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	Engineering and Design PLANS AND SPECIFICATIONS FOR CIVIL WORKS PROJECTS	
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CECW-EP

Regulation
No. 1110-2-1200

30 October 1993

**Engineering and Design
PLANS AND SPECIFICATIONS FOR CIVIL WORKS PROJECTS**

1. Purpose

This regulation prescribes the responsibilities, requirements, principles, and procedures for the preparation, review, approval, and distribution of plans and specifications (P&S) for civil works projects.

2. Applicability

This regulation applies to all HQUSACE/OCE elements, major subordinate commands (MSC), district commands, laboratories and field operating activities (FOA) having civil works responsibilities.

3. References

- a.* PL 91-190, National Environmental Policy Act of 1969.
- b.* FAR 52.212.11.
- c.* ER 1-1-11, Progress, Schedules, and Network Analysis Systems.
- d.* ER 415-1-11, Biddability, Constructibility, Operability.
- e.* ER 415-1-15, Construction Time Extensions for weather.
- f.* ER 1110-2-109, Hydroelectric Design Center.
- g.* ER 1110-2-1002, Maps and Drawings.
- h.* ER 1110-2-1150, Engineering and Design for Civil Works Projects.

i. ER 1125-2-303, Design Acquisition and Construction.

j. EM 1110-1-1807, Standards Manual for U.S. Army Corps of Engineers Computer-Aided Design and Drafting (CADD) Systems.

4. Policy

a. The policy of the Chief of Engineers requires the highest standards of engineering in the preparation of P&S. Pursuant to this policy, P&S for all Civil Works projects shall be prepared by the Engineering Division using current engineering standards and criteria, cost control management and sound professional judgment.

b. P&S for construction, procurement by supply contract, and extraordinary maintenance leading to major alterations, major item replacement, or rehabilitation for existing civil works projects shall be prepared in accordance with approved decision documents (i.e., Engineering Appendix to Feasibility Report, Detailed Project Report, subsequent design memorandums, etc.) and shall conform to the approved cost estimate. As prescribed in ER 1110-2-1150, approval shall be obtained for any substantial deviation from approved DMs (or other decision documents previously mentioned) found necessary or desirable during the preparation of P&S.

c. The preparation of P&S shall be scheduled to ensure that ample time is allowed for review, approval, revisions, and reproductions.

d. Construction/Supply bidding and contract documents shall be carefully prepared to eliminate all

conditions or practices that might delay the work or result in disputes and subsequent claims. Changes in design drawings and specifications affecting work in progress and contracts for which bids may have been received shall be limited to cases of absolute necessity.

e. For projects requiring local cooperation, detailed P&S shall not be prepared until there is assurance that the conditions of local cooperation will be met.

5. Types of Contracts Requiring P&S

Plans (consisting of one or more drawings including notes located thereon) are required for all construction contracts and for some supply contracts. Technical specifications shall be prepared for both construction and supply contract documents. The design drawings and technical specifications for both types of contracts shall be provided by the Engineering Division and forwarded to the Contracting Division for processing (advertisement through award).

a. Construction contract documents are normally prepared for those contracts requiring a construction type of activity, i.e. building a new facility or modifying an existing structure by construction forces.

b. Supply contract documents are normally prepared for those items of work that are fabricated or assembled in a plant or manufacturing facility off-site and do not normally involve site installation by the construction trades or for such special items (equipment) which are to be Government furnished under a separate contract.

6. Application of Engineer Regulations (ER), Engineer Manuals (EM), and Engineering Technical Letters (ETL).

The basic technical guidance, criteria, and design procedures set forth in ERs, EMs, and ETLs shall be used in the preparation of P&S. When criteria or procedures not covered in the ERs and EMs or ETLs are proposed, or when departure from criteria in these documents is proposed, full explanation and justification shall be included in or appended to the appropriate DM and/or decision document as required by ER 1110-2-1150.

7. Preparation of Plans (Contract Drawings)

Contract drawings shall be prepared on a Computer Aided Design and Drafting (CADD) System whenever feasible in accordance with the Corps of Engineers CADD Standards outlined in EM 1110-1-1807. These standards include details, symbols, levels to place various details of a drawing (lettering, reinforcing, electrical-mechanical details, etc.), units of resolution, fonts, colors, title blocks, drawing size, and many other details. These standards shall be followed whether the work is performed by an Architect-Engineer (A-E) firm or prepared in-house. Contract drawings prepared by hand shall follow the applicable drafting standards established by the district and shall, as much as possible, conform to the applicable CADD standards outlined above. When surveys, maps and engineering site drawings are included, they shall conform to the requirements of ER 1110-2-1002.

a. *Keep number of drawings to a minimum.* To achieve maximum economy when preparing contract drawings, omit all unnecessary details and avoid repetitive presentation. Include only those details that are necessary to ensure a full understanding of the contract requirements. Specific practices to be adopted to this end are listed below. This list is by no means complete, but all contract drawings shall be treated in a manner consistent with those mentioned.

(1) Omit details of alternatives when all such alternatives will yield features of acceptable quality. Avoid details that may be described clearly in notes or specifications or by reference to trade publications, catalogues, standard specifications, building codes, or other accepted criteria.

(2) Omit reinforcing bar lists and bending schedules; however, reinforcement drawings shall be prepared in sufficient detail to reflect design requirements.

(3) No contract drawings shall be prepared that are intended primarily to facilitate review of plans by higher authority. Copies of office sketches or preliminary CADD drawings that permit thorough understanding will suffice for this purpose.

(4) Avoid excessive sectioning and the repetition of views, dimensions, and notes where these practices are intended primarily to improve the reading of a drawing. The use of CADD reference files and close coordination of the automated drafting process are encouraged to

ensure that all elements make optimal use of previously generated details and plans. From both a contractual point of view and that of economy in the drafting process, it is better to show a requirement only once.

b. Enhance for clarity. Shading, annotation, coloring (if color plotters or color reproductions are available), and different line weights and line symbols may be used on contract drawings when it is felt that such use is needed to enhance the clarity of some important feature, such as the differentiation between existing conditions and future work.

c. Show work limits. Right-of-way and work limits and access to these limits shall be clearly delineated on the drawings. Indicate other topographic detail that may be affected by or may restrict the construction.

d. Eliminate all construction interference wherever possible. The design shall provide for the accomplishment of new construction with minimum interference with other essential operations of any existing project facility or any other contractor on site. Unless construction strategy so dictates, the practice of having two contractors with individual contracts working on the same site should be discouraged. The order and schedule of construction work shall not be established and shall not be reflected in the contract documents unless it is necessary to ensure construction is accomplished in the most economical manner.

8. Preparation of Specifications

a. Consistency. Technical specifications shall be clear, concise, and complete to ensure that neither the included part manufacturer or construction firms experience undue difficulty in preparing bids, and that the most probable questions arising during the performance of the contract can be determined and settled by reference to the contract documents. It is essential that terminology be consistent between the design drawings and the technical specifications. Unless thoroughly researched and coordinated with higher authority, unusual or unproven construction requirements shall be avoided. Tolerances and inspection standards shall conform to standard commercial practice as much as possible. Provisions in the contract clauses shall not be repeated in the technical specifications, nor shall any conditions or provisions that conflict with the contract clauses be incorporated in the technical specifications.

b. Promote competition. Technical specifications shall be written in a manner that will promote competition. Designation by trade names is not permitted unless it is impractical to identify the article desired in any other way. Whenever possible, articles and materials shall be identified in terms of their salient physical or chemical composition, test qualifications, performance criteria, or similar descriptions.

c. Federal Acquisition Regulation (FAR). Requirements in connection with labor regulations, taxes, and similar matters, and procedures for invitations of bids, awards, and other contract procedures, are identified in the Federal Acquisition Regulation (FAR).

d. Time of commencement and completion. With the aid of network analysis schedules (ER-1-1-11) the time specified for commencement and completion of contract work shall be based on a rigorous analysis of the specified work. The contract duration provision should reflect a minimum reasonable duration for the specified work without restricting bidder competition or increasing costs. The analysis shall take into consideration cost, desired completion date, seasonal work, adverse weather delays (ER 415-1-15), document submittal and "turnaround" time for approvals, lead time for manufactured items, and job complexity.

e. Insurance coverage. For contracts where progress payments will be made and title to property will pass to the Government while remaining in the custody of the contractor, the Contracting Officer may require the contractor to carry insurance to protect the Government interest. Insurance will not be required unless circumstances warrant the additional cost.

f. Protection of the environment. In order to implement the National Environmental Policy Act of 1969 (PL 91-190) and all applicable Federal environmental laws, the specifications for each construction contract shall contain a section on protection of the environment during construction operations. This section shall include instructions to the contractor concerning layout and the construction of project plant facilities (roads, camps, storage yards, shops, etc.); landscape preservation; the control of air, water and noise pollution; and other factors necessary to prevent the degradation of project site(s) during construction, and to govern the restoration of contractor-caused environmental damage to the greatest extent practicable. Requirements for the control of water quality and air pollution shall be based on standards obtained from the

regional offices of the Environmental Protection Agency and the responsible State water and/or air pollution control agency.

g. Government-furnished plant or materials. When Government-owned plant or materials are available for use by contractors on the work included in the contract, suitable provisions shall be made in the specifications to ensure that all bidders have full information and equal opportunity to permit use of the plant or materials available for the work. The description of items of materials and/or equipment shall include approximations of weight, value, expected delivery date and special storage or handling requirements such as:

(1) when the weight exceeds the capacity of the material handling equipment that the contractor might otherwise have at the job-site by the date of delivery.

(2) when the equipment requires special care and protection at a significant expense to the contractor, and,

(3) when providing such descriptive information will probably reduce contingencies in the contractors' bids.

When procurement arrangements for Government-furnished equipment are complete prior to the advertisement for bids, the specifications will indicate that the data provided was extracted from the Government procurement contract or purchase order. If the data shows the value of the equipment, the specifications will reflect the same. It must be clearly stated that said data is the best available at the time the specifications were prepared and is offered for information purposes only.

h. Bid Items.

(1) Variations in estimated unit cost bid item quantities. Bid quantities are extremely important. Only when bid items are properly described and isolated from other items, and the quantities are accurately described, can bidders submit a bid that is in the best interest of the Government. The standard clause for variations in estimated quantities is found in FAR 52.212.11. Subdivided items can be a source of significant cost growth and, therefore, extreme caution shall be exercised in their use. If a small quantity (relative to the first subdivided item) is placed in the second, or subsequent, subdivided items, the contractor may price it at a high unit price without considerably raising the overall bid price. Any overrun in the quantities listed in the second, or following, subdivided items could lead to unreason-

able contract costs. When subdivided items are used, careful consideration shall be given to the structuring of the bidding schedule to ensure that the Government is adequately protected in situations where inordinately high unit prices are charged for subdivided items of the same nature, and where only the quantity varies.

(2) Lump-sum bid items. Lump sum items shall be permitted only when the limits of the item is well defined or fixed and there cannot be a variance of any part within the item.

(3) Buildings. Where building work not subject to variation in quantities is an adjunct to a heavy construction contract, the bid item should be a lump-sum rather than separated into a large number of bid items. For large buildings it may be advisable to prepare the bidding schedule so that the work of various subcontractors (plumbing, electrical, excavation, etc.) is broken into separate bid items to allow for more reasonable negotiations of modifications, should the need arise.

i. Payment for Materials. Provisions may be made in the specifications for partial payments of high cost material or equipment when delivered to the site, even before incorporation in the work. Such payments may not be dependent on the time such material or equipment is actually incorporated into the construction product as much as being dependent on market conditions. Specifications shall contain suitable provisions to ensure safe storage of all such materials by the contractor until installation. An arbitrary percentage payment shall not be used, but shall be derived from an analysis of the work progress of the item(s) to incorporate the material or equipment. Where conditions warrant, further provision may be made for partial payments of materials delivered to a fabricating plant and for the work of fabrication. Payment for such materials shall be contingent only on the approval of the Contracting Officer.

j. Payment for care and diversion of water and cofferdam construction. The intent of these requirements is to ensure that the contractor is compensated as the work progresses in essentially the same manner as for the permanent work and in proportion to the amount of work actually completed. An arbitrary percentage payment shall not be used. Because the cofferdam and flow diversion portion of the project is usually unique to each project, each such feature will require consideration when specifying a payment method.

k. CSI format. Construction contract technical specifications shall be presented in the standard Construction Specification Institute (CSI) sixteen-division format, three-part section, and five-digit numbering system, insofar as practicable. Only the technical specifications shall be maintained in the CSI format. The remainder of the bid/construction documents shall be in accordance with the U. S. Army Corps of Engineers standard contract format as facilitated through the Standard Army Automated Contracting System (SAA-CONS).

l. Use of guide specifications. Civil Works Guide Specifications (CWGS) issued by HQUSACE shall be used as much as possible when preparing technical provisions for civil works projects. These CWGS can be retrieved and processed electronically from an automated data base maintained by CEHND-ED-ED and are available in different electronic media (CD-ROM, floppy disk, magnetic tape).

(1) Except for conversion to the Construction Specification Institute (CSI) format as provided in paragraph 8k, CWGS shall be used without modification as much as possible in the preparation of project technical specifications. Modifications to the CWGS shall be made to provide for changes in design criteria, local conditions, special project requirements, and/or new improvements in construction technology.

(2) For project work not covered in existing CWGS or when CWGS are not particularly suitable, other non-CWGS specifications, such as military construction guide specifications (CEGS), MSC or district "in-house" specifications, recently approved specifications for other projects, guide specifications issued by other Federal agencies, and industry specifications, may be used to develop project specifications.

m. Use of standards

(1) Materials and equipment shall be described, where possible, by documents commonly known to the construction industry. Nationally recognized industrial and technical society specifications and standards shall be used as much as practicable to ensure that specified requirements are compatible with current industrial practices and manufacturing resources. If industry documents are not available or not suitable, applicable Federal or Military specifications shall be used. Where the use of nationally recognized industry standards or Federal and Military specifications is not practicable,

specifications shall require materials, equipment and workmanship that satisfy sound commercial standards and are available from commercial sources. Specifications for highways and highway bridges shall conform to the standard specifications of the American Association of State Highway and Transportation Officials (AASHTO) or to those of the State, County or City Highway Department having jurisdiction. Specifications for railroads and railroad bridges shall conform to the general specifications of the American Railway Engineering Association (AREA) or to the applicable specifications and standards of the railroad system involved.

(2) It is not necessary to refer to a standard in its entirety. The documents shall be specific, however, in making reference only to the applicable portions of a standard. Requirements that are too restrictive for the intended application or add unnecessarily to the cost shall be omitted from the project specifications. The following general rules should be used to determine the applicability of Federal Specifications and other standards:

(a) Use Federal Specifications to designate supplies and materials other than equipment of standard manufacture to be provided for Government stock.

(b) Specifications for equipment of standard manufacture, whether intended for Government stock or for incorporation in a specific permanent feature, need not make reference to Government and industry standard specifications for materials of the component parts, but, shall be prepared in order to base acceptability of the equipment upon capacity, performance, life cycle costs, or other requirements. When a Government or industry standard specification covers the desired item in its entirety, such a specification shall be used.

(c) For special design equipment which is not a standard manufactured product, state the quality of the materials for the major component parts by referencing those Government and industry standard specifications that are considered necessary. For minor parts it will usually be advantageous to permit a manufacturer to use stock materials of acceptable quality.

(d) For temporary construction or for small permanent structures such as operations and service buildings, a specification requiring commercially available products and workmanship is satisfactory for the components of these structures. When warranted by the quantities involved, recognized standards shall be used for prod-

ucts, such as paint, which otherwise would be difficult to properly evaluate. For these structures, insofar as possible, show technical requirements on the drawings, identify reference publications by number and issue, avoiding lengthy titles, and/or state installation requirements as being in accordance with approved manufacturer's recommendations or instructions, but omit detailed descriptions and procedures.

(e) Reference standard specifications by specific editions, including amendments. Include the date of the specification or amendment. Such phrases as "the edition in effect on the date of the invitation for bids" or "the current edition" shall not be used to designate editions of standard specifications applicable to the work.

(3) References to industry standards and codes, contained in the guide specifications shall be carefully checked for correctness, applicability to the particular project, and revisions subsequent to the date of the guide specification. To determine the applicability of a referenced specification or standard, each command that prepares or reviews project specifications shall maintain a file copy of the current edition of each referenced specification.

n. Excavation. In rare instances provisions may be stated for the Government to reserve the right to increase or decrease the dimensions of the excavation, or to modify the cross-sections indicated on the plans in such a manner as to take advantage of the contractors' progress with equipment being used at the site, provided the changes are within allowable contract quantity changes. If field conditions require extensive revisions, particularly for those portions of the work that have been completed, these revisions shall be directed by "change order" under the applicable contract provisions for "change of conditions."

9. Review and Approval of Plans and Specifications

a. Every effort shall be made to ensure that P&S are free of error. Before advertising for bids, completed P&S shall be independently reviewed in accordance with ER 415-1-11. Except as otherwise provided in this paragraph, all P&S prepared by A-Es will be reviewed by the district or MSC, as appropriate and those prepared by district personnel will be reviewed at the MSC level.

b. The Commanders of CEPOD and CENED, as operating MSCs, will ensure that their approval process includes an in-depth, rigorous technical review in a manner similar to higher authority oversight.

c. P&S may be submitted to HQUSACE for review provided: (1) the district and MSC Commanders are in major disagreement and/or (2) the technical expertise is not available at the MSC.

d. Except in rare instances, the complete review and approval of P&S will be accomplished prior to advertising for bids. In those rare instances where this review and approval process is not completed prior to advertising, it will be expedited so that any required changes can be made by amendment prior to bid opening.

e. The basis for review of P&S is the approved DM and previous "decision" document. However, the MSC commander may request further design analyses, calculations, or details for use in the review of the P&S.

f. The main features of design to be included in review of P&S are-

(1) location and arrangement of structures and equipment;

(2) adequacy for the intended purpose without unnecessary complication;

(3) reliability;

(4) environmental and aesthetic treatment;

(5) safety;

(6) economy;

(7) ease of operation and maintenance;

(8) the restrictive or nonrestrictive character of the design and possible limits to competition;

(9) conformance with HQUSACE guide specifications, regulations, manuals, technical letters, and safety regulations; industry and Federal specifications, codes, and standards; and manufacturers' current designs and practices;

(10) the extent to which the P&S define a project that can be constructed within budget as prescribed in the baseline estimate (i.e., designed to cost).

g. Detailed points to consider in review of P&S shall include, but shall not necessarily be limited to-

(1) site-development design, including siting, access roads, parking areas, walks, outdoor recreational areas, grading, drainage, turfing, planting, etc., to ensure that the development is complete and efficient from operation and maintenance standpoints and attractive in appearance;

(2) adequacy of geotechnical information, foundation preparation, and earthwork methods and sequencing;

(3) basic structural design concept, service-loading assumptions, wind and seismic considerations, allowable stresses, foundation evaluations, compliance with applicable codes and design criteria, allowances for unusual loading anticipated during construction not covered by normal live-load considerations, critical surface features such as expansion and crack control, and construction joint locations, and unusual construction or erection methods;

(4) stability of all structures and of the sizing and selection of all structural members, elements and connections, and their associated specifications;

(5) architectural finishes, materials, and components, such as roofing, windows, and doors, for suitability for the local market and climatic conditions;

(6) mechanical and electrical design concepts with capacity requirements, specified codes and arrangements, and acceptability of all mechanical and electrical components;

(7) review of dimensions, clearances, and locations including structural, mechanical, electrical, or other equipment to ensure the dimensional, space, and aesthetic compatibility of all elements;

(8) review of drawings and specifications for clarity of architectural, structural, mechanical, and electrical detail so that the checking of shop-drawings will be facilitated;

(9) adequacy of safety, fire-prevention, and fire-protection features;

(10) ensuring that new construction will provide minimum interference with essential operations of any existing project facilities;

(11) review to coordinate requirements of drawings and specifications to eliminate conflicts, vagueness, and ambiguities;

(12) availability and suitability of specified construction materials;

(13) construction procedures and water and sediment control plans.

h. The authority to prepare and approve P&S for floating plant is defined in ER 1125-2-303.

i. P&S prepared by the Hydroelectric Design Center (HDC) for hydroelectric power plants and pumping plants will be reviewed by an independent HDC unit. When work prepared by HDC is subsequently incorporated into work performed by others, the completed document will be furnished to HDC for review to ensure proper coordination of HDC's work. HDC's and MSC's review may be concurrent. If this review generates any conflicts or differences that cannot be resolved by mutual agreement, HQUSACE (CECW-E) will be consulted for final resolution.

j. Significant revisions of approved project P&S, whether made prior to advertising or by amendment of an invitation for bids or by modification of an existing contract (by supplemental agreement or change order), will be approved by the same authority that approved the P&S being revised. This specifically includes revisions resulting from Value Engineering actions. For purposes of the present regulations and this paragraph in particular, significant revisions are those that modify the structural features, functional purpose, or operational and maintenance characteristics of the equipment or work involved, or have an appreciable effect on bid price, competition for the work, or administration of the contract. HQUSACE (CECW-E) should be informed before implementation whenever such revisions constitute significant departures from the design concept as presented in the approved DM. Districts will make those minor changes needed to meet field conditions or to correct errors and omissions, and will provide information copies to the office having approving authority.

10. Submission of Plans and Specifications

a. P&S which require review by either the MSC or by HQUSACE shall be forwarded with the district commander's endorsement. The number of copies of P&S to be submitted for review is as follows:

(1) Four copies where the work involves no more than three engineering disciplines;

(2) Eight copies where the work involves four or more engineering disciplines.

b. When P&S are returned to the preparer by the reviewing authority, subject to indicated modifications, the P&S need not be resubmitted for further review unless resubmission has been specifically requested by the reviewing office, or unless reconsideration of specified modifications is desired. When resubmission has not been requested and all modifications requested have been accomplished without substantial change, the P&S may be issued whenever all other requirements, such as funding and conditions of local cooperation, have been satisfied. When modifications requested in an earlier review have not been incorporated in the P&S being resubmitted, full explanation will be provided to the reviewing office. Any change in the supplemental information originally submitted will also be indicated when P&S are resubmitted.

c. Prior to advertisement for bids on any work, the district commander shall compare the most current estimates of cost for the work with the updated project baseline estimate and with the program amount available for the work. The district commander shall withhold advertisement for bids and request advice of the MSC commander and HQUSACE in any case in which there is doubt as to the adequacy of funds available for the work.

11. Alternative Bids and Bidders' Options

a. Instructions to bidders requiring each bidder to submit separate bid prices for named alternative items of equipment or alternative methods of accomplishing a given feature of work shall not be used. Such determinations shall be made before the issuance of invitations for bids, based on the requirements and economy of the work.

b. Solicitations on large supply or construction contracts shall provide for the subdivision of the work into separate lots or schedules whenever necessary to ensure adequate competition. Such solicitations shall provide that each bidder may bid on any or all of the separate lots or schedules and shall state that the Government reserves the right to either award a contract for the work as a whole or award separate contracts for each lot or schedule. An example of a situation where the subdivision of the work may be advisable is found in the procurement of switchgear equipment for hydroelectric power plants. In this case it is desirable to advertise for several different items (such as 480-volt metal-clad switchgear, a 480-volt metal-enclosed buss, and 480-volt motor control centers) under a single solicitation. Some bidders may manufacture all such items, while other bidders may manufacture only one or two.

c. When two or more construction materials, combination of materials, or methods of construction will result in equally satisfactory construction for a project feature as designed, provision shall be made in the specifications and bid forms for the bidder to select between such equally satisfactory materials or methods in order to ensure maximum competition and lowest cost to the Government.

d. When bidders' options are permitted, the instructions to bidders shall clearly state that a bid on only one option is desired and that in evaluating bids, all options will be considered as defining equivalent amounts and equivalent levels of quality regarding the completed work. In setting up quantities for such options, care shall be taken to ensure that the quantities listed do represent equivalent amounts of completed work. If a bidder submits bids on more than one option in a group, only the lowest bid option will be accepted.

12. Consulting and Engineering Services

ER 1110-23-1 describes the general policies and procedures for using the services of other elements of the Corps of Engineers, A-E firms, owners of facilities to be relocated, technical specialists in HQUSACE, and individual consultants and experts.

13. Shop Drawings

Shop drawings shall be reviewed by technical personnel who are fully qualified to evaluate such drawings,

including the verification of critical design details. Particular care shall be exercised in assigning responsibility for review and approval of shop drawings affecting basic design, and, where possible, such reviews shall be assigned to the designer. This work shall include architectural review to preclude aesthetic conflict of piping, ductwork, conduits, transformer stations, etc., with architectural treatment. When review and approval of shop drawings by Government forces are impracticable, A-E firms may be employed for this purpose. When an A-E is employed for this purpose, extreme care shall be taken to provide sufficient criteria and instructions to ensure proper review.

14. Corrections and Suggestions for Improving Designs

To take full advantage of the experience gained through construction and to avoid the repetition of mistakes, the following actions shall be taken:

a. For designs prepared by the USACE commands or by A-E firms working directly under the supervision of USACE commands, these provisions apply:

(1) Errors, omissions, and ambiguities discovered by the USACE commands responsible for the design shall be reported promptly to the responsible MSC and any other offices to which copies of related P&S have been provided. Such reports shall include recommended remedial action or remedial action taken, as appropriate.

(2) Where designs are used in USACE commands other than the USACE commands responsible for the original design, errors, omissions, and ambiguities by the using districts or MSCs shall be reported promptly to the USACE command responsible for the design together with a statement of corrective action taken.

b. Upon discovery, errors, omissions, and ambiguities in guide specifications and EMs shall be reported promptly to HQUSACE. MSC and district commanders are also encouraged to inform HQUSACE concerning suggested changes to guide specifications and EMs that are considered desirable to improve construction or functional use, or, to effect savings. Such information shall include suggested improvements based on local experience and suggested optional materials and methods of construction.

c. ENG Form 3078, Recommended Changes to Engineering Documents, shall be used for reporting to HQUSACE errors, omissions, ambiguities, and suggested improvements in design, guide specifications, and EMs. ENG Form 3078 does not require a letter of transmittal. Four copies of the ENG Form 3078 report shall be provided to CECW-EP.

15. Report on Latent Deficiencies

MSC and district commands shall promptly submit reports to HQUSACE in all cases where latent deficiencies develop that are attributable to weaknesses in generally accepted design and construction practices. The report shall be in letter form and shall contain a complete statement of the deficiency, its cause or probable cause, and the corrective action taken or recommended. Where a case is urgent or of major consequence, a telecopy or copy by way of other comparable electronic means shall be sent immediately, followed by a detailed letter report.

16. As-Built Drawings

a. As construction of a project progresses, plans shall be prepared showing the work as actually constructed. In order that the preparation of the as-built drawings may be supervised by personnel familiar with the actual construction, the drawings for each major component of the project shall be prepared as soon as practicable after the component is completed.

b. The original tracings or CADD equivalent, which are maintained at the district office, shall be revised to show the work as constructed.

c. A minimum of one complete set of as-built drawings shall be maintained at the project, and a complete set on microfilm (or CADD drawings on CD ROM) shall be maintained in the district office. Maintenance of these drawings in the MSC office is at the discretion of the MSC commander. It is not required that the drawings be provided to HQUSACE.

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d. For hydroelectric projects, the original tracings and/or CADD file, revised to show actual construction, shall be transferred to the respective project drawing

files in the powerhouse. When approved changes are completed, the changes shall be made on the tracings and/or CADD file, and the revised prints distributed.

FOR THE COMMANDER:

A handwritten signature in black ink, appearing to read "William D. Brown". The signature is fluid and cursive, with a long horizontal stroke at the end.

WILLIAM D. BROWN
Colonel, Corps of Engineers
Chief of Staff