisting of technical specifications, design intentions and requirements, and programmatic details, the IDSG would guide how future vertical and horizontal development proceed across the district and would be prepared concurrently with the related ITFP. In sum, these requirements — which are similar to requirements that Waterfront Toronto incorporates in its development agreements in the usual course — seek to achieve the objectives of the IDEA District, such as sustainability and affordability, and to implement the vision articulated in the MIDP.

The IDSG would directly inform the precinct planning process and development of the ITFP and ITMPs. From time to time, the administrator could update the IDSG to address local scale issues and to carry out updates that reflect ongoing planning initiatives and new innovations.

## Precinct-level planning documents

### Precinct plans and implementing bylaws.

The Central Waterfront Secondary Plan calls for a precinct planning process to govern land use and infrastructure development on the waterfront. Precinct planning would continue to serve as a key implementation tool for areas anticipated to be comprehensively redeveloped with mixed-use residential uses. Precinct plans would build on and enhance the recommendations and directions in the Port Lands Planning Framework. These plans would provide a level of detail and precision needed to move from Official Plan policies to the passage of City Council bylaws.

Similar to the planning function currently performed by Waterfront Toronto, the public administrator of the IDEA District would assume primary responsibility for the planning process and would collaborate with city staff to advance land-use planning regulations for the precinct plan area. These regulations would include land uses, densities, built-form standards, affordable housing requirements, sustainability requirements, social infrastructure requirements, and performance outcomes consistent with the MIDP.

The administrator would collaborate closely with city staff to prepare these regulations in the form of city bylaws (proposed to be Community Planning Permit Bylaws) and submit them for City Council approval. In addition, the administrator may prepare and seek approval of Draft Plans of Subdivision (DPOS) required prior to development call and land disposition. The administrator may also elect to permit the development of certain land parcels following the completion of a precinct plan and prior to the adoption of implementing bylaws, where such development is in the public interest and is consistent with the Precinct Plan.

In such cases, the relevant deliverables would be prepared as part of a development application and the responsibility would fall on the private applicant, working with the administrator, to ensure that the requirements are met.

Notably, in circumstances where a Precinct Plan and a Zoning Bylaw already exist, the responsibility for planning deliverables would fall to the private applicant and would be delivered as part of the development application. Within the IDEA District geography, precinct plans have been established for Quayside (a combination of two precinct plans: the East Bayfront Precinct Plan and the Keating Channel Precinct Plan), Keating, and Villiers Island. While Zoning Bylaws have been established for Quayside and Keating West, no bylaw is in place for either Keating East or Villiers Island, and McCleary and Polson Quay still require precinct plans.

Accordingly, the specific paths for development within the IDEA District would proceed on slightly different paths, given the varying levels of formal planning. The approval process for Quayside and Villiers West would generally proceed as a traditional development application, led by the vertical developer (Sidewalk Labs, working with local partners), including in connection with the process for seeking zoning modifications to achieve the MIDP.

By contrast, Villiers East and Keating East (which have precinct plans but no bylaws) and McCleary and Polson Quay (which have yet to undergo precinct planning) would undergo sequential, overlapping planning processes led by the public administrator of the IDEA District and coordinated with city staff. Those processes would be guided by the ITFP and the IDSG.

### Infrastructure and Transportation Master Plan.

For each precinct, an ITMP would detail all horizontal infrastructure required to support and service the precinct development, including local roads and servicing. This plan would be coordinated with the ITFP for the broader geography. The public administrator would use the ITMP to prepare any necessary Environmental Assessment approvals. To the extent that a private developer would

complete any of the municipal infrastructure, as opposed to the public administrator as horizontal developer, the infrastructure obligations will be identified in the developer's DPOS application.

## Administrator implementation responsibilities

### Development call and land disposition management.

The public administrator of the IDEA District would lead and manage the land disposition and development call process, ensuring participation by a wide variety of developers in the build out. Working closely with the City of Toronto and CreateTO, the public administrator would ensure that the land disposition process meets City Council objectives and requires new developments to satisfy the IDSG.

### Certification of development and building permit applications.

All development applications and building permit applications will undergo a review and certification process by the administrator to ensure conformance with the IDSG prior to City Council consideration or permit issuance.

### Management of municipal infrastructure development.

Working closely with the City of Toronto, the public administrator would manage the design, construction, and turnover of all required municipal infrastructure, including site preparation, domestic water, sanitary sewer, storm drain conveyance, shoreline improvements, bridges, and public realm (such as parks, plazas, promenades, and streetscape areas), except where noted in Chapter 2, on Page 114.


### Management of further light rail transit (LRT) development.

The public administrator would take the lead role on the detailed design and implementation of the LRT (which completed the Environmental Assessment process in 2010). Specifically, this process would involve the following steps:

- The public administrator would procure and manage consultants to design the LRT corridor in accordance with the Toronto Transit Commission (TTC) design manual, with the TTC itself designing specific elements, such as electrical design and vertical alignment, as appropriate.
- The TTC would review and approve the LRT corridor design.
- The public administrator would procure and oversee contractors for construction of the LRT corridor, again with the TTC itself managing certain elements, such as electrical wiring and special track work, as appropriate.

Notably, this is consistent with the role Waterfront Toronto played on the Queens Quay West LRT realignment as part of the Queens Quay West revitalization.

### Management of advanced systems.

The advanced systems required to meet the objectives of the IDEA District proposed in the MIDP take several different forms. These include a thermal grid, an advanced power grid, an advanced stormwater management system, a pneumatic waste system, dynamic streets, a digital communications networks, a freight management system, a mobility subscription package, and district parking management. As lead developer, Sidewalk Labs would deliver the advanced systems at Quayside and Villiers West. The public administrator would oversee that development and integrate advanced system designs into its plans for municipal infrastructure for Quayside and Villiers West. For advanced systems in the rest of the IDEA District, the public administrator would assume the role of lead developer. 

### Oversight of new management entities.

As discussed in the preceding chapter, the IDEA District proposal assumes that several new entities and administrative units would oversee or manage the advanced systems proposed in the MIDP. These entities include the Waterfront Transportation Management Association (WTMA), the Open Space Alliance (OSA), the Urban Data Trust (UDT), and the Waterfront Sustainability Agency (WSA). While its proposed relationship varies with respect to each of the entities, the public administrator would play a coordinating role between and among the various entities.

### Annual public reports on the IDEA District's progress.

On an annual basis, the public administrator would prepare a public report for the three orders of government on the performance of the IDEA District and the progress of any pilot programs.

### Public engagement.

The public administrator would be responsible for ensuring robust community engagement and consultation to ensure that the operation of the IDEA District remains responsive to the public. This would include online content, social media, public workshops, charrettes, and meetings with working groups, agencies, and other stakeholders.

## Capabilities for the public administrator

To carry out its responsibilities, the administrator of the IDEA District would need a series of specific capabilities and capacities. These include a sophisticated understanding of land-use planning and the management and implementation of large-scale construction, infrastructure, and transportation projects. The role also requires sufficient knowledge of technology to oversee the work of third-party consultants and adequate staffing and institutional resources. In particular, developing and managing the performance of advanced systems in later years will require the administrator to develop specialized expertise. Finally, the administrator needs to institute appropriate institutional mechanisms to monitor compliance by parties participating in economic development activities across the IDEA District, including Sidewalk Labs, developers, technology firms, and others.


As discussed earlier, the IDEA District is designed to be self-financing and could provide for the administrator's operational expenses. Most notably, each management entity has a dedicated revenue stream designed to deliver necessary operational resources and reduce or eliminate the need for outside funding (see Page 80). For the advanced systems, these funds would come directly from the operators.

Waterfront Toronto has some of these capabilities, but additional capacity and resources consistent with the needs described would be required if Waterfront Toronto assumed the public administrator role, particularly with respect to the anticipated role in oversight and operations.



See Chapter 2, on Page 86, for more detail on Sidewalk Labs' and the public administrator's role in advanced systems.

# Governance and management of advanced systems and solutions

The innovative approaches needed to carry out the MIDP’s vision — from new systems for improving mobility and sustainability to programming for newly created public spaces — require management and oversight by dedicated, accountable, and financially self-sustaining, community-based governance structures. The MIDP accordingly describes five management entities needed to carry out the plan. These include two proposed units of the public administrator (the Waterfront Sustainability Association and the Waterfront Transportation Management Association); the Waterfront Housing Trust, a private entity established at the discretion of the public administrator; and two independent non-profits (the Open Space Alliance and the Urban Data Trust). These management entities would take on responsibilities outside the jurisdiction of existing public agencies, pilot and administer novel systems, and consolidate certain powers as needed to carry out an integrated district-focused strategy. 

## Open Space Alliance.

The MIDP proposes establishing a new non-profit open space entity, the Open Space Alliance (OSA), which would be jointly financed and managed by public (e.g. Parks, Forestry & Recreation) and private stakeholders (e.g. land owners, local businesses). In partnership with the City of Toronto, the OSA would create opportunities to pilot ideas together with city staff, enabling a continuous cycle of knowledge sharing and learning to help successful innovations benefit Torontonians around the city.

There a number of factors driving the proposal for the OSA: Publicly accessible space in Quayside would include a mix of privately and publicly owned spaces requiring coordination to give residents and visitors a seamless

experience. Several of the innovative systems planned, including district-wide green infrastructure, digital and physical infrastructure for public artworks and film shoots, weather mitigation, digital maintenance technologies, and new tools for community programming, would require active oversight, with an expectation of experimentation, iteration, and adjustment. Moreover, open space funding is very limited, and it would be even more stretched at Quayside, which will have more open space per person than other developments, due to innovative policies which promote reclaiming parts of the rights of way for people instead of vehicles. Non-profit management of open spaces is not a new concept in Toronto; in response to a similar set of factors, the City has entered into a number of successful collaborations with non-profits to run open spaces, such as Evergreen at the Brick Works, the AGO at Grange Park, Artscape at Wychwood Barns, and the Bentway Conservancy under the Gardiner Expressway.

The MIDP proposes that the City of Toronto and private landowners follow this model, initially for Quayside, and enter into a collaborative management agreement with the OSA. This agreement would outline, policies, standards of performance, and scopes of work between OSA, private landowners, and the City of Toronto (all public land would remain publicly owned). Based on its success, the public administrator could call for new open spaces in the IDEA District to likewise enter into similar agreements with the OSA.

## Key Term


# Urban data

Information gathered in the city’s physical environment, including the public realm, publicly accessible spaces, and even some private buildings.

## Urban Data Trust.

The MIDP proposes the creation of a new entity, the Urban Data Trust (UDT), to oversee the collection and use of “urban data” throughout the IDEA District. There is no existing entity that has the legal authority, capacity, or experience to approve the proposed collection and use of urban data by private and public sector entities. Recently, Canada recognized the need to grapple with data collection and use in “Digital Charter for Canada,” a call to action to revamp the rules in the digital sphere.<sup>42</sup>

As more fully described in Volume 2, this new governance entity would issue a set of Responsible Data Use (RDU) Guidelines and review applications for proposed collections and uses of urban data throughout the district. While the UDT would determine the most appropriate RDU Guidelines, Sidewalk Labs has suggested an initial set for consideration, including that all digital products and projects apply values of diversity, inclusion, and privacy; use data minimization and de-identification by default; make non-personal data publicly accessible by default; and prohibit the sale of personal information or its use for advertising without explicit consent.

Any entity, whether public or private (and including any entity created by IDEA District legislation), that desires to collect or use urban data in the district would have to comply with UDT requirements, in addition to applicable Canadian privacy laws (as overseen by the provincial and federal privacy commissioners). Initially, UDT requirements would be enforceable by contract, with a view to a long-term solution, such as transforming the UDT into a public sector or quasi-public sector agency. Public sector entities may need certain exceptions from those requirements where acting in the public interest, such as in an emergency. 

## Waterfront Housing Trust.

Facing a serious affordable housing shortage, the City of Toronto announced the “Housing Now Initiative,” which seeks to create 40,000 units of affordable housing citywide.<sup>43</sup> Consistent with the city’s goal and Waterfront Toronto’s priority outcome of housing affordability, Sidewalk Labs has committed to an ambitious

approach to affordable housing at Quayside — dedicating 40 percent of residential units to below-market housing.

To further advance affordable housing across the IDEA District, the MIDP proposes the establishment of a new financial vehicle to oversee an affordable housing portfolio. Building off successful precedents in the United States and elsewhere, the trust could assemble and disburse funding from a variety of sources, including a condo resale fee proposed for the IDEA District (see Page 76). With appropriate public sector governance in place, it could offer increased predictability and certainty of funding for developers of affordable housing. At the scale of the IDEA District, a trust could incubate alternative funding sources tailored for the market, including low-cost loans and top-loss guarantees to reduce lending costs for developers.

## Waterfront Sustainability Association.

Reaching the ambitious targets detailed in the MIDP and needed to achieve Waterfront Toronto’s priority outcome for sustainability and climate-positive development depends on the development of four advanced systems: an advanced power grid, a thermal grid, a waste management system, and a stormwater management system. Many (although not all) of these services have limited public regulatory oversight and would be operated by third parties. The MIDP therefore envisions a new unit of the public administrator called the Waterfront Sustainability Association (WSA), whose core responsibilities would be to:

- **Administer and enforce** all operational service contracts for sustainability-related systems within the district, and
- **Report** on performance relative to sustainability objectives within the IDEA District.

The proposal seeks to establish a mechanism to hold operators accountable and to fairly represent the interests of users in the district for systems that are not currently subject to public regulation. (Where they are, those regulations would prevail and not be replaced by any requirements of the WSA.) The WSA would issue and oversee operating contracts



For a summary of the proposed management entities, their relationship to the administrator, the scope of their responsibilities, their method of formation, and their funding mechanism, see ST.1 in the Supplemental Tables.



For more information on the proposed responsible data use process and the UDT, see the “Digital Innovation” chapter of Volume 2.



as needed, monitor operator performance, enforce contractual rates (for rates not regulated by an existing public agency), compile GHG performance reports, and enforce contractual remedies for underperformance. Participating operators would fund the staff and operations the WSA requires through fees prorated based on each operator's revenue.

#### **Waterfront Transportation Management Association.**

The mobility plan calls for an adaptive approach to mobility, including a series of ideas that reflect new approaches (such as dynamic curbs, passenger drop-off and pick-up zones, ride-hail vehicle staging areas, and curb pricing). In certain instances, these mobility innovations would require independent regulatory approval. But to function, they all require direction from, coordination through, and supervision by a dedicated mobility manager for the IDEA District.

Throughout Canada and elsewhere in North America, transportation management associations oversee and seek to upgrade transit, manage parking, expand transportation options, and provide related services in an identified area or neighbourhood. These entities recognize the added value of a targeted, multi-faceted, local approach.

Expanding on this model, the MIDP calls for the creation of a Waterfront Transportation Management Association (WTMA) as a unit of the administrator. Working with the Toronto Transit Commission (TTC) and the city's Transportation Services Division, the core responsibilities of the WTMA would be to:

- **Implement** mobility policy objectives within the IDEA District;
- **Oversee** planning, operation, and maintenance of the new mobility-related infrastructure, such as "dynamic streets"; and
- **Manage** the four advanced mobility systems in the district, including the mobility subscription package.

The WTMA would oversee the maintenance of the modular pavement system; set and collect certain district-specific, mobility-related fees (specifically parking fees and curb pricing); allocate travel credits and subsidies; and adjust speed limits for certain speed-separated streets. The proposal would create a transparent, accountable, and fiscally responsible manager. The WTMA would include a steering committee with representatives from all three orders of government and would collect and retain revenue from parking and curb pricing — providing a dedicated funding source for capital improvements and operations.

Because many of the functions and authorities proposed for the WTMA — for instance, managing parking and coordinating traffic lights in the area — are currently dispersed across city departments, they have not been coordinated into a single integrated, district-level mobility strategy in Toronto so far. In certain cases, the proposed authority pertains to new solutions and does not fit neatly within the purview of an existing agency. By assigning the WTMA to manage the innovative mobility systems proposed for the IDEA District, and by enacting a City Council resolution granting it oversight of mobility-related functions pertinent to the district (discussed under the Innovation Framework), the WTMA could advance important transit objectives for the waterfront and seamlessly integrate diverse mobility options.

**The innovative solutions needed to achieve Waterfront Toronto's priority outcomes require management and oversight by dedicated, accountable, and financially self-sustaining, community-based governance structures.**

# IDEA District Component 2: The Innovation Framework

## Objectives and principles

The second main feature of the IDEA District is [the Innovation Framework](#), a package of targeted regulatory adjustments and enhanced requirements on development that would apply in the area. These reforms, submitted here for government consideration, are designed to facilitate and foster innovative development and achieve Waterfront Toronto's priority outcomes: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

Overall, the MIDP seeks to explain why the proposed Innovation Framework is fundamental to achieving these objectives. The proposed framework proceeds from five key principles:

→ [Active government oversight.](#)  
The development of the IDEA District would proceed as a multiphase public project conceived and implemented

to meet well-defined policy objectives. Further development is, and must remain, subject to clear public directives and proper oversight by the federal, provincial, and city governments.

→ [A predictable policy environment.](#)  
To invest the resources required to achieve the vision laid out in the MIDP and to develop the broader waterfront, Sidewalk Labs, vertical developers, and others operating in the district require certainty that the conditions necessary for success are in place. Advancing this initiative is impossible without a clear understanding of the rules governing the Quayside project or the IDEA District as a whole.

→ [A responsive regulatory approach.](#)  
Using cutting-edge urban design and technologies as a catalyst for innovative development, programming, and service delivery on the waterfront requires a regulatory environment that affords

## Key Terms

**The IDEA District's Innovation Framework** — a modified regulatory framework designed to foster the policy conditions necessary to tackle urban challenges using innovative solutions comprised of regulatory adjustments and the IDSG.

**Regulatory Adjustments** — a part of the Innovation Framework constituting legal modifications that would require further action, such as legislation or an administrative agreement, from the federal, provincial, or municipal government.

**IDSG (Innovation Design Standards and Guidelines)** — a part of the Innovation Framework constituting enhanced requirements for new IDEA District developments arising out of Waterfront Toronto's priority outcomes.



See Chapter 2, on Page 95, for more detail on standard planning permissions and other regulatory approvals.

developers additional leeway to test out new solutions, offers flexibility in implementation, and can adapt as circumstances change or as key milestones are achieved.

→ [Accountability and incentives to match higher demands for performance.](#)

The regulatory structure must link accountability and incentives to performance. This means increasing the requirements on new developments to address key priorities, like affordability and sustainability. It also means holding developers accountable for those higher standards, through incentives and penalties.

→ [Recognizing the value of scale.](#)

The viability of the MIDP, specifically components requiring significant, upfront infrastructure investments, depends on sufficient scale. These advances cannot proceed or receive funding on a development-by-development basis and must be integrated into a broader strategy for the eastern waterfront.

The particular reforms proposed in the next section reflect these principles and follow a close review of the applicable regulatory schemes. Notably, the Innovation Framework does not refer to the more standard planning permissions and other regulatory approvals associated with larger developments.

## Proposed policies: Introduction

The Innovation Framework would serve as a centrepiece of the IDEA District, encompassing the policies needed to advance the vision set forth in the MIDP and lay the groundwork for sustained innovation and economic growth. This section outlines proposed aspects of the Innovation Framework associated, respectively, with [mobility, public realm, buildings and housing, sustainability, social infrastructure, and digital innovation.](#)

Each section highlights certain reforms needed to advance Waterfront Toronto's priority outcomes for the eastern waterfront. The Innovation Framework, as proposed,

has two distinct parts. The first part consists of a smaller number of targeted [regulatory adjustments](#) that would require additional action by the federal, provincial, or municipal government, such as legislative amendments or administrative agreements.

The second part of the framework, the [Innovation Design Standards and Guidelines \(IDSG\)](#), would require no further action by the three orders of government. Similar to the development requirements that Waterfront Toronto today imposes on new developments on the waterfront, the public administrator would establish the IDSG to require new developments on public land in the IDEA District (or where private landowners opt in) to advance district innovation and development priorities. For example, new developments would be required to adopt sustainable construction techniques and contribute annually to support the public realm. Over time, the administrator would oversee revisions to the IDSG based on the early practical experiences at Quayside and Villiers West, the availability of new technologies, the perceived success or limitations of the MIDP solutions in practice, and economic practicalities. The initial IDSG would be approved in connection with the Implementation Agreements, but would not expand beyond its initial application in Quayside and Villiers West until the public administrator adopts the IDSG for the broader IDEA District. This would occur after the approaches prove both effective at achieving district priorities and financially viable.

The proposed regulatory adjustments touch on a number of specific subject matters that necessarily require review and consideration by the relevant orders of government. In certain circumstances, Sidewalk Labs may be called on to demonstrate the safety of a particular reform from a science and engineering standpoint (for example, that Sidewalk Labs can construct safe wooden buildings of 30 storeys or higher).

Accordingly, Sidewalk Labs recognizes that not all regulatory adjustments would be enacted when the parties first enter into Implementation Agreements. In the near term, Sidewalk Labs is seeking formal approval by government of a policy framework and implementation timetable — potentially through


a Community Improvement Plan under Section 28 of the Planning Act — sufficient to ensure that reforms are considered by government and enacted in time for their application to this project, and without delaying it.<sup>44</sup>

To advance the IDEA District’s priority outcomes, the MIDP proposes a set of targeted legal adjustments and proposed requirements that would be included in the IDSG (See the Supplemental Tables). A few that merit further discussion are discussed in detail in the following spreads.

## Innovation Framework: Mobility

The MIDP offers a detailed, multimodal strategy for ensuring area residents, workers, and visitors have access to a broad array of mobility options in Quayside and across the IDEA District.

This plan includes the addition of an LRT system to Toronto’s existing streetcar network, upgrades to bicycle infrastructure, and management systems to reduce traffic congestion and ease traffic flow — all while reclaiming parts of the roadway for public space. The plan also includes a street network designed to accommodate the emergence of self-driving vehicles.

This plan would increase mobility options; promote affordability and convenience for residents, workers, and visitors; and attract further investment and development to the IDEA District. 

### Regulatory adjustments: Mobility

**Allowing dynamic curbs.** The MIDP calls for the deployment of dynamic curbs where the amount of space allocated to roadway, sidewalk, or parking would vary based on demand. When rush hour ends, for example, certain vehicle lanes could become pedestrian space. This system relies on lighted pavement and digital signage, and on the elimination of raised curbs, instead pursuing one consistent grade from building front to building front. As a consequence, it may require exemptions from specifications in Ontario’s Highway Traffic Act and Toronto’s Municipal Code, specifically regarding acceptable signage, and from certain parking rules. Sidewalk Labs proposes including these adjustments in the

Innovation Framework, with oversight of the dynamic curbs falling to the WTMA.

**Authorizing curb pricing.** The MIDP calls for the WTMA to administer “curb pricing” to reduce traffic congestion, encourage the use of alternative forms of transportation, and cut down on greenhouse gas emissions. Under the proposal, all vehicles would be assessed a charge to access curb space, and vehicles waiting longer than five minutes would pay higher time-based charges. The plan also calls for delivery vehicles to pay for permits to make curbside deliveries (as opposed to at a central distribution centre, where no fee would be charged). Such a scheme requires authorization by the province, in the form of an amendment to the City of Toronto Act to permit the city to adopt this approach. The City of Toronto, in turn, could authorize the WTMA to manage the program and apply the funds to mobility in the IDEA District.

**Authorizing ride-hail pick-up / drop-off / staging zones.** To move away from curbside parking and reduce traffic in the IDEA District, the MIDP envisions the establishment of ride-hail pick-up, drop-off, and staging areas that would shift based on demand. Sidewalk Labs proposes that, as part of the Innovation Framework, Toronto amend its Municipal Code to permit these dynamically shifting areas, require drivers to comply with these rules, and empower the WTMA to modify and work with law enforcement to administer them.


### IDSG: Mobility

**Requiring increased bike parking and bike lane access or bike priority streets for all new buildings.** To make bicycles and e-bikes an attractive transit option for as many people as possible, the mobility plan calls for an unprecedented level of bike access in Quayside and across the IDEA District through dedicated lanes and bike priority streets. Consequently, Sidewalk Labs has advanced designs for Quayside with bike access to all buildings and expanded long- and short-term bicycle parking, and proposes that these constitute requirements for new developments in the district (as well as a component of future precinct plans for the area).

**Facilitating underground delivery tunnels and a neighbourhood logistics hub.** The MIDP calls

for a pilot project at Quayside to develop an underground system of tunnels linked to a neighbourhood logistics hub for deliveries, storage, waste, and borrowing. By keeping delivery and garbage trucks off major roads, the proposal would substantially reduce congestion and pollution. Advancing the Quayside plan would require certain upfront permissions, including permission to tunnel under city roadways. Based on the success of the pilot, the IDSG would mandate that new developments in the IDEA District connect to the tunnel system for deliveries and sanitation.

## Innovation Framework: Public Realm

The MIDP offers a strategy for delivering more and higher-quality open space in Quayside, space that is flexible, better programmed, and attractive more seasons of the year. Overseen through a collaborative management agreement with a new independent non-profit, the OSA (see Page 68), the success of this approach would pave the way towards expanding access to improved public space across the IDEA District. This approach seeks to reduce social isolation, improve health, and contribute to a vibrant community life on the waterfront. 


### IDSG: Public Realm

The MIDP separately proposes that the public administrator require new developments to support the open space network, by incorporating the following requirement into the IDSG:

**Requiring new developments to contribute to open space management.** To operate well-programmed, well-maintained, and innovative publicly accessible space, the OSA requires operational funding. But public funding for these purposes is limited. To help fill this funding gap, the IDSG would include a requirement that landlords furnish funds, which they may pass on to commercial tenants in the form of common area maintenance fees, to support parks and other open spaces across the IDEA District. Modelled off of the funding framework for Business Improvement Areas and Green Benefit Districts that exist elsewhere in North America, these funds would be dedicated exclusively to improving and administering local open spaces.

## Innovation Framework: Buildings and Housing

The MIDP details how Sidewalk Labs intends to construct buildings in Quayside and Villiers West that are faster to build, more affordable to live in, and more sustainable from an environmental perspective.

This approach includes the factory construction of mass timber buildings as tall as roughly 30 storeys; the development of highly adaptable “Loft” and stoa (lower-floor) spaces that can support a mix of uses, from residential to light manufacturing; and the use of a low-voltage power system. Anchored around the use of factory-built wood construction, the plan announced an unprecedented commitment to below-market housing, with below-market units accounting for 40 percent of the new residential units, including both purpose-built rentals and a novel shared equity model. 

### Regulatory adjustments:

#### Buildings and Housing

**Permitting mass timber buildings and related advances.** The MIDP calls for the use of mass timber in all buildings developed in Quayside. This will include buildings of varying heights, including a roughly 30-storey wood building, which is taller than any previous wood construction in Canada. This construction would also incorporate several other novel design features — including the use of fire-resistant, environmentally friendly Shikkui plaster (rather than drywall) — that make the buildings as safe as traditional concrete and steel buildings, at much higher levels of sustainability.

The proposed wood construction would require permission to exceed the six-storey limit on wood construction imposed by the Ontario Building Code and permission to use the Shikkui plaster that is a key aspect of the construction.<sup>45</sup> Sidewalk Labs is actively consulting with the city’s building department and with federal and provincial officials on these specifications, and is prepared to establish their benefits from a safety and sustainability perspective. The ultimate ability of mass timber construction to proceed will depend on either provincial legislation to allow such construction in the IDEA District or a determination through the city’s “alterna-



For more details on Mobility innovations, see Volume 2, Chapter 1.



For more details on Public Realm innovations, see Volume 2, Chapter 2.



For more details on Buildings and Housing innovations, see Volume 2, Chapter 3.

tive solutions” process that the construction in Quayside, as described, achieves the same or better level of performance to currently permitted approaches.<sup>46</sup>

**Authorizing a pilot to shift to an outcome-based, building-use system.** The MIDP contemplates buildings with highly flexible spaces that can quickly adapt to new uses, from residential to commercial to light manufacturing. In a bid to increase the adaptability of spaces without negatively affecting those living and working nearby, the proposed Innovation Framework would establish a pilot program of an “outcome-based” system for new developments to allow for a broader range of uses to coexist together and for a simpler and easier process changing uses within existing built spaces. Sidewalk Labs has identified nine “use-neutral” code categories (such as restaurants, single dwelling units, mercantile/retail uses, and low-hazard industrial uses), where the effects on third parties tends to be limited. Rather than prescribe how these use-neutral spaces are to be used, the proposed system would monitor real-time compliance with city-established standards for noise, air pollution, and other nuisances — in other words, focusing on the outcomes and allowing flexibility, as long as the outcomes are met. This requires Zoning or Community Planning Permit Bylaws permitting a broader range of uses and incorporating real-time monitoring in the building permitting process.

#### **IDSG: Buildings and Housing**

The MIDP separately proposes that the public administrator require new developments to improve access to affordable housing by establishing the following requirement:


**Funding below-market housing through a condo resale fee for new developments in the IDEA District.** The shortage of affordable housing represents a serious challenge for Torontonians at all income levels. The Innovation Framework proposes a new source of private funds for affordable housing: a resale fee for all condo sales from new developments in the IDEA District.

Pursuant to a restrictive covenant or other legal strategy, condo sellers would have to pay a percentage of the sales price to support affordable housing. A Waterfront Housing

Trust (see Page 69) could collect this new revenue stream, pair with it with existing funding sources, and use the combined funds to advance an affordable housing strategy for the IDEA District overall. Notably, the new fees could support not only traditional affordable housing but also below-market units for middle-income households.

## **Innovation Framework: Sustainability**

Waterfront Toronto’s RFP set an ambitious goal to make the waterfront a climate-positive community. To deliver on this goal, and to accomplish a range of other environmental-sustainability objectives, the MIDP details a multi-part strategy.

This approach starts with the design and construction of buildings using mass timber. It extends to how buildings are powered, heated, and cooled, and includes the management of waste and stormwater across the neighbourhood. To reduce and manage energy needs, Sidewalk Labs plans to construct highly energy-efficient buildings and deploy advanced systems for generating, managing, using, and storing electricity and thermal energy. The plan also incorporates a smart waste disposal chain designed to improve the diversion of recyclable and compostable waste from landfills and a centralized, actively controlled green-infrastructure approach to stormwater management. 

**Regulatory adjustments: Sustainability**  
**Establishing an advanced power grid for the IDEA District.** Key to achieving a climate-positive waterfront is the deployment of an advanced power grid. The MIDP calls for connecting Quayside to the main Toronto electric grid, supplementing the energy supply with local solar generation and battery storage, and employing an innovative rate structure. This rate structure is designed to reward behaviour and technology that move discretionary energy use to “off peak” times when the grid’s electricity is cleaner (lower GHG intensity) and often less costly. It employs a “monthly power budget” scheme that gives commercial and residential occupants far greater control to manage their utility costs than ever before.

Compensating Toronto Hydro at the regulated rate based upon a campus meter, and then charging customers within the campus at a variable rate, requires approval from the Ontario Energy Board to implement the new rate structure and potentially amend Local Distribution Company regulations to allow a campus approach to electricity.

**Facilitating a novel stormwater management system for the IDEA District.** As climate change causes storms of increasing frequency and severity, actively managing stormwater is fundamental to the sustainability and resiliency of cities. The MIDP calls for increased reliance on district-wide green infrastructure solutions to manage stormwater, including structural soil beds, scientifically selected vegetation, and permeable paving — systems that capture and naturally filter stormwater collected beneath the street.

Executing this vision requires permission from the city for stormwater systems to encroach into the right of way. Furthermore, it requires allowing stormwater management infrastructure that serves larger swathes of the IDEA District, rather than mandating a development-by-development approach.

Finally, the approach would require directing funding to stormwater infrastructure. Accordingly, the Innovation Framework would require new developments to fund the new stormwater management infrastructure and its ongoing management in lieu of developing their own more expensive, in-building solutions. At the same time, the Innovation Framework would seek an equivalent reduction in the portion of the Toronto Water billing for stormwater.

**IDSG: Sustainability**  
**Requiring new developments to meet heightened sustainability and active energy management requirements.** Waterfront Toronto set a climate-positive objective for development in the waterfront. Achieving this objective begins with how buildings are constructed and outfitted. In Quayside, Sidewalk Labs intends to show that truly sustainable buildings are commercially viable, safe, and economical. Based upon success in Quayside, the Innovation Framework would impose heightened sustainable-building requirements for new developments in the IDEA District.

Among other requirements, new developments would need to be constructed with materials at least as sustainable as the mass timber construction proposed for Quayside. They would need to feature a well-insulated building envelope to prevent avoidable energy loss. And they would need to connect to the advanced power grid and employ active energy management systems — what Sidewalk Labs is calling “Schedulers” — that optimize heating, air conditioning, ventilation, and other systems to sharply limit the extent to which energy is being used when not needed. Over time, the sustainability requirements would be refined to keep pace with advances in research and technology.

**Developing an outcome-based energy code.** While the existing Toronto Green Standard (TGS) imposes requirements for sustainability in the design phase, there is no ongoing performance requirement that applies post-construction during building operation.<sup>47</sup> As a consequence, TGS-compliant buildings may consume higher levels of energy in operation than desired or reasonably needed. The solution is a dynamic approach that holds developments accountable for their energy performance in actual operation.

As an initial step, the Innovation Framework would require that new developments in the IDEA District maintain systems for collecting real-time data related to energy performance, occupancy, and tenant type, as well as sharing that data in standard published formats with the administrator. This data would be used to establish dynamic operational energy performance standards to apply in the district.


**Connecting to a fossil fuel-free thermal energy solution.** To substantially reduce the reliance on fossil fuels for heating and cooling, the MIDP calls for the development of a thermal grid that could harness clean energy resources (such as geothermal energy), waste heat from buildings, industrial waste heat (from a data centre, for example), and wastewater heat recovery. To proceed with this type of thermal grid, the City of Toronto would need to permit thermal pipe under the right of way and the operation of a thermal energy utility in the IDEA District. As part of the Innovation Framework, new developments in the district would be required to connect to the thermal grid and pay for service.



For more details on Sustainability innovations, see Volume 2, Chapter 4.

**Connecting to a pneumatic waste system.** As part of delivering a sustainable, resilient, and innovative waterfront, the MIDP proposes the use of other major new infrastructure, including a pneumatic waste collection system that rapidly sends trash, recycling, and organics to a neighbourhood collection point. This approach keeps trash off the street, makes recycling easier and more effective, reduces contamination across waste streams, and reduces garbage truck-related congestion. To make the system financially feasible and spread its benefits across the IDEA District, the Innovation Framework would require that new developments connect to the new sanitation system (with protections to prohibit monopolistic pricing).

## Innovation Framework: Social Infrastructure

The MIDP sets out a vision for Quayside as a model of a complete, inclusive community — one that prioritizes the health and well-being of residents, workers, and visitors; fosters a civically engaged community; and enables opportunities for lifelong learning so that everyone has an opportunity to thrive. More broadly, the MIDP proposes to address from the outset social development objectives, including civic participation, health equity, and workforce development, and to allocate space where local non-profits and government entities may choose to pilot new models of service delivery to achieve better outcomes. (Sidewalk Labs would not provide any community services.) 

**Establishing healthy urban design and construction requirements for new developments.** The design and construction of the built environment has profound implications for the health outcomes of residents and workers in the district and for overall community well-being. Seeking to optimize the health and well-being of those who live and work in Quayside, the MIDP includes features designed to prioritize health and well-being, including pedestrian- and bicycle-friendly infrastructure, outdoor green spaces, and community gathering and service delivery spaces. The precinct and land-use plans for the IDEA District, as well as the Innovation Framework, would reflect a similar commitment to incorporating the best

practices for promoting community well-being. Specifically, the public administrator of the IDEA District would advance existing healthy urban design guidelines and require adherence by new developments.

**Requiring all new developments to advance health, education, and civic engagement through proactive planning.** Urban revitalization is about improving the lives of city residents. Yet too often, the delivery of community services is an afterthought in development planning. Consistent with the City of Toronto's TOcore Strategy, the Innovation Framework seeks to ensure that all new developments in the IDEA District incorporate planning for community service spaces and coordinate with service delivery partners.<sup>48</sup> New developments would need to describe how they align with district-wide community service and facility plans prepared by the city, and detail their specific contributions to establishing healthy communities; creating connected, civically engaged communities; and promoting lifelong learning.

**Incorporating space for health facilities in new development plans.** Meeting the health needs of the waterfront depends on ensuring that residents and workers continue to have access to health care and community services as development proceeds. Based on that insight, the Quayside plan sets aside a central space for the co-location of health care and community services, called the Care Collective.

Building on the existing partnership between the city and the province to coordinate planning efforts to enhance population health, the administrator would work closely with these bodies to integrate health care service and facility planning into future Precinct Plans for the IDEA District and would explore opportunities to incorporate appropriate, flexible spaces for delivering health care services in new developments if deemed a priority by the province.

**Requiring new developments to prioritize community benefits in construction.** To ensure that new construction means new opportunities for community residents, the Innovation Framework would establish community benefit requirements for new

construction. These requirements are consistent with Ontario's Infrastructure and Jobs for Prosperity Act and with the City of Toronto's Social Procurement Policy.

First, new developments would be required to commit to training, apprenticeships, and jobs for members of historically disadvantaged groups, at minimum participation thresholds (equivalent to 10 percent of all construction labour hours, where applicable). Second, new developments would be required to commit to directing a minimum percentage of project costs to diverse suppliers, small businesses, and social enterprises. Third, during planning and construction, development leads would be required to meet quarterly with a working group of community members and representatives from government agencies to report on progress towards achieving these goals.


**Establishing sustainable funding for a non-profit neighbourhood association.** Neighbourhood associations play an important democratic role, representing the interests of community members in the broader city and responding to their concerns as an independent, non-profit entity. This is especially true for the nascent neighbourhoods of the eastern waterfront, where decisions today could influence the shape of community life for years to come. But funding for these associations is often ad hoc, typically proceeding on a voluntary, membership model which makes the adoption of new processes, programs, tools, and spaces challenging.

The public administrator would consider more reliable funding models, for example, incorporating a dues requirement into the Innovation Framework, in which area residents pay a small monthly fee on a sliding scale. Another option would be to seek sustaining contributions from area businesses.

## Innovation Framework: Digital Innovation

The MIDP proposes ubiquitous connectivity for residents, workers, and businesses in Quayside on a secure, super-fast internet network — no matter where they are, at an affordable cost. This connectivity would boost productivity, bridge the digital divide, and power

cutting-edge digital and automated technologies — all to improve quality of life across the waterfront.

Many of the previously mentioned innovative systems rely on information collected from the physical space, such as using cameras to chart traffic patterns. To safeguard the interests of urban residents, the MIDP calls for an innovative approach to digital governance in the IDEA District that builds on the strong foundation established by Canadian privacy laws to create a new process for approving the use or collection of urban data gathered in the public realm. The initiative aims to demonstrate to Toronto, Canada, and the rest of the world that cities do not need to sacrifice their values of inclusion and privacy for opportunity in the digital age. 

As discussed earlier, the MIDP calls for the creation of the UDT, a new entity that will oversee the collection and use of urban data throughout the IDEA District. The MIDP proposes that any entity, whether public or private (and including any entity created by IDEA District legislation), that desires to collect or use urban data in the district would have to comply with UDT requirements in addition to applicable Canadian privacy laws (as overseen by the provincial and federal privacy commissioners). Compliance with UDT requirements would be enforceable by contract initially, with a view to a long-term solution that may include transforming the UDT into a public sector or quasi-public sector agency. Public sector entities may need certain exceptions from those requirements where acting in the public interest, such as in an emergency or other urgent situation.



For more details on Social Infrastructure, see "The Quayside Plan" chapter of Volume 1.



For more details on Digital Innovation, see Volume 2, Chapter 5.

# IDEA District Component 3: Financing

The MIDP sets out an ambitious vision for spurring economic growth in the eastern waterfront while tackling core urban challenges. But improving quality of life in the waterfront should not come at the expense of other municipal or provincial priorities. As recognized in the Toronto Official Plan, there is a need for “new funding mechanisms ... to provide monies for investment in facilities, services and amenities.”<sup>49</sup>

Self-financing or “value capture” strategies are commonly used throughout Canada and the United States, offering a way to finance district infrastructure and growth-generating strategies with the economic value they are expected to generate. To advance a comprehensive development strategy for the IDEA District, the public administrator should receive the authority to employ at least three typical value capture strategies:

## 1

### **City fee and development charge credits, municipal infrastructure contributions, and local infrastructure contributions.**


In Toronto, city fees, development charges, and, for certain projects, other developer contributions, are typically assessed to pay for the municipal infrastructure required to support the infrastructure needs associated with new development. For example, Waterfront Toronto has used such fees — including a local area improvement charge specified in the East Bayfront Zoning Bylaw — to fund local infrastructure in East Bayfront.<sup>50</sup>

Within the IDEA District, the administrator would deliver a broad range of enabling horizontal infrastructure and services typically funded through city fees and development charges. As a consequence, the administrator would reasonably seek a credit of equivalent



See Chapter 2, on Page 81, for more detail on local infrastructure.

value to reduce the city fees and development charges developers in the IDEA District would pay. Acting under its authority over the sale of public lands, the administrator would recoup the value of this credit by requiring developers to pay a district-specific fee, called a “municipal infrastructure contribution” (MIC), to fund the enabling horizontal infrastructure and services the public administrator delivered.

Some of the local infrastructure required to make land parcels suitable for development in the IDEA District replaces the costs for certain business as usual (BAU) horizontal systems, specifically gas and electrical distribution systems. These systems are not eligible for city fee or development charge credits. To fund this local infrastructure, the administrator would also assess a “local infrastructure contribution” (LIC) as part of the land disposition process. This fee, which would be equivalent to the avoided BAU horizontal costs, would be used to reimburse operators up to the amount of those avoided costs. 

## 2

### **Land proceeds reinvestment.**

By selling public land incrementally over time and investing the proceeds in local area development, a city can use the growth potential of land to fund development. Waterfront Toronto has used this approach since 2006, relying, in part, on the authorities contained in its MOU with the City of Toronto.

In concert with Infrastructure Ontario, Waterfront Toronto used this strategy to develop the West Don Lands, leveraging provincial lands to fund the costs of the new infrastructure, remediation, and land-use approvals necessary to enable development. Reinvesting land proceeds also represented another part of Waterfront Toronto’s approach to funding East Bayfront. And the Harbourfront Corporation used this strategy to enable development of approximately 36 hectares along Toronto’s central waterfront; the corporation obtained land-use approvals, delivered enabling infrastructure, and later sold the lands to repay an initial federal investment.<sup>51</sup>

This financing approach requires ensuring that the public administrator has control over the disposition of public lands within the IDEA District (akin to the authorities the city has already granted to Waterfront Toronto in their 2006 MOU) and the authority to apply the proceeds to finance the overall development and innovation strategy.

## 3

### **Incremental property tax.**

Tax-increment financing (TIF), known elsewhere in Canada as a Community Revitalization Levy (CRL), directs a share of the increase in property tax revenue within a project area to fund major infrastructure, like transit. For example, Calgary used a CRL financing strategy to advance the Rivers District Community Revitalization Plan. Since 2007, this approach has enabled \$396 million in infrastructure funding, attracting nearly \$3 billion in planned private development to downtown Calgary.<sup>52</sup> As a result, residential property assessments reportedly increased from \$328 million to about \$1.2 billion, and non-residential assessments jumped from \$647 million to \$1.8 billion.

In another example, Edmonton will use a CRL financing strategy to fund several projects in the Capital City Downtown CRL Plan.<sup>53</sup> TIF is commonplace for funding projects across the United States, including Hudson Yards (New York), Mesa del Sol Development (New Mexico), and Lincoln Yards (Illinois).

Toronto’s Official Plan acknowledges the value of TIF, specifically commending the strategy as a way to “invest without direct cost to the municipal taxpayer.”<sup>54</sup> This tool should be available in Ontario and to the public administrator of the IDEA District. Notably, the MIDP proposes using TIF as one way to finance the Waterfront East LRT extension.

Ontario enacted a TIF law in 2006. To make TIF available for infrastructure, the province must promulgate implementing regulations. Moreover, the public administrator should be granted the authority to recommend IDEA District projects as prospective recipients of TIF funding.

# Innovation and Funding Partnership Proposal

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## Introduction

p84

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**Role 1:  
Development  
of Real Estate  
and Advanced  
Systems**

p86

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**Role 2:  
Innovation  
Planning,  
Design, and  
Implementation**

p114

---

**Role 3:  
Technology  
Deployment**

p120

---

**Role 4:  
Optional  
Infrastructure  
Financing**

p128

# Introduction

Through the RFP process, Waterfront Toronto selected Sidewalk Labs as its Innovation and Funding Partner and entered into a PDA to prepare this MIDP. By design, this role encompasses several distinct but interrelated responsibilities that involve conceptualization, implementation, and financing.

The MIDP Innovation and Funding Partnership Proposal suggests that Sidewalk Labs would play four distinct, interrelated roles:

## 1

### Development of real estate and advanced systems.

Sidewalk Labs would vertically develop two neighbourhoods in the IDEA District, Quayside and Villiers West, and is committed to advancing this development with local partners.

In Quayside, the result would be a new neighbourhood that would pioneer strategies for improving sustainability, affordability, mobility, and other Waterfront Toronto priorities. In Villiers West, Sidewalk Labs would serve as lead developer of a new urban innovation campus, which would be anchored by an expanded Canadian headquarters for Google and a new academic institution, the Urban Innovation Institute. The overall campus would include 1.5 million square feet of commercial space.<sup>55</sup>

Sidewalk Labs would also serve as lead developer of the advanced systems critical to the success of Quayside and Villiers West and to the achievement of Waterfront Toronto's priority outcomes. These include an advanced power grid, thermal grid, waste management system, stormwater management system, freight management system, dynamic streets, district parking management system, digital communications network, and mobility subscription package. To implement these systems, Sidewalk Labs would identify or partner with experienced third-party operators wherever possible.

By acting as lead developer of real estate and advanced systems, Sidewalk Labs would serve as a catalyst for broader development that follows Waterfront Toronto's principles — laying the foundation for how, as part of a district-wide strategy, future developments can achieve ambitious public objectives. Accordingly, Sidewalk Labs has no intention of serving as vertical developer for any parcels in the IDEA District beyond Quayside and Villiers West.

## 2

### Innovation planning, design, and implementation.

Sidewalk Labs would provide advisory services and management services in connection with planning, devising, constructing, integrating, delivering, and operating project-specific infrastructure and advanced systems for the IDEA District. Assuming it achieves all required project milestones, Sidewalk Labs would apply its practical insights from serving as lead developer of a range of advanced systems and vertical development at Quayside and Villiers West. Although the precise scope of these services varies for different aspects of the project, the role would centre on areas where Sidewalk Labs' expertise and resources can uniquely benefit the project.

## 3

### Technology deployment.

Sidewalk Labs would source or create key technological solutions needed to deliver on the MIDP targets. These would include a number of new technologies where no suitable alternative exists, including for mobility and digital innovation, that qualify as "purposeful solutions." In addition, as part of this role, Sidewalk Labs would share profits of certain technologies deployed in connection with the project.

## 4

### Optional infrastructure financing.

As described throughout the MIDP, the accelerated development of horizontal infrastructure is critical to realizing the promise of the eastern waterfront as a leading force in sustainability, affordability, mobility, public realm, and other quality-of-life factors. To ensure financing is not a barrier to constructing critical infrastructure, Sidewalk Labs is prepared to arrange or enable front-end financing for the accelerated construction and support of certain critical infrastructure and advanced systems.

The next four sections detail how Sidewalk Labs, as Innovation and Funding Partner, proposes to leverage its unique assets and outline the scope of its responsibilities and the associated financial terms.



# Innovation and Funding Partner Role 1: Development of Real Estate and Advanced Systems

Sidewalk Labs' proposal centres on two inter-dependent vertical real estate development projects that serve distinct functions and on a series of advanced systems essential for delivering key performance outcomes.

In Quayside, Sidewalk Labs is seeking to deliver a national and global model to encourage market transformation towards climate-positive city building and to achieve a range of specific public objectives, including affordability, economic opportunity, and sustainable mobility. In Villiers West, Sidewalk Labs seeks to extend the innovations piloted at Quayside while undertaking a major economic development project: a new urban innovation campus anchored by Google's Canadian headquarters and an Urban Innovation Institute. Together, these projects represent a core element of Sidewalk Labs' role as Innovation and Funding Partner to achieve the MIDP priority outcomes and to catalyze growth across the eastern waterfront. For each area, Sidewalk Labs would serve as the lead developer and work with local partners.

The success of these development projects, however, relies on advanced systems for mobility and sustainability, such as an advanced power grid, a thermal grid, and dynamic streets. Accordingly, Sidewalk Labs proposes to serve as lead developer for those systems in Quayside and Villiers West and to identify capable operators or partners to run those systems. Importantly, serving as lead developer of advanced systems is distinct from Sidewalk Labs' role in technology deployment (see Page 120), which concerns the sourcing or creation of individual technological solutions.

As reflected in the following table, vertical development at Quayside and Villiers West represents a small percentage (about 16 per cent) of projected development for the overall IDEA District.

Fig. 2.1

## Build Plan by parcel

	Phase 1	Phase 2	
	Quayside (led by Sidewalk Labs)	Villiers West (led by Sidewalk Labs)	Rest of River District* (developed by others)
<b>Scale</b>	7 hectares**	8 hectares	62 hectares
	2.65M sq ft	2.75M sq ft	27.5M sq ft
<b>Percent of IDEA District Development Program</b>	8.1%	8.3%	83.6%
<b>Build Plan (GFA)***</b>			
Residential	1.78M sq ft (67%)	1.15M sq ft (42%)	20.15M sq ft (73%)
Office	550K sq ft (21%)	1.4M sq ft (51%)	5.55M sq ft (20%)
Retail	230K sq ft (9%)	150K sq ft (5%)	1.4M sq ft (5%)
Social Infrastructure	90K sq ft (3%)	50K sq ft (2%)	400K sq ft (1%)
<b>Total Units</b>	<b>2,670</b>	<b>1,720</b>	<b>30,470</b>
<b>Total Residents</b>	<b>4,176</b>	<b>2,710</b>	<b>46,090</b>
<b>Total Jobs</b>	<b>3,952</b>	<b>7,680</b>	<b>33,990</b>
<b>Full Absorption Year</b>	<b>2026</b>	<b>2030</b>	<b>2045</b>


\* Volume 3 includes Keating West in the River District.

\*\* The size of each district in the table includes open space and rights of way within its borders. For instance, this is why Quayside is described as 7 hectares, while including only 4.9 hectares of developable land.

\*\*\* Numbers reflect gross floor area ratio, inclusive of rights of way. Retail includes production space at Quayside.

Critically, as part of an overall transaction involving Villiers West, Sidewalk Labs is incurring higher-than-market real estate costs at Quayside, to prove the model — and to enable third-party developers to employ these same sustainable construction methods and innovative building systems on a cost-effective basis. For example, Sidewalk Labs is shouldering the engineering, testing, and regulatory costs necessary for the approval of tall timber, environmentally friendly Shikkui plaster, and digital electricity. This would pave the way for

future developers to receive the benefits of these techniques and systems at substantially lower risk and cost.

The first two sections that follow describe the respective objectives, build programs, and implementation plans for the developments proposed for Quayside and Villiers West. The third discusses Sidewalk Labs' role as a developer of the advanced systems associated with both parcels. 



The economics associated with each transaction are discussed in Chapter 3.

# The Quayside Plan

As the lead vertical developer, Sidewalk Labs would enter into an agreement with Waterfront Toronto to plan, design, deliver, and operate a mixed-use, mixed-income development on the consolidated properties that together constitute Quayside. By tackling fundamental urban challenges with powerful new strategies, the development would serve as a model and proof of concept demonstrating the benefit, feasibility, and financial viability of economic development that advances Waterfront Toronto's priority outcomes.

Completed during an intensive 18-month consultation and planning process, the Quayside plan is detailed in Volume 1. The planning process involved frequent consultations with Waterfront Toronto, the City of Toronto, the Province of Ontario, and the Government of Canada as well as four public roundtables, dozens of community meetings, six topic-specific advisory boards, hundreds of one-on-one and small group meetings, and a Residents Reference Panel. Overall, Sidewalk Labs heard from more than 20,000 Torontonians.<sup>56</sup> Sidewalk Labs considered numerous designs and build plans, explored potential urban innovations and how to integrate them, and emerged with a comprehensive strategy for achieving the objectives in the RFP and the PDA.

Working alongside Waterfront Toronto, Sidewalk Labs reviewed substantial feedback from stakeholders to prepare an inventory of promising ideas to integrate into a holistic development plan for Quayside. Sidewalk Labs next reviewed the broader physical, social, and economic context around Quayside, including existing precinct plans, zoning bylaws, analyses of market economics and waterfront development patterns, and pre-existing concept plans for specific elements, such as the

extension of Queens Quay. With that information, Sidewalk Labs made a detailed assessment of what the business as usual approach to its development would look like.

The Sidewalk Labs team developed plans integrating urban innovations, people-centred urban design, public feedback, site planning, and economic strategies into a proposed build program, site plan, and delivery strategy.

Using an iterative process, Sidewalk Labs continuously weighed alternatives, adjusted the plan, and revisited how best to integrate the numerous project elements into a singular strategy — all to maximize the impact of the development of Quayside on achieving the MIDP priority outcomes.

As a result of this deliberate process, Sidewalk Labs is confident that the build program, site plan, and development strategy proposed for Quayside serve as a realistic and comprehensive basis for Implementation Agreements. Sidewalk Labs expects that the plan, as with all development proposals, will evolve further as it advances through the design and approvals process.

## Objectives

The Quayside Plan would achieve the objectives set out in the RFP and the PDA: demonstrating replicable and scalable systems that enhance sustainability, increase affordability, and benefit the broader public. As a world-class sustainable, mixed-use, mixed-income development, the development of Quayside would serve as a powerful catalyst for inclusive economic growth across the eastern waterfront and beyond.



For more details on the Quayside development plan, as well as the innovations helping that plan achieve quality-of-life objectives, see the “Quayside Plan” chapter of Volume 1.

## Build program

The proposed Quayside development plan consists of 10 buildings on five sites comprising approximately 2.65 million square feet of developed space. This would include approximately 2,600 housing units, about half of which would be purpose-built rentals. The proposal also includes 40 percent of units at below-market rates (with 20 percent affordable housing units and 20 percent middle-income housing units). Non-residential uses, such as retail, office, and community uses, would account for roughly 33 percent of gross floor area, resulting in approximately 3,900 full-time permanent jobs and 12,000 Canadian construction jobs.

Notably, the 2.65 million square feet of developed space is less than the 3 million square feet of developable space allowed in the existing zoning bylaw.<sup>57</sup> Proposing a development with lower density and forgoing a request for greater density reduce the financial upside of the project. Sidewalk Labs nevertheless opted for lower density to advance several key objectives for the project, including expanding access to open and publicly accessible space; accommodating stoa and flexible spaces that require taller ceiling heights, thereby reducing total floors; and enabling sustainable tall timber construction, which may create limits on building heights in the 30- to 35-storey range. Sidewalk Labs will refine the Quayside plan as it prepares a Development Plan Application for Quayside after approval of the MIDP and may adjust the build program through this process.

## Building design

All Quayside buildings would be built with a system of mass timber construction to demonstrate the significant benefits to project speed and sustainability over traditional concrete and steel construction. This construction would incorporate other innovations that improve sustainability, accelerate construction speeds, and enhance building safety, including mist-based fire suppression, Shikkui plaster that is as fire-resistant as drywall but more environmentally friendly, and low-voltage energy systems.

Sidewalk Labs proposes to advance these efforts through a new economic develop-

ment project: with one or more partners, Sidewalk Labs would build a factory in Ontario to process mass timber building parts, create a library of building parts that could be combined in thousands of permutations to ensure design excellence while accelerating the design and procurement phases, and develop a digital management system that coordinates the entire supply chain from conception to completion. The design and fabrication approach also includes a series of components, such as flexible wall systems and hybrid building cores, intended to support a range of housing and unit types. As part of a holistic transaction and alongside local partners, Sidewalk Labs will catalyze an investment of up to \$80 million in this Ontario-based factory.

The combination of off-site prefabrication and use of mass timber is expected to reduce labour and materials costs versus traditional development by approximately 20 percent. It would also create meaningful value for developers by accelerating project timelines by approximately 35 percent and improving predictability in regard to schedule and cost for any given development.<sup>58</sup>

## Housing

The total residential gross floor area of the Quayside development would be approximately 1.78 million square feet, with approximately 2,600 residential units.


To help improve long-term affordability, roughly 980,000 square feet of residential space (more than 1,250 units) would be dedicated to purpose-built rentals. To address the affordable housing shortage confronting middle- and low-income Torontonians, Sidewalk Labs would offer 40 percent of housing units at below-market prices, with 20 percent of units dedicated to affordable housing and another 20 percent to below-market rentals for middle-income households. Roughly a quarter of the affordable housing units would meet the city definition of “deep affordability.”

To further expand affordable options for middle-income households, the plan would also apply a novel shared equity model for an estimated 125 units, allowing residents to purchase a share of equity in an apartment without a large down payment.

Sidewalk Labs would seek to establish a mixed-income community not only across the neighbourhood but also at the building level. The goal is to distribute affordable and below-market units throughout Quayside. Current plans have not yet finalized the specific distribution, which would be a component of the next phase of development planning.

The housing program would also address the shortage of family-size housing units. At least 1,000 units (40 percent of the total) would have two or more bedrooms. The residential plan also incorporates shared facilities for the benefit of the building community, including to assist families, children, and seniors.

## Employment

Sidewalk Labs would dedicate roughly 33 percent of total space in Quayside, approximately 870,000 square feet, to non-residential uses. This commitment seeks to promote economic development objectives and a mixed-development model, in which a variety of spaces would support employment, commercial, and community uses. Office or production spaces would make up 570,000 square feet of this space. These would accommodate a range of businesses, provide a sizable base of economic activity, and set the stage for significant economic generation within the larger eastern waterfront. Development of Quayside alone would create 3,900 direct jobs and 12,000 short-term construction jobs. 

## Ground-floor stoa

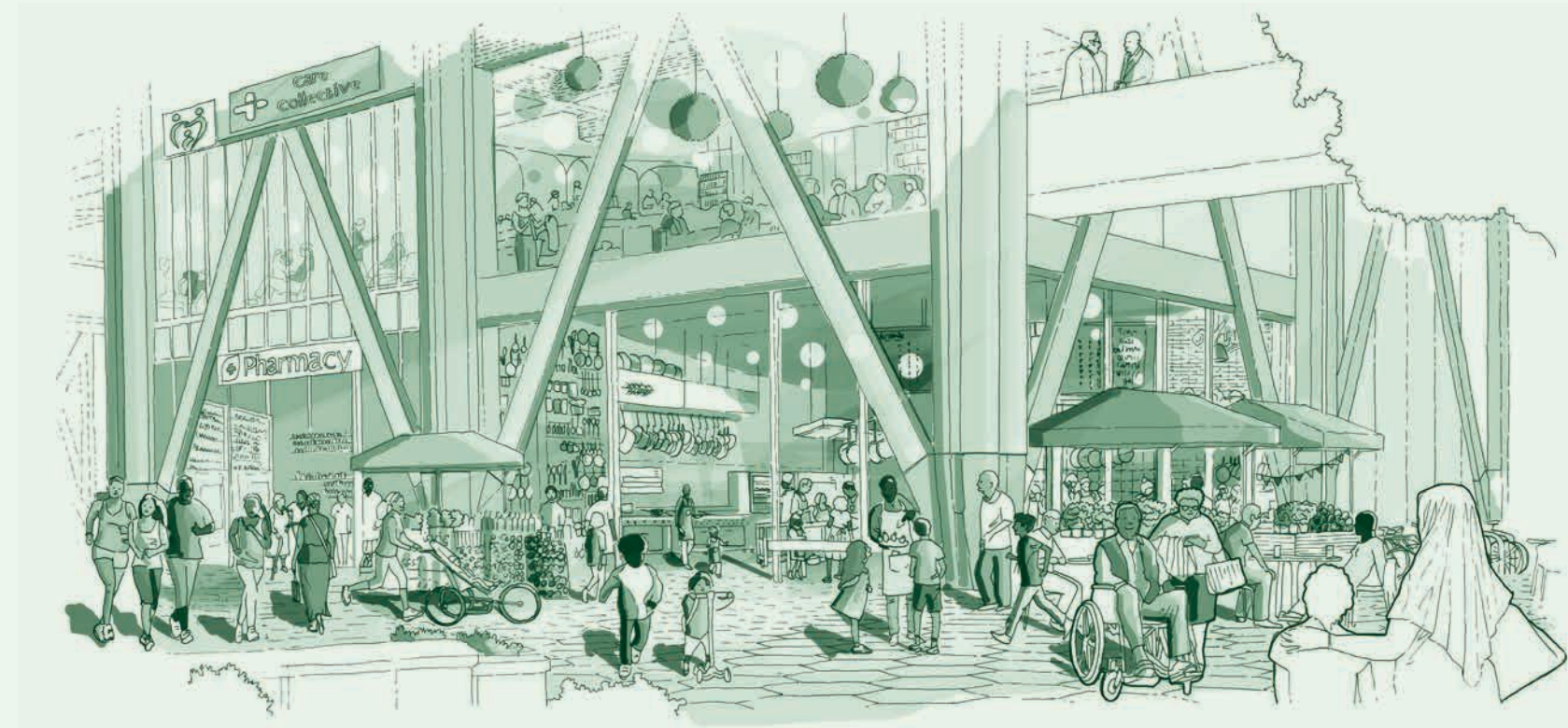
The Quayside program dedicates significant portions of the lower two floors of buildings to animated and publicly accessible uses, an approach dubbed “stoa” in tribute to the Ancient Greek structures that played a range of civic functions, acting as markets, art galleries, and teaching spaces. This modern stoa will foster a diverse urban ecosystem of traditional retailers, pop-ups, public markets, restaurants and cafés, light manufacturing and production facilities, and community gathering or service-delivery spaces. The stoa concept, which allows spaces to shift seamlessly between uses, would occupy 400,000 square feet in Quayside or 15 percent of the total development program.

At any given time, Sidewalk Labs anticipates that stoa space would accommodate retail (40–80 percent); other commercial uses (15–45 percent); schools, health clinics, and other forms of social infrastructure (5–10 percent); and production uses (1–5 percent).

As is typical, retail is expected to occupy at least half of Quayside’s ground-floor space. Flexible floor plates and reduced fit-out costs would allow for a mix of retailers of all sizes and ambitions. The stoa plan also incorporates production spaces for light manufacturing. An outcome-based building code system would ensure that such uses remain compatible with a mixed-use environment and are respectful of neighbours.

## Social Infrastructure

The Quayside plan would integrate space for social infrastructure from the start, creating opportunities for community organizations and local service providers to activate these spaces, strengthen the community, and help community members thrive. The Quayside plan allocates approximately 4 percent of floor space, or up to 100,000 square feet, to social infrastructure, including approximately 60,000 square feet for a co-located elementary school and daycare facility and 30,000 square feet of stoa spaces for evolving community uses. The plan allocates community space for health care and community service delivery alongside proactive health programming as well as for participation in civic and cultural activities and the development of digital skills. The Quayside Plan would also provide space for ongoing education programs, such as pop-up libraries and community mentorships.



The Quayside Plan would deliver on Waterfront Toronto’s priority outcomes, employing innovative strategies to enhance the quality of urban life.

## Public Realm

Sidewalk Labs’ proposal for Quayside includes roughly 4 hectares of public open space and a range of spaces designed to appeal to different user groups, from traditional parks, to reclaimed street space made possible by a series of street design changes, to new opportunities for enjoying Toronto’s lakefront. The public realm program includes four major anchors: Parliament Slip (6,000 square metres), Parliament Plaza (6,000 square metres), Queens Quay (7,500 square metres), and Silo Park (5,000 square metres).

## Supporting infrastructure

Sidewalk Labs’ proposal calls for the development of new advanced systems (see Page 114).

## Build program summary

The build program for Quayside deviates from the existing precinct plan, zoning bylaws, and a business as usual (BAU) development approach. In some cases this results from the development of a detailed plan. In most cases, this results from deliberate decisions to prioritize the shared objectives of Waterfront Toronto and Sidewalk Labs.

The table that follows summarizes these departures, with a description of the underlying rationale.

The Quayside program has been distributed across five development parcels, subject to further refinement through the approvals and implementation processes.



For more on jobs in Quayside, see the “Economic Development” chapter of Volume 1.

Fig. 2.2

# Quayside BAU and Sidewalk Labs comparison

Program Components	Business as Usual Quayside Approach	Sidewalk Labs' Quayside Plan	Rationale / Impact
<b>Buildings and Housing</b>			
Total Build Program	3.2M sq ft (GFA)	2.65M sq ft* (GFA)	The Quayside plan establishes a model for achieving Waterfront Toronto's priority outcomes and incorporating the approaches and advanced systems described in the MDP. A critical element of the plan is factory-built tall timber construction, which is more sustainable and speeds up construction times. Currently, a height limitation constrains the density achievable with tall timber.
Residential	2.7M sq ft of residential GFA; 20% Affordable Housing	1.8M sq ft of residential GFA; 20% Affordable Housing and 20% additional below-market housing	The Quayside plan creates a mixed-income community, offering 40 percent of housing units at below-market rates and outpacing recent development on the waterfront and downtown. To create a complete, mixed-use community, the Quayside plan reduces residential space to allow for more commercial, retail, and social infrastructure space.
Commercial	300K sq ft of commercial GFA	550K sq ft of commercial GFA	To catalyze economic development opportunities and create jobs, the Quayside plan nearly doubles the amount of commercial space to create a mixed-use environment and increase job creation. Quayside alone is projected to create 3,900 permanent full-time jobs.
Stoa (the lower two floors)	A BAU plan would not include stoa space type.	400K sq ft of stoa GFA includes retail, social infrastructure, and office	Sidewalk Labs' flexible stoa spaces are designed to accommodate retail, commercial, production, and social infrastructure uses, creating vibrant, adaptable public spaces and streets.
<b>Social Infrastructure</b>			
Social Infrastructure	A BAU build plan would not include social infrastructure.	90K sq ft of social infrastructure GFA	Quayside's proposed community spaces include the Care Collective, a space for the co-location of health care and community services, as well as the Civic Assembly, a hub for community, arts, and cultural gatherings, and for an elementary school. These spaces would exist near cultural and recreational areas to nurture the interactions that build relationships and forge a healthy, vibrant, and engaged community.
<b>Public Realm</b>			
Public Realm	Roughly 3.6 hectares of public open space	Roughly 4 hectares of public open space and a range of spaces designed to appeal to different user groups	Sidewalk Labs' Quayside plan features an expansive public realm designed to bring together residents, workers, and visitors of all ages and abilities and to remove traditional barriers between indoors and outdoors, public space and private space, and land and water.
<b>Digital Innovation</b>			
Digital Communications Network	Standard broadband services available in Toronto	Ubiquitous internet connectivity	Sidewalk Labs plans to catalyze digital innovations that help tackle urban challenges and establish a new standard for the responsible collection and use of data.

Program Components	Business as Usual Quayside Approach	Sidewalk Labs' Quayside Plan	Rationale / Impact
<b>Sustainability</b>			
Advanced Building Systems	Buildings account for roughly 60 percent of Toronto's greenhouse gas (GHG) emissions, primarily due to burning natural gas for heat and hot water.	Buildings feature ambitious energy-efficient construction, meeting Toronto Green Standard Tier 4 for GHG intensity.	To reduce greenhouse gas emissions and strive towards a climate-positive neighbourhood, Sidewalk Labs' plan: <ul style="list-style-type: none"> <li>Reduces buildings loads: heating, cooling, ventilation, and other systems needed for comfort</li> <li>Recycles every source of "waste" heating or cooling created in its own buildings</li> </ul>
Infrastructure Systems	Primary reliance on gas infrastructure	Thermal grid; advanced power grid using solar energy and battery storage; smart disposal chain; underground pneumatic tube system; active stormwater system	To reduce GHG emissions and strive towards a climate-positive neighbourhood, the plan: <ul style="list-style-type: none"> <li>Shifts from gas infrastructure to cleaner electricity and proposes to use new digital tools to help manage energy consumption</li> <li>Features a series of technological and policy advances to exceed Toronto's goals for landfill diversion and waste removal</li> </ul>
<b>Mobility</b>			
LRT	LRT is built through traditional public funding and financing, but construction does not begin until 2030 (or later).	Credit support accelerates financing for segments within the IDEA District, and construction begins in early 2020s.	LRT extension would connect residents to employment hubs, draw workers and visitors to the waterfront from all over the city, and enable greater density and growth in the eastern waterfront.
Parking	2,400 car spots on-site 3,169 short- and long-term bicycle spots	1,250 car spots (500 on-site below grade; 750 off-site) 3,778 short- and long-term bicycle spots	Sidewalk Labs designed a mobility approach that reduces the need to own a car by providing safe, convenient, connected, and affordable options for every trip. Limiting parking improves the quality of the pedestrian experience on the sites by freeing up potential space for plazas, sidewalks, and other public uses.
Roads	Challenges from congestion less safe for pedestrians/ cyclists	Mobility management system; dynamic curbs; adaptive traffic signals; "people first" street design	Sidewalk Labs' innovations would reduce traffic congestion and encourage shared trips, provide passenger loading zones during rush hour that could be used as public spaces in off-peak times, and prioritize pedestrians and cyclists.
Freight	Challenges from congestion and less convenient delivery	A neighbourhood freight "logistics hub" connected to an underground package delivery system	Sidewalk Labs' plan would dramatically reduce truck traffic on surface streets and improve convenience for residents and businesses.
Pedestrian / Cycle	Less accessible	Pedestrian / cycling network with wider sidewalks, heated bike lanes, and accessibility elements	Sidewalk Labs' plan would encourage walking and cycling and support people using wheelchairs or other assistive devices; Sidewalk Labs estimates that its street designs could provide 91 percent more pedestrian space than a business as usual scenario.

\* If Sidewalk Labs can increase the density in Quayside without impeding the innovation agenda, Sidewalk Labs may seek to utilize a greater share of the 3.2 million square feet allowable in the as-of-right zoning.



The Quayside Plan is designed to create a complete community that integrates space for social infrastructure from the start.

## Implementation

Sidewalk Labs proposes to enter into an agreement with Waterfront Toronto to acquire Quayside and undertake the design, financing, delivery, and operation of the Quayside development. Such an agreement would be memorialized in detailed Implementation Agreements between the parties following approval of the MIDP.

### Roles and responsibilities.

Sidewalk Labs proposes to serve as the lead developer of the vertical buildings in Quayside to prove the technical and economic market viability of the urban innovations core to achieving Waterfront Toronto's overall objectives. These objectives would require connecting the Quayside vertical development to advanced systems and integrating with them. To realize the innovation agenda and desired outcomes, Sidewalk Labs would need to invest disproportionately in the development and implementation of these systems.

To benefit from local knowledge, relationships, and expertise and to ensure that the Canadian development community can fully participate in and learn from the project, Sidewalk Labs

is committed to seeking one or more local development partners, working with the public administrator, and is also open to seeking outside equity capital.

Waterfront Toronto would perform a number of functions. Consistent with terms to be finalized in the Implementation Agreements, Waterfront Toronto would sell its Quayside land holdings to Sidewalk Labs. Waterfront Toronto, or the public administrator, would assist Sidewalk Labs in pursuing the necessary approvals, financial contributions, or other actions from the city or other orders of governments; would monitor the performance of Sidewalk Labs; and would fulfill the various governance roles incumbent upon it as the public administrator of the IDEA District.

In addition to potential real estate development partners, Sidewalk Labs anticipates entering into partnerships to facilitate the detailed design, construction, and management of specific elements of the Quayside plan. The inventory of partners ultimately engaged in implementing the Quayside plan is likely to include corporate entities, non-profit organizations, civic institutions, public sector entities.



The Supplemental Tables include a listing of the upfront planning and regulatory permissions needed to facilitate the project.

### Upfront permissions.

The Quayside plan incorporates new construction techniques, alternative approaches to curb design, utility tunnels under public rights of way, and a range of other proposed modifications to standard development approaches needed to carry out the MIDP and achieve Waterfront Toronto's priority outcomes. As is common with real estate development projects, particularly for large-scale projects such as the one proposed, Sidewalk Labs would require a number of regulatory and planning permissions to proceed and implement the proposed innovations.

The integrated strategy detailed in the MIDP — and the extent to which it relies on advanced systems and solutions that are new to Toronto — requires an added degree of certainty and predictability concerning the applicable rules and constraints. This certainty can be accomplished through upfront permissions that can be embodied in legislation, regulations, or contractual arrangements with government agencies or that can be secured through planning approvals.

A few examples of required upfront permissions include:

- Permission to construct tunnels under rights of way to enable the underground freight management system, the pneumatic waste system, and the thermal grid;
- Reductions in parking and loading zoning requirements as part of an overall plan to reduce traffic congestion and increase mobility options;
- Permission to put heating and LED lights into pavement to allow “green waves,” melt snow, and otherwise improve mobility; and
- Permission to apply certain innovative building techniques, including a flexible interior wall system that speeds up construction times and allows spaces to adapt quickly to a variety of uses.



See Chapter 5 for a more detailed description of the approvals process and timeline for the development of Quayside.

The expectation is that these upfront permissions — after being validated through the experience in Quayside and, later, in Villiers West — will inform and become standard for the IDEA District as a whole. Indeed, this is fundamental if the district is to implement the MIDP and achieve Waterfront Toronto's priority outcomes.

### Land-use approvals process and timeline.

Upon approval of the MIDP, Sidewalk Labs would prepare a detailed development plan, an infrastructure and transportation master plan, and a site remediation plan for Quayside, all subject to approval by Waterfront Toronto as spelled out in the Implementation Agreements. The development plan would reflect the revision of all elements of the development program, site plan, and business plan to provide sufficient detail to proceed with the relevant approvals processes, finalize financing, commence detailed design and construction, and inform occupancy strategies.

Sidewalk Labs anticipates that Waterfront Toronto would assess the Quayside plan to confirm that it meets the requirements of the IDEA District. Entitlements for the plan would require City Council approval and would otherwise proceed through the traditional development application processes. Sidewalk Labs estimates that construction on a portion of Quayside could commence as early as 2021 and that the entirety of Quayside could be completed by the end of 2026.



See Chapter 5 for additional details.



An overview of the role of third parties in advancing the innovation agenda and the development of Quayside can be found in Chapter 7.

## Economics



See Chapter 6 for the range of strategies Sidewalk Labs proposes to mitigate the risk of innovative solutions for governments and for Waterfront Toronto.

The Quayside plan is only feasible if all parties recognize that the risk profile associated with forging new development models and proving the effectiveness and financial viability of innovative solutions is fundamentally different from that of a market standard project. This is precisely the obstacle that limits meaningful innovation in the urban environment. Sidewalk Labs' proposal offers a roadmap for overcoming this obstacle, while ensuring that the interests of Sidewalk Labs and the public sector remain aligned as the project progresses.

Sidewalk Labs is prepared to work with partners, lenders, and other market participants to finance the development of Quayside. This requires a willingness to pursue a new but worthy development model and to delay the realization of financial upside. Second, Sidewalk Labs is prepared to bear the cost of the research and development embedded in the Quayside development program.

Under terms to be detailed in the Implementation Agreements, Sidewalk Labs and its local development partners would be responsible for funding — including through borrowing — the development of Quayside at an estimated total cost of approximately \$2 billion. This total cost reflects the higher-than-market costs of the innovation agenda at Quayside, such as higher build costs to prove a new model of advanced timber construction, higher soft costs to integrate innovations like Shikkui plaster and digital electricity into a single building design for the first time and obtain the necessary approvals, and extra investment to make ground-floor spaces flexible to enable more community uses and diversity of retail spaces. It also results in a program with greater-than-standard revenue risk because features such as residential units with less parking and more buildings that combine both residential and commercial uses could contribute to lower condo prices.

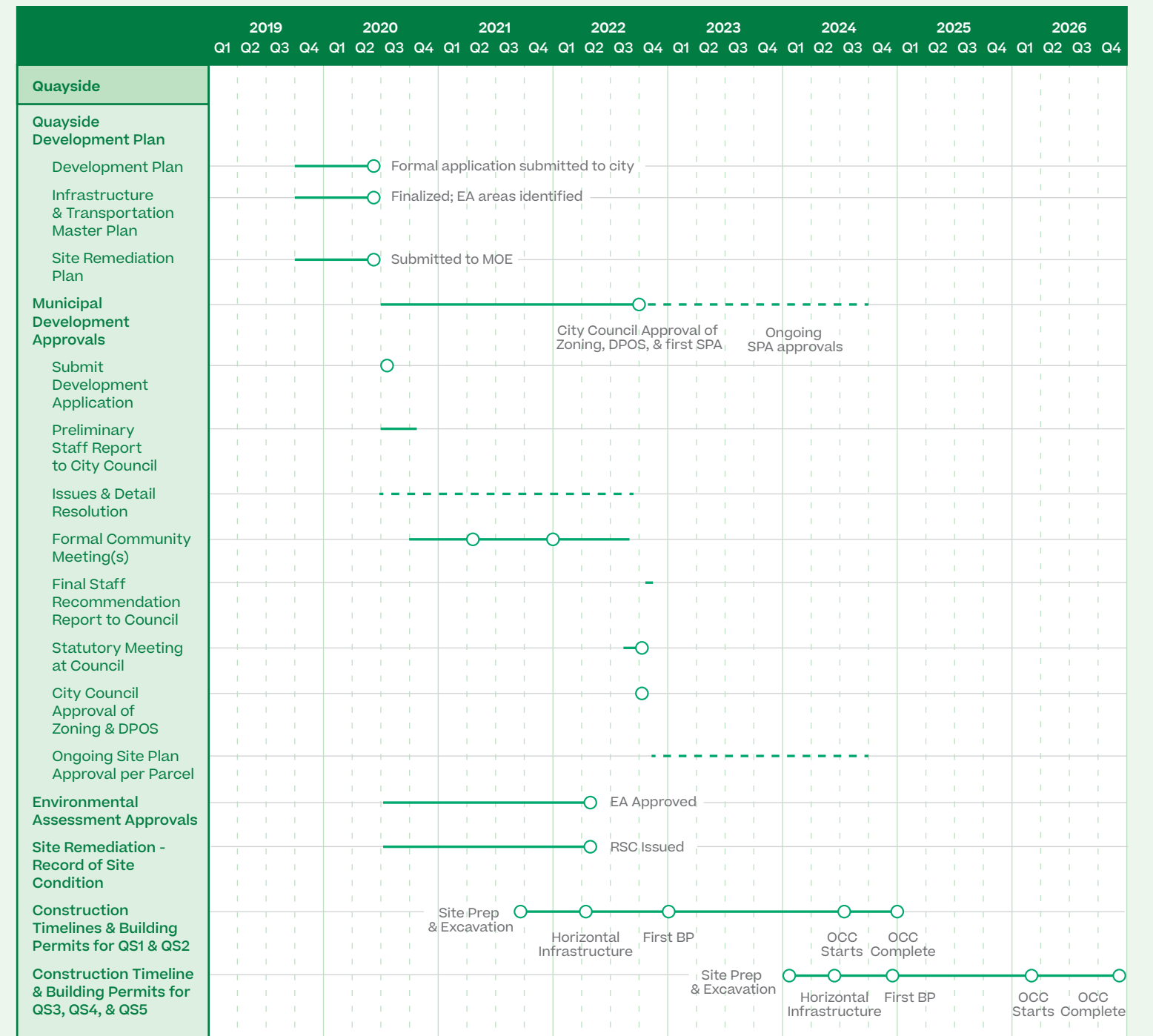
The innovation agenda proposed in Quayside is designed to deliver on Waterfront Toronto's programmatic priorities. Scale is necessary for many of the innovations initiated in Quayside to become financially viable and to maximize their ability to help achieve Waterfront Toronto's priority outcomes around economic opportunity, new mobility, housing affordability, sustainability, and urban innovation, which is why the Quayside development in isolation (without the Villiers West development and other project elements) is not likely to achieve market-rate returns.

In taking responsibility for delivering this program, Sidewalk Labs and its local partners would take the traditional risks and receive the traditional revenue streams associated with a real estate project, including rental income, unit and asset sales, developer fees, and income from capital events.

In transacting for the Quayside properties, Sidewalk Labs would propose to pay Waterfront Toronto a price that places the cost and risk of the innovation agenda on Sidewalk Labs, while recognizing that Waterfront Toronto would receive some of the value for its land in a direct payment and some by achieving the policy objectives it laid out in the Quayside RFP and prior precinct planning.

Fig. 2.3

## Quayside detailed timeline



DPOS = Draft Plan of Subdivision; MOE = Ministry of Environment; EA = Environmental Assessment; RSC = Record of Site Condition; BP = Building Permit; OCC = Occupancy; SPA = Site Plan Approval; see Volume 1 for details on Quayside sites 1 through 5.

# Villiers West urban innovation campus

In 2012, Waterfront Toronto and all three levels of government jointly began the Port Lands Acceleration Initiative, one of the most ambitious urban infrastructure improvement projects in decades: a long-term flood protection plan that would renaturalize the mouth of the Don River.<sup>59</sup> The completion of the project will protect large swaths of the Port Lands from flood risk, create a more naturalized and resilient environment, and transform a portion of the Port Lands into Villiers Island, a distinct development area.

The Port Lands Planning Framework calls for developing Villiers Island as a “destination or catalytic use that would spawn and support regeneration efforts and bring people to the Island in early stages of its development.”<sup>60</sup> The Villiers Island Precinct Plan expanded on this vision and called for a catalytic use of Villiers Island to reinforce its potential as a regional destination.<sup>61</sup> Sidewalk Labs assessed numerous sites for a new economic hub and concluded that the western end of Villiers Island was ideal in several respects. Most importantly, it can accommodate the scale and footprint required for a mixed-use community centred around a new catalytic use: an urban innovation campus.

Sidewalk Labs proposes to build the Villiers West Urban Innovation Campus, which would extend the innovations begun at Quayside and co-locate a series of economic development assets, including a new Canadian headquarters for Google and the Urban Innovation Institute, a new applied research institution. The proposal would represent the first phase of implementation of the River District concept plan described in Volume 1. By increasing density throughout Villiers West and supporting a wider mix of uses and spaces, Sidewalk

Labs would further prove out the solutions pioneered at Quayside and spur economic activity on the waterfront. Rather than serving solely as new live-work communities, Villiers West would function as an extension of the city — serving as an expanded downtown area and building on the work of Waterfront Toronto and governments to drive economic activity eastward along the waterfront.

Upon completion of the Don River Naturalization work, the government would need to combine the parcels proposed for the new campus with parcels owned by the City of Toronto and Ports Toronto. To enable the creation of these new economic development assets and realize the catalytic potential of Villiers West sooner, Sidewalk Labs proposes to execute a land transaction to vertically develop the area, with development partners.

## Objectives

Under the proposed development plan, Sidewalk Labs would serve as an economic catalyst — accelerating the development of Villiers Island.<sup>62</sup> By advancing this proposal, Sidewalk Labs would integrate Villiers West into the innovative urban plan started in Quayside, advancing the objectives of the RFP into the River District and creating jobs and employment opportunities in the Port Lands. The Villiers West proposal would create an ecosystem of growth and employment-generating activity at Villiers West, with the potential to spark similar growth at broader scales. Without the addition of the urban innovation campus on Villiers Island, establishing the IDEA District as a vibrant centre of commerce is unlikely.



Map  
**Villiers West**

- IDEA District
- River District

Fig. 2.4

## Villiers West proposed program mix

Total GFA	Residential (GFA)	Commercial (GFA)	Retail (GFA)	Social Infrastructure
2,750,000 sq ft	1,150,000 sq ft	1,400,000 sq ft	150,000 sq ft	50,000 sq ft
(100%)	(42%)	(51%)	(5%)	(2%)

### Build program

Villiers West is a 7.8-hectare parcel of publicly owned land, representing approximately a third of the development area of the Villiers Island Precinct Plan. Consisting of six new sites, Villiers West would straddle the new Cherry Street alignment and would be served by the proposed LRT extension. The parcels are currently bounded by Promontory Park to the west and south, the Keating Channel to the north, and new mixed-use development parcels to the east.

The table above outlines the initial proposed program mix across the six blocks in Villiers West, which plans for 1.6 million square feet of employment-generating activity within a total development of 2.75 million square feet. Intended to advance the program begun at Quayside, the mix would continue to develop as Sidewalk Labs and Waterfront Toronto advance the project post-approval of the MIDP.

The build plan for Villiers West — less developed than the detailed plan for Quayside, which would be built first — centres on three core components: a new Canadian headquarters for Google; the Urban Innovation Institute, a new non-profit academic institution; and a network of mixed-use surrounding spaces. Together, these components would form the Villiers West urban innovation campus.

This plan reflects Sidewalk Labs’ early thinking about the design of Villiers West and how its design would integrate a connected, publicly accessible campus and economic hub with the surrounding parks and neighbourhoods.

It would likewise advance new approaches to housing, mobility, and public realm, including those spelled out in the MIDP. The expectation is to refine and further develop the plan with stakeholders through a collaborative process similar to the approach taken for Quayside.

### Building design

As with Quayside, all the buildings in Villiers West would be built with mass timber to further demonstrate the benefits of the construction approach for reducing project costs, including by speeding up project timelines and increasing sustainability. This construction would be paired with other innovations first proven at Quayside, including mist-based fire suppression, environmentally friendly Shikkui plaster, and low-voltage energy systems.

The Villiers West project, together with the development of Quayside, would establish a mass timber pipeline sufficient to justify an Ontario wood construction factory. As part of a holistic transaction and alongside local partners, Sidewalk Labs would catalyze an investment of up to \$80 million in this Ontario-based factory as an important new economic development project. As noted in the Quayside plan, the combination of off-site prefabrication and use of mass timber is expected to reduce labour and materials costs versus traditional development by approximately 20 percent. It will also create meaningful value for developers by accelerating project timelines by approximately 35 percent and improving predictability in regard to schedule and cost for any given development.

## Google’s Canadian headquarters

As part of an agreed-upon transaction within the IDEA District, Alphabet commits to establish a new Canadian headquarters for Google on the western edge of Villiers Island. Alphabet would target up to 500,000 square feet, which would be sufficient to accommodate as many as 2,500 jobs, the majority of which would be for Google employees (though actual hiring will depend on market conditions and business requirements). The Google headquarters would be situated within a connected, mixed-use public campus of approximately 2 million square feet. Adjacent to a planned LRT stop and Promontory Park, the new headquarters would serve as an anchor, drawing talent and companies to Villiers West to support a new business and innovation campus at the waterfront.

Following the successful approach taken in other cities where the company operates, the Google Canadian headquarters would be integrated into a connected campus with spaces for other businesses, cultural space, retail, and community uses. Areas designated as Google workspaces would be complemented with flexible areas designed to support a range of community uses and flexible enough to accommodate changing uses over time. Overall, this campus would include about 1.5 million square feet of commercial space.

## Urban Innovation Institute

As a second economic engine for Villiers West and the broader eastern waterfront, Sidewalk Labs would provide physical space and \$10 million in initial seed funding for a new, cross-disciplinary Urban Innovation Institute. Bringing together urbanists and technologists, the new academic institution would serve as a focal point for a new urban innovation cluster.

The Institute is envisioned as an independent, non-profit organization located within the innovation campus. Sidewalk Labs envisions that local academic institutions would collaborate in the design and implementation of the Urban Innovation Institute, which would serve as a centre for applied research, policy development, and skills training.

## Employment: A campus for urban innovation

In Villiers West, Sidewalk Labs would allocate nearly 60 percent of the total development program (approximately 1.6 million square feet) to non-residential uses. Departing from the existing precinct plan, this approach would enable more complete and widespread mixed-use planning, capable of supporting a wider range of businesses and employment opportunities, including more commercial, retail, and community space.

Specifically, the Villiers West urban innovation campus would form a cluster for businesses and industries working on ideas and exploring technologies to improve the quality of urban life, co-locating resources, expertise, and physical scale to support economic growth and drive advancements in the emerging field. This mirrors the approach taken with the MaRS Discovery District for medical advancement.<sup>63</sup>

The Villiers West urban innovation campus would attract a range of design and technology-oriented tenants. The development could also potentially include any of the visionary and iconic educational, cultural, or institutional projects that have been identified by the City of Toronto, Waterfront Toronto, and others as appropriate for this location. There is no requirement or expectation that additional tenants have any connection to Google or Alphabet.

## Ground-floor stoa

Together, the new Google Canadian headquarters and Urban Innovation Institute would occupy less than 50 percent of built space at Villiers West. To enable a connected, active campus surrounding these two anchors, the Villiers West program allocates a significant portion of the lower two floors of buildings to widespread application of the stoa space typology. The large-scale application of Sidewalk Labs’ adaptable “Loft” spaces, interior wall systems, and ground-floor stoa spaces would create a dynamic and flexible network to support a wider range of uses, allowing an amenity-rich environment for all who live and work in Villiers West.

### Key Term

## Loft spaces

(found on upper floors) are designed with flexible floor plates to accommodate a range of residential and non-residential uses.



Ground-floor stoa spaces would integrate community and cultural facilities alongside commercial and retail space instead of isolating them in separate, standalone structures. Co-location of different experiences and space types would enable businesses and entrepreneurs of all sizes to find the necessary resources and spaces for their work. Retailers would benefit from new foot traffic and a customer base drawn from the commercial real estate throughout the neighbourhood. Rather than developing Villiers West as a primarily residential area, the mixed-use development would create an area active throughout the week and is flexible enough to adapt to meet the changing needs of the community over time.

## Housing

The economic success of the innovation campus would depend, in part, on developing a residential base in close proximity, such that businesses locating in Villiers West can readily access their labour force. Villiers West has the potential to support thousands of new housing units — designed to support a mixed-income community — interlaced with retail, social infrastructure, and cultural spaces, which would draw new residents and businesses seeking a high quality of life for their employees. While the Villiers Island Precinct Plan calls for a primarily residential

community at Villiers West (80 percent residential across the full precinct), Sidewalk Labs' proposal would dedicate 42 percent of its total program on Villiers West to residential uses as part of a more diverse mixed-use plan.

Sidewalk Labs would deliver the same 40 percent below-market housing program for residential units in Villiers West (with 20 percent affordable housing units and 20 percent middle-income housing units). Of the 1,700 projected residential units, approximately 700 would be offered as below-market housing.<sup>64</sup>

## Social Infrastructure

Like Sidewalk Labs' proposed development plan for Quayside, the proposal for Villiers West incorporates a range of social infrastructure uses from the onset, totalling approximately 2 percent of the total build plan.<sup>65</sup> While Sidewalk Labs expects the programming for many of these spaces would be devised with local partners and service providers following approval of the MIDP, Sidewalk Labs envisions setting aside stoa space specifically for public programs, such as a workforce training centre. Social infrastructure spaces and programming at Villiers West would also benefit from the adjacent Promontory Park, which Waterfront Toronto is developing as a resource for all Torontonians, especially families with children.

## Mobility

As part of the first phase of development, Villiers West would serve as a physical and economic bridge connecting the waterfront to the rest of the city. The development plan proposed for Villiers West includes a series of new connections to make it easier to access the waterfront by foot, bike, or public transit. Within Villiers West, a network of internal streets designed to prioritize the pedestrian would support a more walkable, multimodal mobility system.

Creating connectivity to Villiers West begins with a new centrally located LRT stop, which follows from the waterfront LRT extension. Two new bridges — one dedicated to pedestrians and a second created as part of an extensive bike network — would connect Quayside directly to Villiers West, further improving access and creating a safer system for all modes of transit.

Through the centre of the site, Sidewalk Labs has proposed a wide public walkway to the west of New Cherry Street, lined with commercial activity. This street would connect the residential community to the east with the public parks to the west. Sidewalk Labs proposes a one-way “shared streets” path with pick-up and drop-off areas instead of parking, which would also improve safety by decreasing the number of crossings between different modes of transit.

## Public Realm and adaptive reuse of heritage structures

Existing planning documents for Villiers Island include a 16-hectare park that would curve around the southern edge of the island, connecting to Promontory Park — a dynamic public space located along the western edge of the island.<sup>66</sup> Sidewalk Labs' development plan for Villiers West prioritizes connections to the park through an expanded public realm and street design that maximizes walkways and bike paths throughout the island.

In addition to creating a connected, mixed-use campus at Villiers West, Sidewalk Labs is proposing a new vision for Keating Channel, which today is lined with industrial buildings, including a number of designated heritage sites. Sidewalk Labs imagines Keating Channel as a dynamic new zone — a water-focused spine programmed with art and cultural uses, restaurants, and production spaces — and envisions Villiers West as a core hinge designed to enable physical and programmatic connections from Quayside through Villiers West to the 6-hectare neighbourhood at Keating Channel.

## Build program summary

The build program for Villiers West deviates from the existing precinct plan and a business as usual development approach, due in large part to deliberate decisions to reflect Waterfront Toronto and Sidewalk Labs' shared objectives for the site and for the future potential of the waterfront.

The following table summarizes these departures with a description of the underlying rationale.

The Villiers West plan is designed to spur an urban innovation cluster, anchored by a new Google Canadian headquarters and an Urban Innovation Institute.



Fig. 2.5

## Villiers West BAU and Sidewalk Labs comparison

Program Components	Business as Usual Villiers West Approach	Sidewalk Labs' Villiers West Plan	Rationale / Impact
<b>Buildings and Housing</b>			
Total Build Program	2.46M sq ft (GFA)	2.71M sq ft (GFA)	The Villiers West plan furthers the model for achieving Waterfront Toronto's priority outcomes, incorporating the approaches and advanced systems described in the MIDP. This includes the use of mass timber to improve sustainability and lower costs, including by speeding up construction timelines. Additionally, this neighbourhood will be home to a new urban innovation campus, including a Google Canadian headquarters and the Urban Innovation Institute.
Residential	1.97M sq ft of residential GFA; 20% Affordable Housing	1.15M sq ft of residential GFA; 20% Affordable Housing and 20% additional below-market housing	Similar to Sidewalk Labs' Quayside plan, Villiers West will create a mixed-income community, offering 40 percent of housing units at below-market rates. In total, this plan will create a neighbourhood that will be home to 2,700 residents.
Commercial	380K sq ft of commercial GFA	1.39M sq ft of commercial GFA	The Sidewalk Labs' Villiers West plan more than triples the amount of space devoted to commercial compared to business as usual. This space will be the foundational anchor of the IDEA District's economic development, home to a new Google Canadian headquarters and an Urban Innovation Institute, core components of an overall innovation campus within the neighbourhood.
Stoa	A BAU plan would not include the stoa space type.	290K sq ft of stoa GFA includes retail, social infrastructure, and office	Sidewalk Labs' flexible stoa spaces (found on the lower two floors) are designed to accommodate retail, commercial, production, and social infrastructure uses, creating vibrant, adaptable public spaces and streets.
<b>Social Infrastructure</b>			
Social Infrastructure	30K sq ft of social infrastructure GFA	50K sq ft of social infrastructure GFA	Totalling approximately 2 percent of the total build plan, the proposal for Villiers West incorporates space for a range of social infrastructure uses. While programming for these spaces would be devised with local partners and service providers, Sidewalk Labs envisions setting aside stoa space specifically for public programs, such as a workforce training centre.
<b>Public Realm</b>			
Public Realm	N/A	To be planned	Existing Villiers Island plans include a 16-hectare park curving around the southern edge of the Island and connecting to Promontory Park. The plan for Villiers West, which would be advanced through a public engagement process, will prioritize connections to the park through expanded public realm and street design that maximizes walkways and bike paths.

## Implementation

Sidewalk Labs proposes to enter into an agreement with Waterfront Toronto and the City of Toronto for the acquisition of the Villiers West parcels in order to undertake the planning and design, construction, operation, and financing of the project. Although Villiers West was not specifically identified in the RFP, the city's 2006 MOU with Waterfront Toronto contemplates circumstances such as this one where an important economic development opportunity arises outside of the context of a traditional request for proposal.<sup>67</sup> In such circumstances, including where a business seeks to move to or establish operations in Toronto, the MOU provides that "flexibility is required." This reasonably applies to the proposed transaction, which would deliver a major economic development project, bringing a new Google Canadian headquarters and a new applied research institution to Toronto.

### Roles and responsibilities.

Sidewalk Labs would serve as the lead developer for the Villiers West project, with responsibility for the horizontal infrastructure and vertical development, to ensure the delivery of the Google facility consistent with the company's expectations and specifications; execution of the project's economic development objectives; and the continuation of the systems, techniques, and innovations initiated in Quayside. Sidewalk Labs would seek to implement the project in collaboration with local development partners.

Upon approval of the MIDP and the relevant Implementation Agreements, Sidewalk Labs would lead a collaborative planning process with Waterfront Toronto, the City of Toronto, Google, and other stakeholders to further advance the creation of a detailed development plan for the campus. This would include further development of the build program, site planning, and design requirements.

Sidewalk Labs would also solicit institutions interested in co-locating with the Urban Innovation Institute and other tenants. Sidewalk Labs is committed to engaging local development partners in the project and, working with Waterfront Toronto, would solicit appropriate partners. Waterfront Toronto would collaborate with Sidewalk Labs in completing the development plan so that it can serve as the basis for approvals and advance the achievement of the IDEA District goals. Waterfront Toronto would also work with the City of Toronto and, if appropriate, Ports Toronto to facilitate the land assemblage (combination of parcels) and to determine the optimal transactional construct.

### Approvals process and timeline.

Sidewalk Labs is proposing that the approvals process for projects within Phase 2 of the IDEA District follow the Community Planning Permit process that the city is developing. Where precinct planning is complete, the administrator may allow for a development application to proceed ahead of the adoption of an implementing bylaw. Sidewalk Labs proposes that the Villiers West proposal proceed through a standard rezoning if it precedes the adoption of a Community Planning Permit Bylaw (CPPB) for Villiers Island. Should a CPPB be in place ahead of a development application, then Villiers West would proceed through that process.

As depicted on the timeline on the following spread, based on current estimates, the development application process for Villiers West would commence in 2022 with approvals by 2024 and occupancy anticipated by 2027.



# Advanced systems

Waterfront Toronto's RFP for an Innovation and Funding Partner identified significant sustainability, urban innovation, and mobility objectives that are only achievable through the development of advanced systems capable of outperforming business as usual approaches and traditional systems.<sup>69</sup> To date, no other comprehensive, large-scale project has integrated all these components. Their combined effect would be dramatic, enabling the IDEA District to materially improve mobility, deliver ubiquitous internet connectivity to residents and workers, and advance outsized sustainability objectives, including the establishment of a climate-positive community.

Sidewalk Labs proposes to serve as lead developer of a range of advanced systems for Quayside and Villiers West. These systems are essential to achieving Waterfront Toronto's priority outcomes, to delivering the innovative real estate model called for in the MIDP, and to proving the practical and financial viability of these advanced systems in the broader marketplace.

The success or failure of the vertical real estate development at Quayside and Villiers West is inextricably tied to the availability and effectiveness of these advanced systems, some of which are not available on the market. For example, the ability to achieve more than incremental reductions in GHG emissions in Quayside requires an advanced power grid, a thermal grid, mobility improvements, and a host of building-specific innovations — all working together.

Given the critical importance of these systems, Sidewalk Labs would play a hands-on role in the early stages of their development and operation. It would prepare designs,

identify or partner with operators, and refine and stabilize the operations to achieve efficiency and deliver the promised performance outcomes. This section is intended to describe the role that Sidewalk Labs would play as the lead developer of advanced systems to best manage the pursuit of innovation and create a platform for expansion across the broader IDEA District.

## Objectives

The advanced systems proposed are necessary to achieving the Waterfront Toronto objectives for the IDEA District. Advanced systems would also allow the city and province to advance other policy goals, including those set forth in TransformTO, TOcore, Resilient City, the Toronto Green Standard, and the New Toronto Official Plan.

Developing these advanced systems for a neighbourhood offers several specific benefits:

→ **Neighbourhoods are small enough to innovate yet big enough to leverage meaningful investment and cost savings from scale.** For example, the waste management system at Quayside has a large enough user base to justify the investment in the neighbourhood collection facility, as well as centralized operation, which will ultimately yield a more cost effective and less disruptive way to remove waste from the site while improving diversion rates.

→ **Project-based standards tailored to district performance allow for systems that**

**apply the most effective technologies for the site characteristics.** For example, the advanced power grid allows for each neighbourhood to develop the appropriate balance of generation and storage depending on the load profile relative to varying uses and generation potential relative to available rooftop space and shading.

→ **Operating sustainability systems at a neighbourhood or district scale rather than applying them to an individual building creates efficiencies and space savings by balancing peak demands across the system.** For example, because thermal demand for specific uses varies at different times of day, a district thermal grid improves efficiency by transferring energy between buildings based on their localized needs.

→ **Layering complementary systems in a single geography enables cross-platform efficiencies that amplify the overall benefit.** For example, energy efficiency can be optimized by coordinating the activities and combining the controls for electricity (the advanced power grid) and heating (the thermal grid).

→ **Integrating horizontal infrastructure systems, municipal and advanced, allows for coordinated design, cost-effective construction, and the ability to establish a comprehensive district-wide operational governance structure.** Integrating advanced systems into the design approach — particularly for infrastructure in the public right of way, such as dynamic streets — facilitates coordination and reduces the potential for space conflicts during installation that occur where advanced systems are treated as add-ons.

→ **Isolating systems at a neighbourhood scale enhances resiliency.** For example, the district-level stormwater management system offers a holistic upstream approach that reduces stress on downstream treatment facilities during significant rainfall events, while expanding local green spaces.

## Program

The MIDP proposes advanced sustainability systems (including an advanced power grid, a thermal grid, a waste management system, and a stormwater management system), advanced mobility systems (a freight management system, dynamic streets, district parking management, and mobility subscription package), and an advanced digital communications network (see table on Page 92).

The advanced sustainability systems, the freight management system, and the digital communications network would be operated by private companies, except where Toronto Hydro is involved with the operation of the advanced power grid. The advanced mobility systems would be operated by the WTMA. Dynamic streets, the only advanced system that replaces publicly operated municipal infrastructure, would be owned by the city as a public right of way.

All of the other systems are traditionally private services and represent novel approaches.

The advanced systems would deliver a range of sustainability and mobility benefits and direct quality of life benefits to residents, workers, and visitors to the district, including those listed in the table on Page 111.

The set of systems proposed for the IDEA District, which is described in the following table, is designed to enable a wide range of developers to participate in the future while ensuring the long-term sustainability of the waterfront. To ensure a high degree of flexibility, Sidewalk Labs intends to evaluate alternative approaches — to expand opportunities for a wide range of service providers and facilitate easy, inexpensive maintenance and upgrading of systems. Sidewalk Labs is specifically considering models that would encourage service providers of all sizes to access shared building space, with easy access to complementary systems and to users.

Fig. 2.7

## Descriptions and benefits of advanced systems

System	MIDP Goals	Existing Service	Description
<b>Advanced Power Grid</b>	Climate-positive	Private	An advancement to the typical Toronto Hydro electric service, which incorporates rooftop photovoltaic generation, battery storage, possible electric vehicle charging stations and islanding capabilities, and behind-the-meter demand management capabilities utilizing hardware, software, and dynamic real-time rates.
<b>Thermal Grid</b>	Climate-positive	Private	A thermal energy grid at either the neighbourhood or building scale that could incorporate geothermal heat exchange, building heat recovery, sewage heat recovery, and other clean energy sources.
<b>Waste Management</b>	Improved waste diversion and reduced impact	None	A pneumatic waste collection system with dynamic pay-as-you-throw rate structure managed through a user interface at the chute and downstream monitoring of contamination that helps improve waste separation habits.
<b>Stormwater Management</b>	Enhanced performance and green infrastructure	None	A district scale management of stormwater through green infrastructure that uses continuous monitoring and active controls to reduce the infrastructure needs of individual buildings and enhance performance in the public realm.
<b>Freight Management</b>	Reduced impact and climate-positive development	Private	A freight delivery system allowing Quayside buildings to rely on a single on-site urban consolidation centre (UCC) for receiving most kinds of deliveries. Deliveries would be sorted at the UCC using both labour and machines and delivered to residents and on-site businesses using self-driving delivery dollies travelling through tunnels. The freight system would also offer an on-site storage service and transport recyclable cardboard to the UCC for outbound pickup.
<b>Dynamic Street Infrastructure</b>	Enhanced mobility	Public	Innovative hex paving, dynamic lighting and signage, heated pavements for snow melt, and digital infrastructure for traffic management.
<b>District Parking Management</b>	Enhanced mobility	Private	A system offering space-efficient parking both on-site and off-site using equipment allowing high-density parking, attendant-based retrieval of vehicles, and electric-vehicle charging.
<b>Mobility Subscription Package</b>	Enhanced mobility	Private	A specialized, app-enabled mobility service bundle spanning public transit, ride-hail, parking, shared services, and micro-mobility programs.
<b>Digital Communications Network</b>	Ubiquitous connectivity	Private	A robust, fibre-optic internet network using Super-PON technology that would support ubiquitous connectivity throughout the project area.

Note: Certain systems may require a strategic partnership due to existing jurisdictional authority, regulatory considerations, or availability of service in the Project Area, such as Toronto Hydro on the advanced power grid.

System	Benefits
<b>Advanced Power Grid</b>	<ul style="list-style-type: none"> <li>↳ Two points of connection to Toronto Hydro distribution grid and ability to island for resiliency</li> <li>↳ Demand management incorporating photovoltaic generation and battery storage and dynamic hourly rates to reduce peak demand and GHG emissions</li> <li>↳ Possible electric-vehicle charging</li> </ul>
<b>Thermal Grid</b>	<ul style="list-style-type: none"> <li>↳ Fully electrified district hot water, heating, and cooling through a thermal grid using geothermal energy and other clean energy resources to reduce GHG emissions</li> </ul>
<b>Waste Management</b>	<ul style="list-style-type: none"> <li>↳ Innovation provides user feedback to improve diversion and limit waste contamination</li> <li>↳ Efficiencies gained and local traffic and vehicle emissions reduced through centralized collection</li> </ul>
<b>Stormwater Management</b>	<ul style="list-style-type: none"> <li>↳ Reduced stormwater discharge to municipal infrastructure systems</li> <li>↳ Efficiencies gained by operating at a district scale</li> <li>↳ Enhanced greenscape benefits in public realm</li> </ul>
<b>Freight Management</b>	<ul style="list-style-type: none"> <li>↳ Fewer truck trips reduce GHG footprint, congestion, and air pollution</li> <li>↳ Fewer loading docks enable provision of pedways between buildings</li> <li>↳ Dramatic reduction in delivery trucks parking and double-parking on the streets enables more space for sidewalks and other uses</li> </ul>
<b>Dynamic Street Infrastructure</b>	<ul style="list-style-type: none"> <li>↳ Reduced congestion and travel times, safer streets, and more public space for public realm</li> </ul>
<b>District Parking Management</b>	<ul style="list-style-type: none"> <li>↳ Eliminates incentive for residents to use personal vehicles when more sustainable alternatives are equally attractive</li> <li>↳ Allows parking rates for those who must own a car to be lower by using off-site land</li> </ul>
<b>Mobility Subscription Package</b>	<ul style="list-style-type: none"> <li>↳ Enables residents and on-site employees to make better use of mobility options other than the private vehicle by bundling options ranging from public transit, to shared bikes, to hailed rides in ways that encourage the optimal choice for each trip</li> </ul>
<b>Digital Communications Network</b>	<ul style="list-style-type: none"> <li>↳ High-performance internet network based on Super-PON standard enables flexible operation of advanced technologies and supports multiple carriers</li> </ul>

## Implementation

Following a determination by Waterfront Toronto to proceed with the approach in the MIDP, Waterfront Toronto would enter into detailed Implementation Agreements with Sidewalk Labs to serve as lead developer of the advanced systems proposed for Quayside and Villiers West. This approach mirrors similar agreements Waterfront Toronto has entered with other system developers, including its broadband internet partner. Pursuant to the agreement, Sidewalk Labs would design, construct, procure, and stabilize the operations of the advanced systems. The Implementation Agreements would incorporate various terms and conditions, including specific performance requirements, user-rate constraints, and a requirement of adequate security.

### Roles and responsibilities.

Sidewalk Labs proposes to serve as the lead developer of the advanced systems in Quayside and Villiers West to prove the technical and economic market viability of the urban innovations core to achieving Waterfront Toronto's overall objectives. The success of vertical development in Quayside and Villiers West also depends on the systems existing and performing up to expectations. These objectives would require connecting the developments to and integrating with advanced systems.

With the exception of the digital communications network (which would be implemented directly by Waterfront Toronto's broadband internet partner with Sidewalk Labs' technical advisory support), Sidewalk Labs would be responsible for the following implementation framework for all of the advanced systems, including:

- **Preparing preliminary designs** supplemental to the ITMP to be used as bridging documents in the form of plans and specifications issued during the procurement of operators for certain systems
- **Managing the procurement process** and selecting operators based on their merits, including qualifications, rate structure, strength of financing, and cost

→ **Providing design and construction oversight**

→ **Working with operators** to ensure the systems meet the IDEA District objectives

→ **Working alongside the public administrator** to ensure that operators maintain an acceptable level of performance

Wherever practical, Sidewalk Labs would seek to utilize third-party partners and products to develop the advanced systems.

Acting through the Waterfront Transportation Management Association and the Waterfront Sustainability Association, the public administrator would manage and oversee the advanced systems, including by monitoring operator compliance with their master service agreements on performance, rates, and other key obligations.

### Procurement.

The Implementation Agreements would provide Sidewalk Labs with the flexibility to procure operators that, in its judgment, offer the best solution for Quayside and Villiers West. While relying heavily on joint development agreements with third-party operators, Sidewalk Labs would retain the ability to develop solutions internally, participate in operations, and iterate and adjust those operations.

As described below, certain principles and constraints would dictate when Sidewalk Labs, either directly or as part of a joint venture, would participate in operations.

### Principles and conditions for advanced systems deployment.

As the advanced systems developer for Quayside and Villiers West, Sidewalk Labs would follow several principles for advanced systems deployment.

First, Sidewalk Labs would seek external partners where available to diversify risk and incorporate expertise from others into the project. Second, Sidewalk Labs would limit its provision of products and services to situations when its involvement is needed

to achieve the necessary outcomes of each system. This means it would not participate in operations where an existing provider is willing and able to deliver the operational approach and performance outcomes and to do so cost effectively. Third, in its role as Innovation Partner, Sidewalk Labs would transfer knowledge to the public administrator to enable it to take over the advanced systems development role after Quayside and Villiers West.

**An advanced system, or a component thereof, must meet one or both of two conditions before Sidewalk Labs would provide the solution directly.**

First, the solution calls for significant iteration or ongoing management after the initial installation. Specifically, no suitable turnkey approach exists, and the system requires active management to stabilize its operations or optimize its performance to deliver the desired outcomes. For example, the advanced power grid combines distinct elements, including a dynamic rate structure, that may need to be calibrated to achieve optimal results. This may require an extended period of refinement to modify and replace system components, educate users, and adjust system operating parameters to improve the results. Second, the approach represents a technological solution that has no suitable alternative available in the market based on the methodology established for classifying purposeful solutions (see Page 123 for more details).

With respect to advanced systems, Sidewalk Labs would notify the relevant administrative unit within the public administrator if it intends to utilize a product or service in which it holds a financial interest within Quayside or Villiers West. At a minimum, the notification would identify which of the applicable conditions applies and evaluate its application to such product or service. Sidewalk Labs would submit the notification and completed evaluation within a reasonable timeframe.

To the extent that Sidewalk Labs, as lead developer, elects to participate as an operator of an advanced system, directly or through a joint venture, Sidewalk Labs may be compensated through operating revenue in place of, or in addition to, advanced system development fees, subject to the terms of a master service agreement to be negotiated with either the Waterfront Sustainability Association or

the Waterfront Transportation Management Association, as applicable. (See Page 128 for further detail on Sidewalk Labs' proposal related to financing advanced systems.)

## Advanced systems beyond Quayside and Villiers West

As lead developer of advanced systems at Quayside and Villiers West, Sidewalk Labs must establish the effectiveness, commercial viability, and ability of those systems to deliver on key **project milestones**, specifically a series of negotiated **performance targets**. As discussed in further detail in Chapter 6, unless Sidewalk Labs satisfies its project milestones, the advanced systems would not extend beyond Quayside and Villiers West.

Assuming Sidewalk Labs achieves the relevant project milestones, its role in advanced systems would shift to serving as an advisor to the public administrator. Consistent with its responsibilities as an advisor to the public administrator (see Role 2), Sidewalk Labs would support the public administrator — which would assume the role of lead developer for advanced systems outside of Quayside and Villiers West — in procuring operators and partners; working with the operators to integrate the systems in the IDEA District to achieve the envisioned technologically enabled outcomes; and working alongside the public administrator to ensure the operators achieve and maintain acceptable performance levels. The public administrator would take on the ultimate responsibility for procuring operators, with the option to continue with existing operators from Quayside and Villiers West.

Sidewalk Labs would also advise the public administrator on the design of the systems for integration with completed infrastructure and vertical development and assist with preparation of procurement documents. Based on its practical experience developing Quayside and Villiers West, Sidewalk Labs would work with the public administrator to refine and expand the standards and guidelines incorporated in the IDSG.

# Innovation and Funding Partner Role 2: Innovation Planning, Design, and Implementation

The second role for Sidewalk Labs as Innovation and Funding Partner would be to provide technical advice, innovation planning, and project-management services to the public administrator. In this capacity, Sidewalk Labs would support the public administrator in devising and implementing a comprehensive innovation and development strategy, where the company can augment its capacity or resources, or has special expertise, particularly with respect to the technical specifications, deployment, iteration, and integration of advanced systems as well as to performance outcomes. The public administrator will have the authority to terminate these advisory services in the event the IDSG is not extended beyond Quayside and Villiers West.

A core element of this role is building the capacity of public-sector partners and engaging in knowledge transfer. Over time, this would reduce the need for, and the scope of, Sidewalk Labs' responsibilities.

## Planning phase

At the planning phase, Sidewalk Labs would propose to partner with the public administrator to provide technical advice and otherwise support the innovation strategy for the IDEA District across three interrelated categories:

### Technical advice and systems integration for precinct planning.

Sidewalk Labs would advise the public administrator on the development requirements associated with advanced systems and MIDP objectives, technical integration, and the district-specific land-use strategies proposed in the MIDP (such as stoa requirements and outcome-based code). This role would not apply to Quayside and Villiers West, where Sidewalk Labs intends to serve as the developer of vertical real estate and advanced systems.



See Chapter 6 for a detailed discussion of project milestones.



See Chapter 3 for further details about the proposed financial terms.

### Planning services for municipal and advanced systems.

Sidewalk Labs would partner with the public administrator in preparing the IDEA District Infrastructure and Transportation Master Plan (ITMP) documents, with special emphasis on the technical specifications and related considerations attendant to advanced systems and their integration with traditional municipal infrastructure.

### Technical specifications and content development for the Innovation Framework.

Sidewalk Labs would partner with the public administrator in developing the requirements and technical specifications for development that are needed to achieve the sustainability, affordability, and related objectives of the IDEA District. This would include developing and refining the IDEA District's initial Innovation Design Standards and Guidelines (IDSG). Sidewalk Labs would update the IDSG from time to time, in partnership with the public administrator, based on experience gained in the early phases of the project and technological advances that become available over time.

Initially, the IDSG would apply only to Quayside and Villiers West. The extension of the IDSG to

other parts of the IDEA District, and the ability of Sidewalk Labs to submit modifications and additional specifications, would rely on their adoption by the public administrator and Sidewalk Labs first achieving project milestones and demonstrating that the proposed standards and guidelines advance Waterfront Toronto's priority outcomes in a manner that can prove economically viable. Sidewalk Labs would thereafter propose refinements and expansions to the IDSG to better achieve the priority outcomes, drawing on its practical experience as lead developer of Quayside, Villiers West, and the advanced systems for those two vertical developments.

The following table reflects how Sidewalk Labs would support the public administrator of the IDEA District at the planning phase in carrying out its responsibilities.

**Financial and other key terms.** Sidewalk Labs proposes to deliver these advisory planning services to the public administrator at cost and estimates the total value of these resources to be in the range of \$3 million dollars annually over approximately the first 15 years of the project, the time during which the relevant planning deliverables for the IDEA District would be completed.

Fig. 2.8 Sidewalk Labs' role in relation to public administrator planning deliverables

Administrator Planning Deliverable	Sidewalk Labs' Role
<b>Precinct Plans and Implementing Bylaws</b>	Advise on issues related to IDSG and integration with advanced systems, as it relates to planning and proposed bylaws; utilize digital planning tools to assist precinct planning and develop outcome-based code where necessary.
<b>Infrastructure and Transportation Framework Plan (ITFP)</b>	Advise on ITFP, including guidance on analysis and design of mobility, sustainability, and public realm; support for estimation of population and employment; and provide a framework for proposed advanced systems networks.
<b>Infrastructure and Transportation Master Plan (ITMP)</b>	Support the public administrator on overall planning, including engineering support for advanced systems within each precinct and preparation of ITMP for Quayside and Villiers West as part of the Development Plan Application.
<b>Innovation Development Standards and Guidelines (IDSG)</b>	Develop the technical specifications needed to achieve sustainability, affordability, and related objectives of the IDEA District, including the drafting and later refinement of the IDSG.

## Implementation and operation phases

At the implementation and operations phases, Sidewalk Labs proposes to advance the work of the public administrator of the IDEA District in the following ways:

### Design of municipal infrastructure in Quayside and Villiers West.

Sidewalk Labs would provide different levels of support to the public administrator for different types of proposed horizontal infrastructure based on the technical needs associated with the project. Apart from site-work and shoreline-related work, Sidewalk Labs proposes to manage the design of traditional municipal infrastructure (such as water mains, sewers, and parks) for Quayside and Villiers West. Quayside and Villiers West represent the first attempt at integrating the innovations proposed in the MIDP, which would raise complex integration challenges associated with several of the newly created advanced systems (such as the proposed dynamic streets) and strategies (such as ground-floor stoa space). The public administrator would manage the construction of the municipal infrastructure.

### Integration of municipal infrastructure with advanced systems.

Outside of Quayside and Villiers West, the public administrator would manage the design and construction of all municipal infrastructure, as it does normally. Sidewalk Labs, however, would serve an integration role to coordinate municipal infrastructure designs prepared by the administrator with buildings and advanced systems infrastructure. These systems are multi-layered, require careful physical layout, and oftentimes are interconnected where one serves the other (such as electric service for a sanitary sewer-pumpstation).

### Design, management, and improvement of advanced systems.

The MIDP proposes several advanced sustainability systems (such as advanced power grid, thermal grid, waste management, and storm-water management), advanced mobility systems (such as freight management, dynamic streets, district parking management, and mobility subscription packages) and an advanced digital communications network. (The attributes of these systems are detailed on Page 108.)


In Quayside and Villiers West, Sidewalk Labs would serve as lead developer of advanced systems (other than the digital communications network). As lead developer, Sidewalk Labs would be responsible for delivering advanced systems based on agreed-upon performance standards and would procure and select appropriate partners and operators to prepare designs, obtain construction permits, and stabilize operations.

For parts of the IDEA District outside of Quayside and Villiers West, the public administrator would act as lead developer of advanced systems. Sidewalk Labs would provide support in procuring operators and partners; work with the operators to integrate the systems in the IDEA District to achieve the envisioned technologically enabled outcomes; and work alongside the public administrator to ensure that the operators achieve and maintain acceptable performance levels.

As noted earlier, Sidewalk Labs would not develop or manage the procurement of the Super-PON digital communications network proposed for the IDEA District. Instead, Sidewalk Labs would provide technical advice to the public administrator and Waterfront Toronto's broadband internet partner, which is expected to deliver the digital communications network.

During buildout of the advanced systems infrastructure, the operators would employ their own management entities for constructing their respective systems under the observation of the design team, including Sidewalk Labs as Innovation Partner. The public administrator would serve as the master site construction manager to coordinate the various advanced systems construction projects with other site construction activities. The lead developer of advanced systems — Sidewalk Labs at Quayside and Villiers West and the public administrator in the remainder of the IDEA District — would provide construction oversight and operational-stabilization support to the operators.

### Support for management entities.

In addition to its role in connection with infrastructure development, Sidewalk Labs would offer technical assistance and advice to the public administrator to support the management entities administering new district systems. These include the proposed entities focused on Mobility (Waterfront Transportation Management Association), Public Realm (Open Space Alliance), and Sustainability (Waterfront Sustainability Association). 


### Technical advisory services related to vertical development.

After Quayside and Villiers West, Sidewalk Labs would serve in an advisory capacity to assist the public administrator upon request with its oversight of the developer call and application processes, where technical expertise may be required, for instance, in the need to evaluate plans for fidelity to the Innovation Framework.

The following table reflects how Sidewalk Labs would support the public administrator in carrying out its responsibilities as the public administrator of the IDEA District at the implementation phase.

### Financial terms for municipal infrastructure.

Sidewalk Labs proposes to receive a flat market-rate percentage fee (8 percent) for managing the design of certain municipal infrastructure at Quayside and Villiers West. Sidewalk Labs would receive a lower percentage (2 percent) of related soft costs for supporting the public administrator in integrating municipal infrastructure with advanced systems infrastructure. These fees are based on Waterfront Toronto's typical management fees of 6 percent, with the additional 2 percent for the extra work required to coordinate with advanced systems.

Financial terms for advanced systems. Third-party operators would compensate Sidewalk Labs directly for its responsibilities as lead developer of advanced systems at Quayside and Villiers West. When the public administrator assumes the role of lead developer of advanced systems in later phases, the operator would similarly compensate the public administrator for its work. 



See Chapter 1, on Page 50, for a table of the management entities and their relationship to the public administrator.



Further details related to financial terms for municipal infrastructure and advanced systems are included in Chapter 3.



Fig. 2.9

## Sidewalk Labs' role in relation to public administrator implementation responsibilities

Administrator Implementation Responsibility	Sidewalk Labs' Role
Development Call and Land Disposition Management	No role (optional advisory services related to proposed impact of proposed development on Innovation Framework and advanced systems).
Certification of Development and Building Permit Applications	Advise on the compliance of development proposals with the IDSG and integration with advanced systems.
Light Rail Transit Development	Optional financing role (see Role 4 for more information).
Management of Municipal Infrastructure Development	Manage the design of public realm (such as parks and streetscape areas), bridges, and municipal underground infrastructure (such as domestic water, sanitary sewer, and storm drain conveyance) in Quayside and Villiers West. Thereafter, Sidewalk Labs would support the public administrator in the integration of municipal infrastructure with advanced systems.
Management of Advanced Systems	<p><b>Digital Communications Network:</b> Sidewalk Labs would provide technical advisory support to the public administrator and Waterfront Toronto's broadband internet partner (procured separately by the public administrator) for development of a Super-PON network to achieve the objectives of high-speed ubiquitous internet connectivity in accordance with specifications in the IDSG.</p> <p><b>Advanced Systems:</b> For all other advanced systems, Sidewalk Labs would serve the following roles:</p> <ul style="list-style-type: none"> <li>→ <b>For Quayside and Villiers West,</b> Sidewalk Labs would serve as lead developer of advanced systems based on agreed-upon performance standards and would procure and partner with independent operators to prepare designs, obtain construction permits, and stabilize operations.</li> <li>→ <b>For the areas where the public administrator would serve as the lead developer of advanced systems,</b> beyond Quayside and Villiers West, Sidewalk Labs would advise on design and assist with preparing procurement documents.</li> </ul>
Oversight of New Management Entities	Sidewalk Labs would advise in the establishment and operation of various new management entities and the advanced systems they would manage. As Innovation and Funding Partner, Sidewalk Labs would provide advisory support on strategies to achieve public objectives.
Annual Public Reports on Progress of IDEA District	No role, except as advisor.

**Sidewalk Labs would support the public administrator with technical advice, innovation planning, and project-management services to advance a comprehensive innovation and development strategy.**

# Innovation and Funding Partner Role 3: Technology Deployment

The third role Sidewalk Labs proposes to fill as Innovation and Funding Partner is to identify or develop key technological solutions for advancing Waterfront Toronto's priority outcomes in the project area. The MIDP draws on a range of technological solutions, including software, hardware, and other products and services that target urban priorities, from sustainability to affordability. These include commercially available technologies and systems, incremental improvements to existing approaches, and products and services that do not yet exist in the market in a usable form.

The MIDP seeks to foster an urban innovation ecosystem open to entrepreneurs and inventors from across Canada and around the world. This ecosystem is critical to the project achieving its economic growth and job-creation goals, to its financial success, and to its goal of creating a testbed for how to harness new technological insights to improve urban life.

Leveraging Sidewalk Labs' substantial technological resources, the technology deployment role incorporates two related responsibilities.

### Evaluate the existing marketplace for necessary innovations.

First, to realize the vision of the MIDP and implement its components, Sidewalk Labs would survey and evaluate the innovations currently in research, development, or in the marketplace to determine their relevance and applicability to the project. Constituting an important part of formulating the MIDP, this process is already well underway. Because technology advances rapidly, however, the process calls for an ongoing assessment of available technologies to determine whether the project could benefit from emerging solutions. Based on this work, Sidewalk Labs would advise the public administrator on product road maps, which would survey all plausible market sources.

Ubiquitous connectivity in the IDEA District and digital innovations, such as universal mounts, would help support a range of industries, such as film.

In the vast majority of circumstances, the technologies recommended for advancing the project would be purchased, commissioned, or licenced from existing vendors. For these solutions, Sidewalk Labs' responsibilities would be limited to those encompassed within Roles 1 and 2, as an advisor to the public administrator and as lead developer of advanced systems at Quayside and Villiers West.

### Develop a necessary innovation if none exists.

Second, where a key solution does not yet exist in the market, Sidewalk Labs is committed to developing it by identifying appropriate technology partners to carry out the work, by integrating and enhancing existing solutions, or by undertaking the research and development itself to create and test the solution for deployment as part of the project.

As one example, Sidewalk Labs has proposed to work with Waterfront Toronto's broadband internet partner to develop the first Super-PON internet network in Canada (see the "Digital Innovation" chapter of Volume 2), which would power ubiquitous connectivity in the project area. Sidewalk Labs would bring the technical expertise needed to roll out a system that supports substantially more users per fibre-optic strand than other approaches, incorporate managed Wi-Fi to optimize speed and coverage even during periods of heavy usage, and create software-defined networks that enhance security.

Sidewalk Labs anticipates that the total number of solutions it would develop itself represents a tiny fraction of the thousands of products to be deployed in connection with the project.





See the “Digital Innovation” chapter of Volume 2 for more details on Sidewalk Labs’ responsible data use strategy.

Regardless of whether it provides a given technology or sources it from the market, Sidewalk Labs would apply several important principles:

# 1

## Support collaboration with third parties.

First, as an integral part of creating an urban innovation ecosystem, Sidewalk Labs would support collaboration with third parties, particularly local players. The Implementation Agreements would consider and include specific terms for cases in which Sidewalk Labs would partner with a third party, such as Canadian firms or researchers, to develop or deploy a product or solution. Consistent with Sidewalk Labs’ approach to economic development, and to the spirit of both Waterfront Toronto’s initial RFP and the PDA, the Implementation Agreements would include a structure designed to support Canada’s capacity to build and retain IP locally. Moreover, Canadian firms and researchers would not be expected to relinquish ownership of their IP just for providing their products and services in the project area and could negotiate various approaches to IP development, ownership, and commercialization.

# 2

## Incorporate privacy from the start.

Second, Sidewalk Labs would integrate privacy considerations from the outset. All digital innovations deployed that involve the collection or use of urban data in the IDEA District — whether by Sidewalk Labs or any third party — would be subject to approval by the Urban Data Trust (UDT). Among other roles, the UDT would establish Responsible Data Use (RDU) Guidelines that incorporate globally recognized Privacy by Design principles. These proposed RDU Guidelines would call for all digital innovations involving urban data to apply Canadian values of diversity, inclusion, and privacy; use data minimization to ensure the collection of urban data is limited to what is needed; employ up-to-date de-identification techniques to reduce the collection of

personal information; restrict the use of personal data to sell or advertise without explicit consent; and employ responsible AI practices. Above all, Sidewalk Labs has committed never to sell people’s personal information.

# 3

## Promote open standards.

Third, Sidewalk Labs would promote open technology standards and modularity. Too often, technology firms employ closed, siloed systems, which lock out competition and slow down innovation. They also sell non-modular systems, which can only be operated, maintained, and augmented by a single vendor. This increases operating and maintenance costs.

In its technology deployment role, Sidewalk Labs would not only develop products that adopt open technology standards and modularity but recommend and source products from third parties that conform to the same standards.

As a further means of advancing openness and innovation by third parties, Sidewalk Labs is making a “patent pledge,” that it would not assert its digital innovation hardware or software patents issued in Canada against any third party who develops and sells an innovation relying on those patents, with narrow exceptions (see Page 127).

# 4

## Promote transparency and open-data access.

Fourth, Sidewalk Labs would actively promote transparency and foster a vibrant ecosystem of new applications using urban data. Subject to the rules of the Urban Data Trust, as more fully described in Volume 2, Sidewalk Labs would promote the use of standardized, publicly accessible application programming interfaces (APIs) to make urban data sets publicly available and usable by third-party developers and the public at large.

# Purposeful Solutions

## Key Term Purposeful Solutions

A limited set of innovations that are necessary to achieve agreed-upon project goals and for which there is no suitable alternative on the market.

One notable category of the technology Sidewalk Labs would develop in-house is “purposeful solutions.” These solutions — which Sidewalk Labs proposes to provide at cost to the public administrator and the management entities in the IDEA District — would proceed through a project-specific, direct award process. This designation would last for 10 years, after which the solution would be subject to ordinary procurement processes and market prices.

The proposal for purposeful solutions originated with the RFP, which anticipated that its Innovation and Funding Partner would need to deliver certain “solutions” or “solution areas.” The RFP provided that:

“For solution areas where the Partner has technologies or methodologies that could benefit the Project, a review process will be enacted wherein Waterfront Toronto can be assured of the degree of innovation and the cost-competitive nature of the Partner’s proposed solutions prior to the initiation of additional downstream procurement processes.”

The PDA directs Sidewalk Labs to identify purposeful solutions in the MIDP and calls for a process for designating purposeful solutions over the life of the project:

“As contemplated by A1.c of the RFP and RFP Submission Materials, the MIDP will identify technological innovations that at the time of their development can objectively and impartially be shown to have no suitable alternatives available in the market (“Purposeful Solutions”), and the Implementation Agreements will generally contemplate competitive procurement

processes, with limited exceptions allowing for Sidewalk Labs or its affiliates to provide Purposeful Solutions, but only on a fair and demonstrably arms’-length basis.”

Purposeful solutions are procured through a direct award, rather than a competitive procurement, for several reasons. By definition, purposeful solutions do not exist in a mature form in the marketplace. This requires that Sidewalk Labs develop them. In addition, the MIDP offers an integrated vision, which relies on the existence of key technologies. Unless Sidewalk Labs commits to delivering these solutions, the entire vision could be jeopardized.

Sidewalk Labs is developing a range of digital innovations, which are described in detail in Volume 2. Most of these technologies are not being proposed for designation as purposeful solutions. At the outset, Sidewalk Labs is proposing three technologies for designation as purposeful solutions: dynamic curbs, standardized mounts, and Perform, a real-time energy modelling tool. Sidewalk Labs believes that these solutions are critical to achieving aspects of the MIDP; that there are no suitable alternative solutions available in the marketplace; and that these products therefore constitute purposeful solutions and should be designated as such in the Implementation Agreements.

### Dynamic curb.

The static and unchangeable nature of traditional curbs represents a barrier to the more efficient use of urban street space. The dynamic curb can repurpose its space — for example, serving as drop-off or pick-up zones during peak traffic times or open space at off-peak periods — enabling more flexible uses of the street and helping to provide more open space for residents, visitors, and workers.

The dynamic curb would incorporate real-time, historical, and projected demand for curbside pick-ups and drop-offs to optimize curb space, dynamically price the curb, assign rates, and set other rules, including pick-up and drop-off locations. The system would rely on physical infrastructure (availability sensors, dynamic and lighted pavement, digital signage, and payment systems) and digital tools (such as navigation apps) to communicate and enforce regulations responsive to dynamic conditions. For example, the dynamic curb system could adjust curb pricing, the location of pick-up and drop-off locations, or even the space in the right of way allocated as curb space or sidewalk.

### Standardized mounts.

Today, cities (and the private vendors they hire) install thousands of devices on public infrastructure, from Wi-Fi access points to traffic cameras. But installing these devices often requires significant disruption to street life, creates risks to workers in bucket trucks, and costs thousands of dollars, because light poles and other street fixtures were never designed to host digital hardware. As a result of this onerous process, cities tend to invest in high-priced, ultra-reliable devices that are expensive to repair and upgrade.

Sidewalk Labs has designed a standardized mount called “Koala” that would make it fast, inexpensive, and safe to install a device on a light pole or other street fixture by providing a sturdy physical mount, power, and network connectivity. Just as USB ports made it easier to connect external devices with computers, this new type of urban USB port would create a standard connection point for cities that drives down the cost of installing and maintaining digital hardware. Sidewalk Labs

estimates its mounts would reduce the time of installation by roughly 92 percent — down from 30 hours today to 2 hours.<sup>69</sup>

Additionally, by facilitating installation in an inexpensive way, Koala enables cities to buy much less expensive technology, replace the small fraction of devices that fail, and provide some redundancy of devices to improve reliability around things like Wi-Fi networks. Cities would also be able to upgrade technology on a much more rapid timeline and have more resources to conduct pilots or explorations for new services.

Koala also serves as a platform for other urban innovations. For example, by lowering costs, Koala makes commercially feasible the sensing technology for the dynamic curb (as discussed previously).

### Perform.

The existing Toronto Green Standard (TGS) sets sustainability requirements based on expected energy usage and greenhouse gas (GHG) emissions. But there is no real-time monitoring of energy performance after construction, nor is there any meaningful opportunity to adjust performance accordingly. As a result, energy usage in buildings often exceeds the sustainability targets, contributing to a less sustainable built environment than otherwise possible.<sup>70</sup>

To address this shortcoming, Sidewalk Labs is developing a real-time modelling tool called “Perform.” The software would compare a building’s near real-time energy usage with an energy budget that adjusts dynamically based on occupancy, the weather, and other factors. Used to advance a new outcome-based code, the tool would convert the TGS energy, thermal energy, and GHG intensity targets from static targets based on a building’s modelled energy use to dynamic targets for comparison against a building’s actual energy use.

## Future Purposeful Solutions

Consistent with the PDA, Sidewalk Labs recognizes that further technological needs are likely to arise as the project progresses. Sidewalk Labs proposes a review process to designate additional purposeful solutions at other times in the life of the project.

In this review process, Sidewalk Labs would identify a purposeful solution to advance the project goals, either on an unsolicited basis or in response to a request from the public administrator. In a submission to the public administrator, Sidewalk Labs would outline the proposed solution, detail how it meets project objectives, and provide an analysis demonstrating the absence of comparable solutions from the marketplace.

Upon receipt of such a proposal, the public administrator may initiate either or both of the following two processes to validate a future purposeful solution against predefined criteria:

### Advance contract award notice.

The public administrator (including a management entity, such as WTMA) could issue an advance contract award notice (ACAN) regarding its intention to procure a solution on a non-competitive basis. The ACAN will state a deadline for responses ensuring a reasonable period of time is given for the market to respond. The public administrator would review all responses to the ACAN. Alternatively, the procurer may designate that an independent reviewer consider all responses to the ACAN. If the procurer (or the independent reviewer) determines that no response to the ACAN presents a suitable alternative to the proposed solution, the proposed solution would then be designated as a purposeful solution. In contrast, if the public administrator determines that any response to the ACAN presents a suitable alternative to the proposed solution, then the public administrator would proceed to procure such a solution only through its standard procurement process.

### Independent reviewer.

The public administrator could engage an independent reviewer to research the availability of alternative solutions that represent a suitable alternative to a proposed solution, and compile that research into a report. That report would identify the range of potential alternatives and assess their suitability. If the report concludes that there is no suitable alternative to the proposed solution, the proposed solution would then be designated as a purposeful solution. If the report concludes that there is one or more suitable alternatives to the proposed solution, the public administrator would then proceed to procure such a solution only through its standard procurement process. If the report is unable to conclude whether alternatives are suitable, then the ACAN process would be invoked.

The processes relating to the form of purposeful solution proposals, relevant criteria, and the execution of either of the two review paths would be spelled out in Implementation Agreements. In the case of these and any subsequently designated purposeful solutions, the public administrator and Sidewalk Labs would negotiate the agreed-upon terms related to deployment on a case-by-case basis. (As discussed in the section that follows, any given purposeful solution may or may not be considered Testbed-Enabled Technology and subject to a profit-sharing agreement.)

# Profit-sharing for Waterfront Toronto from Testbed-Enabled Technology

Sidewalk Labs is committed to entering a first-of-its-kind profit-sharing agreement, in which the public sector would receive a portion of the profits arising from certain technologies deployed in the project area.

The PDA contemplates and addresses three categories of IP: Non-MIDP Site IP, Co-Created IP, and Site-Specific IP. The PDA states that “the Implementation Agreements will set out what use rights Waterfront Toronto will have in Sidewalk Labs’ Non-MIDP Site IP utilized at the MIDP Site, and what use rights either Party will have in Co-Created IP and Site-Specific IP.”

As planning work on the MIDP progressed, it became clear that these categories of IP were inadequate for resolving a question that has been the subject of a great deal of the feedback that Waterfront Toronto and Sidewalk Labs received over the life of the project so far: How will the public share in the value of intellectual property enabled through implementation of the project? Because neither Waterfront Toronto nor the public sector is primarily a technology developer, co-created technology is not likely to emerge over the life of the project. Correspondingly, co-ownership of the intellectual property associated with those technologies is not likely to arise.

There are other ways, however, for the public to benefit when the project enables a new solution developed by Sidewalk Labs. Specifically, Sidewalk Labs is committed to sharing with the public sector proceeds from certain products or other solutions that would not have been developed but for the opportunity created by the project. Sidewalk Labs proposes that such solutions be referred to as Testbed-Enabled Technology and be subject to a profit-sharing agreement.

A product or other solution developed and commercialized by Sidewalk Labs, which meets the following criteria, would be considered eligible for classification as Testbed-Enabled Technology:

1 The Toronto project geography is used in the first deployment of the product or other solution at scale.

2 The relevant public stakeholders must create the conditions for innovation that Sidewalk Labs needs to effectively pilot and scale the new product or solution, specifically by providing all of the following (as applicable):

→ access to mount or deploy the technology in physical spaces (such as on lamp posts, in roads, as part of new private developments, and so on);

→ a mandate to use common software standards that enable compatibility and interoperability (such as building access systems using a common open standard);

→ approvals in place up front and regulatory conditions in place that support the physical, digital and operational conditions required, either directly or through negotiation with the appropriate regulator;

→ sufficient scale for efficacy or to otherwise achieve desired outcomes; and

→ an ecosystem that provides the opportunity to integrate all the physical, software, and regulatory conditions simultaneously, as necessary for a successful pilot.

The Implementation Agreements would establish a process through which Sidewalk Labs and the public administrator would jointly determine, in advance of the deployment of any product or other solution by Sidewalk Labs, whether the criteria have been met — including agreement around the provision of necessary innovation conditions — and whether the product or solution is thereby considered Testbed-Enabled Technology. As part of a transparent process, Sidewalk Labs would provide a rationale for the scale needed to establish the efficacy of the proposed solution. Sidewalk Labs would also be open to negotiating value sharing for products if the public administrator provides testbed conditions beyond the IDEA District.

Sidewalk Labs proposes that the public sector receive 10 percent of Sidewalk Labs’ profits from Testbed-Enabled Technology for a 10-year period. This period only begins with the sale of the solution to a second customer after its initial deployment (i.e. when the product has been effectively commercialized). The overall approach is structured to align the interests in a successful deployment, with both Sidewalk Labs and the public sector profiting from technologies that prove viable. Additional specificity for profit-sharing terms would be negotiated as part of the Implementation Agreements.

Sidewalk Labs believes that this framework would align the interests of public and private sectors in service of nimbly piloting new technologies and innovations as part of this project.

Finally, as a point of clarification, the designation of Testbed-Enabled Technology is a separate and distinct matter from the designation of a purposeful solution. A purposeful solution may or may not be considered Testbed-Enabled Technology, and any given piece of Testbed-Enabled Technology may or may not be designated a purposeful solution. The tests and goals attendant to these two designations are different.

## Patent pledge

Through the public consultation process, Sidewalk Labs heard the fear of losing access to the technology and inventions deployed and tested on the waterfront for other Canadian cities. To ensure that the technology innovations created in Toronto remain available, Sidewalk Labs would pledge not to assert Sidewalk Labs’ digital-innovation-related hardware or software patents issued in Canada (“Canadian Patents”) against third parties who develop and sell innovations that utilize such patents, subject to the defensive termination described later in this section. For example, if Sidewalk Labs obtains a Canadian patent for digital mounts, a third party could build and sell a product that practices the claims in the patent without concern that Sidewalk Labs would bring a patent infringement related to those claims against the party.

Sidewalk Labs is making this pledge to enable any startup, non-profit, government agency, or independent entrepreneur to build on Sidewalk Labs’ Canadian Patents without fear of litigation or other assertion of patent infringement. These patents would consist of those patents filed by Sidewalk Labs in Canada during development of Sidewalk Toronto and that cover software or hardware that enable digital innovations related to Sidewalk Toronto. Sidewalk Labs is in the early stages of product development and will list the patents included in the pledge over time.

Sidewalk Labs would publish the full content of this pledge on the Sidewalk Toronto website. The only condition is that those taking advantage of the pledge not assert their Canadian patents against Sidewalk Labs or its affiliates. Thus, in the event of any such assertion against Sidewalk Labs or its affiliates, the pledge is immediately null and void as to the party causing or making the assertion, including that party’s affiliates. While Sidewalk Labs hopes that other innovators will join this pledge over time, it would not be required of technology providers for the Sidewalk Toronto project.

# Innovation and Funding Partner Role 4: Optional Infrastructure Financing

The MIDP seeks to answer the challenges set out in Waterfront Toronto's Quayside RFP and deliver on Waterfront Toronto's priority outcomes: job creation and economic development, sustainability and climate-positive development, housing affordability, new mobility, and urban innovation (including robust data privacy and digital governance).

These objectives cannot be achieved exclusively through the construction of innovative buildings. Instead, they require substantial investments in horizontal infrastructure — including both traditional municipal infrastructure, like sewers, and advanced systems that are new in Toronto — to serve the entirety of the IDEA District.

Accordingly, as Innovation and Funding Partner, Sidewalk Labs proposes to support the financing of horizontal infrastructure critical to the success of the IDEA District. The specific financing role that Sidewalk Labs proposes to play would vary based on the category of horizontal infrastructure.

This financing is optional, and offered in the event alternative financing is not available at comparable or better rates. The plan incorporates optional financing associated with three primary categories of horizontal infrastructure:

- **Extension of Light Rail Transit (LRT)**, which would be TTC owned and operated
- **Expansion of municipal infrastructure**, which would be city owned and operated
- **Development of advanced systems**, which would be privately owned and operated (except dynamic streets, which is city owned and WTMA operated)

In general, Waterfront Toronto and its stakeholder governments have had to identify public sources to finance this infrastructure at the outset or contend with a timing mismatch — where the development charges, tax revenues, or other funding needed to pay for infrastructure comes years after construction. To bridge this funding gap, Sidewalk Labs proposes to provide or facilitate optional financing to enable or accelerate the development of the infrastructure needed to achieve the economic development and innovation objectives of the IDEA District.

The next three sections address each of the categories of infrastructure, describing the program scope and costs as well as the proposed financing approach.

**Sidewalk Labs is prepared to offer optional financing for infrastructure systems that are critical to development throughout the IDEA District.**

## Key financing terms

The proposal relies on the following key concepts to describe how infrastructure might be financed.

**Advanced system operator.** The company that the lead developer selects to operate the advanced systems, including delivering service to end users and collecting user rates. In certain cases, the operator may also design and construct the system.

**Avoided costs.** Refers to standard expenses not incurred, either because of a replacement or supplemental system (such as dynamic streets replacing standard roads).

**Business as usual (BAU).** Used to refer to standard infrastructure, building systems, and operations, as compared with the advanced systems and approaches proposed in the MIDP (such as BAU gas distribution replaced by the thermal grid).

**City fees and development charges.** Fees the city collects from vertical developers to fund municipal infrastructure, such as roads, transit, utility infrastructure, parks, social infrastructure and other services.

**Local infrastructure contributions (LIC).** Payments from vertical developers to the public administrator where an advanced system replaces a BAU horizontal or vertical system that is typically funded by the vertical developer in an amount equivalent to the avoided costs (such as not installing gas systems).

**Municipal infrastructure contributions (MIC).** Payments from vertical developers to the public administrator up to the amount of credit for city fees and development charges that the public administrator receives in exchange for delivering municipal infrastructure and services, including dynamic streets in place of traditional streets.

**Tax-increment financing (TIF).** A “value capture” approach relying on borrowing against the future increase in property tax revenue to fund large-scale public infrastructure (such as transit).

# Role 4A: LRT financing

Extension of the LRT into the eastern waterfront is critical to achieving the objectives spelled out in Waterfront Toronto’s RFP, most importantly to accelerate economic growth; establish the eastern waterfront as a vibrant mixed-use, mixed-income community; and achieve extraordinary levels of mobility, sustainability, and affordability. Access to rapid transit is similarly essential to achieve the targeted levels of population density for the IDEA District and, more broadly, for the eastern waterfront. As more fully explained in the “Mobility” chapter of Volume 2, a link to the rest of Toronto’s rapid transit system is integral to advancing waterfront development at scale and necessary to the vision set out in the MIDP.

The city’s Waterfront Transit Network Plan and other local and regional transportation plans have identified light rail extension to the eastern waterfront as a priority.<sup>71</sup> As shown on the map on the opposite page, the city’s plan for the district calls for improving the underground transit link from Union Station to Queens Quay to connect to an exclusive light rail right of way running east from the western waterfront (Legion Road and Lake Shore Boulevard) along Queens Quay to Cherry Street, and ultimately to the intersection of Leslie and Commissioners Streets further east, with new north-south connections at Cherry Street and at a newly extended Broadview Avenue.

Until now, however, this project has not been funded. The MIDP proposes to change that — to secure financing to construct the LRT extension, connect the eastern waterfront to the rest of the city, and catalyze development.

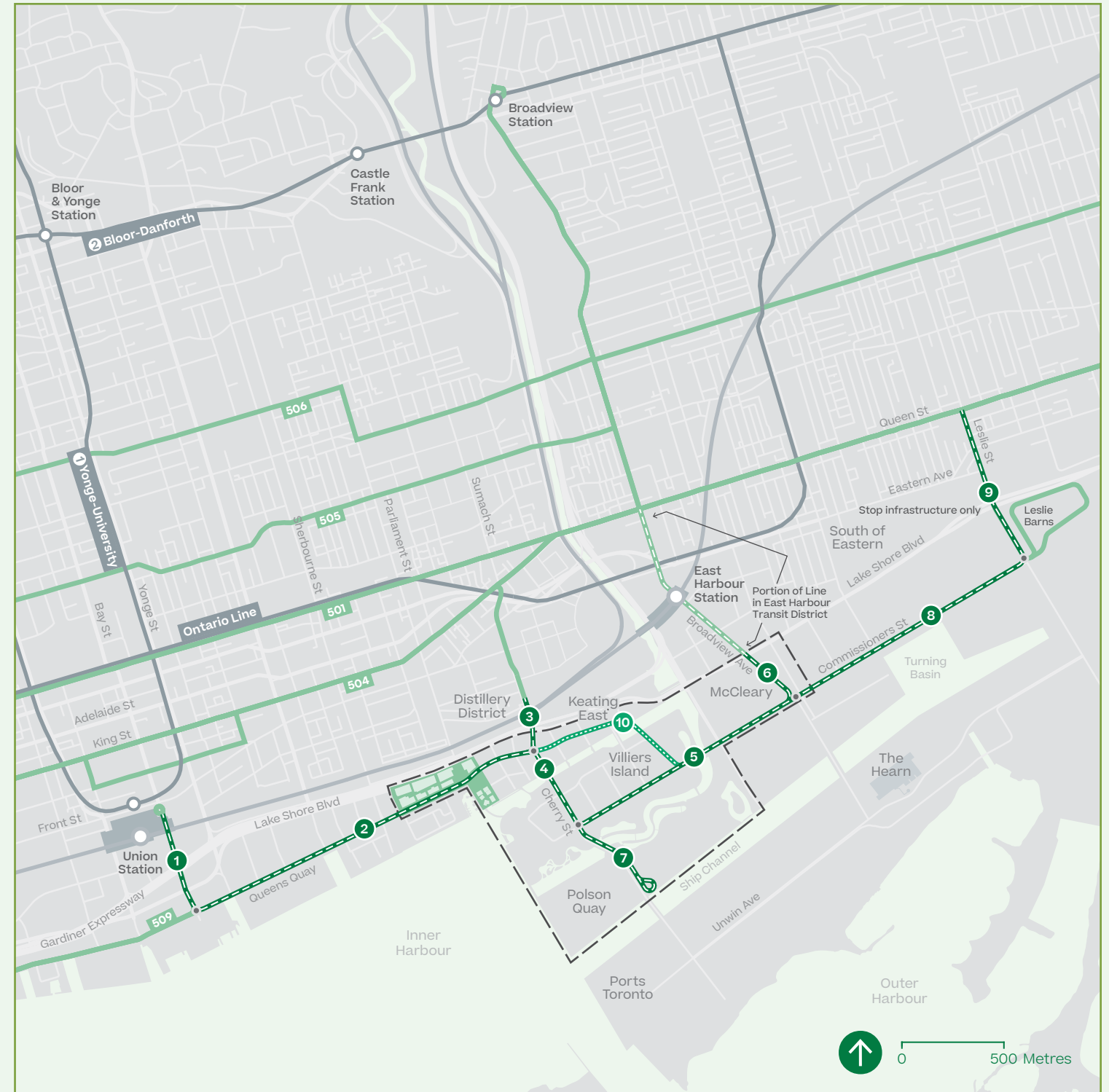
The proposal below, including the program and financing strategy, follows the recommendation of the Central Waterfront Secondary Plan for a “staged implementation schedule and accompanying financial plan for the construction and operation of transit facilities.”

## Program

To develop its thinking about rapid transit on the eastern waterfront, Sidewalk Labs established a Mobility Advisory Working Group, consisting of mobility experts and thought leaders in the Toronto community, to review and help refine the proposals. Sidewalk Labs also retained the consulting services of the former head of TTC’s planning department. Based on their advice, Sidewalk Labs concluded that the best approach to rapid transit in the eastern waterfront is the City of Toronto’s approved LRT plan that underwent the Environmental Assessment process in 2010. This proposal is reflected on the following map.

Bridges and temporary turnarounds associated with the LRT segments on the opposite page are included in the LRT program. In addition, upgrades of two underpasses at Cherry and Parliament Streets are required to support the LRT extension and related mobility improvements.

The light rail extension to the eastern waterfront consists of two parts. The first part, which includes Segments 1 and 2, connects Union Station, via a rebuilt tunnel, to Queens Quay, via a new surface portal near Bay Street, and provides service east to Cherry Street. According to the city’s analysis from March 2019, the cost to deliver these segments is



Map  
**Proposed LRT extension by phase**

- GO Transit / SmartTrack
- Subway (existing and proposed)
- Existing Light rail
- - - Approved extension
- ⋯ Optional
- - - IDEA District
- ▬ Quayside

approximately \$650 to \$700 million. These segments are important for the eastern waterfront LRT but equally important to the city’s overall rapid-transit network.<sup>72</sup>

The LRT segments running through the IDEA District include the portion of Segment 2 east of Bonnycastle Street, the portion of Segment 3 south of Lakeshore Boulevard, and Segments 4 through 7, as described in the next section. Based on an analysis conducted by WSP Global, a Canadian engineering firm, these segments will together cost approximately \$406 million.<sup>73</sup> That sum is made up of \$167.7 million to complete the portions of Segments 2 through 4 within the IDEA District, including certain improvements to the Cherry Street underpass, and \$238.3 to complete Segments 5 through 7.

## Optional LRT financing

Rapid transit is critical to the development of the eastern waterfront and to implementation of the MIDP. The eastern waterfront is projected to experience faster growth in the near term than most other areas of the city. Connecting the area to Toronto’s rapid transit is vital to meet this demand, attract commercial tenants, and create jobs. As reflected in a recent economic impact study from the Waterfront Business Improvement Area, accelerating the development of the LRT along the eastern waterfront would increase productivity, decrease private car use, raise property values, and yield more tax revenue.<sup>74</sup>

Some key conclusions of this study include:

→ **Productivity gains.** In total, delaying the accelerated build of the LRT from 2025 to 2045 would cost about 100 million person-hours through commute time savings. That monetizes to productivity losses of about \$1.8 billion.


→ **Mode-share shift.** Conversely, accelerating the LRT’s arrival would lead to a 44 percent decrease in automobile use by incoming workers and residents, and a 15 percent increase in public transit ridership.

→ **Tax revenue uplift.** The cumulative cost of delaying the LRT project is \$22.8 billion in tax revenue to the federal (\$9 billion), provincial (\$3.8 billion), and municipal (\$10 billion) governments over the period 2025 and 2045.

→ **Property value uplift.** According to research done on previous comparable LRT projects, property values along the Waterfront East LRT corridor could rise to a cumulative \$4.5 billion by 2045 if LRT service is provided.

**Sidewalk Labs would welcome more traditional public sector funding for the Waterfront East LRT project. Timely funding for this project through traditional means, however, is not considered likely, given the number of high-priority transit projects across the region.** Although the City of Toronto affirmed the project as a transportation priority as recently as Spring 2019, no government funds have been allocated to extend the Waterfront LRT to the planned East Harbour transit station.<sup>75</sup> In fact, the TTC capital budget through 2028 does not allocate funding to even design the project, let alone build it, and therefore the most optimistic estimates do not expect rapid transit in the eastern waterfront until at least 2034.<sup>76</sup> Accordingly, without an intervention, the availability of rapid transit in Quayside, Villiers Island, and the adjacent Film Studio District is likely to lag behind development by many years.

Because rapid transit is the linchpin for waterfront growth and for achieving Waterfront Toronto’s priority outcomes, Sidewalk Labs is prepared to assist with financing to accelerate the project. Sidewalk Labs’ financing support, if needed, could take various forms depending on what the governments want, from pulling together a consortium to finance the entire extension to playing more targeted roles in addressing specific gaps in public-sector financing mechanisms that could prevent the project from moving ahead.

One possible approach is for Sidewalk Labs to offer credit support to facilitate the financing of the LRT extension, as part of a “value capture” strategy. In particular, the segments of the LRT in the IDEA District offer a potential use case for TIF. 

With TIF, the public sector borrows against the future increase in property tax revenue expected from construction of new large-scale infrastructure, such as transit. Typically, this involves the establishment of a government-sponsored special purpose vehicle to issue debt, with the proceeds paying to construct growth-producing infrastructure. The resulting increase in property tax revenues after construction — the tax increment — is earmarked to repay the bonds. Thus, TIF is considered a form of self-financing, where vital infrastructure pays for itself through the tax revenue it generates.

TIF has been effectively employed to fund numerous major transit and urban development projects, including in Calgary and Edmonton. For example, the Rivers District Community Revitalization Plan used TIF (referred to in Alberta as a Community Revitalization Levy) to finance \$396 million in infrastructure funding for downtown Calgary, attracting nearly \$3 billion in planned private development and causing residential property assessments to increase from \$328 million to about \$1.2 billion and non-residential property assessments to increase from \$647 million to \$1.8 billion.<sup>77</sup>

Importantly, the proposed LRT segments outside of the IDEA District — Segment 1, the portion of Segment 2 west of Bonnycastle Street, and the portion of Segment 3 north of Lakeshore Boulevard — are in areas that are already well developed and do not appear suitable for TIF. Accordingly, Sidewalk Labs believes these segments should be funded and financed in the traditional manner, through a partnership between the relevant orders of government. The segments are nevertheless critical to the viability of the project. Sidewalk Labs is therefore open to discussing how it could assist financially, particularly if a TIF approach proves feasible.

Assuming funding is secured for those segments, Sidewalk Labs proposes to extend credit support to accelerate the financing of the segments traversing the IDEA District. This offer seeks to address one of the traditional barriers to the broader use of TIF. Because the TIF special purpose vehicle has no cash or credit, investors typically require that government serve as a “backstop” to pay the cash interest owed to lenders during the period before development generates enough new property tax revenue to cover those costs. By serving as the initial backstop for financing these segments, Sidewalk Labs is prepared to relieve the public sector of a significant portion of this responsibility.

Sidewalk Labs would offer up to \$100 million of credit support—up to \$50 million for the portions of Segments 2 through 4 within the IDEA District and up to \$50 million for Segments 5 through 7, to be repaid at a fixed rate of return. The financing would be offered at market rates to be negotiated — with a commitment from Sidewalk Labs to work with governments, pension funds, and other institutional investors to develop transaction structures to reduce the rate as much as possible while still attracting the necessary financing.

Notably, Sidewalk Labs has sized its credit support offer based on initial financial modeling of the potential TIF structure. The preliminary analysis, which would be refined with the assistance of public-finance experts and lender feedback, suggests that the credit support offered would be more than sufficient to address the timing gap discussed earlier.

**Because rapid transit is the linchpin for waterfront growth and for achieving Waterfront Toronto’s priority outcomes, Sidewalk Labs is prepared to assist with financing.**



See Chapter 1, on Page 80, for more information on various value capture tools.

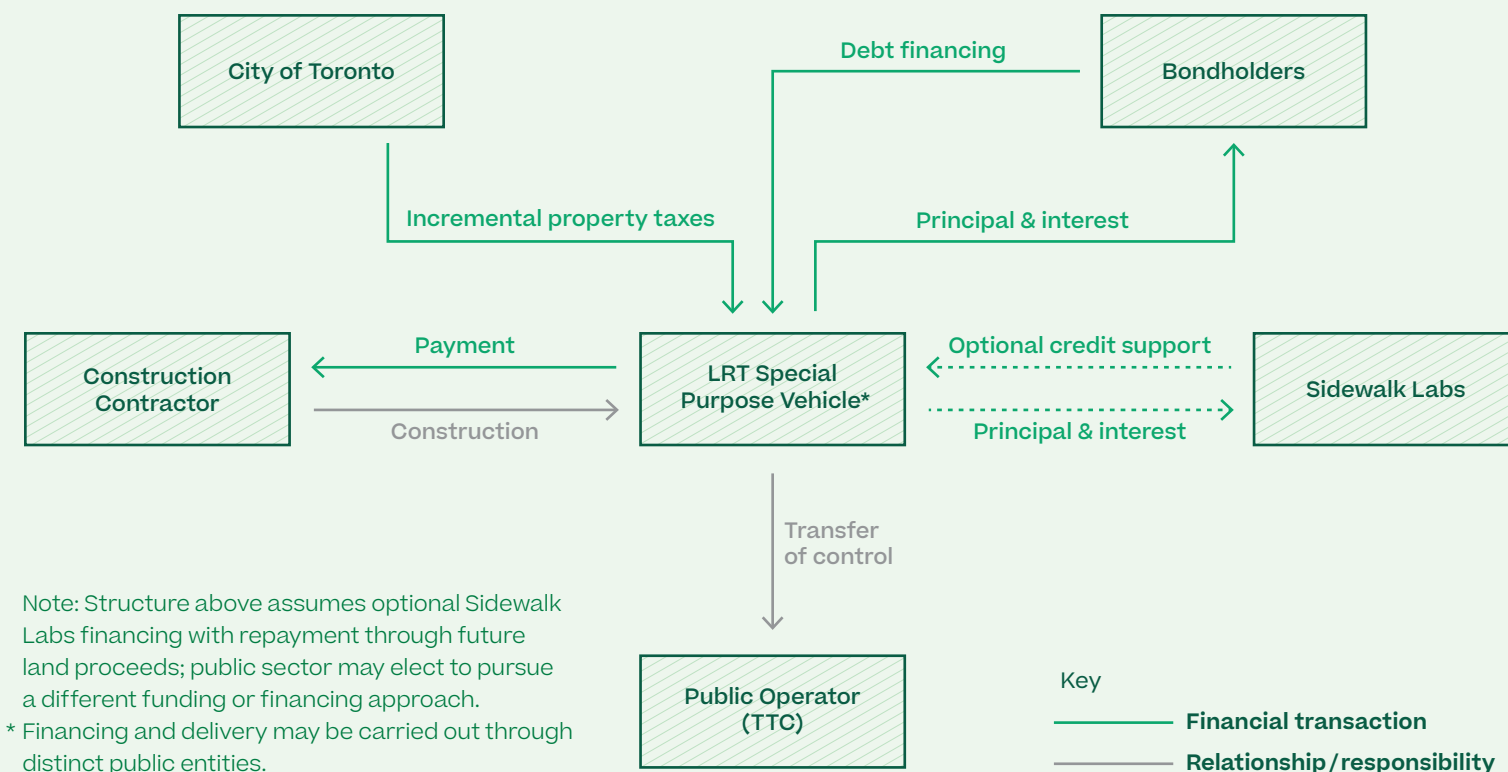


Based on this initial model, lenders underwriting a conservative downside scenario for financing the portions of Segments 2 through 4 within the IDEA District would require an interest backstop estimated at \$15 to \$25 million (as compared to Sidewalk's offer of \$50 million in credit support for these segments). A preliminary analysis of the financing of Segments 5 through 7, meanwhile, suggests that a backstop may not be required at all.

While the financial offer assumes that the public sector decides to employ a TIF approach, Sidewalk Labs recognizes this is not the only option for financing. Sidewalk Labs stands ready to engage with Waterfront Toronto and the stakeholder governments on a mutually agreeable structure for accelerating the financing of the Waterfront East LRT through other means as well.

Of course, no financial support would be needed if the government funds the project itself or secures an alternative financing source. Regardless of how the light rail extension is financed, Sidewalk Labs does not seek to diminish the TTC's role as provider of public transit in Toronto, and expects that the TTC would own, operate, and maintain the LRT extension, and would collect and retain all fares.

**Fig. 2.10**  
**How tax-increment financing could fund the LRT**



## Role 4B: Municipal infrastructure

Sewers, roads, public spaces, and other traditional forms of municipal infrastructure have been the backbone of city building for centuries. Upgrading this municipal infrastructure is necessary for economic progress in the eastern waterfront and is a prerequisite for the advanced systems and strategies called for in the MIDP. With little funding for this crucial infrastructure in the city's five-year Development Charge Background Study, which identifies Toronto's future growth forecast and associated growth-related infrastructure needs and costs, Sidewalk Labs is prepared to finance certain infrastructure, as necessary, to accelerate development, as detailed below.

- **Public realm (surface and above).** Refers to improvements within parks, plazas, promenades, and streetscape areas, including finish grading, trees, landscape planting, paving, stormwater treatment, furnishings, lighting, site civil, digital infrastructure, audio / visual equipment, security, and signature features like structural canopies and floating elements.
- **Shoreline.** Includes lakefill, dockwall replacement and repair, and revetments.
- **Bridges.** Includes pedestrian and vehicular bridges exclusive of bridges associated with LRT improvements covered separately in the LRT program.

### Program

Municipal infrastructure consists of horizontal systems and facilitating sitework that follows city standards, connects to a larger city grid or network of facilities, and is operated and maintained by the city. Municipal infrastructure falls into the following categories:

- **Sitework.** Includes demolition, ground improvement, remediation, and grading in future areas of public right of way, parks and open space.
- **Underground utilities.** Systems include domestic water, sanitary sewer, and storm-drain conveyance, including downstream grey infrastructure and outfalls.

The table below provides estimated total costs based on preliminary designs to construct municipal infrastructure for Quayside, Villiers West, and the IDEA District overall. Importantly, these cost estimates are presented for completeness, but are expected to change during design and development and based on new information. In addition, they exclude BAU horizontal avoided costs and do not account for financing costs or inflation.

When this volume went to print, Sidewalk Labs and Waterfront Toronto were engaged in active discussions about the actual costs associated with particular cost categories. These discussions could lead to revised cost estimates.

**Fig. 2.11**  
**Estimated costs for municipal infrastructure**

	Quayside (Millions ±15%)	Villiers West (Millions ±15%)	IDEA District (Millions ±15%)
<b>Estimated Cost</b>	\$240	\$180	\$1,860

Note: Figures in 2019 dollars; the equivalent total cost is adjusted for inflation when it is presented in Chapter 3.

## Financing

In standard practice, the city levies development charges (DCs) on developers to fund municipal infrastructure and related work to support the increased services necessitated by new development citywide, including transit, life-safety facilities, parks and recreation, roads, utility infrastructure, educational facilities, public arts, and civic improvements. In accordance with the Development Charges Act (Ontario), the city conducts a five-year background study identifying priority projects. It then amends its DC rates based on the 10-year forecast for municipal infrastructure projects in the DC Background Study and the amount of new development expected to fund the work.

Historically, Waterfront Toronto would use land proceeds and infrastructure contributions, such as one in the East Bayfront zoning bylaw,

to fund a phased buildout. Some of these infrastructure costs would be recouped from later developers through front-ending agreements. This financing approach has a significant drawback: the capital needed to fund municipal infrastructure is often not available at the pace or scale required, causing horizontal development to proceed in a piecemeal fashion. The city approach to completing non-local infrastructure has similar drawbacks, proceeding in sporadic bursts based on a plan designated years earlier. These traditional approaches to financing and building municipal infrastructure would prevent or slow development and delay Waterfront Toronto in achieving its policy objectives.

The MIDP proposes constructing municipal infrastructure in phases ahead of the vertical development it supports. Accordingly, the project would incur infrastructure costs before developer contributions from those

vertical developments are available to pay for that infrastructure. Sidewalk Labs anticipates that Waterfront Toronto would deliver needed shoreline and sitework through traditional mechanisms within Quayside and Villiers West. For the rest of the municipal infrastructure needed for the IDEA District, Sidewalk Labs proposes front-end financing, to bridge the gap between when funds are needed to begin construction and when Waterfront Toronto realizes the revenue to pay for it.

Any optional financing for municipal infrastructure Sidewalk Labs arranges would carry a market rate of return to be negotiated. Sidewalk Labs is committed to working with government, pension funds, and other institutional investors to develop transaction structures that can reduce the rate as low as possible, while still attracting the capital necessary to finance the investment.

Because the public administrator would deliver substantial amounts of municipal infrastructure — infrastructure of a type typically funded by DCs — the public administrator would seek a reduction in the DCs developers would pay to the city. Specifically, the project would seek a full credit to the public art fee and a partial credit to the city standard DCs for district and citywide facilities it would deliver. This credit would be negotiated as part

of the Implementation Agreements. Future developers would then be obligated to pay for remaining city fees and DCs discounted by the amount of the credits.

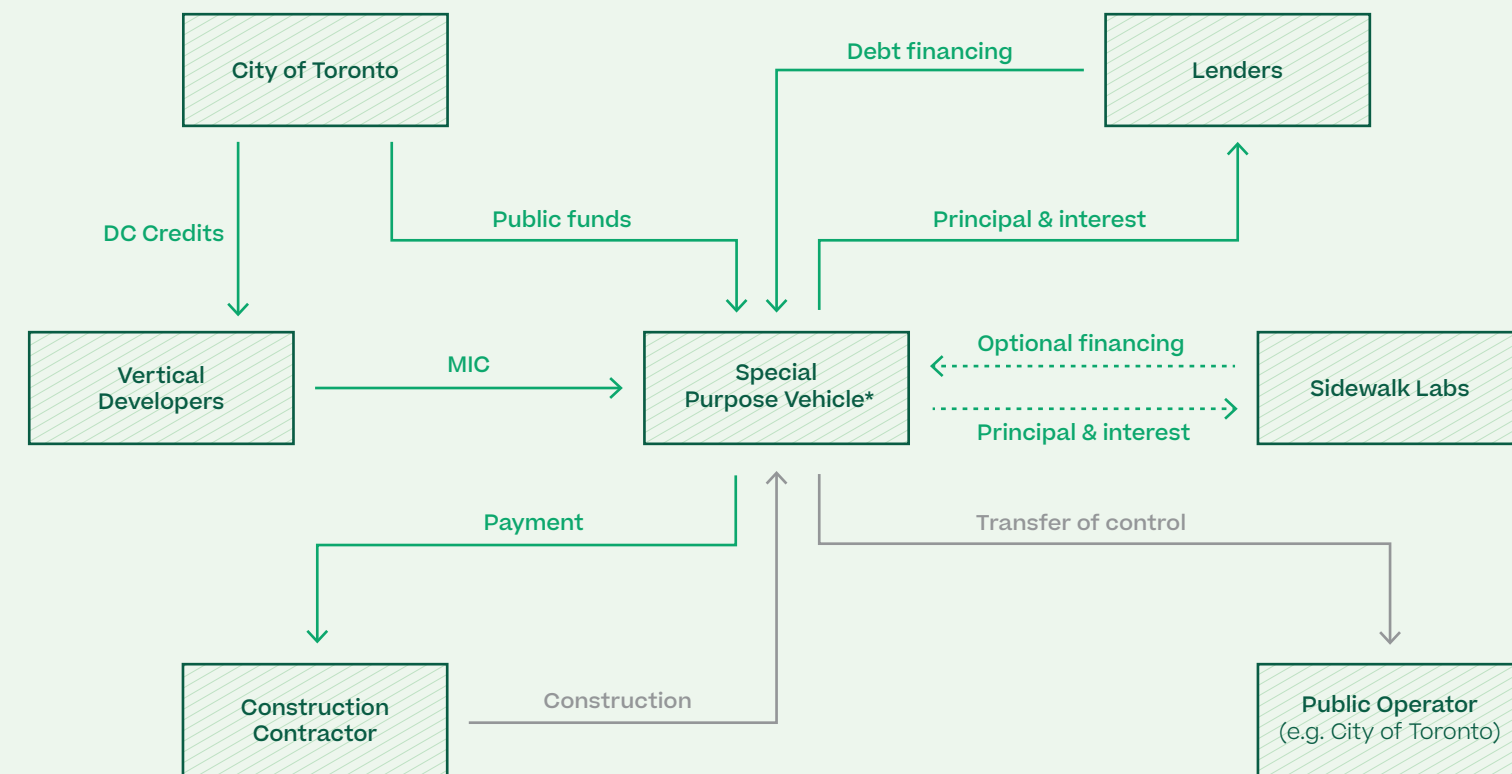
Developers would then pay the public administrator a municipal infrastructure contribution (MIC) in the amount of the negotiated credits.

Thus, vertical developers would pay the same amount for municipal infrastructure as before: the combined cost of the reduced city fees and development charges plus the MIC would equal the standard city fees and DCs. The MIC funds collected would be applied to paying the outstanding costs of municipal infrastructure.

Based on current projections, after vertical developers make their infrastructure contributions there would be a funding shortfall of approximately \$300 million (+/- 15%) at the completion of the IDEA District that could be funded through various sources, including the proceeds from the future public land sales.

*As reflected in the table that follows and more fully described in the next section, vertical developers in the IDEA District would also make a local infrastructure contribution (LIC) equivalent to their avoided costs due to certain advanced systems.*

Fig. 2.12  
**Financing municipal infrastructure**



Note: Structure below assumes optional Sidewalk Labs financing with repayment through future land proceeds; public sector may elect to pursue a different funding or financing approach

\* Financing and delivery may be carried out through distinct public entities.

Key  
— Financial transaction  
— Relationship/responsibility

A vision of the future Polson Quay neighbourhood in the River District.



Fig. 2.13

## City fee & development charge credits and developer infrastructure contributions

Fee	Use	Payment	Source	Applicable To
<b>Discounted City Fees and Development Charges</b>	Citywide projects to support growth associated with new development	Developer to City of Toronto	Developer payment of published city fees and development charges discounted by amount of credits	Separate rates for residential and non-residential, discounted rate for affordable
<b>Municipal Infrastructure Contribution (MIC)</b>	Municipal infrastructure work delivered by project in lieu of fees and DC payment to city  BAU horizontal avoided cost payment* to WTMA to subsidize dynamic streets in lieu of standard roads	Developer to public administrator	Developer payment in an amount equal to the credits	Separate rates for residential and non-residential, discounted rate for affordable
<b>Local Infrastructure Contribution (LIC)</b> (see Page 140)	BAU horizontal avoided cost payment* to advanced systems operators to subsidize advanced power grid and thermal grid in lieu of standard electric and gas distribution, including service connections  BAU vertical avoided cost payment to cover capital costs of advanced systems that replace traditional building systems	Developer to public administrator	Contribution based on estimated avoided cost for standard electric and gas distribution, and other traditional building systems replaced by advanced systems	Market-rate residential only

\* Sidewalk Labs may provide front-end financing.

## Role 4C: Advanced systems

Advanced Systems consist of three categories:

- **Mobility.** Advanced mobility systems that would be operated by WTMA. These include dynamic streets, the freight management system, the mobility subscription package, and the district parking management system
- **Sustainability.** Advanced sustainability systems, which include privately operated horizontal infrastructure implemented at a district scale, to be overseen by the WSA. This encompasses privately operated horizontal infrastructure implemented at a district scale, such as the advanced power grid, thermal grid, waste management system, and stormwater management system
- **Digital Innovation.** The digital communications network, which would be coordinated by the public administrator through Waterfront Toronto's broadband internet partner

### Program

The table on the following page reflects preliminary cost estimates based on preliminary designs for the advanced systems in 2019 dollars, excluding District Parking Management and Mobility Subscription Package, for which estimates are not yet available. Importantly, these cost estimates are presented for completeness, but are expected to change during design and development, and do not account for financing costs or inflation. (See Page 92 for a complete description of the proposed systems.)

### Financing

Prospective operators of advanced systems would commit to privately fund the design, construction, and operation of the advanced systems for a specified period. Funding for the capital costs of the systems would come from three sources:

- Vertical developers
- Assistance from Sidewalk Labs in the early phases
- Future user rates

To ensure that user rates remain consistent with prevailing BAU rates, a key term of the master services agreement with the advanced system operator would be to cap user rates. In its financial models, Sidewalk Labs assumed that aggregate utility bills for end users could not exceed BAU rates by more than 5 to 10 percent.

### Capital cost funding from vertical developers.

Advanced systems would replace various horizontal and vertical systems that developers would pay for in the normal course. These include municipal infrastructure, which developers ordinarily pay for through development charges or deliver directly. The advanced systems also replace certain standard private systems that developers typically pay for directly — such as the thermal grid replacing traditional gas mains and service connections — and avoid the need for certain building systems, such as boilers and chillers.

Fig. 2.14

## Preliminary cost estimates for advanced systems

Advanced System	Quayside & Villiers West (Millions ±15%)	Remainder of River District (Millions ±15%)	Total Cost (Millions ±15%)
Advanced Power Grid	\$100	\$510	\$610
Thermal Grid	\$90	\$370	\$460
Waste Management*	\$10	\$50	\$60
Stormwater Management	\$30	\$120	\$150
Freight Management*	\$50	\$370	\$430
Dynamic Streets	\$70	\$290	\$360
<b>Total</b>	<b>\$350</b>	<b>\$1,710</b>	<b>\$2,070</b>

\* Includes distribution infrastructure systems only. Building systems included in vertical proforma.  
 Note: Figures in 2019 dollars; the equivalent total cost is adjusted for inflation when it is presented in Chapter 3.

As discussed earlier with respect to municipal infrastructure financing generally, vertical developers would make a payment — referred to as a MIC — that is equivalent to the reduction in certain DCs for municipal infrastructure. A portion of the MIC would cover the dynamic streets that replace standard roads.

Similarly, where an advanced system replaces a BAU horizontal or vertical system that is typically funded by the vertical developer, Sidewalk Labs proposes that the vertical developer make a payment, referred to here as a local infrastructure contribution (LIC), equivalent to the avoided costs. In the case of BAU horizontal systems, specifically gas and power, these would be equivalent to the connection fees paid to Toronto Hydro or Enbridge. For replaced BAU vertical systems, these would be the building costs avoided, such as saving on the standard waste rooms, compactors, loading docks, and waste-operation staff due to the consolidated pneumatic waste system. The public administrator would then provide the LIC funds to cover a portion of the capital costs for the replacement system.

The total cost of discounted DCs plus district-specific MIC and LIC fees would equal the BAU cost of the standard DCs plus traditional developer costs for local infrastructure and building systems. The proposed approach therefore would not increase the size of the outlay for a developer or have a negative impact on residual land value. While the proposed distribution of infrastructure payments differs from BAU, the total outlay from a developer would remain the same.

Because MIC and LIC funds are only applicable to certain land uses, and the distribution of land uses varies by neighbourhood, these charges would be estimated for the entire district in advance and allocated accordingly. The estimate would be revised at the start of each new precinct to allow for incremental adjustments as the project progresses.

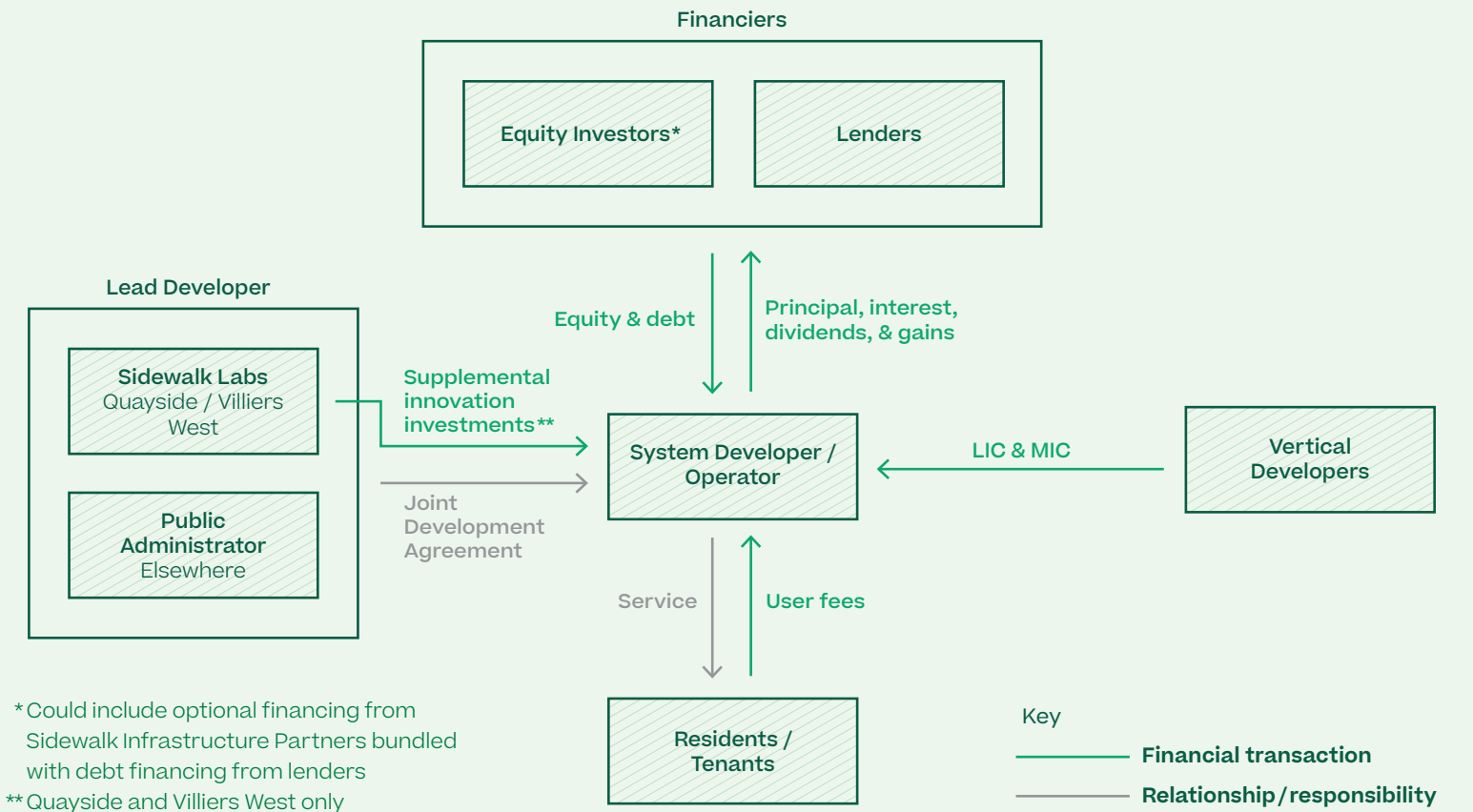
### User rates and supplemental innovation investments.

Advanced system operators would also utilize user rates to recover capital costs and fund operational expenses. Operators

Fig. 2.15

## Private funding for advanced system

The chart below details how advanced systems would be funded. The availability of the various funding streams varies by system.



\* Could include optional financing from Sidewalk Infrastructure Partners bundled with debt financing from lenders

\*\* Quayside and Villiers West only

Fig. 2.16

## Estimated supplemental innovation investments

Advanced Systems (Quayside and Villiers West)	Advanced Power Grid (Millions ±15%)	Thermal Grid (Millions ±15%)	Total Cost (Millions ±15%)
Total system capital costs*	\$102	\$90	\$192
Capital costs recoverable through user rates and developer contributions**	\$83	\$64	\$147
<b>Supplemental innovation investment (difference)</b>	<b>\$19</b>	<b>\$26</b>	<b>\$45</b>

\* System capital costs reflect preliminary estimates, which are subject to change.

\*\* End user rate target of no greater than 10 percent higher than BAU utility rates.

would be contractually required to keep the rates charged to residents and businesses in line with prevailing BAU rates. Sidewalk Labs has completed financial modelling for each proposed system targeting utility bill costs for end users of no more than 5 to 10 percent higher than current BAU rates. This deviation reflects the premium service, which is expected to be less volatile than BAU utilities. (As referenced later, in certain instances, aggregate utility rates are expected to fall.)

The modelling indicates that developer contributions (i.e. the MIC and LIC) together with acceptable user rates could not cover the full capital costs of two advanced sustainability systems: the advanced power grid and the thermal grid. To cover this shortfall in the early stages and make these systems market viable, Sidewalk Labs is prepared to make “supplemental innovation investments.” As reflected in the table on the previous page, Sidewalk Labs estimates that supplemental innovation investments of about \$45 million would be needed. Subsequent phases are not anticipated to require supplemental innovation investments due to economies of scale.

Sidewalk Labs commissioned a preliminary cost-of-living analysis to determine how utility costs in the IDEA District would compare with other neighbourhoods in Toronto. This analysis

found that, depending on household composition and unit size, average utility costs in the IDEA District would be between 1.4 percent lower and 4.9 percent higher than standard rates. This is despite delivering a level of sustainability unavailable in other areas of the city.

In the event that a proposed system requires funding that materially exceeds the anticipated investment, Sidewalk Labs would work with Waterfront Toronto to bring down capital costs or identify alternative approaches that accomplish the project objectives.

The avoided cost contributions (i.e. MIC and LIC) would defray a portion of the capital costs for advanced systems. While user rates would be available to cover other capital costs, these revenues only accrue after the advanced system is operational. The result is that the advanced system operators would likely require financing to deliver a working system.

Due to the timing gap between when the payment is due and when the developer payment is available, Sidewalk Labs is proposing to provide front-end financing for avoided cost contributions to advanced systems operators. This financing would be reimbursed through MIC and LIC by the public administrator, subject to the rate of return associated with municipal infrastructure.

Fig. 2.17

## Summary of funding sources for advanced systems

The table below describes three types of private capital cost funding available to advanced system operators — two from charges for vertical developers and one from Sidewalk Labs. Combined with user rates, these constitute the primary sources of revenue for advanced system operators.

Contribution	Applied To	Payer	Timing
<b>BAU Horizontal Avoided Cost Payment* (MIC or LIC)</b>	Costs that a horizontal developer would have incurred in a BAU development to deliver enabling infrastructure	Vertical developer to operator via the public administrator <ul style="list-style-type: none"> <li>→ MIC for roads</li> <li>→ LIC for gas and electrical distribution</li> </ul>	Issuance of building permit
<b>BAU Vertical Avoided Cost Payment* (LIC only)</b>	Costs that a vertical developer would have incurred in a BAU development to deliver building services	Vertical developer to operator via the public administrator	Issuance of building permit
<b>Supplemental Innovation Investments</b>	Additional contribution needed to make the system economically viable in early phases due to higher cost of first installation and lesser economies of scale prior to expansion across the IDEA District	Sidewalk Labs to operator	At operator’s notice to proceed for construction

\* Only available for specific systems. For further detail, see Page 144.

A vision for the future McCleary neighbourhood in the River District.



Fig. 2.18

## BAU horizontal systems compared with advanced systems

The table below compares BAU horizontal systems – the conventional systems that deliver services, such as heating and electricity, to multiple development sites – to the advanced systems proposed to replace them.

System	BAU Horizontal Payment	BAU Horizontal System Replaced	Horizontal Advanced System
<b>Advanced Power Grid</b>	Yes	Electric distribution and system-wide improvements	Electric distribution and system-wide improvements, master meter, Distributed Energy Resource Management Systems, photovoltaic battery storage, predictable billing
<b>Thermal Grid</b>	Yes	Gas distribution for heating and hot water, electric distribution for cooling, system-wide improvements	Thermal loop that could include neighbourhood energy plants, geexchange, and / or heat recovery
<b>Waste Management</b>	No	N/A (curbside pickup)	Pneumatic waste collection tubes to a central collection facility with user feedback on community recycling
<b>Stormwater Management</b>	No	N/A (stormwater management in park parcels carried separately)	District green infrastructure with continuous monitoring and active control (CMAC)*
<b>Freight Management</b>	No	N/A	Network of tunnels, centralized neighbourhood logistics hub and fleet of delivery robots
<b>Dynamic Streets</b>	Yes (MIC)	Standard pavement section, traffic signals, static striping, signage	Modular paving with heating, traffic management, dynamic lighting, signals, and signs
<b>District Parking Management</b>	No	On-street parking available	Short-term visitor parking managed through shared off-street parking facility
<b>Mobility Subscription Package</b>	No	N/A	A subscription for transit, bike-share, car-share, and other services that provide discounts and other incentives to use modes other than private car
<b>Digital Communications Network</b>	Not included in advanced system procurement		

\* Stormwater management in parks treated as part of the municipal infrastructure cost. Green infrastructure provides incidental benefit to street right-of-way (ROW).

Fig. 2.19

## BAU in-building systems compared to advanced building systems

The table below provides a detailed comparison of the BAU vertical systems – the elements inside a conventional building necessary to deliver heating, electricity, or other services – to the advanced building systems that would replace them.

System	BAU Vertical Payment	BAU In-Building System	Advanced Building System
<b>Advanced Power Grid</b>	Yes	Building meters, unit submetering, building transformers and switchgear	Advanced submetering and automation
<b>Thermal Grid</b>	Yes	Boilers for heating and hot water, chillers for cooling, building pumps	May include neighbourhood or building waste-heat recovery, building energy plants, building energy transfer stations, or similar strategies
<b>Waste Management</b>	Yes	Vertical chutes, waste rooms, compactors, loading docks, and waste-operations staff	Vertical chutes, pay-as-you-throw interface and valve rooms
<b>Stormwater Management</b>	Yes	Stormwater management infrastructure, such as detention tanks and rainwater treatment for reuse	Addition of green infrastructure with CMAC to offset stormwater infrastructure in buildings
<b>Freight Management</b>	No	Individual loading docks and building-operations staff	Smart containers and delivery robots
<b>Dynamic Streets</b>	Yes	Standard pavement section, street lights, striping, signage, and traffic signals	Modular paving with heating, traffic management, dynamic lighting, signals, and signs
<b>District Parking Management</b>	No	Number of parking spaces for each building dictated by bylaw	Pooled on-site and off-site shared parking facilities, managed by attendants, and pricing and regulation strategies
<b>Mobility Subscription Package</b>	No	N/A	N/A
<b>Digital Communications Network</b>	Not included in advanced system procurement		


## Additional expenses

Each advanced system operator would be responsible for certain fees, including compensation of the lead developer for advanced systems (i.e. initially Sidewalk Labs and later the public administrator) and covering the costs of the Waterfront Sustainability Association to maintain ongoing operational oversight of advanced systems.

### Preliminary design fees.

The operators would reimburse the lead developer of advanced systems — Sidewalk Labs at Quayside and Villiers and the public administrator elsewhere in the IDEA District — for the costs of preparing any preliminary designs, issued with the procurement documents, required to supplement the ITMP for certain systems. As applicable, the procurement documents will identify the preliminary design fees as a lump-sum amount, and payment will be due at the time of construction notice to proceed.

### Advanced system development fees.

Third-party operators would compensate Sidewalk Labs directly for its responsibilities as lead developer of advanced systems at Quayside and Villiers West. This includes reimbursement for the costs of preparing the preliminary designs, plans, and specifications issued with the procurement documents for certain systems, as needed. Any applicable preliminary design fees would be identified in the procurement documents as a lump-sum amount and payment would be due at the time of construction notice to proceed. 

The operators would also pay advanced system development fees applied as a percentage of project costs specified up front in the procurement documents. This fee would vary based on the degree of Sidewalk Labs' participation required. Where the operator is responsible for a turnkey design-build-operate approach, and where Sidewalk Labs' participation would be limited to coordination of design and delivery, the advanced system development fee is expected to be in the range of 2 percent of system costs. Where Sidewalk Labs serves as program manager in a co-development role with the operator, a fee of up to 7 percent would be negotiated with the operator on a system-by-system basis.

In later phases, when the public administrator assumes the lead developer role for advanced systems, the operator would similarly compensate the public administrator for its work, including preliminary design fees, as applicable, and a program management fee of up to 7 percent of system costs. The public administrator would negotiate these fees directly with operators.

### Public administrator sustainability fees.

The Waterfront Sustainability Administrator's general and administrative expenses and the cost of financial, technical, and legal consultants would be charged to the operators on a prorated basis relative to their revenues. The amount of these fees would vary depending on the costs incurred and the nature and extent of the operations. Legal fees associated with any failure to perform, arbitration, or termination would be borne by the operator at fault. See Chapter 1 for further details about the WSA.

## Optional financing from Sidewalk Infrastructure Partners

Sidewalk Labs is on the frontlines of the design and implementation of new advanced systems that would enable communities to achieve aspirational sustainability and mobility goals. But a gap currently exists in the ability to fund these systems; because the risk-return profile of advanced infrastructure systems differs from traditional infrastructure investments, traditional infrastructure investors may shy away from the investment. Sidewalk Labs has created Sidewalk Infrastructure Partners (SIP) — a company uniquely focused on technology-enabled infrastructure — to fill this gap and create a path for infrastructure delivery that both proceeds at a rapid pace and achieves ambitious goals for mobility, sustainability, and other public objectives. By helping to close the infrastructure funding gap, this approach would lower the cost of capital and thereby reduce costs for those who use advanced systems.

The MIDP proposes a series of advanced systems that are less familiar to the market and may therefore be more difficult to finance at reasonable rates. SIP financing could

be instrumental to addressing this financing challenge — and to identifying the lowest possible cost of capital to fund the design, construction, and operations of the proposed systems. Working with potential lenders, including those with an interest in advancing Canadian infrastructure, SIP would seek to reduce certain risks associated with the new systems, such as absorption risk (i.e. the risk that buyers or renters might be more hesitant to move to a unit with an advanced system). This could attract investors who might not otherwise participate. SIP could then structure a transaction that bundles debt financing negotiated with lenders with equity financing offered by SIP for multiple advanced systems.

The SIP investment and financing package would be offered as an option for the advanced system operator and described in the request for proposals or other procurement documents. This eliminates the need for an operator to provide its own capital, expanding the pool of potential respondents. The financing would therefore enable the best potential partners to respond, ensuring not only world-class infrastructure development but also reducing costs for the users of advanced systems.

Importantly, SIP would not privatize or operate Toronto's existing traditional infrastructure, or affect expansions of traditional infrastructure systems (such as roads, highways, and transit) by the public or private sector. Moreover, procurement respondents who wish to control the financing or retain ownership of the asset as part of their long-term business model may use their own source of capital. In this event, SIP would serve as a market maker, setting a benchmark for procurement respondents with their own capital in a competitive process with other respondents.

## Sidewalk Infrastructure Partners

Sidewalk Labs has created Sidewalk Infrastructure Partners (SIP), a unique company backed by Sidewalk Labs and Alphabet that seeks to bring together world-leading partners to focus on catalyzing technology-enabled infrastructure. Emerging technologies such as autonomous vehicles, distributed renewable energy, real-time controls, robotics, and machine learning are poised to both disrupt and enable infrastructure. Historically, infrastructure as an asset class has been resistant to innovation, resulting in many traditional infrastructure investors mispricing the risks of technology disruption and failing to capitalize on new infrastructure opportunities enabled by technology. SIP hopes to help close this gap.

SIP aims to catalyze innovation in both companies applying technologies to enhance infrastructure performance and underlying advanced infrastructure projects utilizing such technologies. SIP will focus on verticals including advanced mobility and energy, water and waste, and digital and social infrastructure throughout North America, including providing the option of financing for advanced systems. Bringing together an experienced team with world-leading partners, SIP will seek to facilitate the application of technology to enable more sustainable, distributed and intelligent urban infrastructure, creating jobs, improving mobility, and advancing cleaner water and waste and more environmentally friendly and renewable energy.



See Chapter 3 for more detail.

# Transaction Economics

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## Introduction

p150

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## Sources and Uses of Funds

p156

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## Public Sector Impact

p166

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## Sidewalk Labs' Returns

p174



# Introduction

Overall, the transaction structure seeks to reflect Sidewalk Labs’ final transaction principle: to align the interests of Sidewalk Labs, Waterfront Toronto, its stakeholders, and the public.

The proposed transaction meets that goal, delivering substantial economic value to the public sector while enabling Sidewalk Labs to earn a reasonable and fair return for its multiple roles (as detailed fully in Chapter 2), and providing flexibility to government in how the project is implemented — particularly related to infrastructure financing. This chapter, which includes the transaction’s forecasted economics, addresses Sidewalk Labs’ investments, the investments by third parties, the costs for all parties, and the project’s expected impact for the public sector, Sidewalk Labs, and the people of Toronto.

The project would deliver billions in new investment dollars, initially from Sidewalk Labs and partners, and spurring many times that from others — establishing a new model for sustainable city building and achieving the priority outcomes of Waterfront Toronto. The transaction and the economic activity it would generate would deliver enormous value to the City of Toronto, the Province of Ontario, and the people of Canada — as shown in analyses by Sidewalk Labs and urbanMetrics, a third-party economic impact consultancy — at a scale far greater and a pace far faster than the baseline scenario.

In its entirety, the proposal contemplates leveraging private-sector resources to deliver over 30 percent more square feet of development on a timeline at least 10 years faster than the current plan. Under a baseline scenario — developed by urbanMetrics and based upon the Portlands Planning Framework — the IDEA District geography would see 24.4 million square feet of development by 2050. By contrast, implementing the MIDP would produce 32.8 million square feet of development a full decade ahead of schedule, by 2040.

This accelerated development would include a significantly (almost two times) larger commercial component — catalyzed and made economically viable by the relocation of Google’s Canadian headquarters to an Innovation Campus on Villiers Island — that employs more people, generates greater tax revenue, and adds more to the Canadian GDP than would a more single-use, residential neighbourhood.

According to the analysis by urbanMetrics, in total, the project would generate approximately \$4.3 billion in annual municipal, provincial, and federal tax revenues; add \$14.2 billion annually to the Canadian gross domestic product (GDP); and create a total of 44,000 permanent jobs (93,000 total direct, indirect, and induced) by 2050.<sup>78</sup> To construct a baseline for comparison purposes, urbanMetrics assumed that baseline development would proceed based on the current set of government-created planning documents for the project geography (including zoning where it exists, precinct plans, and the Port Lands Planning Framework). As shown on the table below, the project would generate \$2.8 billion more in annual tax revenues (including personal tax, corporate tax, property tax, and other taxes), a \$9 billion increase in GDP, and 27,000 more jobs than the baseline scenario.

## A note on the figures included within this chapter

The information presented in this chapter is based on Sidewalk Labs’ internal financial analysis, conducted throughout the MIDP process, as well as guidance and validation from external firms with expertise in local Toronto real estate and policy, construction cost estimation, and infrastructure finance. While all terms and outputs would evolve through continued discussions with government, adjustments in the proposed transaction terms, and further analysis based on those discussions, Sidewalk Labs believes the financials demonstrate the viability of the approach, the inherent creation of value, and the alignment of interests. Both parties agree that the terms of any eventual transaction must be entirely transparent.

Fig. 3.1

## Summary of economic impact over baseline in 2050

	Baseline Scenario	IDEA District	Improvement Over Baseline
<b>Total Tax Revenues (Annual)*</b>	\$1.5 billion	\$4.3 billion	+\$2.8 billion (187% increase)
<b>GDP (Annual)</b>	\$5.1 billion	\$14.2 billion	+\$9.0 billion (178% increase)
<b>Direct Job Growth (Total)</b>	17,000 jobs	44,000 jobs	+27,000 jobs (159% increase)

Note: The above figures are from an economic analysis and report provided by urbanMetrics to Sidewalk Labs, and are presented in 2019 dollars.<sup>79</sup>

\* Other taxes include: Federal Trading Profits, Federal Gas Tax, Federal Excise Tax, Federal Duty Tax, Federal Environmental Tax, Federal Air Transportation Tax, Federal Sales Tax, Import Duties, Federal Taxes on Production, Provincial Environment Tax, Provincial Gallon Tax, Provincial Trading Profits, Provincial Gas Tax, Provincial Amusement Tax, Other Provincial Consumption Taxes, Provincial Sales Tax, Provincial Harmonized Sales Tax, Provincial Taxes on Production, Municipal Amusement Tax, Municipal Sales Tax and Municipal Taxes on Production.

Fig. 3.2

## Increase in City of Toronto revenue streams through 2050

Revenue Stream	Baseline Scenario	IDEA District	Improvement Over Baseline
City Property Taxes (Cumulative)	\$1.6 billion	\$2.8 billion	+\$1.2 billion (+75%)
Development Charges (Cumulative)	\$2.1 billion	\$3.8 billion	+\$1.7 billion (+81%)
Total Proceeds From the Sale of Public Land	\$0.9 billion	\$2.4 billion	+\$1.5 billion (+167%)
<b>Total</b>	<b>\$4.6 billion</b>	<b>\$9.0 billion</b>	<b>+\$4.4 billion (+96%)</b>

Note: The above figures are adjusted for inflation.

Beyond these broader benefits, Sidewalk Labs' analysis suggests that the project would increase and accelerate the receipt of three major municipal revenue streams: property taxes, city fees and development charges, and land proceeds from the sale of public land within the project area.

The value created for the public sector on this accelerated timeline results from a series of upfront investments in innovation from Sidewalk Labs, and the implementation of the robust public-private partnership described in the previous two chapters.

In aggregate, Sidewalk Labs and its partners would invest an estimated \$900 million in the four roles described in Chapter 2, in addition to reinvesting over \$2 billion of proceeds received as the project progresses. This total does not include an additional \$400 million of potential financing that Sidewalk Labs would offer as an option to the public sector as part of the broader transaction for the LRT expansion and municipal infrastructure delivery, nor

the almost \$1.2 billion in total capital (equity and debt) that Sidewalk Labs expects to enable for the delivery of advanced systems. It also does not include construction financing that Sidewalk Labs would secure as part of its proposed real estate development at Quayside and Villiers West.

The chart on the following page summarizes the sources and uses of funds for the entire \$39 billion project, identifies where Sidewalk Labs is providing funding or financing (including optional financing offered to the public sector), and shows the estimated third-party real estate investment expected to follow — over \$29 billion, which Sidewalk Labs projects will be the total amount of money invested by others to develop the entirety of the IDEA District beyond Quayside and Villiers West.

**The project would generate more revenue for the City of Toronto, and on an accelerated timeline, from three sources: property taxes, city fees and development charges, and land proceeds.**

Fig. 3.3

# Sources and uses of funds

Uses (Preliminary Analysis for Indicative Purposes)	Uses (\$M)	Sources (Preliminary Analysis for Indicative Purposes)	Sources (\$M)	Sidewalk Labs (and Partners) Funding & Financing Support (\$M)
<b>Real Estate (Quayside + Villiers West ONLY)</b>				
Hard Costs <sup>A</sup>	2,840	Sidewalk Labs (and Partners) Equity Investment <sup>B</sup>	595	595
Soft Costs (incl. design, contin- gency, G&A, land payment, taxes, interest, and fees) <sup>C</sup>	1,090	Sidewalk Labs (and Partners) Equity Investment in Below-Market Housing <sup>B</sup>	110	110
		Construction Financing	735	
		Reinvested Proceeds (Reinvested Equity)	2,405	
		Government Affordable Housing Grants <sup>D</sup>	85	
<b>Total Real Estate Uses</b>	<b>3,930</b>	<b>Total Real Estate Sources</b>	<b>3,930</b>	<b>705</b>
<b>LRT</b>				
Total Capital Costs <sup>E</sup>	430	Debt Financing (backed via value capture mechanism) <sup>F</sup>	430	
		Traditional Government Funding <sup>G</sup>		
<b>Total LRT Uses</b>	<b>430</b>	<b>Total LRT Sources</b>	<b>430</b>	
		Optional Sidewalk Labs Credit Sup- port to Fill Timing Gap in Funding <sup>H</sup>		100
<b>Municipal Infrastructure (IDEA District)<sup>I</sup></b>				
Total Capital Costs	2,340	Traditional Government Funding <sup>G,1</sup>	150	
		Municipal Infrastructure Contribution - Muni (excludes Roads) <sup>J</sup>	1,860	
		Additional Public Sources	330	
<b>Total Municipal Infrastructure Uses</b>	<b>2,340</b>	<b>Total Municipal Infrastructure Sources</b>	<b>2,340</b>	
		Optional Sidewalk Labs Credit Facility to Front-End Infrastructure <sup>H</sup>		300

Note: The above figures are adjusted for inflation.  
<sup>A</sup> Inclusive of above-standard costs incurred by Sidewalk Labs as part of the innovation agenda.  
<sup>B</sup> "Sidewalk Labs (and Partners) Equity" refers to equity from Sidewalk Labs and potential local development/capital partners.  
<sup>C</sup> Additional density, which would increase all costs related to the project, could also enable a larger land payment.  
<sup>D</sup> Reflects existing government affordable housing programs.

<sup>E</sup> Total capital cost for LRT includes the portions of Segments 2 and 4 within the IDEA District, as well as Segments 5 through 7, as defined in Chapter 2.  
<sup>F</sup> Third-party debt (or government bonds) could be repaid by incremental property taxes or other source identified by the public sector.  
<sup>G</sup> Use of traditional government funding could decrease or eliminate reliance on value capture mechanisms.  
<sup>H</sup> Credit support to be provided in exchange for a fixed market-rate return, to be negotiated.

<sup>I</sup> Includes sitework and shoreline for Quayside and Villiers West.  
<sup>J</sup> Municipal infrastructure contributions are paid by vertical developers to fund the project's municipal infrastructure, in an amount up to the credit received against city fees and development charges; if municipal infrastructure contributions are not sufficient to fund the entirety of the required infrastructure, additional sources such as land proceeds or traditional government funding would need to be utilized; excludes municipal infrastructure contribution to roads.

Uses (Preliminary Analysis for Indicative Purposes)	Uses (\$M)	Sources (Preliminary Analysis for Indicative Purposes)	Sources (\$M)	Sidewalk Labs (and Partners) Funding & Financing Support (\$M)
<b>Advanced Infrastructure (IDEA District)</b>				
Total Capital Costs	2,670	Third-party Financing, incl. Equity + Debt (potentially SIP)	1,165	
		Local Infrastructure Contribution - BAU Horizontal Costs	330	
		Local Infrastructure Contribution - BAU Vertical Costs	645	
		Municipal Infrastructure Contribution - Roads	485	
		Sidewalk Labs Equity (Supplemental Innovation Investment) <sup>K</sup>	45	45
<b>Total Advanced Infrastructure Uses</b>	<b>2,670</b>	<b>Total Advanced Infrastructure Sources</b>	<b>2,670</b>	<b>45</b>
<b>Additional Investments</b>				
Tall Timber Factory	80	Sidewalk Labs (and Partners) Equity <sup>B</sup>	90	90
Venture Fund	10			
<b>Total Additional Investments Uses</b>	<b>90</b>	<b>Total Additional Investments Sources</b>	<b>90</b>	<b>90</b>
<b>Additional Investments without Direct Return</b>				
MIDP Investment	65 <sup>L</sup>	Sidewalk Labs Equity	75	75
Urban Innovation Institute	10			
<b>Total Additional Investments without Direct Return Uses</b>	<b>75</b>	<b>Total Additional Investments without Direct Return Sources</b>	<b>75</b>	<b>75</b>
<b>Total Uses</b>	<b>9,535</b>	<b>Total Sources</b>	<b>9,535</b>	<b>915 (1,315 with optional financing)</b>
<b>Third-Party Real Estate (IDEA District, excluding Quayside and Villiers West)</b>				
Real Estate Uses <sup>M</sup>	29,130	Third-Party (Non-Sidewalk Labs) Equity + Debt	29,130	
<b>Total Third-Party Real Estate Uses</b>	<b>29,130</b>	<b>Total Third-Party Real Estate Sources</b>	<b>29,130</b>	
<b>Total Uses with Third-Party Real Estate</b>	<b>38,665</b>	<b>Total Sources with Third-Party Real Estate</b>	<b>38,665</b>	

<sup>K</sup> Size of innovation investment reflects current equity injection necessary at Quayside and Villiers West to achieve business as usual user utility rates.

<sup>L</sup> MIDP Investment reflected in CAD; equivalent to stated commitment of USD \$50M.

<sup>M</sup> Third-party real estate costs reflect Sidewalk Labs' internal projection of the third-party real estate catalyzed in the broader IDEA District by the project; at this geography, Sidewalk Labs will not have development rights or control over vertical development.

# Sources and Uses of Funds

In accordance with the transaction principles, Sidewalk has designed a comprehensive transaction framework that would ensure public sector control, deliver needed infrastructure, and, alongside local partners, utilize Sidewalk Labs' private-sector capital in targeted ways to fund an ambitious innovation agenda (and take the associated risk) and accelerate the delivery of the overall project. The result is a holistic, estimated \$39 billion dollar project that achieves Waterfront Toronto's priority outcomes.

## Real estate at Quayside and Villiers West

Sidewalk Labs' role as developer of real estate and advanced systems at Quayside and Villiers West is core to both achieving the project's objectives and its commercial viability. This role includes partnering to deliver two early-phase real estate development projects at Quayside and Villiers West at an estimated combined total cost of \$3.9 billion. These two projects, totalling approximately 5.4 million square feet (approximately 16 percent of the IDEA District's proposed 33 million square feet, and approximately 7 percent of the eastern waterfront by land area) would be the proving ground, where Sidewalk Labs would make special investments in order to demonstrate the impact and prove the financial viability of its innovations.

To deliver the combined program at Quayside and Villiers West, Sidewalk Labs would bring together funding from several sources, including an equity commitment from Sidewalk Labs and its partners, construction loans, certain existing affordable housing programs, and the reinvestment of proceeds received as the project progresses (such as proceeds from condo sales), each of which are standard sources of funds in traditional real estate projects. But Sidewalk Labs' approach includes two unique aspects. [The first is an additional equity investment to increase the amount of below-market housing at Quayside and Villiers West from the currently mandated 20 percent to 40 percent. This affordable housing investment totals \\$110 million for Quayside and Villiers West.](#)

The second is accepting as part of its equity commitment the above-standard costs required to implement the innovation agenda at Quayside and Villiers West, which may reduce returns.

Volume 1 and Chapter 2 of this volume provide more detail on the program and innovation agenda proposed in Quayside and at Villiers West to deliver on Waterfront Toronto's priority outcomes.

Because many of the innovations initiated in Quayside only become (1) financially viable, (2) effective in advancing Waterfront Toronto's priority outcomes, or (3) both, when extended to a broader geography, Quayside in isolation is anticipated to result in subpar returns. However when considered in aggregate with the proposed development at Villiers West, Sidewalk projects the combined real estate project to result in a blended return in line with market expectations for real estate development, in large part due to the value the Google Canadian headquarters brings to the Villiers West site.

### Quayside real estate

The Quayside plan is only feasible if all parties recognize that the risk profile associated with forging new development models and proving the effectiveness and financial viability of innovative solutions is fundamentally different than the risk profile of a market-standard project. This is precisely the obstacle that limits meaningful innovation in the urban environment. Sidewalk Labs' proposal offers a roadmap for overcoming this obstacle, while ensuring that the interests of Sidewalk Labs and the public sector remain aligned as the project progresses.

First, Sidewalk Labs is prepared to work with local partners, lenders, and other market participants to finance the development of Quayside. Second, Sidewalk Labs is prepared to bear the cost of the research and development embedded in the Quayside development program. Chapter 6 discusses a range of strategies Sidewalk Labs proposes to mitigate the risk of innovative solutions for the governments and Waterfront Toronto.

Under terms to be detailed in the Implementation Agreements, Sidewalk Labs and a Sidewalk Labs-led consortium of local development partners would be responsible for funding (via debt, equity, and other sources, such as pre-sales) the development of Quayside, at an estimated total cost of approximately \$2 billion. This total cost reflects the higher-than-market costs of the innovation agenda, such as higher build costs to prove a new model of advanced timber construction; higher soft costs and contingencies to integrate innovations like Shikkui plaster and digital electricity into a single building design for the first time and obtain the necessary approvals; and extra investment to make ground-floor spaces flexible to enable more community uses and a diversity of retail spaces. It also results in a program with greater-than-standard revenue risk, such as residential units with less parking and more buildings that combine both residential and commercial uses, each of which could contribute to lower condo prices and lower rents.

In taking responsibility for delivering this program, Sidewalk Labs and its local partners would take the risks and receive the traditional revenue streams associated with a real estate project, including rental income, unit and asset sales, developer fees, and income from capital events.

#### **Approach to valuation and payment to Waterfront Toronto.**

Sidewalk Labs proposes to use the following methodology to agree upon a purchase price with Waterfront Toronto for the Quayside properties. This methodology relies upon identifying the value of that land under three scenarios utilizing a “residual land value” approach. This approach involves estimating the expected revenues and costs of the project and then applying a standard developer

return to obtain the fair market value of the development (the residual).

**The first scenario** used to analyze the value of Quayside would be a “highest and best use” scenario, in which a real estate developer would deliver a project that generated the highest returns possible under the existing zoning and other requirements, such as Waterfront Toronto’s 20 percent affordable housing mandate. This scenario would result in the highest potential land payment to Waterfront Toronto and a development that primarily consists of condos, with minimal retail or commercial space. This scenario assumes the developer delivers condo buildings that reflect a unit-type mix (more studios and one-bedrooms), level of finish, and build cost that maximize its profit.

**The second scenario** used to analyze the value of Quayside would be a “policy proposal” scenario, in which a real estate developer would deliver a project that had additional requirements from Waterfront Toronto that reflect the organization’s stated objectives. This project might have more rental housing, more commercial space, more sustainable buildings, more community uses, and less density to match the vision in the East Bayfront and Keating Channel Precinct plans. This scenario would result in a discounted land payment to Waterfront Toronto because these additional requirements would decrease the price that a developer could pay to Waterfront Toronto while still achieving a market return. For example, certain sustainability requirements lower the land value by increasing construction costs without a matching revenue offset (such as passive house facades, which are more expensive but may not command a sufficient market premium to cover the higher costs). Other requirements lower the land’s value by reducing its revenue potential. For example, dedicating a higher percentage of units to below-market housing would lower the revenue to a developer without changing its cost basis. Similarly, shifting residential square footage to less profitable retail space, as is necessary to create a true mixed-use community, would decrease the value of the land to a developer. This valuation approach is commonly utilized for the disposition of publicly held land — including by Waterfront Toronto in its disposition of the West Don Lands.

**The third scenario** used to analyze the value of Quayside would be an “innovation” scenario, which factors the additional costs and requirements of the proposed innovation agenda into the valuation. As detailed in Volume 1 and earlier in this document, this project would include 40 percent below-market housing, use tall timber for all buildings, and employ a flexible ground-floor program with increased community and retail space. This scenario would result in further reductions to land value because the additional prototyping costs and decreased revenue potential would further diminish a developer’s ability to achieve a market return. As previously noted, these higher-than-market costs are due to many of Sidewalk Labs’ innovations not reaching market viability until they are deployed across a larger geography.

After aligning on these three valuations with Waterfront Toronto and reviewing them with neutral, third-party market experts, Sidewalk Labs would propose to pay Waterfront Toronto a price that reflects the second scenario — the “policy proposal” valuation — while agreeing to bear the cost to deliver the program outlined in the “innovation” scenario. This construct places the innovation risk and cost on Sidewalk Labs while recognizing that Waterfront Toronto would receive some of the value for the land in a direct payment and some by achieving the policy objectives it laid out in the Quayside RFP and prior precinct planning.

In its internal analysis, Sidewalk Labs projects that the difference between the value of the Quayside lands in the second and third scenarios is approximately \$115 million. This \$115 million discount, realized through foregone profit, represents the investment that Sidewalk Labs is making at Quayside to pilot the innovation agenda and the reason for Sidewalk Labs’ anticipation of subpar returns for that initial phase of the project. Specifically, Sidewalk Labs projects approximately 50 percent of the \$115 million would be used to fund the additional 20 percent below-market housing units, bringing the total below-market program in Quayside to 40 percent, since many of Sidewalk Labs’ proposed affordability innovations can only be realized at scale. The remaining 50 percent would fund a series of other innovations, such as the flexible ground-floor stoa, increased soft costs, and additional

commercial space, included in Sidewalk Labs’ proposed plan.

#### **A note on density.**

Sidewalk Labs’ proposed 2.65 million-square-foot program for Quayside is lower than the approximately 3.2 million square feet allowable in the current zoning.<sup>80</sup> When crafting the Quayside plan, Sidewalk Labs made the decision to utilize less than the maximum available density to prioritize the innovation agenda — namely, the implementation of an entirely tall timber program designed to meet Waterfront Toronto’s sustainability and affordability goals, as well as decisions regarding building form, cultivating a mix of uses, and prioritizing community and retail space.

Initial study suggested that engineering constraints limited tall timber construction to 30 storeys, and Sidewalk Labs created a plan that reflected that limitation. Over the past 18 months, new work undertaken by Sidewalk Labs’ buildings team in conjunction with a team of tall timber experts suggests that, by the time Quayside is developed, wood buildings of up to 35 storeys may be possible. If Sidewalk Labs can increase the density in Quayside without impeding the innovation agenda, Sidewalk Labs would seek to increase the amount of residential space on the site while maintaining the same housing mix, including the 40 percent below-market program, and staying within the existing zoning envelope. In that scenario, **the higher density would increase the expected value of both the second and third scenarios described above, enabling a larger payment to Waterfront Toronto for the Quayside lands, pending the larger transaction structure.**

#### **Scenario analysis and risk management.**

The adjusted land price is designed to account for factors limiting the profit potential of the project. **To protect Waterfront Toronto if Quayside’s returns are higher than anticipated, Sidewalk Labs proposes to pay Waterfront Toronto an earnout — a share of upside value above an agreed-upon return threshold — from the Quayside proceeds.** This would ensure that both parties benefit if Quayside as a stand-alone project exceeds that threshold.

## Villiers West real estate

By successfully advancing the plan for Quayside, Sidewalk Labs would earn the right to lead development of the Villiers West urban innovation campus, along with local development partners, to serve as a major economic catalyst for the IDEA District and broader Toronto, anchored by a new Google Canadian headquarters.

Sidewalk Labs' proposal envisions a similar approach to the transaction for Villiers West as for Quayside, with Sidewalk Labs and its local partners bearing the development and innovation risk, and the City of Toronto and PortsToronto providing the underlying land. Sidewalk Labs has developed detailed economic projections based on concept plans for Villiers West. Under terms to be detailed in the Implementation Agreements, Sidewalk Labs and its local partners would be responsible for funding (through equity, debt, and other sources) the development of Villiers West, at an estimated total cost of approximately \$1.9 billion.

Sidewalk Labs would continue to work with its government counterparties to further define the Villiers West project. Critically, Sidewalk Labs believes the Google Canadian headquarters is fundamental to the accelerated viability of a commercial office market in the proposed IDEA District and the broader eastern waterfront. Without the Google Canadian headquarters, Sidewalk Labs is not confident that the proportion of commercial space proposed in the MIDP or even the Port Lands Planning Framework is economically viable. As such,

the Google Canadian headquarters and the broader innovation campus would enable the city to better (1) achieve the “catalytic use that would spawn and support regeneration efforts and bring people to the Island in early stages of its development” that is noted in the Port Lands Planning Framework and (2) accelerate the development of new commercial space that the City recognizes is vital for a downtown core that currently has one of the lowest commercial vacancy rates in the world. The Google Canadian headquarters would also help prove the viability of the broader eastern commercial office market in Toronto, including the proposed East Harbour development.

Land purchase price, along with the evolution of the proposed program, would be negotiated with Waterfront Toronto and its government stakeholders. Sidewalk Labs is committed to compensating the City of Toronto and PortsToronto fairly for the acquisition of Villiers West, regardless of the form of the transaction, while reflecting the value Sidewalk Labs would create as an economic development catalyst.

The proposed transaction would be governed by detailed Implementation Agreements to be developed once the MIDP has been approved, including the details regarding the form of the transaction (such as land-lease versus sale, profit-sharing, joint-venture, or otherwise) and the value of the land.

## Infrastructure finance

Sidewalk Labs has proposed financing mechanisms for each of the three categories of necessary project infrastructure: the LRT extension, municipal infrastructure, and advanced systems. In aggregate, Sidewalk Labs projects an approximate cost of \$5.4 billion to deliver these three categories of infrastructure to the entire IDEA District (figures include inflation to reflect the proposed timeline of delivery).

Sidewalk Labs has proposed that Waterfront Toronto and the governments leverage the value created by the project itself to fund a significant portion of this infrastructure, and has included a way by which Sidewalk Labs' capital could provide benefits to the proposed funding mechanism for each category of infrastructure, either through front-ending agreements to fill a gap in the timing of available funds or through offering financing for innovative systems that address Waterfront Toronto's sustainability and mobility goals, which would otherwise be difficult to finance through traditional markets.

The potential role of Sidewalk Labs in financing, as well as the overarching funding concept for each system, are included in this proposal as one potential option to enable infrastructure development to proceed at the pace and scope necessary to deliver on the project's objectives, without placing undue burden on the City's current budget. Sidewalk Labs recognizes that governments could choose to utilize alternative methods to finance this infrastructure.

### LRT financing

Through its optional LRT financing role, Sidewalk Labs could provide financing support for the accelerated delivery of the waterfront LRT extension. Sidewalk Labs is prepared to offer up to \$100 million of credit support — up to \$50 million for the portions of Segments 2 through 4 within the IDEA District and up to \$50 million for Segments 5 through 7 — to be repaid at a fixed rate of return. The financing would be offered at market rates, to be negotiated — with a commitment from Sidewalk Labs to work with government, pension funds, and other institutional investors to develop transaction structures to reduce the rate as low as possible while still attracting the necessary financing.

The structure of this financing offer is based upon the use of a tax-increment financing approach for a portion of the extension and would require the participation of one or more other public authorities engaged in funding and financing infrastructure. The size of Sidewalk Labs' credit support offer is based on initial financial modelling of the potential TIF structure. While this preliminary modelling would be refined with the assistance of public finance experts and lender feedback, the analysis suggests that — if a TIF approach is taken — the support offered would be sufficient to provide the credit support necessary in advance of the generation of incremental taxes.



More detail on Sidewalk Labs' optional role in infrastructure finance can be found in Chapter 2, on Page 128.

If governments choose to pursue a wholly different method of funding to deliver the LRT but still desire to accept the offer of optional financing, Sidewalk Labs would seek to work with government to craft a mutually agreeable structure.

## Municipal infrastructure financing

As part of Sidewalk Labs' optional municipal infrastructure financing role, Sidewalk Labs could provide financing support to “front-end” municipal infrastructure to bridge the gap between when funds are needed to begin construction and when Waterfront Toronto realizes the revenue to pay for it. This front-ending solution is one way to solve the timing issue created when municipal infrastructure contributions are used to pay for the infrastructure needed to support the development that generates those revenues, without needing to either delay the project or require the City to find separate sources of funds in its capital budget to bridge that gap.

Sidewalk Labs estimates the total cost of this infrastructure to be approximately \$2.3 billion for the entirety of the IDEA District (including inflation). In Sidewalk Labs' proposed structure, a majority of the necessary funding would be supplied through municipal infrastructure contributions, made by real estate developers, and for which those real estate developers would receive a credit against the standard city fees and development charges. (In total, developers would pay the same amount of development charges for projects within and outside the IDEA District because the municipal infrastructure contribution would be equal to a credit received by the developer against standard development charges.)

In its analysis, Sidewalk Labs projects that if government, in its sole discretion, elected to accept its offer of financing (subject to terms to be agreed upon), a single Sidewalk Labs' credit facility — in essence, a line of credit with a maximum outstanding balance — of approximately \$300 million would be sufficient to provide the necessary funds to begin construction of each phase of municipal infrastructure on an accelerated timeline, without having to delay until municipal infrastructure contributions have been received or having to allocate additional funds from the city or Waterfront Toronto's budget.

Any optional financing for municipal infrastructure Sidewalk Labs arranges would carry a market rate of return. Sidewalk Labs is committed to working with government, pension funds, and other institutional investors to develop transaction structures that can reduce the rate as much as possible while still attracting the capital necessary to finance the investment.

## Advanced systems financing

Sidewalk Labs' offer for optional advanced systems financing proposes a series of Advanced Systems that are critical to achieving the project's sustainability and mobility objectives. These advanced systems include: advanced sustainability systems (includes an advanced power grid, a thermal grid, a waste management system, and a stormwater management system), advanced mobility systems (includes a freight management system, dynamic streets, district parking management, and mobility subscription package), and an advanced digital communications network.

Sidewalk Labs estimates the total cost of these systems to be approximately \$2.7 billion (including inflation). In Sidewalk Labs' proposed structure, approximately \$1.5 billion of the necessary funding would come from local and municipal infrastructure contributions.

Third parties would supply the remaining \$1.2 billion needed to fund the advanced systems. However, because these innovative systems are less familiar to typical infrastructure financiers, the systems may be more difficult to finance at reasonable rates.

Sidewalk Labs has created Sidewalk Infrastructure Partners (SIP) — a company uniquely focused on technology-enabled infrastructure — to fill this gap and create a path for infrastructure delivery that both proceeds at a rapid pace and achieves ambitious goals for mobility, sustainability, and other public objectives. SIP would work with potential lenders to reduce certain risks associated with the new systems and attract investors who might otherwise not participate. SIP could then structure a transaction that bundles debt financing from lenders and equity financing from SIP for multiple advanced systems.

The SIP investment and financing package would be offered as an option for the advanced system operator and described in the request for proposals or other procurement documents, eliminating the need for an operator to provide its own capital. The financing would therefore enable the best potential partners to respond, ensuring not only world-class infrastructure development, but reducing costs for the users of advanced systems.

### Supplemental innovation investment.

Sidewalk Labs is also prepared to make supplemental innovation investments, currently estimated to cost \$45 million for Quayside and Villiers West, to render certain advanced systems market-viable in their early phases. According to Sidewalk Labs' initial financial modelling, these would be needed for the advanced power grid and thermal grid systems to enable third-party financing and keep end-user rates on par with business as usual rates. Sidewalk Labs believes that these initial deployments in Quayside and Villiers West would prove the viability of the systems and would not be required at scale. If a proposed system requires funding that materially exceeds the anticipated investment, Sidewalk Labs would work with Waterfront Toronto to bring down capital costs or identify alternative approaches that accomplish the project objectives, without necessitating a greater supplemental innovation investment.

The supplemental innovation investments are funds that Sidewalk Labs is willing to put at risk in the first phase of the project to prove the effectiveness and commercial viability of its approach. This investment has no direct method of return. Rather, this type of investment is part of why Sidewalk Labs is seeking future performance payments if its approach achieves project milestones, including growth and performance targets, and the project proceeds to scale.

**Sidewalk Labs would work with governments and institutional investors to reduce the cost of optional infrastructure financing as much as possible, while ensuring sufficient funds are available.**

## Additional Sidewalk Labs investments

To achieve Waterfront Toronto's priority objectives for the project, Sidewalk Labs' proposal also includes \$165 million in additional Sidewalk Labs investments. \$90 million of this funding is for investments that have the potential to increase the overall economic impact of the project and to generate their own returns. These include an investment in an Ontario-based tall timber factory, towards which Sidewalk Labs is prepared to make an investment of up to \$80 million alongside partners, and an investment in a venture fund that would invest in local startups focused on urban innovation, towards which Sidewalk Labs is prepared to commit \$10 million (side-by-side with other institutional funding partners, including one or more local venture firms).

An additional \$75 million in funding would be, or has already been, used for purposes that do not have the potential to generate their own returns. This includes the \$65 million at-risk investment Sidewalk Labs made to create the MIDP (MIDP Investment reflected in CAD; equivalent to stated commitment of USD \$50 million), as well as a \$10 million grant for a proposed, cross-disciplinary Urban Innovation Institute, to be located within the IDEA District.

The Urban Innovation Institute is proposed as an independent, non-profit organization, located within the innovation campus on Villiers West. The institute would bring together urbanists and technologists, serving as a focal point for a new urban innovation cluster. Sidewalk Labs envisions that local academic institutions would collaborate in the design and implementation of the Urban Innovation Institute, which would serve as a centre for applied research, policy development, and skills training.

## Third-party real estate catalyzation

Sidewalk Labs' internal analysis suggests that beyond Quayside and Villiers West, the IDEA District could generate an additional \$29 billion in real estate investment, enabling a diverse set of local developers to deliver the additional nearly 28 million square feet of mixed-use development. Sidewalk Labs would have no involvement in this additional vertical development.

Core to Sidewalk Labs' approach to the project is the belief that the innovations piloted at Quayside and Villiers West by Sidewalk Labs would enable third-party developers to adopt the most successful innovations in their future developments. And because the most successful innovations would have proven to be financially viable, government would be able to ask more of private developers — more affordable housing, more community space, more sustainable buildings — without asking those developers to compromise their bottom lines.

**Sidewalk Labs would enable third-party developers to adopt the most successful innovations by demonstrating their financial viability and effectiveness at Quayside and Villiers West.**



# Public Sector Impact

Sidewalk Labs projects that the IDEA District, at scale, would be home to more than 44,000 jobs, 27,000 more than the baseline scenario, and add \$28 billion annually to Canada’s GDP. These economic impacts are discussed at length in the “Economic Development” chapter of Volume 1.

Beyond these broader benefits, Sidewalk Labs estimates that the proposed transaction, by 2050, would produce \$9 billion in city revenues through three major public revenue streams generated from the project: property taxes, city fees and development charges, and proceeds from the sale of public land within the IDEA District. Based on its internal analysis, this is almost double what would be produced in a baseline scenario.

To perform this analysis Sidewalk Labs quantified the proceeds for the public revenue streams in an IDEA district scenario and a baseline scenario. The baseline scenario for the IDEA District was developed by urban-Metrics, Sidewalk Labs’ third-party economic impact consulting firm, and based upon the Portlands Planning Framework, and market participant real estate assumptions.

Sidewalk Labs’ proposal for the IDEA District includes 32.8 million square feet of development (GFA), an increase of 34 percent above a baseline scenario of 24.4 million square feet of development. Sidewalk Labs has assumed that its development would be accelerated compared to the baseline due to the creation and acceleration of the LRT, the relocation of the Google Canadian headquarters

within Villiers West and creation of an urban tech cluster, and the increased quality of life enabled through Sidewalk Labs’ innovation agenda. This acceleration would mean a faster absorption rate, or the rate at which residents and tenants move to the development. Sidewalk Labs projected absorption rates for both a traditional market development and for the IDEA District as proposed, utilizing both external analysis from Altus, a Toronto-based global real estate analytics firm, and its own internal analysis. The accelerated absorption would mean that more construction would proceed, and full occupancy would be achieved faster than a traditional market development, providing government with more proceeds in total and over a shorter time horizon.

Fig. 3.4

## Increase in City of Toronto revenue streams through 2050

Revenue Stream	Baseline Scenario	IDEA District	Improvement Over Baseline
City Property Taxes (Cumulative)	\$1.6 billion	\$2.8 billion	+\$1.2 billion (+75%)
Development Charges (Cumulative)	\$2.1 billion	\$3.8 billion	+\$1.7 billion (+81%)
Total Proceeds from the Sale of Public Land	\$0.9 billion	\$2.4 billion	+\$1.5 billion (+167%)
<b>Total</b>	<b>\$4.6 billion</b>	<b>\$9.0 billion</b>	<b>+\$4.4 billion (+96%)</b>

Note: The above figures are adjusted for inflation.

### Property tax generation

Property tax proceeds from the IDEA District between 2025 and 2050 are expected to be significantly higher than the baseline due to the acceleration of development timelines owing to Sidewalk Labs’ involvement in the development and the greater density proposed for the IDEA District. Sidewalk Labs’ analysis projects that property tax proceeds to the City would be approximately \$2.8 billion compared to just \$1.6 billion in the baseline scenario.

The property tax figures are presented in total through 2050. In 2050, the City would receive \$200 million in annual property tax revenues from the IDEA District, \$70 million more than in the baseline scenario (a 55% increase).

The projected property tax proceeds are based upon the proposed build program for the IDEA District, property tax calculations that use the prevailing market tax rates for commercial and residential use types, and other real estate assumptions fundamental to the IDEA District, such as rezoning, rents, and expected absorption rates. These proceeds are projected on a quarterly basis by parcel. While projected here through 2050, the proceeds from property tax would continue indefinitely.

As is noted in Chapter 2, Sidewalk Labs hypothesizes that a tax-increment financing structure could be used to assist in funding of the LRT. In the scenario that is modelled as part of the Sidewalk Labs proposal included here, a portion of incremental City of Toronto property tax revenues generated by the project would be used to help fund the LRT extension through that TIF structure. Sidewalk Labs’ proposal includes utilizing future incremental property tax revenue to fund public transit, but no other necessary infrastructure.

#### Provincial property taxes.

A portion of property taxes, separate from the City property taxes noted earlier, is allocated to the Province for education funding. Property taxes to the Province are projected to be approximately \$1.7 billion compared to \$0.9 billion in the baseline scenario. These projected proceeds use the same methodology as described in the preceding section.

Fig. 3.5

## Cumulative property taxes to the City of Toronto through 2050

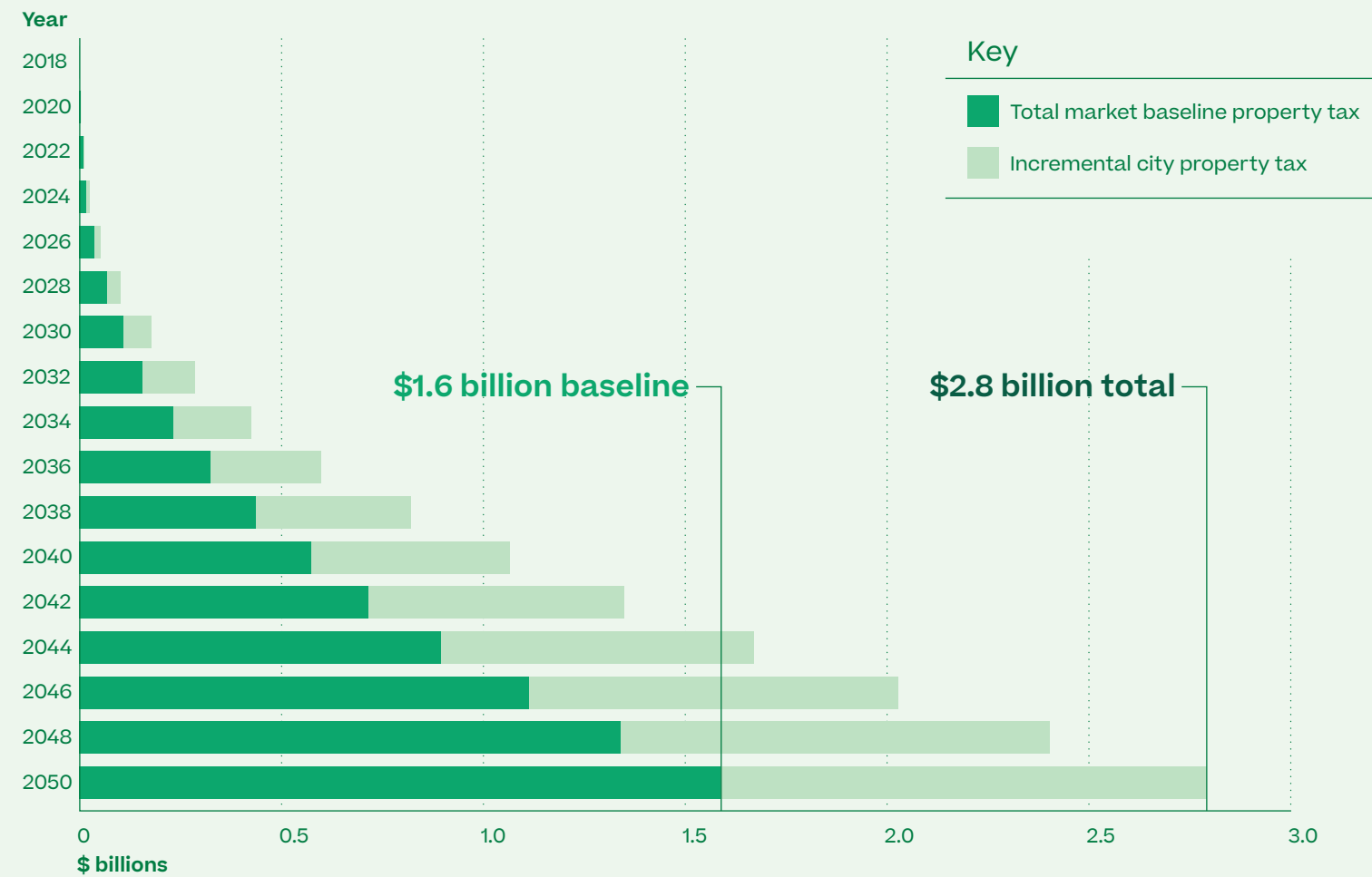


Fig. 3.6

## Total city fees and development charges by district

	District	Baseline Scenario	IDEA District
1	Quayside	\$200 million	\$200 million
2	Keating West	\$300 million	\$400 million
3	Keating East	\$300 million	\$400 million
4	Villiers West	\$200 million	\$200 million
5	Villiers East	\$300 million	\$500 million
6	Polson Quay	\$100 million	\$1,400 million
7	McCleary	\$700 million	\$700 million
	<b>Total</b>	<b>\$2,100 million</b>	<b>\$3,800 million</b>

## City fee and development charge generation

City fees and development charges are paid by vertical real estate developers to the City of Toronto. The City then uses these funds to reinvest in infrastructure and other city services resulting from population and employment growth. Typical investments related to infrastructure include roads, parks, transit, site improvements, social infrastructure, and other services. Developers pay city fees and development charges at the start of vertical construction, which has historically presented funding challenges for the City and Provincial governments when they are seeking to invest in projects that need substantial service improvements to enable vertical development. City fees and development charges are critical to the development of the IDEA District. Absent a substantial city fee and development charge contribution, the project would be financially infeasible.

As is described more fully in the Chapter 2 section on optional municipal financing on Page 135, Sidewalk Labs estimates that the project would generate approximately \$3.8 billion in city fees and development charges. This estimate is \$1.7 billion greater than the \$2.1 billion in city fees and development charges in the baseline scenario. Sidewalk Labs developed these estimates using the published 2020 city fee and development charge rates and the corresponding build plans and timelines for the IDEA District and the baseline scenario.

The city fee and development charge is built using a line-item approach which designates a cost for each line item (including standard city development charges, public art contribution, education charges, miscellaneous municipal fees) to arrive at a fee for each residential unit (specific to unit size), and per square metre of non-residential space. These charges are inflated over time at rates that reflect both the historical escalation of city fees and development charges in the City of Toronto and Sidewalk Labs' analysis of what the market could bear while still enabling third-party developers to reach market rate returns on vertical development. In the transaction framework that Sidewalk Labs modelled, approximately 50 percent of these city fees and development charges would be utilized to fund IDEA District infrastructure.

City fees and development charges vary when comparing the baseline scenario to the project due to differences in density, use-type mix, and inflation (as a result of different timelines).

**The project would generate \$1.2 billion more in property taxes for the City of Toronto over the baseline scenario.**

## Land proceeds generation

The public sector owns approximately 80 percent of the land in the IDEA District. While Sidewalk Labs is not proposing to develop any IDEA District land beyond Quayside and Villiers West, its investment in those first two developments and its carrying out the broader strategy in the MIDP would create significant value for the City across that portfolio of public lands above the baseline scenario.

Sidewalk Labs would also spur value creation through its commitment to upfront infrastructure investment, including transit, municipal infrastructure, and advanced systems; the relocation of Google's Canadian headquarters; and the other programmatic investments detailed throughout the MIDP. This value creation and acceleration would yield greater proceeds to the public sector than the baseline scenario when it sells publicly owned lands for development.

The value that government could receive for its publicly owned land was calculated assuming the following: (1) The completion of the Don Mouth Naturalization Project on schedule, which will open hundreds of hectares for development; (2) The IDEA District build program matching the plan described in Volume 1; and (3) All third-party vertical real estate developers target a market return. The projected value also depends upon basic real estate economics and delivery assumptions, such as building costs, rents, absorption, operating expenses, and financing costs.

For comparison purposes, this process was then replicated for the baseline scenario using urbanMetrics baseline program and market baseline fundamental real estate assumptions.

In total, Sidewalk Labs projects that the sale of public lands within the IDEA District could generate \$2.4 billion in proceeds, \$1.5 billion more than the \$900 million in proceeds generated in a market baseline scenario. Government could use these proceeds to fund additional infrastructure investments, pay down any upfront financing debt, fund other expenses, or achieve desired public policy outcomes such as increased affordable housing.

## Use of City of Toronto proceeds

In total, the project would generate 96 percent more proceeds for the City overall than the market baseline scenario, increasing expected proceeds over the 30-year project timeline from \$4.6 billion to \$9.0 billion.

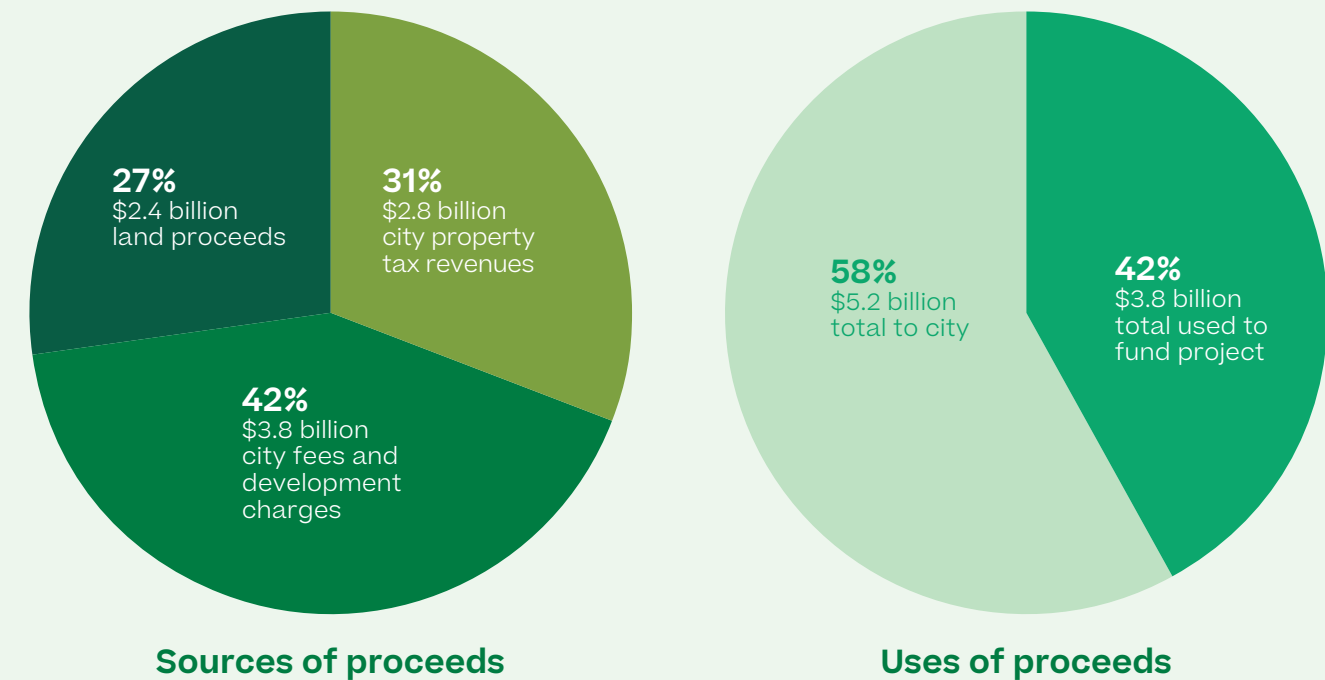
In Sidewalk Labs' proposed deal structure, in the scenario in which the public sector accepts Sidewalk Labs' offer of optional infrastructure financing for both the municipal infrastructure and the LRT, \$3.9 billion of the \$9.0 billion total proceeds would be dedicated to IDEA District infrastructure (including the repayment of Sidewalk Labs' infrastructure financing) and \$5.1 billion would be returned to government coffers. It is important to note that if the public sector elects not take Sidewalk Labs' offer of infrastructure financing it would still need to fund enabling infrastructure.

In the chart on the opposite page, the \$2.8 billion in property tax revenue represents the total City portion of the property taxes in the IDEA District, excluding Keating East, for which incremental property tax revenues have already been pledged to other projects. In comparison, a market baseline scenario would expect \$1.6 billion in property taxes for the City.

The scenario represented in the chart includes using property tax revenue to fund the Waterfront East LRT extension and the fixed return on Sidewalk Labs' optional credit facility, through a TIF structure, and with the remaining proceeds directed to the City. The provincial portion of property taxes are neither utilized as part of the LRT financing district, nor included in the chart.

Fig. 3.7

## Sources and uses of \$9 billion in City of Toronto revenues



City fees and development charges in the Sidewalk Labs scenario total \$3.8 billion, compared with a market baseline scenario total of \$2.1 billion. This total includes the full IDEA District. In the Sidewalk Labs scenario, these city fees and development charges would be split between proceeds used to fund the principal balance for the project's municipal infrastructure and the remaining proceeds would go to the City of Toronto. Sidewalk Labs estimates that nearly 50 percent of these proceeds would be returned to the City with approximately 50 percent invested in municipal infrastructure.

The expected total land proceeds are \$2.4 billion, which is 167 percent higher than the \$900 million in total land proceeds expected in a market baseline scenario. In the Sidewalk Labs scenario, a portion of these proceeds would be needed to fund the principal balance for the project's municipal infrastructure above what is covered by city fees and development charges in the model and the fixed return on the optional municipal infrastructure financing. The City would retain all remaining land proceeds.

In addition, the project would also receive funding from a local infrastructure contribution across all neighbourhoods in the IDEA District. This is a city fee and development charge fee that is levied on vertical developers to support the development of the IDEA District's advanced systems. The total local infrastructure contributions are approximately \$300 million and are 100 percent dedicated to investing in the project's infrastructure systems. Ultimately, a vertical developer would pay market rate city fees and development charges or the same total charges as they would if developing outside of the IDEA District.

Fig. 3.8

## Total net proceeds to the City of Toronto

Proceeds to City of Toronto	Notes	Total	Percent of Proceeds
Land Proceeds	Increased land proceeds	\$1.7 billion	33%
City Fees and Development Charges	Portion of city fees and development charges not necessary to fund the project; 42.9% of total city fees and development charges	\$1.6 billion	31%
Property Tax	Portion of total property taxes not used to fund LRT TIF financing (excludes Keating East, which is in a TIF zone)	\$1.9 billion	35%
<b>Total Proceeds to City of Toronto</b>		<b>\$5.2 billion</b>	<b>100%</b>

### Summary of City of Toronto economics

In the Sidewalk Labs scenario, in which government chooses to utilize the optional infrastructure financing offers from Sidewalk Labs, the project generates \$9.0 billion in total proceeds for the City of Toronto. After funding project costs of \$3.8 billion, \$5.2 billion would be returned to government coffers, as shown in the table above.

*In the market baseline scenario, even if all necessary infrastructure is paid for through other means, the total proceeds generated would be only \$4.6 billion, far less than even the net proceeds remaining after infrastructure is funded in the Sidewalk Labs scenario.*

In the Sidewalk Labs scenario, the City would receive \$1.9 billion in property taxes (excluding Keating East, as previously noted) after funding the LRT and the fixed return on the optional credit support.

Additionally, the City would retain \$1.6 billion in excess city fees and development charges after funding the IDEA District’s municipal infrastructure. The City would also receive \$1.7 billion in increased land proceeds beyond the funds needed to pay for IDEA District infrastructure.

In addition to the three revenue streams available to fund the project, the City would also receive \$100 million in land transfer taxes (LTT), which are taxes that are paid upon the transfer of real estate. The proceeds from LTT are not included in the table above, nor does Sidewalk assume any LTT proceeds are necessary to fund project infrastructure in its proposed structure.

Fig. 3.9

## Total net proceeds to the Province of Ontario

Proceeds to Province	Notes	Total	Percent of Proceeds
Property Tax	Provincial portion of total property taxes (education tax rate) through 2050 (excludes Keating East, which is in a TIF zone)	\$1.7 billion	32%
Net Harmonized Sales Tax (HST)	HST net of provincial rebates	\$3.7 billion	66%
Land Transfer Tax (LTT)	Includes provincial portion (50%) of total LTT	\$0.1 billion	2%
<b>Total Proceeds to Province</b>		<b>\$5.5 billion</b>	<b>100%</b>

### Summary of provincial economics

The Sidewalk Labs model expects the project to generate \$5.5 billion in taxes for the Province of Ontario. Sidewalk Labs assumes that none of the provincial taxes are used to fund the project. The three types of tax revenue are shown in the table above and include \$1.7 billion in property tax, which is 89 percent more than the \$0.9 billion in property tax revenues expected in a market baseline scenario. The Sidewalk Labs scenario also includes \$3.7 billion in harmonized sales tax (HST) net of rebates, and \$100 million in land transfer tax.

In total, including property taxes, net HST on the vertical development, and LTT, the \$5.5 billion in provincial taxes generated by the Sidewalk Labs scenario would be 90 percent greater than the \$2.9 billion in proceeds to the Province in a market baseline scenario. The HST projected is exclusively for the vertical development of the real estate within the IDEA District.

# Sidewalk Labs' Returns

While providing extraordinary value to the public sector, the proposed transaction would also enable Sidewalk Labs to have an opportunity to receive a reasonable return for the holistic value it would bring to the project. This return is best addressed in its component parts.

## Real estate returns.

Sidewalk Labs believes that the combined real estate project at Quayside and Villiers West may be able to achieve market-level returns. The underwriting relies on the assumption that Sidewalk Labs' residential units would obtain a premium on rents and sales values observed for other properties in the area because of the provision of rapid transit. The market risk of not achieving the underwritten rents would be borne by Sidewalk Labs and its local partners. In the event the achieved values are significantly above underwriting, Waterfront Toronto stands to receive an earnout payment on Quayside.

At Quayside, the build program has been optimized to achieve Waterfront Toronto's objectives rather than financial returns, and the proposed land purchase price would not enable Sidewalk to obtain market-level returns even with the assumed rent and sales premia.

At Villiers West, Sidewalk has incorporated into its underwriting the effect of a pre-leasing agreement with Alphabet for part of the office space. This would have positive financial effects for the development, including an increased ability to obtain construction debt for the office element as well as making the surrounding office space more attractive to other tenants. Due to the additional value that a Google tenancy would bring to the site, the underwriting reflects improved returns at Villiers West.

The combined projected return for the two developments is projected to be in line with market expectations, as measured by the projected pre-tax internal rate of return and based on the preliminary costing analysis. The internal rate of return (IRR) is a standard method used to estimate the potential profitability of an investment—as measured by the projected annual return generated by the equity invested in the project. While this IRR is generally comparable to other Toronto real estate

development projects, it does not account for other significant investments Sidewalk Labs is making in the overall project — the provision of advisory services and technology products at cost, the cost of creating the MIDP (and the underlying research and development involved to develop the plans), the supplemental innovation investment to make the advanced systems at Quayside and Villiers West commercially viable, and a series of economic development initiatives. Nor does the IRR account for added risk embedded in the innovation agenda, which is structured around Waterfront Toronto's priority outcomes.

## Non-real estate returns “at market.”

Apart from the real estate transaction at Quayside and Villiers West, Sidewalk Labs expects to have an opportunity to receive market returns if the public sector elects to use its optional financing of infrastructure and in connection with several of its project-related investments. Specifically, Sidewalk Labs would expect to negotiate market terms for any financing it extends, and would work with institutional lenders and others to deliver the lowest cost of capital possible.

Sidewalk Labs would also commit to investing in an Ontario-based tall timber factory, likely undertaken with partners, which would have stand-alone economics and the same potential upside and risks as other investments in manufacturing. Similarly, Sidewalk Labs would also commit to investing in a venture fund targeting Canadian startups, also likely to be undertaken with partners, which would have stand-alone economics and the same potential upside and risks as typical venture capital investing.

Sidewalk also expects to receive market-rate fees for implementation services it would provide to Waterfront Toronto and advanced infrastructure operators.

Implementation services – municipal infrastructure implementation: As is further described on Page 135 of Chapter 2, in its role related to innovation planning, design, and implementation, Sidewalk Labs proposes to receive a flat market-rate percentage fee (8 percent of costs) to manage the design of municipal infrastructure it is responsible for in Quayside and Villiers West, including the

preparation of drawings and permitting for public realm, bridges, and municipal underground infrastructure. For work managed by the public administrator in Quayside and Villiers West and thereafter, Sidewalk Labs would receive a lower percentage (2 percent) of related soft costs for supporting the public administrator in integrating municipal infrastructure with advanced systems infrastructure. These fees are based on Waterfront Toronto's typical management fees of 6 percent, with the additional 2 percent for the extra work required to coordinate with advanced systems.

Implementation services – advanced systems implementation: As is further described on Page 108 of Chapter 2, in its role related to development of real estate and advanced systems, Sidewalk Labs would be compensated directly by third-party operators for its role as lead developer of advanced systems in Quayside and Villiers West. This would include reimbursement for the costs to prepare the preliminary designs, plans, and specifications issued with the procurement documents for certain systems, if required. Any applicable preliminary design fees would be identified in the procurement documents as a lump-sum amount, and payment would be due at the time of construction notice to proceed.

In Quayside and Villiers West, third-party operators would also pay Sidewalk Labs an advanced system development fee applied as a percentage of project costs specified upfront in the procurement documents. This fee would vary based on the degree of Sidewalk Labs participation required. Where the operator is responsible for a turnkey design-build-operate approach, and where Sidewalk Labs' participation would be limited to coordination of design and delivery, the advanced system development fee is expected to be in the range of 2 percent of system costs. Where Sidewalk Labs serves as program manager in a co-development role with the operator, the fee would be up to 7 percent of system costs, as negotiated on a system-by-system basis. This includes the dynamic streets, which would be operated by the Waterfront Transportation Management Association.

In later phases, when the public administrator assumes the lead developer role of advanced systems, the operator would similarly compensate the public administrator for its work, including preliminary design fees, as applicable, and a program management fee of up to 7 percent of system costs. The public administrator would negotiate these fees directly with operators.

### Non-real estate investments without direct return.

Sidewalk is also prepared to make a series of investments and commit resources without an expectation of a direct return. These include Sidewalk Labs' original MIDP investment and its grant funding for the Urban Innovation Institute.

This category also includes its provision of advisory services to Waterfront Toronto and its provision of a limited number of technologies to the project. For both roles, Sidewalk Labs proposes to be paid back at cost, with no profit margin. The proposed transaction constructs are discussed in more detail below.

**Advisory services:** Under its innovation planning, design, and implementation role, described fully on Page 114 of this volume, Sidewalk Labs proposes to provide technical advice, innovation planning, and project management services to the public administrator. In this capacity, Sidewalk Labs would support the public administrator in devising and implementing a comprehensive innovation and development strategy, in areas where Sidewalk Labs can augment the public administrator's capacity or resources, or has special expertise, particularly with respect to the technical specifications, deployment, iteration, and integration of advanced systems.

Sidewalk Labs proposes to deliver these resources at cost to the public administrator and estimates the total value of these resources would be in the range of \$3 million dollars annually over approximately the first 15 years of the project, the time during which the relevant planning deliverables for the IDEA District would be completed. These expenses would be submitted to the public administrator and reimbursed at cost on an annual or other periodic basis. The proposed reimbursement covers Sidewalk Labs' services, not the

costs for functions undertaken by the public administrator, directly or via contractors.

The Implementation Agreements would set out the exact fee schedule, scope, performance expectations, and process for review and extension of the advisory services relationship. The Implementation Agreements would also include provisions for termination, cancellation, or extension through the completion of all precinct plans, ITMPs, and stage gates.

Specifically, the public administrator would not be obligated to contract for the entirety of these services at the signing of Implementation Agreements. These services would only be provided to the extent that Sidewalk Labs achieves the agreed-upon project milestones. Chapter 7 provides more detail on proposed stage gates.

Sidewalk Labs would provide advisory services entirely at cost, with no additional return. This structure is part of why Sidewalk Labs is seeking performance payments if the project achieves its objectives, proceeds to scale, and satisfies each of the proposed stage gates.

**Technology deployment:** Sidewalk Labs proposes to develop a limited number of key technological solutions for advancing Waterfront Toronto's priority outcomes (explained in detail on Page 120 in the section on Sidewalk Labs' role in relation to technology deployment). Sidewalk Labs would provide these "purposeful solutions" to the public administrator and management entities in the IDEA District at cost.

Sidewalk Labs also proposes that the public sector receive 10 percent of Sidewalk Labs' profits from certain Sidewalk Labs technologies — Testbed-Enabled Technologies, as defined on Page 126 — for a 10-year period. This period would begin with the sale of the solution to a second customer after its initial deployment (i.e. when the product has been effectively commercialized). Overall, the approach is structured to ensure that both Sidewalk Labs and the public sector profit from certain tech solutions first piloted in the IDEA District. More specific profit-sharing terms would be negotiated as part of the Implementation Agreements.

## Proposed performance payments

Sidewalk Labs proposes to receive performance payments to fairly compensate the company for its role in accelerating development on the eastern waterfront and advancing Waterfront Toronto's priority outcomes, generating billions of dollars of economic activity for the city, province, and country and producing substantial revenue for the governments that would otherwise go unrealized.

These payments would recognize the overall risk and resulting upfront costs assumed by Sidewalk Labs and would be conditioned on Sidewalk Labs' completion of all stage gates, which require it to achieve a series of growth and performance targets demonstrating the success of the overall project. These growth and performance targets would be negotiated for inclusion in the Implementation Agreements and would reflect Sidewalk Labs achieving the economic acceleration and public priorities sought in Waterfront Toronto's priority outcomes.

By the time Sidewalk Labs earns its first performance payment, in approximately 2028 — when Sidewalk Labs estimates it would achieve the project milestones associated with its final stage gate — the project would have begun yielding significant results for Toronto, Ontario, and Canada and placing a new frontier of the city on a trajectory for continued growth. This would result in gains well beyond what would be possible otherwise, including:

- Tens of millions of square feet of development in the pipeline, without burdening the city's balance sheet, decades ahead of schedule;
- A major economic engine and thousands of new jobs, with the new Google Canadian headquarters on Villiers Island anchoring a new tech ecosystem alongside existing industries, such as film and television production, adjacent to the IDEA District;

- The advancement of a vibrant centre of commercial activity on the eastern waterfront, where little exists today, bringing in additional property tax revenue to city and provincial coffers;
- Thousands of units of affordable housing built with sustainable economic models that do not exist today;
- Made-in-Canada and scaled-in-Canada innovations that reduce the cost of constructing and operating buildings and which, therefore, enable the City to ask more of private developers; and
- Major reductions in greenhouse gas emissions, proving the value of scaling new sustainable infrastructure across the IDEA District and paving the way to climate-positive development at a reasonable cost.

The concept of a performance payment is logical for this project not only because of its uncertain outcome but because Sidewalk Labs has structured the business model, in response to feedback from a range of stakeholders, in ways that limit its opportunity for upside elsewhere. These include forgoing revenue streams not as directly tied to the public interest or which other firms would seek in the normal course of business. Sidewalk Labs' proposal limits the amount of real estate the company would develop to two pieces of the overall project; seeks no real estate interest in the vast majority of the IDEA District; puts urban data under the control of an independent entity; makes a number of constraining unilateral commitments with regard to the commercialization of data; and does not seek special tax subsidies.

It also reflects the unusual nature of certain early investments Sidewalk would make in the success of the project with no direct return, including its spending to develop this plan (\$50 million USD, as seed funding for the project), to subsidize advance systems at the Quayside/Villiers West scale to demonstrate their viability while maintaining business as usual user rates, with a supplemental innovation investment worth an estimated \$45 million, and the provision of advisory services and certain technology products entirely at cost.

In short, this financial structure is designed to align the interests of Waterfront Toronto, Sidewalk Labs, and the public; to compensate Sidewalk Labs for serving as a catalyst for a new approach to urban development; and to account for the special challenges underlying the project, such as an extended repayment timeline and complexities associated with integrating next-generation systems that are new to Canada or the market.

**Proposed approach.**

Sidewalk Labs proposes to be eligible for three performance payments. Sidewalk Labs would receive an initial payment in 2028 and additional payments in 2032 and 2035, if it achieves additional project milestones. To earn these performance payments Sidewalk Labs must meet growth and performance targets related to the acceleration of development and the achievement of Waterfront Toronto’s priority outcomes.

The exact terms and magnitude of the performance payments would be determined in future negotiations with Waterfront Toronto and its government stakeholders in advance of approval of the project. Although the proposal does not depend on a particular source of payment, all or a portion of the performance payments could come from economic activity the project generates, including increased land proceeds and other incremental revenues.

**Summary of Sidewalk Labs’ potential sources of revenue**

To provide clarity and transparency regarding Sidewalk Labs’ business model in Toronto, the following table identifies each potential Sidewalk Labs revenue stream related to the project.

Under this construct, Sidewalk Labs would only be eligible to receive even the first of the three performance payments after completing all milestones related to its sixth and final stage gate.

For the first performance payment in 2028, the development acceleration target would turn on the delivery of the new Google Canadian headquarters. For the second and third payments, in 2032 and 2035, respectively, the development acceleration target would turn on increased development activity within the IDEA District, as measured against a baseline, to be negotiated.

At each of the three dates, in order to earn the performance payment, Sidewalk Labs will also have to demonstrate the success of its innovation agenda, as demonstrated through progress against Waterfront Toronto’s priority outcomes. In advance of signing Implementation Agreements, the parties would negotiate metrics and target thresholds tied to each priority outcome — job creation, sustainability, mobility, affordability, and urban innovation — for each performance payment.

Fig. 3.10

**Sidewalk Labs’ potential sources of revenue**

	Role / Revenue Opportunity	Description
1	Real Estate	In delivering Quayside and Villiers West, Sidewalk expects to receive revenue from the sources traditionally associated with real estate projects: rental revenue, income from the sale of condominiums, and income from the sale of individual buildings.
2	Technology Deployment	The limited number of its own technology products that Sidewalk Labs deploys in the project would be provided at cost.  For technologies that Sidewalk Labs develops and deploys at scale in Toronto that meet the testbed criteria described in Chapter 2, Sidewalk Labs proposes that the public sector would share 10 percent of the profits for ten years when that product is sold in other cities.
3	Advisory Services	Advisory services provided to Waterfront Toronto by Sidewalk Labs in its role as Innovation and Funding Partner are proposed to be paid back, at cost, to Sidewalk Labs.
4	Implementation Services (Municipal Infrastructure)	Sidewalk Labs proposes to receive a flat market-rate (8 percent) percentage fee of the related costs to manage the design of municipal infrastructure it is responsible for in Quayside and Villiers West.  For work managed by the public administrator in Quayside and Villiers West, and thereafter, Sidewalk Labs would receive a lower percentage (2 percent) of related soft costs for supporting the public administrator in integrating municipal infrastructure with advanced systems infrastructure.  These fees are based on Waterfront Toronto’s typical management fees of 6 percent, with the additional 2 percent for the extra work required to coordinate with advanced systems.
5	Implementation Services (Advanced Systems)	For work managed by the public administrator in Quayside and Villiers West, and thereafter, Sidewalk Labs would receive a lower percentage (2 percent) of related soft costs for supporting the public administrator in integrating municipal infrastructure with advanced systems infrastructure.
6	Venture Fund Seed Funding	This investment, likely to be undertaken with partners, would have stand-alone economics and the same potential upside and risks as typical venture investing.
7	Tall Timber Factory	This investment, likely to be undertaken with partners, would have stand-alone economics and the same potential upside and risks as other investments in manufacturing.
8	Optional LRT Financing	In the event government elects to utilize Sidewalk Labs’ optional LRT financing, Sidewalk Labs would receive revenue that reflects a market return for the magnitude and risk associated with the agreed-upon financing structure.
9	Optional Municipal Infrastructure Financing	In the event government elects to utilize Sidewalk Labs’ optional municipal infrastructure financing, Sidewalk Labs would receive revenue that reflects a market return for the magnitude and risk associated with the agreed-upon financing structure.
10	Optional Advanced Systems Financing	In the event a Sidewalk Infrastructure Partners financing package was utilized to implement an advanced infrastructure system, Sidewalk Infrastructure Partners (SIP) would receive revenues related to the operation of that system, to provide SIP an opportunity to achieve a standard market return associated with the financing of a project of such magnitude and risk.
11	Performance Payment	In the event Sidewalk Labs satisfies the final stage gate and achieves the performance and growth targets incorporated in the Implementation Agreements, Sidewalk Labs would receive performance payments. These payments would compensate Sidewalk Labs for its overall catalyzation of the acceleration of development within the IDEA District and advancing Waterfront Toronto’s priority outcomes.



See Chapter 6 for a detailed explanation and estimated timeline of proposed stage gates.

# Achieving Waterfront Toronto's Priority Outcomes

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**Introduction**

p182

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**Job Creation  
and Economic  
Development**

p184

---

**Sustainability and  
Climate-Positive  
Development**

p186

---

**Housing  
Affordability**

p188

---

**New Mobility**

p190

---

**Urban Innovation**

p192



# Introduction

Waterfront Toronto's objectives — first spelled out in the RFP and later articulated as “MIDP targets” in its Plan Development Agreement (PDA) with Sidewalk Labs — define the core mission for this project.

Relying on those objectives, as further refined in the PDA, Waterfront Toronto devised evaluation criteria for reviewing the MIDP centred on it achieving five priority outcomes: job creation and economic development; sustainability and climate-positive development; housing affordability; new mobility; and urban innovation (including robust data privacy and digital governance).

**Sidewalk Labs considered what is achievable for each priority outcome in Quayside alone and across a larger geography. A summary of that analysis is reflected in the following five tables.**

# Job creation and economic development impacts

**Goal:** Catalyze economic growth for Toronto and Canada and create a thriving urban innovation cluster, including by bolstering Toronto's innovation ecosystem, providing opportunities for Canadian firms to scale, and expanding jobs across the socio-economic spectrum.

**Topline impact:** Catalyzing 93,000 total jobs, \$14 billion in annual economic output (GDP), and \$4.3 billion in annual tax revenue (2050 dollars) — all delivered years faster than existing baseline plans.

## Proposed innovation or initiative

## Impact at IDEA District scale

<p><b>1 Proposed Economic Anchors</b> The proposed economic anchors include a new Google Canadian headquarters on Villiers Island as part of an agreed-on transaction within the IDEA District, and an applied research centre called the Urban Innovation Institute.</p>	<p>→ Together, a new Google Canadian headquarters and the Urban Innovation Institute (seeded with \$10 million by Sidewalk Labs) would form the foundation of a 2.7 million square foot innovation campus on Villiers Island, catalyzing an urban innovation cluster.<sup>81</sup></p>
<p><b>2 Venture Fund</b> A new venture fund would support early-stage local enterprises working in urban innovation-related fields.</p>	<p>→ Sidewalk Labs' \$10 million initial seed investment (coupled with commitments from other local funding partners) would help startups and small businesses scale and support the region's capacity to retain talent and intellectual property.<sup>82</sup></p>
<p><b>3 Sidewalk Works Jobs Program</b> The Sidewalk Works jobs program would bring employers and educators together to identify real-time needs; partner with educators and trainers on skills development to meet demand; and identify opportunities to further develop a diverse and talented workforce.</p>	<p>→ Realized at a district scale and over time, the Sidewalk Works jobs program could support the development of an inclusive talent pipeline and foster a culture of inclusion in the workplace.<sup>83</sup></p>
<p><b>4 Community Benefits Commitments</b> Community benefits commitments are designed to ensure more equitable access to employment opportunities.</p>	<p>→ In alignment with the Waterfront Toronto Employment Initiative, at least 10 percent of newly created jobs over time would be designated for low-income youths, women, and Indigenous people.<sup>84</sup></p>
<p><b>5 Mass-Timber Construction</b> Mass timber construction in an Ontario-based factory would catalyze a new industry that taps into Canada's vast sustainable forests.</p>	<p>→ The creation of a local factory would support an estimated 2,500 person-years of full-time employment over a 20-year period and catalyze an estimated 5.2 million total work hours for all factory-related trades.<sup>85</sup></p>
<p><b>6 Library of Building Parts</b> A library of building parts created in a mass timber factory would reduce costs related to materials procurement, design, assembly, and shipping efficiency; reduce waste; and reduce regulatory approval timelines for developers.</p>	<p>→ A library of factory-made mass timber building parts would accelerate construction by up to 35 percent and enhance project predictability — savings that could be applied towards below-market housing. It could also help reduce project costs by up to 20 percent.<sup>86</sup></p>

## Proposed innovation or initiative

## Impact at IDEA District scale

<p><b>7 Sidewalk Digital Fabrication</b> A digital coordination system called Sidewalk Digital Fabrication would build on existing building information modelling (BIM) tools to help coordinate every part of the proposed mass timber supply chain, from the off-site factory to on-site assembly.</p>	<p>→ Use of this tool by the entire construction pipeline — developers, architects, contractors, landlords, and others — has the potential to create an unprecedented degree of clarity across the entire development ecosystem, enabling all parties to reduce costs related to uncertainty.<sup>87</sup></p>
<p><b>8 Adaptable "Loft" Spaces</b> Adaptable Loft spaces are designed with flexible floor plates to accommodate residential, commercial, and light manufacturing uses, enabling a true live-work community.</p>	<p>→ Broad development of Loft spaces could accommodate the full range of live-work needs and respond nimbly as those needs change over time, decreasing vacancy periods by 50 percent compared to traditional spaces and attracting the workers and companies necessary for an innovation cluster to thrive.<sup>88</sup></p>
<p><b>9 Flexible Wall Systems</b> Flexible wall systems enable renovations to Loft and residential spaces to occur much faster than normal, reducing vacancies and helping the neighbourhood adapt to market conditions.</p>	<p>→ These systems accelerate renovations through features such as low-voltage digital power (which travels over ethernet cables rather than electrical wires) and mist-based sprinkler systems (which are equally effective as traditional sprinklers but need not be embedded in walls).<sup>89</sup></p>
<p><b>10 Outcome-Based Building Code System</b> An outcome-based building code system could monitor noise and other nuisances in real time to help a mix of residential and non-residential uses thrive while protecting public safety.</p>	<p>→ Realized throughout the IDEA District, an outcome-based building code system could unlock new local economic opportunities by safely enabling a broader mix of uses at both the building and district scales, including production spaces and small-scale industries.<sup>90</sup></p>
<p><b>11 "Stoa" Spaces</b> Ground-floor "stoa" spaces are designed to accommodate a wide range of uses beyond traditional retail, ensuring that the community has a lively mix of shops and restaurants, community spaces, maker studios, pop-ups, and small businesses.</p>	<p>→ Sidewalk Labs estimates that the costs associated with renovation, such as moving walls and electrical wiring, would decline by roughly 50 percent in stoa compared to traditional ground-floor spaces — making it easier for businesses of all sizes to launch or expand.<sup>91</sup></p>
<p><b>12 Small Business Incubator</b> A small business incubator would be designed to help those without access to capital open up shop.</p>	<p>→ Sidewalk Labs plans to work with partners to help launch this program and would reserve a portion of stoa stalls for this incubator, enabling the cohort to test ideas and sharpen business skills in a low-risk environment.<sup>92</sup></p>
<p><b>13 Seed Space</b> A digital leasing platform called Seed Space would help small businesses and other retailers book a wide range of stoa sizes for short- or long-term uses, making it easier for small businesses to establish a physical retail presence.</p>	<p>→ Seed Space services would make it possible for landlords to take risks on more dynamic tenants who might not be equipped or willing to sign up for a five- or 10-year contract, and to reduce short-term space vacancies and downtime between leases.<sup>93</sup></p>

# Sustainability and climate-positive development impacts

**Goal:** Create neighbourhoods with below-zero annual greenhouse emissions and otherwise advance sustainability, including through improved waste management, environmentally friendly building practices, and advanced stormwater management.

**Topline impact:** A sustainability vision that enables the IDEA District to give back 0.69 annual tonnes of clean energy per capita — becoming the largest climate-positive district in North America and the third-largest in the world.<sup>94</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 1 Low-Energy Buildings**  
Low-energy buildings — inspired by the Passive House movement — would feature highly insulated building envelopes, airtight exteriors, and balanced ventilation systems designed to reduce energy needs while improving interior comfort.

→ Low-energy building designs would reduce GHG emissions by 0.96 annual tonnes per capita (or 15.2 percent) from the city's current average. They would also achieve the Toronto Green Standard Tier 3 rating for energy efficiency and Tier 4 for greenhouse gases.
- 2 Active Energy Management Tools**  
Digital active energy management tools called "Schedulers" would optimize energy systems for residents, businesses, and building operators, ensuring that buildings operate in the most efficient way possible.

→ Schedulers would enable low-energy building designs to achieve their full potential and reduce GHG emissions by 0.03 annual tonnes per capita (or 0.5 percent) from the city's current average.
- 3 Advanced Power Grid**  
An advanced power grid would use solar energy, battery storage, and time-based energy pricing to reduce reliance on the main Toronto Hydro grid during periods of peak demand and make an all-electric community affordable.

→ The advanced power grid would reduce GHG emissions 0.05 annual tonnes per capita (or 0.8 percent) from the city's current average, while maintaining comparable utility costs.
- 4 District Energy System**  
A district energy system called a thermal grid would provide heating, cooling, and domestic hot water by drawing on clean energy sources such as geothermal (underground) energy, building "waste" (or excess) heat, and wastewater heat.

→ The thermal grid would reduce GHG emissions by 1.6 annual tonnes per capita (or 25.1 percent) from the city's current average. With support from the city, this advanced infrastructure system could also tap a vast reserve of clean energy from the Ashbridges Bay Wastewater Treatment Plant, removing 70,444 annual tonnes of CO2 per capita from areas outside the IDEA District.
- 5 Innovative Utility Bill**  
An innovative utility bill structure would enable residents and businesses to set monthly budgets for energy costs.

→ When combined with other strategies to enable affordable electrification, such as Schedulers, innovative bill structures enable customers to have more predictable utility bills with much cleaner energy consumption.

## Proposed innovation or initiative

## Impact at IDEA District scale

- 6 Smart Disposal Chain**  
A smart disposal chain would feature real-time feedback to improve waste sorting and "pay-as-you-throw" chutes to reduce household and business waste.

→ The smart disposal chain would reduce GHG emissions by 1.08 annual tonnes per capita (or 17.1 percent) from the city's current average. It would also result in a landfill diversion rate of 80 percent.
- 7 Pneumatic Tube System**  
A pneumatic tube system would separate waste streams underground, reducing contamination and centralizing trash hauling.

→ In addition to helping achieve the greater emissions savings of the smart disposal chain, the pneumatic tube system would remove truck traffic from local streets. Further, it could reduce the need to truck waste to a materials recovery facility for sorting, which currently adds 28 percent to processing costs.
- 8 Anaerobic Digestion Facility**  
An anaerobic digestion facility can convert organic (food) waste into a clean energy source called biogas.

→ In addition to helping achieve the savings of the smart disposal chain, an anaerobic digestion facility could achieve a carbon offset of 0.1 annual tonnes per capita through the creation of biogas, helping the district become climate positive.
- 9 Active Stormwater System**  
An active stormwater system would rely on green infrastructure to capture water and on digital sensors to empty storage containers in advance of a storm.

→ The active stormwater system would reduce GHG emissions by 0.01 annual tonnes per capita (or 0.2 percent) from the city's current average. It would also achieve Toronto Green Standard Tier 3 for stormwater retention and reduce stormwater moving into municipal systems by 90 percent.
- 10 Electric Vehicles**  
A plan to encourage electric vehicles includes a variety of strategies, such as deploying electric ride-hail services, creating charging incentives, and adopting electric self-driving vehicles.

→ When combined with public transit, walking, cycling, and new mobility options, this electric vehicle plan would reduce transportation-related GHG emissions by 1.86 tonnes per capita from the city's current average.<sup>95</sup>
- 11 Mass Timber**  
An emerging building material called mass timber is just as strong and fire-resistant as steel or concrete yet far more sustainable.

→ Mass timber traps 1 tonne of carbon dioxide in every cubic metre of timber, storing carbon that otherwise would have been released back into the air through decomposition. The timber required to build the whole IDEA District would remove the equivalent of roughly 150,000 annual cars from the road.<sup>96</sup>
- 12 Shikkui Plaster**  
A sustainable material called Shikkui plaster would provide fire protection equivalent to dry-wall with a fraction of the waste.

→ The Shikkui system would result in a waste stream that can be recycled as plant-beneficial fertilizer, a far more sustainable alternative to the use of drywall, which generates nearly 12 million tonnes of debris every year.<sup>97</sup>

# Housing affordability impacts

**Goal:** Exceed Waterfront Toronto's affordable housing minimum requirement (20 percent) with minimal reliance on public-sector funding — and create sufficient purpose-built rental housing and market ownership units to enable access to housing for all income groups.

**Topline impact:** A vision for a 40 percent below-market housing program, with the potential to create more than 13,600 below-market units, supported by \$1.4 billion in new private funding sources along with additional government support.<sup>98</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

<p><b>1 Below-Market Housing Program</b> An ambitious below-market housing program would feature 20 percent affordable housing units (a quarter of which would go towards “deep” affordability needs) and 20 percent mid-income housing units.</p>	<p>→ In Quayside, Sidewalk Labs commits to achieving this 40 percent below-market vision, which would create roughly 1,000 below-market units. If applied at the full IDEA District, with additional government support, this vision has the potential to create 13,600 below-market units by 2048 (including 6,800 affordable housing units).</p>
<p><b>2 “Purpose-Built” Rentals</b> Half of the total proposed housing vision would consist of “purpose-built” rentals that are critical to improving long-term affordability.</p>	<p>→ In Quayside, Sidewalk Labs commits to purpose-built rental for half of its housing program, amounting to roughly 1,300 units. If applied at the full IDEA District with additional government support, this program has the potential to create 17,000 purpose-built rentals by 2048, improving long-term affordability.</p>
<p><b>3 “Shared Equity” Units</b> Middle-income housing options would include “shared equity” units designed to help households build value in their home without the high upfront cost of a traditional mortgage down payment.</p>	<p>→ In Quayside, Sidewalk Labs commits to having 5 percent of all units be shared equity units. If this initiative is extended across the full IDEA District, it could increase adoption of an alternative tenure model that can increase affordability for middle-income households.</p>
<p><b>4 “Affordability By Design”</b> An “affordability by design” approach reduces unit footprint while enhancing efficiency, flexibility, and community to enable the creation of more below-market units when compared to traditional development.</p>	<p>→ In Quayside, affordability by design can generate an estimated \$37 million towards below-market housing. If a 40 percent below-market vision is applied at the scale of the IDEA District, it could generate an estimated \$475 million in value towards below-market housing.</p>
<p><b>5 Factory-Based Construction</b> Factory-based construction can accelerate project timelines and enhance cost certainty, enabling an increase in land value, with such premiums directed towards below-market housing.</p>	<p>→ In Quayside, factory-based construction would be tested and refined but would require an estimated 6 million square feet to drive value. If a 40 percent below-market vision is applied at the scale of the IDEA District, factory-based construction could generate \$639 million in value towards below-market housing.</p>
<p><b>6 Condo Resale Fee</b> A condo resale fee of 1 percent would enable market ownership units to support rental economics, which would create an additional source of funding for below-market housing.</p>	<p>→ In Quayside, a condo resale fee would be implemented but would not yet drive value. If a 40 percent below-market vision is applied at the scale of the IDEA District, a condo resale fee could generate \$321 million in value towards below-market housing.</p>

## Proposed innovation or initiative

## Impact at IDEA District scale

<p><b>7 Waterfront Housing Trust</b> A proposed Waterfront Housing Trust would “lock-box” new private funding sources — including land value from factory-based construction and the condo resale fee — for below-market housing.</p>	<p>→ The Waterfront Housing Trust (not administered by Sidewalk Labs) could assemble and disburse funding from a variety of sources for below-market housing within the IDEA District, increasing the predictability and certainty of funding for developers.</p>
<p><b>8 Efficient and Ultra-Efficient Units</b> Efficient and ultra-efficient units of reduced size would enable affordability while remaining livable through thoughtful design features that make the most of their space.</p>	<p>→ Efficient units of all sizes — up to four bedrooms — would create an affordable option for single-person households, families, seniors, and other groups looking for high-quality downtown living with access to community services, public spaces, and neighbourhood amenities.</p>
<p><b>9 Co-Living Units</b> Co-living units would feature shared building amenities, such as communal kitchens, to enhance community for a range of residents.</p>	<p>→ Integration of co-living spaces could improve affordability while creating more community-focused housing options for seniors, families, and others seeking a stronger sense of community from downtown living.</p>
<p><b>10 Family-Sized Units</b> Family-sized units of at least two bedrooms or more would expand housing options for households of all sizes.</p>	<p>→ In Quayside, Sidewalk Labs commits to creating 40 percent of units at family size. If applied at the full IDEA District, this approach could help make downtown living affordable and possible for families that might otherwise leave the city.</p>
<p><b>11 Care Collective</b> A Care Collective would provide community space dedicated to enhancing health and well-being by co-locating the delivery of health care and community services alongside proactive health programming.</p>	<p>→ To support residents and ensure a complete community, the Quayside plan sets aside a central space for the Care Collective, which would be activated by local partners. If these partners choose, the Care Collective could demonstrate a forward-looking model that could extend throughout the IDEA District.<sup>99</sup></p>
<p><b>12 Civic Assembly</b> A Civic Assembly would provide neighbourhood access to spaces for community programs, civic engagement, and cultural events to bolster community.</p>	<p>→ To support residents and ensure a complete community, the Quayside plan envisions the Civic Assembly as a place to connect with neighbours, access local services, and participate in community decisions. If extended across the IDEA District, it could further enhance social interaction and community engagement.<sup>100</sup></p>
<p><b>13 Elementary School and Daycare Centre</b> Plans for an elementary school and daycare centre would ensure that downtown families have access to basic education and childcare needs.</p>	<p>→ To support residents and ensure a complete community, the Quayside plan proposes to work with the Toronto District School Board to plan for an elementary school; a portion of the space could also be allocated for a childcare facility. Beyond Quayside, this approach would demonstrate the viability of planning a neighbourhood with families in mind from the start.<sup>101</sup></p>
<p><b>14 Toronto Public Library (TPL)</b> A proposed collaboration with the Toronto Public Library (TPL) would explore ways to integrate the library's presence, resulting in potential pop-up lending services or TPL-developed classes on digital literacy.</p>	<p>→ While Sidewalk Labs has not yet proposed such collaborations beyond Quayside, the scale of the IDEA District provides the opportunity to enable new learning experiences for a broader population.<sup>102</sup></p>

# New mobility impacts

**Goal:** Reduce the cost and climate impact of transit options while maintaining or increasing convenience for travellers and goods-movement, including by strengthening connections to the city’s public transit network, relying more heavily on electric vehicles, and leveraging the future potential benefits of self-driving vehicles.

**Topline impact:** A safe, affordable, and fully accessible mobility system in which 77 percent of all trips are made by public transit, cycling, or walking; pedestrian street space increases by 91 percent; and households can save \$4,000 a year in mobility costs.<sup>103</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- |                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1 Self-Financing Light Rail Transit Extension</b><br/>A light rail transit extension would connect residents to job hubs and draw workers and visitors to the waterfront from all over the city.</p>                                                                                       | <p>→ At the full scale of the IDEA District, roughly 77 percent of all trips would occur by public transit. The light rail could serve more than 72,900 riders and make 36 percent of jobs accessible across Toronto within 30 minutes — while demonstrating the viability of the self-financing approach.<sup>104</sup></p>                    |
| <p><b>2 Pedestrian and Cycling Infrastructure</b><br/>A network of pedestrian and cycling infrastructure features wider sidewalks, wider and heated bike lanes, and accessibility elements to encourage walking and cycling and support people using wheelchairs or other assistive devices.</p> | <p>→ At the full scale of the IDEA District, more than 16 percent of all trips would occur by foot, bike, or other low-speed vehicles. Cyclists would be able to reach 100 percent of buildings on a dedicated bike lane or cycling street, compared to roughly 15 percent in a typical downtown Toronto neighbourhood today.<sup>105</sup></p> |
| <p><b>3 New Mobility Services</b><br/>New mobility services such as ride-hail, bike-share, electric vehicle car-share, and e-scooters would provide affordable alternatives to private car trips.</p>                                                                                            | <p>→ With the arrival of self-driving technology, applied at the full scale of the IDEA District and coordinated with the city, roughly 7 percent of all trips would occur by ride-hail options, reducing the need to own a car.<sup>106</sup></p>                                                                                              |
| <p><b>4 Integrated Mobility Subscription Package</b><br/>An integrated mobility subscription package would establish a new pricing model that enables residents and workers to see all their trip choices in real time and pay in one place.</p>                                                 | <p>→ Adopting this package — which would include access to public transit, bike-share, ride-hail, car-share, and other services — would save two-person households an estimated \$4,000 a year if they choose to go car-free.<sup>107</sup></p>                                                                                                 |
| <p><b>5 “People-First” Street Types</b><br/>“People-first” street types are designed for different speeds and primary uses, including Boulevards and Transitways for public transit and vehicle traffic, Accessways for cyclists, and Laneways for pedestrians.</p>                              | <p>→ These street types would serve as the foundation for the suite of mobility options and innovations proposed by Sidewalk Labs. At the full IDEA District scale, this network would enable people to fulfill all their daily needs within a 15-minute walk while still ensuring that people can get where they need to go.<sup>108</sup></p> |
| <p><b>6 Accessibility Initiatives</b><br/>A wide set of accessibility initiatives would include curbless street design, wider sidewalks, heated pavement, wayfinding beacons, and accessible ride-hail vehicles.</p>                                                                             | <p>→ These initiatives would ensure that every street meets or exceeds all the requirements of the 2005 Accessibility for Ontarians with Disabilities Act (AODA), making it easier for everyone to get around.<sup>109</sup></p>                                                                                                                |

## Proposed innovation or initiative

## Impact at IDEA District scale

- |                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>7 Freight “Logistics Hub”</b><br/>A freight “logistics hub” would feature a consolidated shipping centre (housed alongside on-demand storage and a borrowing library) with underground delivery, reducing truck traffic on local streets and improving convenience.</p>           | <p>→ In Quayside alone, this system would reduce truck trips into the neighbourhood by 72 percent, along with reducing disruption to local roads and surrounding areas — benefits that would increase considerably at the full IDEA District scale.<sup>110</sup></p>                                                                              |
| <p><b>8 Mobility Management System</b><br/>A mobility management system would use real-time information to coordinate travel modes, traffic signals, and street infrastructure, and to apply pricing to curb and parking spaces — reducing congestion and encouraging shared trips.</p> | <p>→ Such a system could coordinate the entire street network to help achieve transportation goals established by a public entity, such as prioritizing modes that carry the most people, striving towards Vision Zero safety, reducing curbside traffic, and providing cyclists with “green waves” for faster and safer travel.<sup>111</sup></p> |
| <p><b>9 District Parking Management System</b><br/>A district parking management system would incorporate high-density on- and off-site parking, on-demand retrieval of vehicles, and electric-vehicle charging.</p>                                                                    | <p>→ Such a system could dramatically reduce the need for on-site garage or curbside parking, enabling this space to be used for housing, parks, or other uses and encouraging adoption of electric vehicles.</p>                                                                                                                                  |
| <p><b>10 Dynamic Curbs</b><br/>Dynamic curbs are flexible street spaces that provide passenger loading zones during rush hour and public spaces at off-peak times.</p>                                                                                                                  | <p>→ Dynamic curbs would have the capacity to process six times as many curbside pick-ups and drop-offs as a typical one-hour metered curb and would greatly expand the diversity of uses that could be supported in the public realm.</p>                                                                                                         |
| <p><b>11 Adaptive Traffic Signals</b><br/>Adaptive traffic signals have the ability to prioritize pedestrians who need more time to cross a street or public transit vehicles running behind schedule.</p>                                                                              | <p>→ Adaptive traffic signals could optimize their systems across a wider area, enabling the mobility management system to achieve its transportation objectives.</p>                                                                                                                                                                              |
| <p><b>12 Modular Pavement</b><br/>Modular pavement consists of hexagonal pavers that can be replaced or repaired quickly, dramatically reducing the amount of time streets spend closed down for road or utility work and increasing the flexibility of street uses.</p>                | <p>→ Over a 30-year period, modular pavement coupled with open access channels would be 13 percent less expensive per square metre than the standard waterfront streetscape in Toronto today by reducing maintenance costs and accelerating utility repair.<sup>112</sup></p>                                                                      |

# Urban innovation impacts

**Goal:** Tackle complex urban problems, from traffic congestion to energy use, using emerging physical and digital tools, incorporating a series of requirements, such as making data open by default to ensure equitable access by third parties, avoiding vendor lock-in and ensuring competition, and enhancing data security and privacy.

**Topline impact:** Catalyzing urban innovation through the implementation of flexible physical conditions and open digital conditions that together enable third parties to create new solutions using urban data in a responsible way.<sup>113</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 1 Ubiquitous Connectivity Internet Network**  
A ubiquitous connectivity internet network — powered by a new Super-PON technology that reaches faster speeds with less equipment — could provide households and businesses with a secure personal network across an entire neighbourhood.
- 2 Standardized Physical Mounts**  
Standardized physical mounts connected to power would reduce the cost of deploying digital innovations, serving as an “urban USB port” of sorts.
- 3 Open, Published Standards**  
Open, published standards would make properly protected urban data accessible to the community in real time.
- 4 Urban Data Trust**  
A proposed Urban Data Trust would build on existing Canadian privacy laws to oversee the review and approval of all digital innovations that propose to use or collect urban data.
- 5 Responsible Data Use**  
Clear Responsible Data Use Guidelines (such as making de-identified or non-personal data publicly accessible by default) and a publicly transparent Responsible Data Use Assessment would help ensure responsible innovation.
- 6 Security and Resiliency**  
A best-in-class approach to security and resiliency would be designed to prevent disruptions, rapidly detect them, and rapidly restore functionality.

- Deployed across the IDEA District, this advanced connectivity would provide the foundation for countless new services and solutions to emerge within the urban innovation cluster. It would also create momentum to deploy lower-cost Super-PON technology, improving the equitable growth of key digital infrastructure.<sup>114</sup>
- The proposed standardized mount system could cut the amount of time it takes to install a device from 30 hours today to two hours, a 92 percent savings of time and cost, enabling a wide array of third parties to deploy urban innovations and preventing vendor lock-in.
- At the scale of the IDEA District, open standards enable a broad range of third parties to build new services or competitive alternatives to existing ones, establishing a core condition for the urban innovation cluster to thrive.<sup>115</sup>
- Over the longer term, once this publicly-accountable entity has benefited from many use cases in Quayside, it could have broader coverage — enabling an urban innovation cluster to grow while protecting inclusion, privacy, and the public good.
- Established by an independent entity such as the Urban Data Trust, RDU Guidelines and Assessments would help ensure that urban innovation has a beneficial purpose — not falling into the trap of being tech for tech’s sake — and that it remains publicly accountable.
- This approach would ensure that urban innovations that use urban data or connectivity remain protected from intentional actions, inadvertent disruptions, or environmental events that could disrupt digital services or infrastructure.<sup>116</sup>

## Proposed innovation or initiative

## Impact at IDEA District scale

- 7 Open Access Channels**  
Open access channels located under removable pavers allow for easy utility access and greater flexibility to incorporate new systems as they are developed over time.
- 8 Shared Programming Infrastructure**  
Shared programming infrastructure, such as projectors and lighting options, would enable communities to program open spaces themselves.
- 9 Outdoor-Comfort System**  
A proposed outdoor-comfort system (featuring Raincoats to shelter sidewalks, Fanshells to cover open spaces, and Lanterns to block wind) could dramatically increase the amount of time it is comfortable to be outside.
- 10 Real-Time Map of Public Realm Assets**  
A real-time map of public realm assets — including park benches and landscaped gardens — would enable proactive maintenance and keep spaces in good condition.
- 11 Generative Design**  
A digital planning tool called “generative design” could help planners identify opportunities to achieve development objectives, such as increased daylight, open space access, or density.

- In addition to facilitating utility access, open access channels would provide communities with greater flexibility to respond to changing needs, enabling infrastructure transformations (such as installing a new community garden) or new utility systems (such as a new communications network with higher performance capabilities) to be implemented faster and at a lower cost.<sup>117</sup>
- In Quayside and across the greater geography of the IDEA District, shared public realm infrastructure would empower the community to program public spaces, democratizing placemaking.<sup>118</sup>
- In Quayside, this system would help to increase comfortable hours by 35 percent. Applied throughout the IDEA District, this weather-mitigation system has the potential to double the number of hours it is comfortable to be outdoors each year across key spaces, drawing more people outdoors, together.<sup>119</sup>
- This map would serve as a single repository for information about open spaces and related infrastructure, enabling open-space managers to run operations software on top of it, improving maintenance, issue response, and proactive repairs. For instance, a water pipe sensing system paired with this map could ultimately save up to \$200,000 a year in preventing quotidian water leaks.<sup>120</sup>
- Such a tool could help ensure that the wide array of developers, architects, and designers who would be responsible for building out the IDEA District over time would maintain flexibility and creativity in developing new ideas, while at the same time ensuring that their proposals achieve key public interest objectives.<sup>121</sup>

# Implement- tation

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**Approval Process,  
Transaction, and  
Implementation  
Timeline**

p196

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**Phase 1 Project  
Delivery Timeline:  
Quayside Plan**

p202

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**Phase 2 Project  
Delivery Timeline:  
Villiers West  
Urban Innovation  
Campus**

p204

# Approval Process, Transaction, and Implementation Timeline

On October 16, 2017, Sidewalk Labs and Waterfront Toronto entered into a Framework Agreement that put forth a set of basic terms and fundamental principles to structure their working relationship.<sup>122</sup> Sidewalk Labs committed up to \$50 million (USD) to fund the over a year-long joint planning process and development of the MIDP and committed to a robust public consultation process to inform all proposals.

## Key Term Framework Agreement

The Framework Agreement, entered following Sidewalk Labs' designation as Innovation and Funding Partner, defined the scope of its relationship with Waterfront Toronto and their shared vision for the MIDP.

The [Framework Agreement](#) was the first step in aligning on shared values and goals for the project and contemplated a series of core programmatic components, including the establishment of the Urban Innovation Institute, a waterfront Canadian headquarters for Google, and more.

On July 31, 2018, Sidewalk Labs and Waterfront Toronto entered into a second phase agreement — the Plan Development Agreement (PDA) — which superseded the Framework Agreement and provided further detail on the roles and responsibilities of both parties in the planning process and production of the MIDP.<sup>123</sup> The PDA included a detailed budget for Sidewalk Labs' \$50 million commitment and began to consider key themes that will govern the implementation of the MIDP once it is approved.

In December 2018, Waterfront Toronto introduced a series of goals and objectives as well as a set of priority outcomes for the MIDP: job creation and economic development; sustainability and climate-positive development; housing affordability; new mobility; and urban innovation (including robust data privacy and digital governance).<sup>124</sup>

Waterfront Toronto developed these priority outcomes through a process which built on the objectives laid forth in the RFP, Waterfront Toronto's own corporate objectives, and key government policy objectives. Waterfront Toronto identified priority outcomes as the basis for the ultimate evaluation of the MIDP, rather than preemptively identifying prescriptive strategies to achieve the outcomes. To accompany the goals, objectives, and priority outcomes, Waterfront Toronto shared a list of process-focused requirements for the implementation of proposals included in the MIDP, with particular focus on an approach to data privacy and governance.

Waterfront Toronto is currently developing a framework and process that will be used to evaluate the MIDP. This evaluation framework is expected to be based largely on the priority outcomes and will also include more specific frameworks and processes for evaluation of each volume of the MIDP. Sidewalk Labs anticipates that Waterfront Toronto's evaluation of the complete MIDP itself will also involve consultation by Waterfront Toronto with independent external experts and the public. Waterfront Toronto's evaluation of the plan is expected to inform the potential revision of the draft MIDP, a final decision on approval by Waterfront Toronto's board of directors, and the review of the MIDP by the governments.

These actions laid the groundwork for the draft MIDP, which details both a plan and a path for implementation. It depends on a series of approvals from Waterfront Toronto and the three orders of government.

## Approval of the MIDP and Establishment of IDEA District / CIP

Sidewalk Labs anticipates that Waterfront Toronto will undertake additional public consultation and analysis as part of its formal review and assessment of the draft MIDP. This assessment will likely inform further revisions to the MIDP by Sidewalk Labs. Waterfront Toronto's assessment will also inform any actions by the Waterfront Toronto Board of Directors and its shareholder governments. The MIDP proposes a complex project that would unfold over multiple years. Numerous elements of the project would evolve through negotiation as the project advances through implementation, but the level of detail in the MIDP has been developed to inform a wide-ranging series of upfront agreements and actions. As outlined in the PDA, approval of the MIDP by both Waterfront Toronto and Sidewalk Labs is required in order for the project to proceed.

A vote by Waterfront Toronto's board of directors to approve a term sheet based on the MIDP would become the basis for the negotiation and completion of detailed implementation agreements (the "Implementation Agreements") which would then have to be formally approved in subsequent actions by the Waterfront Toronto Board of Directors. The Implementation Agreements would govern all aspects of the relationship between Sidewalk Labs and Waterfront Toronto. In some cases, Implementation Agreements may be required between Sidewalk Labs and other parties, most notably the orders of government.

Implementing the MIDP would also require government action to establish the boundaries of the IDEA District and approve a policy framework and implementation timetable, potentially through a CIP under Section 28 of the Planning Act, sufficient to ensure that reforms are considered by government and enacted in time for their application to this project.

An endeavour of this magnitude raises complex issues for government, and risks and opportunity costs for investors. Sidewalk Labs further requests the three orders of government take the steps necessary to establish the IDEA District with all deliberate speed. Based on this assumption, Sidewalk Labs estimates that the initial approvals for the project could be completed by Q1 2020.



Fig. 5.1

## Actions necessary for implementation

Category	Actions
<b>Approval of the MIDP by Waterfront Toronto</b>	<p>Waterfront Toronto Board of Directors vote to:</p> <ul style="list-style-type: none"> <li>Approve a term sheet reflecting the MIDP as the innovation roadmap for Waterfront Toronto’s revitalization strategies for Quayside and the proposed project area.</li> <li>Authorize management to complete detailed Implementation Agreements with Sidewalk Labs, pursuant to the project and broad terms outlined in the MIDP and subject to additional approvals by the Waterfront Toronto Board of Directors.</li> <li>Recommend to governments the creation of the IDEA District.</li> </ul>
<b>Sidewalk Labs and Alphabet Approval</b>	<ul style="list-style-type: none"> <li>Alphabet and Sidewalk Labs to approve final MIDP, per the PDA.</li> </ul>
<b>Implementation Agreements Between Waterfront Toronto, Sidewalk Labs, and Governments</b>	<ul style="list-style-type: none"> <li>Implementation Agreements to be drafted and executed as the governing documents for all aspects of the transaction between Waterfront Toronto and Sidewalk Labs.</li> <li>Where necessary, Implementation Agreements to be drafted and executed between Sidewalk Labs, Waterfront Toronto, and other governmental entities, as warranted by specific programmatic initiatives.</li> <li>Approval of the Implementation Agreements by the Waterfront Toronto Board of Directors.</li> </ul>
<b>Enabling Actions by Government</b>	<ul style="list-style-type: none"> <li>City Council vote to request a Staff Report and/or establish negotiation between the City and Sidewalk Labs.</li> <li>Submission of a Staff Report from the Waterfront Secretariat to the Toronto City Council.</li> <li>Government actions in support of the establishment of the IDEA District.</li> </ul>

### Implementation Agreements between Waterfront Toronto, Sidewalk Labs, and the governments

Following the approval of a term sheet reflecting the MIDP as a blueprint for the transaction, Sidewalk Labs and Waterfront Toronto would enter into Implementation Agreements that would set forth, at a level of detail sufficient to enable the implementation of the project to commence, the terms for governance, economics, roles and responsibilities, risk management, performance requirements,

off-ramps, and all other transactional requirements of all involved parties. The Implementation Agreements would include the definitive documents to support the transaction, enabling investment to proceed, and would have to be formally approved by both Waterfront Toronto and Sidewalk Labs. The specific set of Implementation Agreements and responsible parties would be negotiated with Waterfront Toronto and city, provincial, and federal government partners after formal review of the MIDP has been completed. As the project progresses, Sidewalk Labs also expects Waterfront Toronto to prepare Business Implementation Plans (BIPs), and seek other necessary authorizations, which would be required before advancing to future phases.

### Ongoing project development

Concurrent with the process to finalize the Implementation Agreements, Sidewalk Labs would advance work in four areas in order to further refine the implementation pathway for all plans and projects that will be subject to subsequent government approval processes. Each of these workstreams is critical in translating the MIDP from its current form as a proposal to an actionable plan that takes into account the ongoing de-risking and continued development of specific initiatives, and the path forward for implementation.

#### 1

##### Refine the program.

First, Sidewalk Labs would continue to develop and refine the program in Quayside and for Villiers West. The development program would be amended and refined based on ongoing analysis as well as feedback received from critical stakeholders, government partners, and the public as it is solicited during government and Waterfront Toronto-led review processes.

#### 2

##### Advance core innovations.

Second, Sidewalk Labs would advance the urban innovation agenda and the development of specific new technologies. For example, to further test and refine the application of Sidewalk’s tall timber kit of parts, Sidewalk Labs would begin designing a roughly 30-storey protomodel building (called Proto Model X or “PMX”). PMX will test the viability of integrating various technologies in one building, within the constraints of Quayside, and will help Sidewalk Labs and government partners identify the necessary policies and regulations required to support delivery of a system of timber buildings in the coming years.

This approach and other solutions would advance Sidewalk Labs’ plans for Quayside to a point where there is sufficient information and proof of feasibility to receive regulatory approvals (such as permitting tall timber above six storeys). For each technology or planning solution proposed for Quayside, Sidewalk Labs would further refine the roadmap for implementation that can be executed against once all approvals and permissions are in place.

#### 3

##### Engage third parties.

Third, Sidewalk Labs has begun to engage and will continue to engage third parties, including from the local real estate development community, as potential partners to execute plans in Quayside and Villiers West.

#### 4

##### Prepare for planning and development.

Fourth, Sidewalk Labs would prepare for, in coordination with Waterfront Toronto, the pursuit of the planning and development permissions necessary for Quayside. Though the approval process for development plans would be finalized once the Implementation Agreements have been completed, Sidewalk Labs would continue to refine the plans for Quayside in anticipation of the submission of a development application.


## Planning and development approvals process

Upfront approval of the overall transaction would not substitute for the subsequent pursuit of incremental approvals, wherever appropriate. With the Implementation Agreements in place, it is expected that project delivery would begin with a series of public planning processes whereby planning and development permissions are established to implement the MIDP.

Notwithstanding the planning roles and functions proposed within the IDEA District, all planning approvals and related development rights would be sought through established provincial legislation for regulating land and infrastructure development — most notably the Planning Act and the Environmental Assessment Act — and would require City Council approval. These would be public processes that continue the consultation efforts involved in preparing the MIDP as Sidewalk Labs commits to fair, transparent, and meaningful engagement that exceeds established statutory requirements.

Generally, the approvals required for project delivery to begin would proceed as follows:

- **Vertical development** would proceed through the City of Toronto's formal development application process and would be subject to City Council approval. The public administrator would be responsible for certifying that all development applications going to City Council are consistent with the established principles and objectives for the IDEA District.
- **Horizontal development** approval would be coordinated through the public administrator and would undergo Environmental Assessment approval where required. All municipal infrastructure components would need to be approved by Toronto's City Council.
- **All site remediation and preparatory work** would undergo Ministry of Environment review and approval and would be the responsibility of the vertical developers.

Geographic areas within the IDEA District have undergone varying degrees of planning efforts to date. As required in the Central Waterfront Secondary Plan, land use and infrastructure development on the Waterfront would be guided by and regulations would be established through a precinct planning process. To date, precinct plans have been established for Quayside (a combination of two precinct plans: The East Bayfront Precinct Plan and the Keating Channel Precinct Plan), Keating, and Villiers Island. Regulatory controls through a Zoning Bylaw have been established for Quayside and Keating West, but not for Keating East or Villiers Island. 

Future Precinct Plans would be required for McCleary and Polson Quay. With regard to infrastructure development, Environmental Assessment approvals are complete for Quayside but additional assessments would be required for other areas.

Given the varying level of existing planning across the IDEA District and given the different proposed roles for Sidewalk Labs within those phases, the specific paths to project delivery would be slightly different. At Quayside, the approvals process would be akin to a traditional development application process and would be led by Sidewalk Labs as vertical developer. As zoning and Environmental Assessments for Quayside are already in place, the approval process would be based on modest modifications consistent with the MIDP and detailed in a Quayside Development Plan Application, which would address land uses, densities, built form, and associated requirements, and through a related Infrastructure and Transportation Master Plan, which details the horizontal infrastructure required to support and service the precinct.

In the River District, while Precinct Plans have been established for Keating and Villiers Island, no Zoning Bylaw or Community Planning Permit Bylaw has been adopted for Keating East or Villiers Island. McCleary and Polson Quay have yet to undergo precinct planning processes. As a result, those areas would undergo sequential but overlapping planning processes led by the IDEA District public administrator.

# The project will evolve through negotiation and ongoing public consultation as it advances to government approval and implementation.



As noted in Chapter 2, Sidewalk Labs would be proposing adjustments to the precinct plans for Quayside (see table on Page 92) and Villiers West (see table on Page 104).

# Phase 1 project delivery timeline: Quayside Plan

Sidewalk Labs, in coordination with Waterfront Toronto, would prepare three formal documents for Quayside:

- the Development Plan Application,
- the Infrastructure and Transportation Master Plan (ITMP), and
- a site remediation plan.

These interrelated workstreams, all necessary to facilitate the implementation of the project, would be developed in parallel in order to finalize the build plan for Quayside and to prepare the site for development.

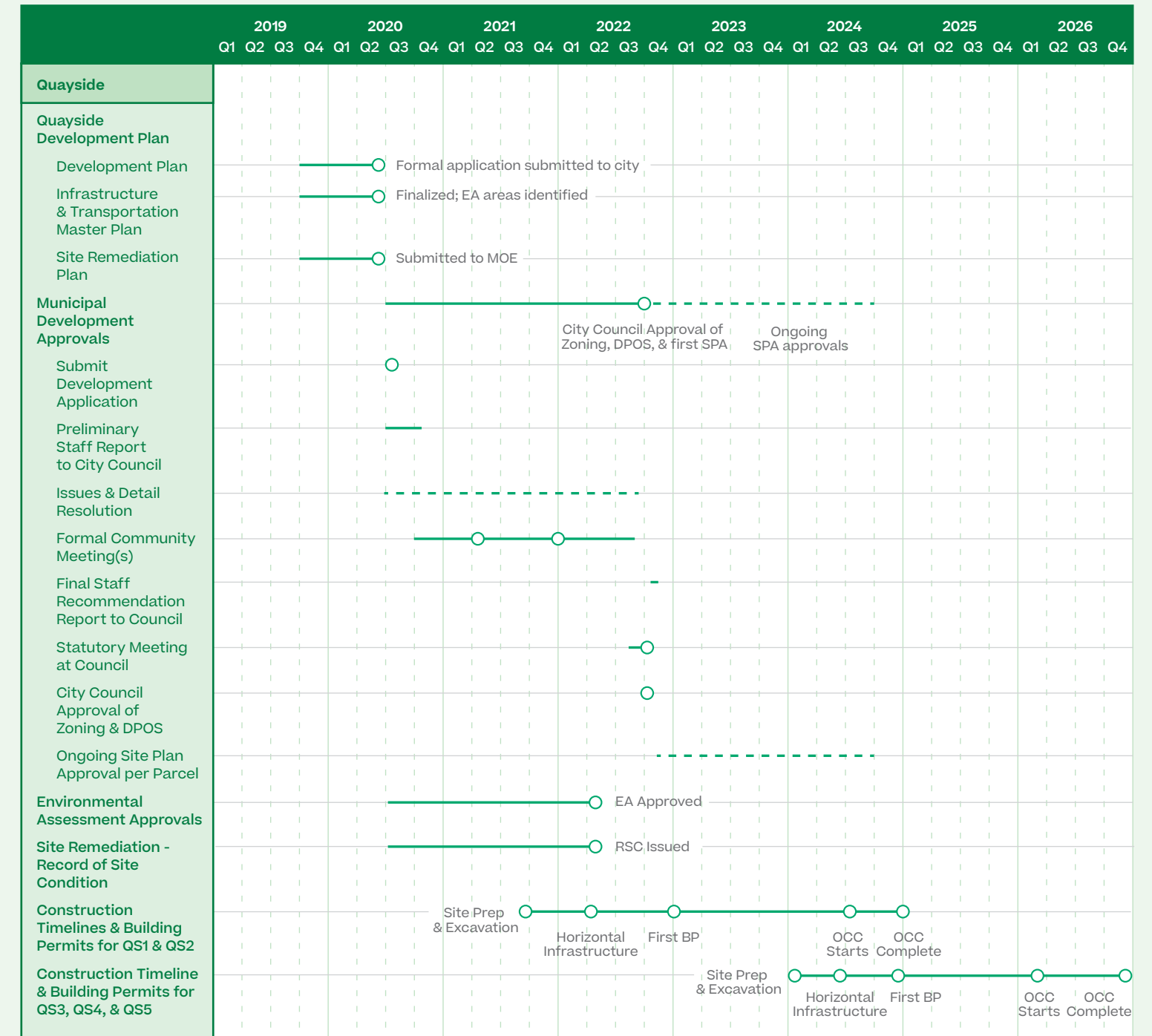
Upon execution of the Implementation Agreements, a formal Development Application would be submitted to the City of Toronto in early 2020 and it is expected that zoning approvals would be in place by early 2022, with building permits for the first buildings issued prior to year-end 2022. In the interim, in 2021, Sidewalk Labs anticipates that site preparation work on the initial Quayside sites (likely Sites 1 and 2, per plans shown in Volume 1), would commence, in parallel with the pursuit of final zoning approvals.

The Quayside Plan would provide the basis for all other documents, and the ITMP would detail all horizontal infrastructure required to support and service the proposed development. Working with Waterfront Toronto, Sidewalk Labs would identify all amendments or new Environmental Assessment approvals required and Waterfront Toronto would work with appropriate public agencies to seek approval. The ITMP would also be used by Sidewalk Labs to support a Draft Plan of Subdivision. It is expected that Environmental Assessment approvals and the Draft Plan of Subdivision approval would be complete in 2022, commensurate with initial development.

Sidewalk Labs would be responsible for ensuring that all Ministry of Environment guidelines for site remediation are met. A site remediation plan would be prepared and submitted in early 2020. It is expected that preliminary site work could begin as early as 2021, with anticipation of excavation and construction in 2022.

Based on the projected timeline, initial occupancy of the first building in Quayside would occur in mid-2024, with full occupancy across the entire Quayside site achieved by the close of 2026. The following timeline summarizes the anticipated delivery schedule for Quayside.

Fig. 5.2  
Quayside timeline



DPOS = Draft Plan of Subdivision; MOE = Ministry of Environment; EA = Environmental Assessment; RSC = Record of Site Condition; BP = Building Permit; OCC = Occupancy; SPA = Site Plan Approval; see Volume 1 for details on Quayside sites 1 through 5.

# Phase 2 project delivery timeline: Villiers West urban innovation campus

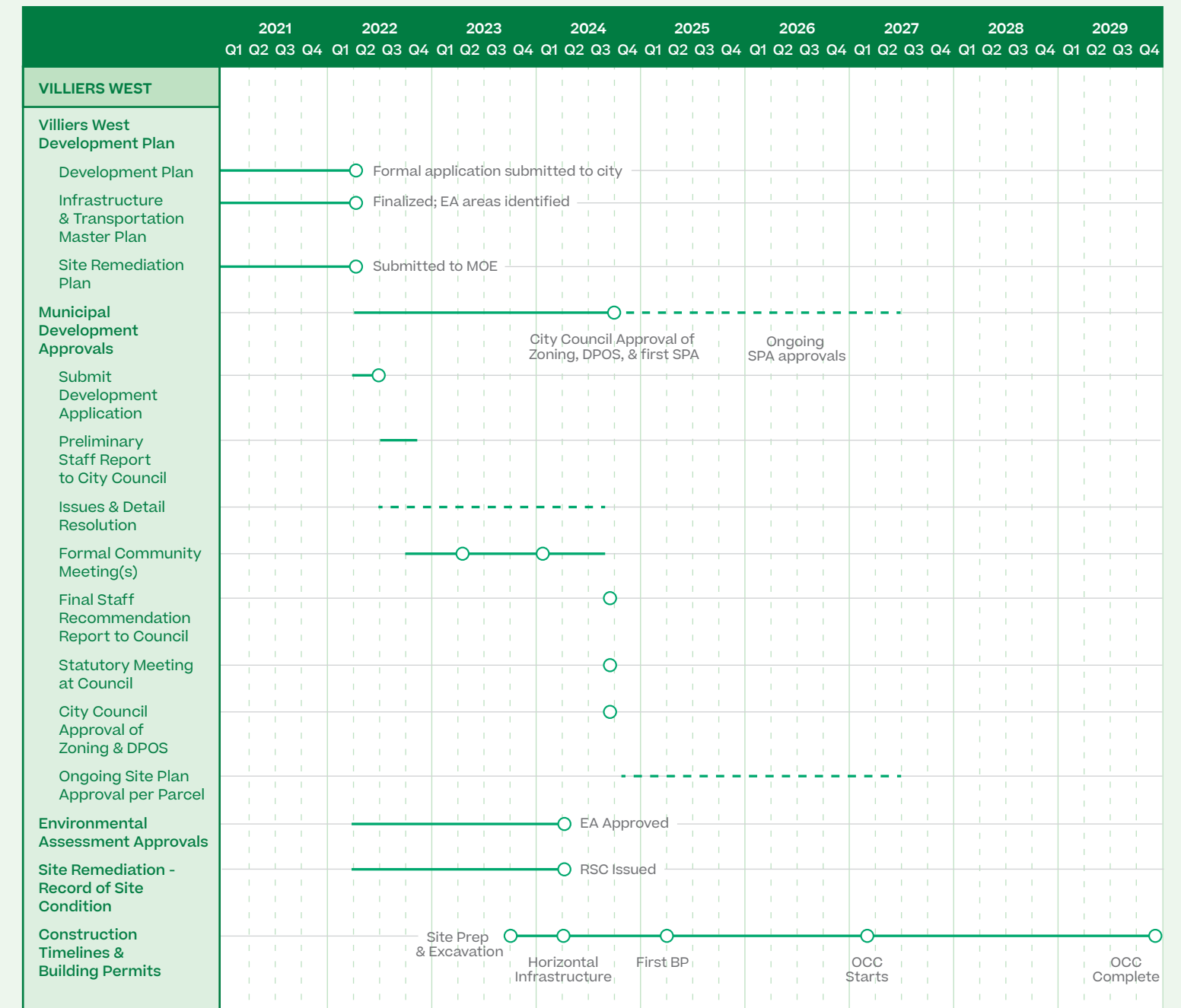
Sidewalk Labs proposes to create an urban innovation campus at the western end of Villiers Island as part of an overall economic development strategy. The City’s MOU with Waterfront Toronto specifically contemplates circumstances, such as this one, where an economic development project justifies the disposition of land outside the context of a traditional request for proposal. Indeed, the MOU specifically notes that “some flexibility is required,” for example, when “responding to a business that is interested in looking to move to or establish itself in Toronto.”

The Villiers West urban innovation campus would provide an opportunity for a wide cross-section of researchers, designers, engineers, and producers to co-locate and collaborate on ideas and technologies that drive urban innovation. As part of this proposal, Sidewalk Labs has worked with Alphabet to commit to establish a new Google Canadian headquarters that would serve as a major tenant and initial anchor for the campus. Accordingly, Sidewalk Labs proposes to undertake the vertical development role for this campus.

Sidewalk Labs would prepare a Villiers West development plan, in parallel with the Quay-side development plan, with a formal development application submitted to the City of Toronto by early 2022. It is expected that zoning approvals would be in place by 2024 with building permits for the first building (or buildings) by the start of 2025, consistent with the timeline for completion of the Port Lands Flood Protection and Enabling Infrastructure construction.

Sidewalk Labs would also prepare an ITMP detailing all horizontal infrastructure required to support and service the proposed Villiers West development, including local roads and servicing. This plan would be coordinated with the Infrastructure and Transportation Framework Plan prepared for the entire River District. The ITMP would be used by Sidewalk Labs to support a Draft Plan of Subdivision, and in collaboration with Waterfront Toronto, any necessary Environmental Assessment approvals would be identified. It is expected that Environmental Assessment approvals and the Draft Plan of Subdivision approval would be complete by 2024, commensurate with initial development. Sidewalk Labs would also be responsible for ensuring that all Ministry of Environment guidelines for site remediation are met. The site remediation approval process would follow the municipal approval process and would be undertaken between 2022 and 2024. Occupancy by Google, the Urban Innovation Institute, and other tenants is anticipated by 2028.

Fig. 5.3  
Villiers West timeline



DPOS = Draft Plan of Subdivision; MOE = Ministry of Environment; EA = Environmental Assessment; RSC = Record of Site Condition; BP = Building Permit; OCC = Occupancy; SPA = Site Plan Approval

# Stage Gates and Risk Mitigation

# Introduction

Sidewalk Labs proposes a phased implementation approach and a series of risk mitigation strategies that together seek to ensure that the project advances incrementally, protects the public sector and third parties, and has the greatest opportunity for success. Most importantly, the overall transaction is structured around a series of stage gates.

The stage-gate approach requires Sidewalk Labs to earn the right to proceed to successive project stages, rather than receiving the contractual right to complete the project at the outset. At each stage, Sidewalk Labs must satisfy key project milestones set out in the Implementation Agreements, and, in the process, prove the effectiveness and commercial viability of its innovation strategy before applying it to third parties.

As reflected in the table at the end of this section, the proposed stage gates track the key planning, construction, and expansion phases of the project. Sidewalk Labs must satisfy milestones before moving from planning development of Quayside (Stage 1) to construction of Quayside (Stage 2), to planning development of Villiers West (Stage 3), to construction of Villiers West (Stage 4), and, later, before the IDSG applies to the broader IDEA District (Stage 5), and before Sidewalk Labs becomes eligible for performance

payments (Stage 6). Initially, Sidewalk Labs' role would be restricted to Quayside, where it would serve as lead developer of real estate and advanced systems. To pass through the Quayside stage gates and undertake similar responsibilities for Villiers West, Sidewalk Labs must satisfy a series of project milestones. At the planning stage, these include submitting a development application that matches the MIDP vision, including for affordable housing, sustainability, and other key elements, and securing the promised investment in a tall timber factory. At the construction phase, these include Sidewalk Labs delivering on its LRT financing commitment if required and preparing the initial set of standards and guidelines constituting the IDSG. If Sidewalk Labs is unable to achieve these project milestones, the company would not be entitled to vertically develop Villiers West and the public administrator would not apply its innovation strategy to the IDEA District overall.

For the final stage gates, the proposed project milestones include key performance targets. These specific quantitative targets would track Waterfront Toronto's priority outcomes and would be negotiated as part of the Implementation Agreements. By satisfying these performance targets (such as reducing greenhouse gas emissions to a particular extent), Sidewalk Labs would demonstrate the effectiveness of its overall approach. In the event that Sidewalk Labs does not deliver, the public administrator would not apply the IDSG beyond Quayside and Villiers West, where Sidewalk Labs would serve as lead developer of real estate and advanced systems. Moreover, Sidewalk Labs would not earn a performance payment.

The following table reflects the proposed milestones that define each stage gate, the obligations that Sidewalk Labs must fulfill to move beyond the stage gates, the obligations of Waterfront Toronto and its government stakeholders for Sidewalk Labs to proceed with its investment, and the implications for achieving or failing to achieve at each stage. The table provides an estimated date for completion of each stage gate, although these are subject to change as the project proceeds. The timing also depends on the timeframe for approvals needed from Waterfront Toronto and the governments to advance the different

project elements, which are necessary conditions for Sidewalk Labs to fulfill its obligations. After Waterfront Toronto approves the MIDP as a basis for transaction, the parties would endeavour to supplement and refine the stage gates through negotiation, and to memorialize them as contractual terms in the Implementation Agreements.

Separate and apart from the stage gates described in the following table, Sidewalk Labs would not proceed with construction on Quayside absent key government actions.

These include:

- Government approval of IDEA District boundaries, potentially as a Community Improvement Project Area, with an approved policy framework and implementation timeline
- A government commitment to advance the LRT, which could proceed in phases
- The assembly of lands constituting Villiers West, and a commitment to sell such lands to Sidewalk Labs in accordance with the Implementation Agreements

In addition to stage gates, the Implementation Agreements would incorporate a series of off-ramps for each party, providing fair financial and contractual remedies should the project not proceed as planned. These off-ramps would relate to milestones in the project timeline and to the delivery of contractual commitments by all parties.

**To protect the public sector, Sidewalk Labs must achieve performance milestones at every stage to earn the right to advance to successive project stages.**

Fig. 6.1

# Proposed stage gates

	Stage Gate	Project Milestone for Sidewalk Labs	Needed Action by Waterfront Toronto and Public Sector	Implications if Stage Gate Not Achieved
1	<b>Sidewalk Labs submits Quayside development plan</b>  (Estimated completion of stage gate before 2021)	A. Submission of Development Plan Application for Quayside reflecting the development plan in the MIDP and the innovation guidelines, including as related to: i. Use mix ii. Minimum percentage of affordable housing iii. Sustainability requirements iv. Economic development v. Public realm B. Submission of ITFP to Waterfront Toronto, aligned with MIDP proposal. C. Investment in timber factory.	A. Approval of development plan, per standard process (including any necessary Sidewalk Labs revisions). B. Granting of initial legal adjustments and permissions needed for Quayside plan (legislative, contractual, or regulatory). C. Upon approval of development plan, Quayside “closing” as per terms in the Implementation Agreements. D. Utilization of Sidewalk Labs as Innovation Partner to advise in planning efforts underway within IDEA District/CIP geography.	The project will not proceed unless and until the stage gate is satisfied.
2	<b>Sidewalk Labs begins construction on Quayside</b>  (Estimated completion of stage gate before 2022)	A. Commitment of equity necessary to begin construction of vertical development and advanced systems on first parcel. B. Submit draft IDSG to Waterfront Toronto, reflecting final Quayside plan. C. Delivery of credit facility or alternative financing tool consistent with optional LRT financing commitment.	A. Granting of building permits and additional approvals needed to begin construction. B. Initiating financing structure/approach for LRT with timeline and clarity as to delivery path. C. Construction of municipal infrastructure underway.	If Sidewalk Labs does not commit equity to begin Quayside construction, it cannot proceed with the formal submission of the Villiers West development plan.
3	<b>Sidewalk Labs submits Villiers West development plan</b>  (Estimated completion of stage gate before 2023)	A. Delivery of Google Toronto occupancy agreement. B. Submission of Development Plan Application for Villiers West reflecting the development plan in the MIDP and the innovation guidelines, including as related to: i. Use mix ii. Minimum percentage of affordable housing iii. Sustainability requirements iv. Economic development v. Public realm C. Completion of ITFP for Villiers West.	A. Approval of development plan, per standard process (including any necessary Sidewalk Labs revisions). B. Granting of additional legal adjustments and permissions needed for Villiers West plan (legislative, contractual, or regulatory). C. Upon approval of development plan, Villiers West “closing” as per terms in the Implementation Agreements. D. Utilization of Sidewalk Labs as Innovation Partner to advise in planning efforts underway within IDEA District/CIP geography.	The Villiers West project will not proceed unless and until the stage gate is satisfied.

	Stage Gate	Project Milestone for Sidewalk Labs	Needed Action by Waterfront Toronto and Public Sector	Implications if Stage Gate Not Achieved
4	<b>Sidewalk Labs begins construction on Villiers West</b>  (Estimated completion of stage gate before 2024)	A. Commitment of equity necessary to begin construction of Villiers West vertical development and advanced systems. B. Submission of an updated IDSG to Waterfront Toronto, reflecting final Villiers West development plan.	Granting of building permits and regulatory approvals needed to begin construction.	The Villiers West project will not proceed unless and until the stage gate is satisfied.
5	<b>IDSG applies to broader IDEA District</b>  (Estimated completion of stage gate before 2025)	A. Achievement of a minimum of 50% occupancy for Quayside, consistent with approved development plans. B. Satisfying performance targets of Implementation Agreements.	Public administrator to elect to adopt revised IDSG for remainder of IDEA District.	If Sidewalk Labs does not meet the project milestones, Waterfront Toronto and governments do not adopt IDSG requirements for future developments.
6	<b>Sidewalk Labs becomes eligible for performance payments</b>  (Estimated completion of stage gate before 2028)	A. Achievement of a minimum of 50% occupancy for Villiers West, consistent with approved development plans. B. Satisfying performance terms of Implementation Agreements for Villiers West. C. Achievement of a minimum of 75% occupancy for Quayside, consistent with approved development plans. D. Satisfying performance targets of Implementation Agreements for Quayside. E. Achievement of the accelerated growth targets for the IDEA District.	A. Public administrator to elect to update IDSG for future development within the IDEA District. B. Government initiates performance payments process as described in the Implementation Agreements.	If Sidewalk Labs does not meet the project milestones, Sidewalk Labs is not eligible for any performance payments, and Waterfront Toronto and the governments do not update IDSG requirements for future developments.

# Additional strategies for managing the risks of innovation

The implementation plan and overall transactional structure are designed to mitigate and manage the risks of implementing the MIDP for Waterfront Toronto, the City of Toronto, the Province of Ontario, the Government of Canada, and the public. By definition, the risk profile for new strategies and technologies is higher than for standard approaches. These costs and risks range from a given technology not performing as intended, to a failure to budget for the operating expenses of bespoke elements.

The proposal calls for Sidewalk Labs and its local partners to shoulder certain upfront financial risks. Most notably, this includes the risks associated with vertically developing Quayside and Villiers West as an urban development model and as a catalyst for innovative growth. Before the public administrator would adopt the IDSG, and require other developments to meet the additional standards and guidelines, Sidewalk Labs and its partners would be required to demonstrate the effectiveness of the new strategies in Quayside and Villiers West, their cost feasibility, and their operating implications.

The transaction structure also incorporates several de-risking strategies. These begin with the stage gates for Sidewalk Labs and the off-ramps for both parties described earlier. They also include an incremental approach to testing and deploying innovations; a clear accounting methodology for project investment (in the event costs need to be recouped before project completion); and funding supplemental innovation investments to support the development of advanced systems before they reach scale and efficiency.


## Incremental approach to innovation research and development.

Sidewalk Labs would utilize an incremental and iterative process to deploy innovative project elements. This process of testing and refinement began well in advance of the MIDP release. The approach includes ongoing investments in incremental design improvements, prototyping, and active consultation to improve and enable concept elements with an ecosystem of regulators, insurers, lenders, and technical providers. In preparation for constructing buildings with cross-laminated timber, for example, Sidewalk Labs has begun to develop a prototype and to engage leading professionals in all aspects of the building design, delivery, and operations. Sidewalk Labs is working with the real estate arm of Google to test and refine specific building elements; with a major insurance carrier to develop new policy and coverage strategies; and with architects to refine the approach to design. Moreover, because the project is organized into discrete elements, the parties can compartmentalize aspects of the plan, determine their viability, and adjust accordingly — without jeopardizing the rest of the program.

## Accounting for downside risks.

Sidewalk Labs has accounted for the operating costs associated with the innovative aspects of the public realm within the overall project economics, including the maintenance of public realm or dynamic streets. For example, the IDSG requires new developments in the IDEA District to contribute to the operation of the OSA, which manages parks and other publicly accessible spaces. Moreover, by tying the performance milestones and stage gates for the Innovation Framework to outcomes, the public sector can manage the risk associated with failure to achieve the desired outcomes. And until achieving those outcomes, Sidewalk Labs would not earn any performance payments.

## Supplemental innovation investments.

Sidewalk Labs has proposed to make certain supplemental innovations investments to support the advanced power grid and thermal grid in their early phases and to keep user rates consistent with prevailing rates while these systems achieve sufficient scale and efficiency. 



See Chapter 2, on Page 140, for more details on supplemental innovation investments.

**Risk management strategies include extensive testing and prototyping; ongoing consultation with regulators and others; and project milestones that demonstrate the solutions are effective before being applied beyond Quayside and Villiers West.**

## Risk mitigation strategies.

The table on the following page summarizes several of the primary areas of risk attributable to the unique aspects of the proposed partnership. The assorted risk mitigation strategies, while summarized here, are detailed throughout this volume.



Fig. 6.2

## Risk mitigation strategies

Risk	Mitigation Strategies
<p><b>The MIDP proposes a number of advanced systems and programmatic elements that are novel, creating the risk that they could fail or need to be modified prior to, or after, initial deployment.</b></p>	<ul style="list-style-type: none"> <li>→ An incremental approach to developing technological solutions enables Sidewalk Labs to work through the challenges before deployment.</li> <li>→ Through prototyping, early partnerships, and other research and development techniques, the programmatic elements would be ready for deployment at Quayside and Villiers West.</li> <li>→ The initial deployment of advanced systems would take place at Quayside and at Villiers West (assuming Sidewalk Labs achieves applicable project milestones). As lead developer of vertical real estate at Quayside and Villiers West, Sidewalk Labs, not the public, would bear certain financial risks if the advanced systems do not perform as expected.</li> <li>→ Sidewalk Labs would work to manage and control risks as lead advanced systems developer, including through the oversight of system design, selection of operators, and iteration and refinement of new systems that directly impact the vertical development.</li> <li>→ In these initial stages, Sidewalk Labs would monitor, adjust, adapt, and optimize solutions to achieve Waterfront Toronto's priority outcomes. The proposal factors in the cost of this necessary iteration process. For example, establishing predictable and affordable rates for users of the advanced power grid is likely to require iteration on the data collection and device control technologies used in homes, as well as the pricing and mechanics of selling community-sited solar and battery energy to offset exposure to peak time rates.</li> <li>→ The development program for Quayside and Villiers West would provide incremental opportunities for testing and refining programmatic elements. This practical experience would inform the improvement of system designs and the development of IDSG for the IDEA District.</li> <li>→ Sidewalk Labs would continue to conduct research and development as technology evolves to ensure that the development of Quayside and Villiers West and the IDSG benefit from the most up-to-date understanding available of evolving capabilities.</li> </ul>
<p><b>Innovative infrastructure and programmatic elements could outlast the project and leave governments with operating costs for unique systems or assets.</b></p>	<ul style="list-style-type: none"> <li>→ The project's economics factor in long-term operating expenses for the new systems and approaches, therefore ensuring that underwriting for the project accounts for those costs. For example, the WTMA incorporates various revenue streams, such as curb financing and parking fees, that would, among other things, finance the maintenance costs for the dynamic streets.</li> <li>→ The incremental product development approach is designed to prove out operating models, to establish that any new programmatic elements or systems are market-viable before their adoption outside of Quayside and Villiers West.</li> <li>→ The development plan and land-use approvals processes for Quayside and Villiers West and the approvals process for the advanced systems serve as a further check on and oversight for the innovative solutions.</li> </ul>

Risk	Mitigation Strategies
<p><b>Developing new systems could result in higher user rates before systems achieve efficiencies and scale.</b></p>	<ul style="list-style-type: none"> <li>→ Sidewalk Labs is prepared to support the systems financially in their early phases until they reach financial viability. For example, Sidewalk Labs has proposed to make a supplemental innovation investment, at an estimated cost of \$45 million, to support the development of a thermal grid and an advanced power grid before they achieve sufficient scale and performance levels.</li> <li>→ Advanced system operators would be required to enter into master services agreements with the management entities that would dictate allowable user rates.</li> </ul>
<p><b>By enabling the development and deployment of technology products within the IDEA District, Waterfront Toronto and the governments provide value to Sidewalk Labs without compensation.</b></p>	<ul style="list-style-type: none"> <li>→ Sidewalk Labs has offered to share 10 percent of profits from certain technologies so that the public sector participates in the upside when providing unique opportunities to develop, test, and deploy technologies.</li> </ul>
<p><b>Sidewalk Labs neglects to deliver on the intended project objectives and requirements, or Waterfront Toronto or the governments do not provide the required commitments.</b></p>	<ul style="list-style-type: none"> <li>→ The proposed system of off-ramps, performance milestones, and stage gates is designed to enable all parties to mitigate exposure should the other not perform.</li> </ul>

Note: Sidewalk Labs has engaged Marsh & McLennan, who are the world's leading Insurance Broker and Risk Advisor, to support and advise Sidewalk Labs throughout the life of this development. Marsh will assist Sidewalk Labs with the identification of key risks to the Waterfront Toronto development during the planning, construction, and operational phases. It will also facilitate the most appropriate risk allocation and insurance solutions, engaging with underwriters and specialists around the globe.

# Overview of the Participants in IDEA District Development

Fig. 7.1

# Participants in the development of the IDEA District

The MIDP anticipates significant participation and collaboration across the public and private sectors in the operation and success of the project. Waterfront Toronto, the public administrator, and Sidewalk Labs would play leading roles. But the success of the IDEA District does not rest solely with them.

The City of Toronto, the real estate development community, the construction industry, the tech sector, and the public all would contribute meaningfully to the IDEA District and the ability to deliver on Waterfront Toronto's priority outcomes. The table below summarizes the roles and responsibilities of various participants in the project.

Note: All public and private entities in the IDEA District must adhere to the Urban Data Trust data protection standards in addition to Canadian privacy law.

	Role	Waterfront Toronto or Public Administrator	City, Province, and Government of Canada	Sidewalk Labs	Real Estate Developers	Third-Party Vendors (i.e. technology, construction, and consultants)
1	<b>IDEA District Oversight and Administration</b>	Public administrator of the IDEA District with oversight for district management entities.	Enabled by government. Relevant city agencies would be core stakeholders of management entities.	Not applicable	Not applicable	Not applicable
2	<b>Land Use and Development Planning</b> (Precinct Plans, Infrastructure and Transportation Master Plans, Precinct-Level Infrastructure Plans, Bylaw and OPA)	Lead planning entity	Traditional roles - IDEA District planning documents would require the standard set of approvals.	Contracted to provide technical expertise and implementation services related to planning and advanced systems, including the IDSG.	No change from current (except for potential application of IDSG to public parcels sold for private development).	Not applicable
3	<b>Infrastructure Financing</b>	Contribute to municipal infrastructure funding, including through land proceeds, in structure laid out in the 2006 MOU.	Enable city fee and development charge credits, municipal infrastructure contributions, and local infrastructure contributions; enable LRT financing through TIF or identify alternate funding source.	Provide optional financing for municipal infrastructure (as front-end agreements).  Provide optional credit support for LRT.  Enable optional financing for advanced systems through newly formed company.	Pay (1) reduced DCs; (2) additional municipal infrastructure contributions (combined with (1), that roughly equal standard city fee and development charge obligations); and (3) local infrastructure contributions, equal to the cost of avoided systems (like traditional gas).	Participate in normal course of business.

	Role	Waterfront Toronto or Public Administrator	City, Province, and Government of Canada	Sidewalk Labs	Real Estate Developers	Third-Party Vendors (i.e. technology, construction, and consultants)
4	<b>Infrastructure Delivery</b>	Manage construction of municipal infrastructure.  Co-lead LRT delivery, in coordination with TTC.	Co-lead LRT delivery, in coordination with Waterfront Toronto.	Partner with public administrator to play various roles. In Quayside and Villiers West, this would include serving as lead developer of a range of advanced systems and leading the design of certain municipal infrastructure.  No role in the design, delivery, or operation of the LRT.	Shoulder a reduced infrastructure burden for vertical development due to public administrator's comprehensive infrastructure program.	Contractors would compete to construct municipal infrastructure.  Operators would compete to deliver advanced systems.
5	<b>Real Estate Development</b>	Lead RFP process for publicly-owned parcels, subject to IDSG.	Traditional roles — IDEA District would require standard set of approvals and permissions.	Lead vertical development of Quayside (for R&D purposes) and Villiers West (for economic development purposes), working alongside local partners.  Prepare the IDSG.	Partner with Sidewalk Labs in delivery of vertical development in Quayside and Villiers West.  Bid on, or proceed with, development of the 83.6% of IDEA District not vertically developed by Sidewalk Labs.	Contractors would compete to deliver vertical real estate.  Other vendors would compete to deliver products and components.
6	<b>Technology Deployment</b>	Establish Innovation Framework.	Traditional roles (where applicable).	Identify technical solutions for use in connection with the project.  Develop and deploy a limited number of solutions that do not yet exist in the market.	Conduct business as usual. No obligation to purchase or use Sidewalk Labs' products.	Third-party technology firms would compete to deliver the vast majority of technology products used in the project area.

# Supplemental Tables

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**I. Management  
Entities**

p222

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**II. Regulatory  
Adjustments**

p224

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**III. Initial  
Innovation  
Design  
Standards and  
Guidelines**

p227

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**IV. Upfront  
Permissions**

p230

# I. Management Entities

The following table summarizes the five management entities the MIDP proposes to advance Waterfront Toronto's priority outcomes in the IDEA District, their relationship to the public administrator, their method of formation, and their funding mechanism.

Fig. ST.1  
Summary of management entities

Entity Name	Description / Scope	Proposed Relationship to Administrator	Method of Formation	Funding Mechanism
<b>Open Space Alliance (OSA)</b>	Serving as a steward of publicly accessible spaces, with community input, the OSA would pursue the following objectives: <ul style="list-style-type: none"> <li>i. A dynamic, well-programmed, well-maintained public realm that benefits the community and city;</li> <li>ii. A seamless public realm experience that creates a unique sense of place and generates value for the neighbourhood;</li> <li>iii. The conditions to explore technology to improve access, programming, operations, and maintenance of open space; and</li> <li>iv. A viable mechanism for long-term operations, including sustainable funding and public-private sector knowledge-sharing.</li> </ul>	An independent non-profit operating within the geography of the IDEA District.	Established as an independent non-profit, the OSA would enter collaborative management agreements with the City and third-party landowners to manage open space programming, operations, and maintenance.	Operations and capital expenses will be funded through private financing from landlords or tenants in the IDEA District; traditional city parks funding; and revenue from sponsored events, special elements, and concessions.

Entity Name	Description / Scope	Proposed Relationship to Administrator	Method of Formation	Funding Mechanism
<b>Urban Data Trust (UDT)</b>	The UDT would govern the collection and use of urban data in the IDEA District. This new governance entity would promulgate responsible data use guidelines, review applications for collecting and using urban data, and ensure non-sensitive urban data is publicly available by default to spur innovation. All entities would need to apply to the UDT and receive approval before collecting or using urban data in or from the IDEA District.	An independent non-profit operating within the geography of the IDEA District.	Established as an independent non-profit, the UDT would enter into agreements that govern the collection, use, disclosure, and storage of urban data.	Each applicant seeking to collect or use data in the IDEA District would pay a data collection and use administration fee to cover the costs of the UDT.
<b>Waterfront Housing Trust</b>	The Waterfront Housing Trust would be a public-private financing entity that administers below-market housing program in the IDEA District. The trust would improve funding predictability for developers and harness new private affordable housing funding sources.	A private trust; the IDEA District public administrator would serve as sole trustee.	Established at the discretion of the IDEA District public administrator.	One initial source of funds for the trust would be a fee paid for condo resales.
<b>Waterfront Sustainability Association (WSA)</b>	The WSA would oversee the operation of four advanced sustainability systems in the IDEA District: the thermal grid, waste management system, advanced power grid, and stormwater management system. This includes monitoring compliance with master service agreements (MSA), including user rates, seeking MSA enforcement where required, and compiling and reviewing key operator performance metrics.	An administrative unit of the IDEA District public administrator.	Established with the creation of the IDEA District.	Operational expenses funded by fees paid by system operators.
<b>Waterfront Transportation Management Association (WTMA)</b>	The WTMA, in conjunction with the City's Transportation Services Division and the Toronto Transit Commission, would: <ul style="list-style-type: none"> <li>i. implement mobility policy objectives for the IDEA District;</li> <li>ii. oversee planning, operations, and maintenance of new mobility-related infrastructure, such as dynamic streets; and</li> <li>iii. manage the district's four advanced mobility systems, including the mobility subscription package.</li> </ul>	An administrative unit of the IDEA District public administrator.	Established with the creation of the IDEA District.	Capital and operating expenses would be funded by revenue from on-site parking garages, curb pricing, and the sale of mobility packages.

## II. Regulatory Adjustments

The following four tables discuss the regulatory adjustments the MIDP proposes to advance Waterfront Toronto's priority outcomes in the IDEA District, describing the legislation, regulation, or policy implicated and the authorization or requirement needed.

Fig. ST.2

### Proposed regulatory adjustments and reforms related to Mobility

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Dynamic curb and curb pricing	Ontario Highway Traffic Act City of Toronto Act City of Toronto Municipal Code	Amendment to the Highway Traffic Act and Municipal Code to permit the features of the dynamic curb.  Amendment to the City of Toronto Act to permit curb pricing and assigning management responsibility to WTMA.
Ride-hail pick-up, drop-off, and staging zones	City of Toronto Zoning Bylaw City of Toronto Municipal Code	Zoning Bylaw amendment and amendment to the Municipal Code to designate adaptive passenger pick-up/drop-off (PPUDO) areas in the IDEA District and empower the WTMA to modify and work with law enforcement to ensure compliance.
Adaptive traffic signals	Ontario Highway Traffic Act City of Toronto Municipal Code	Amendment to the Highway Traffic Act and Municipal Code to permit adaptive traffic signals.
Modifying speed limits	Ontario Highway Traffic Act City of Toronto Municipal Code	Amendments to the Municipal Code to permit modifications to the speed limits for certain separated streets.
Delivery truck permits	City of Toronto Municipal Code	Amendment of Municipal Code to require courier/delivery vehicle parking permits within the IDEA District and assigning management responsibility to WTMA.

Fig. ST.3

### Proposed regulatory adjustments and reforms related to Public Realm

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Shared rights of way	City of Toronto Municipal Code	Municipal Code amendment to create a more streamlined process for granting permits for the use of part of a street between the edge of the roadway and street line for a range of uses.
Outdoor comfort system	City of Toronto Municipal Code	Municipal Code amendment to allow a more significant set of encroachments with or without a requirement to enter into an Encroachment Agreement with the City of Toronto.

Fig. ST.4

### Proposed regulatory adjustments and reforms related to Buildings and Housing

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Mass timber buildings and related advances	Ontario Regulation 332/12 (Division B) of Ontario Building Code	New regulation from the Government of Ontario permitting 30-storey timber building, alternative glazing, internal wall materials, and adaptable Loft spaces; OR  Determination by City Building Department that the proposed timber construction and related advances achieve the same or better level of performance to currently permitted materials.
Outcome-based building use permissions	City of Toronto Noise Bylaw City of Toronto Zoning Bylaw City of Toronto Building Permit Process	Amendment of Zoning Bylaws to allow wider range of uses in connection with the use of alternative outcome-based building use permissions in the IDEA District. Developer requirements to employ building systems to implement outcome-based building code.
Power over ethernet	OEB Act; Electricity Act; Regulation 89/99; Ontario Building Code Act and Building Code	Provincial approval to deploy power-over-ethernet, including the use of direct current, under the Ontario Building Code and section 113 of the Electricity Act and associated regulations.
Efficient units	City of Toronto Affordable Rental Housing Guidelines Ontario Building Code	Authorization to build units smaller than indicated in the Affordable Rental Housing Guidelines of the City of Toronto Affordable Housing Office, when providing a mix of housing options, including larger-sized units of two-, three-, and four-bedrooms.
Affordable housing portfolio funding		Approvals from the Government of Canada and the City of Toronto to receive housing funding for a portfolio of properties, rather than development by development.

Fig. ST.5

## Proposed regulatory adjustments and reforms related to Sustainability

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Advanced power grid	Ontario Energy Board	Amendment to Standard Supply Service Code OR amendment to O. Reg. 95/05 to no longer require compliance with Standard Supply Service Code to authorize advanced power grid.
Dynamic Rate Structure (monthly power budget)	Ontario Energy Board	Ontario Energy Board approval of a regulated customer rate based on joint application with Toronto Hydro or through an alternative structure.
Stormwater Management/Billing for Infrastructure	City of Toronto Act	Permissions to allow stormwater management infrastructure at the scale of the IDEA District and City reduction to the portion of the Toronto Water billing attributable to stormwater in the Port Lands.

## III. Initial Innovation Design Standards and Guidelines

The following five tables discuss the Innovation Design Standards and Guidelines (IDSG) the MIDP proposes that the public administrator implement to advance Waterfront Toronto's priority outcomes in the IDEA District.

Fig. ST.6

## Proposed IDSG requirements related to Mobility

MIDP Proposal	Proposed IDSG Requirement
Dynamic curb	Requirement to establish the features of the dynamic curb in connection with new developments.
Bike access to all buildings via dedicated lanes or bike priority streets	Requirement to ensure bike access to all new developments within the IDEA District through priority streets or dedicated lanes.
Underground delivery tunnels and a neighbourhood logistics hub	Requirement that new developments connect to the underground delivery tunnel system for deliveries and sanitation.
Bicycle parking and amenities	Requirement that new developments in the IDEA District exceed the bicycle parking and amenity requirements of the applicable zoning bylaw.
Rooftop landing pads	Requirement that new developments permit access for aerial drones and provide rooftop landing pads.

Fig. ST.7

## Proposed IDSG requirements related to Public Realm

MIDP Proposal	Proposed IDSG Requirement
Development contributions to open space management	New requirement that developments pay an ongoing fee to partially cover operational expenses of public spaces.

Fig. ST.8

## Proposed IDSG requirements related to Buildings and Housing

MIDP Proposal	Proposed IDSG Requirement
Condo resale fee	New requirement that condos in the IDEA District pay a percentage of the sale price as a fee to the Waterfront Housing Trust to fund affordable housing.

Fig. ST.9

## Proposed IDSG requirements related to Sustainability

MIDP Proposal	Proposed IDSG Requirement
Heightened sustainability and active energy management	Requirement that new buildings utilize sustainable building materials and energy management systems that enable users to conserve energy.
Outcome-based energy performance standards	Requirement that new developments meet new outcome-based energy performance standards.
Use of autonomous building management solutions	Requirement that new buildings utilize an autonomous building management system that communicates to the central grid in a standard, published format called "Brick."
Thermal Grid: Requirement to connect to the thermal grid	Requirement that new developments connect to the thermal grid.
Pneumatic Waste: Connection and use of system	Requirement that new developments connect to, and use, the pneumatic waste system.
Pneumatic Waste: Charging for waste	Requirement that new developments opt out of city sanitation services and pay sanitation fees for pneumatic waste system.
Stormwater Management: Credits and Green Infrastructure Fund; coordination with private buildings and active controls	Requirement that new developments cover the costs of stormwater management and coordinate with the administrator on stormwater management measures and a system of purchasing proposed credits.
Smart Waste	Requirement that new buildings provide three waste chutes consistent with City of Toronto requirements: organics (food), recyclables (glass, metal, plastic, and paper), and landfill garbage.

Fig. ST.10

## Proposed IDSG requirements related to Social Infrastructure

MIDP Proposal	Proposed IDSG Requirement
Healthy design and construction	Requirement that the design of all new developments promote and enable physical and mental health and community well-being.
Advancing health, education, and civic engagement	Requirement that all new developments incorporate planning for community service spaces and coordinate with service delivery partners.
Health facilities planning	Requirement to explore opportunities to incorporate appropriate, flexible spaces for delivering health care services in new developments if deemed a priority by the province.
Community benefits in construction	Requirement that all new developments commit to providing specific community benefits during planning and construction phases of development.
Sustainable funding for Neighbourhood Association	Potential requirement for area residents or businesses to contribute to an independent non-profit neighbourhood association.



# IV. Upfront Permissions

The following five tables list upfront planning approvals and permissions required initially to develop Quayside and, later, to develop Villiers West.

Fig. ST.11

## Upfront permissions related to Mobility

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Reduced parking Requirements	City of Toronto Zoning Bylaw	Zoning Bylaw amendment or Development Permit Bylaw to reduce parking requirements within the IDEA District.
Underground delivery tunnels	City of Toronto Zoning Bylaw	Zoning Bylaw amendment (or variance) to revise the loading requirements. Permissions in the form of encroachment agreements, easements, or other related agreements are required to locate tunnels in the city's right of way.
Green waves	Toronto Guidelines for Pavement Design, Lane Widths, Development Infrastructure Policy and Standards	City of Toronto approval permitting LED lights in pavement to signal green waves.
Dockless bike-share vehicles	City of Toronto Zoning Bylaw	Zoning Bylaw amendment to designate formal parking areas for dockless vehicles.
Heated sidewalks and bike lanes	Toronto Guidelines for Pavement Design, Lane Widths, Development Infrastructure Policy and Standards	City of Toronto approval to permit heated sidewalk and bike lanes.
People first street network	City of Toronto Lane Width Guidelines Ontario Traffic Manual	City of Toronto approval to deviate from existing lane width standards.
Eliminate curbside parking and curbed streets	City of Toronto Municipal Code City of Toronto Zoning Bylaw City of Toronto Complete Streets Guidelines	Amendment to the Municipal Code and applicable Zoning Bylaw to ease on-street parking requirements and to designate certain streets as flexible, curbside streets.

Fig. ST.12

## Upfront permissions related to Public Realm

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Waterbound-spaces, including floating barges	Navigation Protection Act Canadian Environmental Protection Act, Fisheries Act, 1985 Canada Shipping Act, 2001, Small Vessel Regulations (SOR 2010-91)	Determination by the Minister of Transport that programmed barges (if deemed a "work" under the Navigation Protection Act) are not likely to substantially interfere with navigation.

Fig. ST.13

## Upfront permissions related to Buildings and Housing

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Flexible interior wall system (including low voltage power system)	Ontario Regulation 332/12 (Division B) of Ontario Building Code City of Toronto Zoning Bylaw	New regulation from Ontario Cabinet to permit alternative flexible interior wall system; OR  Determination by City Building Department that the alternative flexible interior wall system achieves the same or better level of performance to currently permitted materials.
Stoa and Loft spaces	Provincial Land Use Compatibility D-6 Guidelines City Zoning Bylaw Environmental Protection Act ss. 9 and 14 City of Toronto Noise Bylaw	Amendment to the Zoning Bylaw to expand the range of space uses without additional permissions.

Fig. ST.14

## Upfront permissions related to Sustainability

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
Stormwater Management: Features in the right of way	Ontario Water Resources Act Planning Act City of Toronto Wet Weather Management Guidelines (2006)	Permissions in the form of encroachment agreements, easements, or other related agreements are required to locate facilities and stormwater monitoring equipment in the city's right of way.
Pneumatic Waste: System in Public Right of Way (Open Access Channels)	City of Toronto Act	Council authorization permitting the IDEA District administrator to build the pneumatic waste system through city-owned rights of way; OR  Encroachment agreement or easement from the city permitting the pneumatic tubes.
Pneumatic Waste	Planning Act City of Toronto Zoning Bylaws	Amendment to City of Toronto Zoning Bylaws to reduce the number of loading spaces required for city sanitation pickup and to allow for waste pick-up at mixed residential and commercial properties.
Thermal Grid: Extending pipes into right of way	Toronto District Heating Corporation Act Public Utilities Act City of Toronto Act	Absent an agreement with the existing thermal grid operator, amendment to Public Utilities Act to allow pipes under the right of way. Consent from the City of Toronto under the City of Toronto Act may be required.

Fig. ST.15

## Upfront permissions related to Social Infrastructure

MIDP Proposal	Applicable Legislation, Regulation, or Policy	Proposed Authorization or Requirement
School Site	Planning Act	Agreements with the Toronto District School Board on the size, location, and configuration of a new school.

**By harnessing cutting-edge technology and forward-thinking urban design, the partnership proposal seeks to answer the RFP's call for a "globally-significant community" and dramatically improve the quality of urban life.**

## Endnotes

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- For more details about 307's exhibits, programs and partners, visit the 307 Landing Page on the Sidewalk Toronto website [atsidewalktoronto.ca/get-involved/307-landing/](http://atsidewalktoronto.ca/get-involved/307-landing/).
- To estimate the potential impact of Google's relocation to Toronto's waterfront, Sidewalk Labs, in partnership with the consulting practice of real estate services firm JLL, conducted case-study research on the impact of Google's prior relocations in five other cities around the world: New York, Chicago, Austin, Los Angeles, and London. Each of these cities has between 1,000 and 10,000 Google employees, a range commensurate with the proposed campus.
- See the "Buildings and Housing" chapter of Volume 2 for more information on these building techniques. Additional information on mass timber construction is available in the relevant sections of the MIDP Technical Appendix.
- See the "Outdoor Comfort Development Standard" section of the MIDP Technical Appendix for more details on weather mitigation systems.
- See the "Mobility" chapter of Volume 2 for more details on proposed street types, mobility subscriptions, and freight systems. For details on the cost savings associated with mobility in Quayside, consult the "New Mobility" section of the MIDP Technical Appendix.
- See the "Sustainability" chapter of Volume 2 for more details on thermal grids and stormwater management. If realized as proposed in this MIDP, the River District would become the biggest, densest climate-positive district in North America and the third largest in the world, after announced projects in Jaipur, India, and Seoul, South Korea. Sources: C40 Cities Climate Leadership Group, "Mahindra World City Jaipur becomes world's largest project to receive C40 Climate Positive Development Stage 2 Certification." *National Geographic*, June 4, 2015; The Future City: Magok Urban Development Project. [http://www.i-sh.co.kr/e\\_mgk/index.do](http://www.i-sh.co.kr/e_mgk/index.do) (accessed April 2, 2019); "Spotlight on the C40 Climate Positive Development Program." *C40 Cities C40 Blog*, July 17, 2013.
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- For more details on the proposal to assist with financing the LRT expansion, consult the "Mobility" chapter in Volume 2, as well as the "Enabling Rapid Transit" section of the MIDP Technical Appendix.
- For details on job creation, see the "Sidewalk Toronto Economic Impact Analysis" section of the MIDP Technical Appendix.
- See the "Buildings and Housing" chapter of Volume 2 for more details on total housing and affordable housing units.
- See the "Sidewalk Toronto Greenhouse Gas Model - Path to Climate Positivity" section of the MIDP Technical Appendix for details on GHG emission reductions.
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## Endnotes

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57. For more information on the proportions of residential and non-residential use in this proposal compared to city bylaws, see the accompanying "Planning Policy Justification Report" in the MIDP Technical Appendix.
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80. For more information on the proportions of residential and non-residential use in this proposal compared to city bylaws, see the accompanying "Planning Policy Justification Report" in the MIDP Technical Appendix.
81. For more details on Google's proposed campus in the IDEA District and the creation of an Urban Innovation Institute, see the "Economic Development" chapter in Volume 1.
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87. For more on Building Information Modelling, see the "Buildings and Housing" chapter in Volume 2.
88. For more details on the Loft space concept, see the "Buildings and Housing" chapter in Volume 2.
89. For more on flexible wall systems, see the "Buildings and Housing" chapter in Volume 2.
90. For more on the proposed outcome-based building code system, see the "Digital Innovation" chapter in Volume 2.
91. For more on the flexibility of stoa space, see the "Buildings and Housing" chapter in Volume 2.
92. For more details on the proposed small business incubator, see the "Public Realm" chapter in Volume 2.
93. For more on the Seed Space platform, see the "Public Realm" chapter in Volume 2.
94. Unless otherwise noted, each of the initiatives in this table are further detailed in the "Sustainability" chapter of Volume 2. For background information on projected greenhouse gas reductions, consult the "Sidewalk Toronto Greenhouse Gas Model - Path to Climate Positive" section of the MIDP Technical Appendix.
95. For more on the role of electric vehicles in Quayside and the IDEA District, see the "Mobility" chapter in Volume 2.
96. For more details on the use of mass timber in Quayside and the IDEA District, consult the "Buildings and Housing" chapter in Volume 2. Calculations on the carbon benefits of mass timber courtesy of the Canadian Wood Council's online Carbon Calculator: [cwc.ca/design-tools/carbon-calculator/](http://cwc.ca/design-tools/carbon-calculator/) (accessed April 17, 2019).
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98. Unless otherwise noted, each of the initiatives in this table are further detailed in the "Buildings and Housing" chapter of Volume 2.
99. For more on the proposed Care Collective, see "The Quayside Plan" chapter in Volume 1.
100. For details on the proposed Civic Assembly, see "The Quayside Plan" chapter in Volume 1.
101. For more on the Quayside elementary school, see "The Quayside Plan" chapter in Volume 1.

## Endnotes

- 102.** For more on the proposed collaboration with the Toronto Public Library, see “The Quayside Plan” chapter in Volume 1.
- 103.** Each of the initiatives in this table is further detailed in the “Mobility” chapter of Volume 2. Where endnoted in this table, additional information is also available in other chapters or in the MIDP Technical Appendix.
- 104.** For more information on light-rail ridership and its employment accessibility benefits, consult the “Enabling Rapid Transit” section of the MIDP Technical Appendix.
- 105.** Consult the “Active Transportation” and “Modelling and Transportation Analysis” sections of the MIDP Technical Appendix for details on active modes of transportation.
- 106.** To understand projections regarding the use of ride-hailing services and their associated cost savings, consult the “New Mobility” section of the MIDP Technical Appendix.
- 107.** Consult the “New Mobility” section of the MIDP Technical Index for pricing and savings information regarding mobility as a service.
- 108.** Consult the “Streets for People” section of the MIDP Technical Appendix for more details on street types.
- 109.** More information on accessibility initiatives are available in “The Quayside Plan” chapter of Volume 1 and the “Public Realm” chapter of Volume 2.
- 110.** Consult the “Freight” section of the MIDP Technical Appendix for more details on the logistics hub.
- 111.** Consult the “Mobility Management” section of the MIDP Technical Appendix for more details on active traffic management.
- 112.** Consult the “Public Realm” chapter of Volume 2, as well as the “Cost Comparison of Modular Pavement vs. Typical Waterfront Streetscape” section of the MIDP Technical Appendix, for more details on modular pavement.
- 113.** Each of the initiatives in this table are further detailed in the “Digital Innovation” chapter of Volume 2. Where endnoted in this table, additional information is also available in other chapters or in the MIDP Technical Appendix.
- 114.** Consult the “Building the Backbone of Connectivity” section of the MIDP Technical Appendix for additional details on super-PON technology and ubiquitous connectivity.
- 115.** See also the “Catalyzing Digital Services” section of the MIDP Technical Appendix for more on open standards for data.
- 116.** See the “How Quayside Will Make Data Work for Toronto - And Protect It” section of the MIDP Technical Appendix for more on open data resiliency and security.
- 117.** See the “Public Realm” chapter in Volume 2 for more on open access channels.
- 118.** See the “Public Realm” chapter in Volume 2 for more on shared public infrastructure.
- 119.** Turn to the “Public Realm” chapter in Volume 2, as well as the “Outdoor Comfort Development Standard” section of the MIDP Technical Appendix, for more on weather-mitigation systems.
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