

CHAPTER 2
DELIVERABLES

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2.1 GENERAL

The following paragraphs describe the submittal requirements required by the District for most projects. There may be other requirements not described, and the specific requirements of these will be given in the design contract.

This guide describes the quality expected and the various technical features and requirements of the drawings and specific information that must be included in the various documents. It is not intended to be a complete list of all features. The A-E has the responsibility to show all information necessary to completely describe the project. Regardless of local practice or procedures, the A-E must prepare the drawings with the expectation that both the USACE, in the role of construction manager, and the construction contractor will be able to construct the building or facility without any additional assistance and without the necessity for modifications to correct design deficiencies.

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2.2 SUBMITTALS

Design submittals at each stage provide project cost verification and assure adherence to functional and technical criteria. The following are the design submissions generally required. For design-build projects, the design-build contract will define the required design submittals:

- a. Charrette Document in lieu of concept design where permitted by the PE/A.
- b. Concept Design represents approximately 30% of the total design effort.
- c. Interim Design represents approximately 60% of the total design effort.
- d. Final Design represents approximately 90% of the total design effort.
- e. Corrected Final Design represents 100% of the total design effort and includes all necessary revisions determined during review.

Date all materials submitted in an appropriate location. Whenever items are corrected or later resubmitted, they shall show a revised date in order to differentiate later material from the original submittal.

2.2.1 CHARRETTE DOCUMENT

When accepted by the customer, a Charrette Document may be substituted for the Concept (30%) Design Submittal.

Refer to Chapter 1 General for design charrette requirements. The final Charrette Document is provided, when completed, after the Design Charrette and shall include the following:

- a. Design Charrette meeting minutes.
- b. Architectural Floor Plan, based on decisions from Design Charrette, with the correct room names and numbers, wall locations, toilet fixtures, doors, common administration area workstations, storage racks or cages, etc. The floor plans shall have sufficient detail to show the massing of the building, the relative placement and general size of rooms, and the location of building entrances, exits, stairwells, elevators, and circulation space.
- c. Site Plan, based on decisions from Design Charrette, showing building footprints, AT/FP setbacks, parking and other paved areas, access roads, fences, handicapped parking/ramps, dumpster locations, screen walls, etc.
- d. Concept Narratives including descriptions of the systems proposed or identified for further analysis such as exterior enclosure construction/materials; interior finishes; mechanical, electrical, lighting, and structural systems; fire protection systems; mass notification; IT systems; electronic security systems (ESS); and any special systems. Identify TEMPEST or SIPR requirements. List alternative systems where further analyses are required to determine best system design. Identify any special equipment (Example: unusually large electrical or cooling loads) or unusual elements (Examples: deep foundations or environmental remediation) that will significantly impact project cost. Provide information on any known utility conflicts or capacity upgrades required for the project. List any significant construction concerns or considerations identified during the kick-off meeting or design charrette.
- e. Cost Estimate reflecting design decisions made to date.
- f. Proof of concept CAD/BIM submittal with examples from each discipline demonstrating correct software

usage, A/E/C compliance, sheet assembly, etc.

See paragraph ENERGY/WATER OPTIMIZATION in Chapter 10 SUSTAINABLE DESIGN/ENERGY CONSERVATION.

2.2.2 CONCEPT (30%) DESIGN SUBMITTAL REQUIREMENTS

Concept design is extensively defined in the various chapters of this Guide.

Before submittal of the finished **Concept Design**, ensure that the design has been thoroughly checked and coordinated between the various design specialties.

Provide a design analysis with information as defined herein and in the various chapters of this Guide. The design analysis for concept submittal shall include the information available at the time of submission and as described in the technical discipline chapters in this Guide. Sufficient information shall be provided to support the selection of project features and systems proposed in the concept design submittal. Include a list of any significant construction concerns or considerations identified during concept design of the project.

The Design Analysis shall include a listing of the Unified Facilities Guide Specifications (UFGS), Louisville District Guide specifications, and any A-E developed specification sections proposed for the project. The proposed specification sections shall be shown on the Outline Specification using the UFGS or Louisville District Guide Specification number and heading. Arrange sections within their respective MasterFormat Divisions, in numerical order.

Provide drawings as required by the technical discipline chapters of this Guide and as required herein.

See paragraph ENERGY/WATER OPTIMIZATION in Chapter 10 SUSTAINABLE DESIGN/ENERGY CONSERVATION.

Design may be stopped for review. In some cases, "on-board" or "in progress" reviews will be conducted in the A-E's Office, the District Office, or at the Installation.

2.2.3 INTERIM (60%) DESIGN SUBMITTAL REQUIREMENTS

The Interim Submittal is extensively defined in various chapters of this Guide. A cost estimate shall be included. The submittal, if required, will be made when the total design effort is "60%" complete. **Interim Design** submittals may be required on projects in lieu of **Concept Design** submittals.

Before submitting the finished **Interim Design** to the District Office, ensure that the design has been thoroughly checked and coordinated between various design specialties.

Provide a design analysis with the information required for the concept design submittal updated with all information available at the time of submission and complying with the technical discipline chapters in this Guide. Information provided shall be sufficient to support all design elements presented in the interim design submittal. Include an updated list of construction considerations and concerns for the project identified to date to inform the Engineering Considerations and Instructions for Field Personnel required for the final design submittal.

Update the listing of UFGS and Louisville District Guide specifications based on any changes. If edits to the UFGS or Louisville District Guide specifications have been made before the interim design submittal, submit the edited specifications. Where a UFGS or Louisville District specification section template is not available to cover an element of work, the A-E shall develop and submit an outline specification.

Provide drawings as required by the technical discipline chapters of this Guide and as required herein.

2.2.4 FINAL (90%) DESIGN SUBMITTAL REQUIREMENTS

Final design is extensively defined in the various chapters of this Guide. The Final design shall be completed accurately to the best of the A-E's abilities, anticipating no corrections.

Before submission to the District Office, make a thorough check of plans, specifications, and other required data to comply with comments, eliminate errors, inconsistencies, and any lack of coordination between architectural, structural, mechanical and other applicable design phases of the work. Completely proof and correct final reproducible specifications to eliminate typographical errors, misspelled words, etc.

Provide a design analysis with all information required to fully support the design of the project and complying with the technical discipline chapters in this Guide.

Include the **Concept Design and Interim Design** review comments, as annotated for correction. Ensure that all pages of the Final Design Analyses are initialed by the engineer and the individual checking the work.

Provide drawings as required by the technical discipline chapters of this Guide and as required herein. Provide native CAD/BIM files for review along with all support files needed for the completion of as-built drawings during construction.

Include the edited Engineering Considerations and Instructions for Field Personnel. Template and instructions can be found at: <https://rl.usace.afpims.mil/Missions/Engineering/DesignGuide/MilitaryPrograms/LDMDG1.aspx>.

2.2.4.1 Final Specifications

Fully edit and develop the specification sections listed in the Interim Design submittal. Specification shall be developed, edited, and provided in accordance with the requirements in each of the technical discipline chapters of the LDMDG. In addition to a clean set of specifications in hardcopy or electronic as specified by contract, provide an electronic set of specifications in color, in searchable PDF format, showing the specification edits applied including red lined-out text for deletions and green text for additions.

2.2.4.2 Project Description

It is encouraged that the drawing package includes a project description in the General Information Sheets. The project description should include a description of the type of building, building size (number of floors, floor area, etc.), spaces within the buildings, type of building envelope and structural systems, and the utilities included (HVAC, electrical, etc.). The project description should include a listing and description of the base bid and options matching the bid schedule.

2.2.4.3 Special Provisions

Edit the Louisville District Guide Specification 00 80 00.00 06 SPECIAL PROVISIONS. Comply with the Specifier Notes in editing the specification. Coordinate with the USACE PE/A where any requirement is unclear or information is needed.

2.2.5 CORRECTED FINAL (100%) DESIGN SUBMITTAL REQUIREMENTS

The A-E is responsible for corrections to drawings, design analysis, specifications, cost estimate, etc., as a result of review of the final submittal. **Corrected Final Design** submittal consists of original corrected plans, technical specifications, and Design Analyses including project review comments with annotations of action taken on each comment.

Submit the final project technical specifications that have been corrected and/or revised to correct issues identified from review of the Final Design submittal.

2.3 SPECIFICATIONS

The technical specifications shall include performance and specific task-type specifications for all work required to complete the project. The A-E is totally responsible for the content of the technical specifications and for material

shown on the drawings which has been inadvertently omitted from the specifications. The specifications shall be complete, accurate, clear and precise and free of ambiguities. Verify that version dates referenced in the specification are current as of the date of solicitation for documents such as standards, codes, or handbooks.

Coordinate the specifications with the drawings and cross check all reference publications within the specification for agreement with the drawings and other sections of the specifications.

2.3.1 UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS)

All project specifications shall be prepared using the UFGS unless instructed otherwise. Standardized CoS facilities that use the MILCON RFP Wizard are exempt from this requirement. UFGS are available from the Whole Building Design Guide (www.wbdg.org). The UFGS shall be edited and adapted by the A-E to fit each individual project in accordance with the project requirements. Delete the inapplicable portions of the UFGS and revise and/or supplement, as required, the applicable portions to provide a complete project specification. Deviations are not permitted without prior approval through the Louisville District.

Note that UFGS utilize 5th level designators (NN is the string XX XX XX.XX NN) to denote UFGS that are not currently “unified”. Army specific sections have a 5th level identifier of 10. Navy uses 20, Air Force uses 30, and NASA uses 40. Where there is no 5th level designator, the specification is applicable to all services. Order of precedent for specification section selection: service specific sections, “unified” sections, and other service specific sections. Ensure the specification sections have no redundancies and conflicts. Example: An Army project would use sections with a 10 as the 5th level identifier first. If there are no Army specific sections, use the unified sections with no 5th level identifier. If further sections are still necessary, use Air Force, Navy, or NASA sections.

2.3.1.2 Louisville District Guide Specifications

Louisville District has developed modified guide specifications, based on corresponding UFGS, to fit local conditions and practices. Where Louisville District has prepared a guide specification, use them in lieu of the UFGS. These specifications have a number with a 5th level identifier of 06. Louisville District specifications are available from the Louisville District USACE website:
<http://www.lrl.usace.army.mil/Missions/Engineering/Specs.aspx>

2.3.1.3 Tailoring of Guide Specifications

Tailor each guide specification used in the preparation of project specifications to fit the requirements of the project. Where numbers, symbols, words, phrases, clauses, or sentences are enclosed in brackets [], a choice or modification must be made; exercise care in making the choice or modification. Where blank spaces are provided for the insertion of data or text, insert the appropriate material. Where entire paragraphs are not applicable they must be deleted. When necessary to add additional requirements, be sure they are consistent with the other requirements of the UFGS and that they do not unnecessarily restrict products that can be furnished. The specification writer must not delete any of the contractor’s options for materials and equipment unless a deletion is considered technically necessary. These guide specifications cover the usual and preferred types of construction and as required to provide open and competitive bidding without proprietary exclusion of acceptable products. Specifier Notes are included in the body of technical UFGS in SPECSINTACT templates. These notes form an important part of USACE technical requirements and offer direction to the specification writer. They also include direction regarding preparation of drawings to accompany the specification. It is required that the A-E read the notes and comply with the instructions contained therein. It is very important to provide drawing details referenced in the specification.

2.3.2 OTHER SPECIFICATIONS

When there is no appropriate UFGS or Louisville District guide specification for a particular item of work, prepare the required specification and include it in an existing section or create a new section, numbered within the appropriate Division. Arrange the specification and type using the UFGS format. The specification shall not be written around materials, equipment or procedures which restrain competitive bidding unless a specific waiver has been obtained by the PE/A. Prepare the required section using one of the following procedures:

2.3.2.1 Performance or Descriptive Specifications

Prepare "performance or descriptive specifications" using industry standards, manufacturer's data, and other available information. Prepare and develop these specifications by listing parameters, methods, techniques and other requirements that several manufacturers can satisfy. List the essential features, requirements, minimum functions, and other factors to clearly indicate the type and quality of item required. Specifications must not be developed around a single manufacturer.

2.3.2.2 Sole Source Specifications

There may be instances when only one manufacturer's product will satisfy job conditions. For example, in rehabilitation work, updating a particular piece of existing mechanical equipment may require new parts from the manufacturer of that particular piece of equipment. A sole source type may be acceptable in this instance provided prior approval is received from higher authority. To receive approval, the A-E is required to provide written sole source justification to the PE/A. Prepare and present this justification as early in the design process as possible, since approval usually takes considerable time. Be aware that preparing proprietary type specifications based on trade, brand, manufacturer's name or adopting a manufacturer's description of a particular article or procedure are unacceptable and should be avoided if at all possible. For those rare cases where a substitute product cannot be allowed, clearly state "No Substitutions Allowed".

2.3.2.3 "Or Approved Equal" Specifications

In some instances, acceptable standards of quality may be listed by brand name or approved equal. In some cases, it is preferred that the names of at least three manufacturers with model numbers be listed. Each of the listed items must exhibit all of the performance characteristics required. The essential features (salient features) must be specified so that a determination of "equal" can be made by the Contracting Officer. Each string of brand names shall be followed by the words ", or approved equal." The intent of the ", or approved equal" procedures is to offer bidders the opportunity to substitute items equal in functionality, performance, and quality. "Or approved equal" specifications should be avoided in preference to "performance or descriptive specifications" as discussed above.

2.3.3 SPECIFICATION PREPARATION

2.3.3.1 Specsintact

Specifications shall be prepared using SPECSINTACT except as directed otherwise by the USACE PE/A or contract. SPECSINTACT is an automated processing system designed for editing construction project specifications. Automated features and report options include: generating and printing a Table of Contents for each section and/or the complete job, renumbering paragraphs within each section, editing references to agree with applicable references cited in the section text, revising submittal register to contain only those contractor submittals required, printing the submittal register, verifying that all sections referenced in the text are included as part of the technical specifications, and listing the location of brackets remaining in the text.

SPECSINTACT may be obtained from the SpecsIntact Software Website:

<http://si.ksc.nasa.gov/software/SI32/si4/downloadform6.asp>

2.3.3.2 Preparation

Include a Table of Contents listing section number and title. Arrange the sections in numerical order of the section numbers. In each section, include an index listing main paragraph numbers and titles.

All extraneous and irrelevant information contained in the UFGS or Louisville District specification templates must be eliminated. Likewise, information not originally contained in the UFGS or Louisville District specification templates must be added to ensure a complete specification. Furthermore, performance or descriptive specifications must be developed as necessary to fully specify the requirements of the project being designed. The drawings and specifications must complement each other.

Under no circumstances shall a photocopy be submitted as an original job specification package for reproduction.

Verify that all specification sections that are referenced in the specification text are included in the specification. Show the referenced section title using all capital letters and exactly as the actual section title appears in the technical specifications. Review each specification section and delete from paragraph REFERENCES any which are not specifically cited in the final text.

2.3.3.3 Submittal Register

The Contractor Submittal Register must be edited to include all the submittals required. The specifications frequently require the Contractor to submit shop drawings, samples, manufacturer's data, certificates, test reports, etc. as appropriate. The A-E is required to furnish a listing of the Contractor's submittal requirements on a SPECSINTACT generated submittal register. Where additional submittals are required, add them to the appropriate section list. Indicate appropriate levels of review (Resident Office "RO", District Office "DO", A-E Designer of Record "AE", etc.). Any submittals that need to be reviewed by the AE, particularly extensions of design, must be marked with "AE" in the submittal register. Coordinate with the USACE PE/A to determine which submittals should be marked for review by the AE and which USACE offices are to receive submittals.

2.3.3.4 Omitted Paragraphs

Specifications published from SPECSINTACT automatically renumber deleted paragraphs. For specifications that must be prepared using other software, the paragraphs do not have to be renumbered. Paragraphs in section 00 80 00.00 06 SPECIAL PROVISIONS shall not be renumbered. Show purposely omitted paragraphs when necessary to connect paragraph numbering as follows:

Show omitted main paragraphs in the section text as *NOT USED* using all capital letters. (Example: *10.1 NOT USED.*)

Show omitted main paragraphs in the section Index as *NOT USED*. (Example: *10.1 NOT USED.*)

Show omitted subparagraphs in the section text as *Not used* using a capital N followed by lower case letters. (Example: *12.2.2 Not used.*)

Delete omitted paragraphs, including number, that are not required to connect the paragraph numbers. All consecutively numbered omitted paragraphs shall be shown single spaced.

2.3.3.5 Responsibilities

The A-E is responsible for the accurate preparation of the Price Breakout Schedule, 00 80 00.00 06, and Division 01-48 Specifications.

2.3.3.6 Payment Paragraphs

No payment paragraphs will be required when bid items on the Price Breakout Schedule are all "Job" (previously known as "Lump Sum"). Payment paragraphs are required for those sections which cover work set up for separate payment at a unit price. Each section of specifications which sets items of work for separate payment shall have a paragraph entitled "MEASUREMENT AND PAYMENT." This paragraph shall be so worded as to conclusively indicate the method of measurement and payment and shall be fully coordinated with the applicable item listed in the Price Breakout Schedule.

2.4 DRAWINGS

Prepare clear, uniform design drawings and illustrations. Unless specifically noted in the A-E's contract, use the standards for drawing presentation contained in this guide in the preparation of all drawings required in a contract. Prepare drawings with the expectation that both the USACE, in the role of construction manager, and the construction contractor will be able to construct the building or facility without any additional assistance and without the necessity for modifications to correct design deficiencies. Provide drawing submittals detailed to the extent that an accurate cost estimate can be prepared and shop drawings can be prepared by the construction contractor and checked by USACE or the AE reviewer. Lists of quantities shall not be provided on the drawings.

The A-E is totally responsible for omissions and conflicts in the material shown on the drawings. The drawings shall be complete, accurate, clear and precise and free of ambiguities. They shall be specific and free of ambiguities. Coordinate the drawings with the specifications.

At the start of design, the PE/A and the representative of the user shall define the software requirements for the design. The in-house design team shall provide the end product(s) as agreed upon at this time. The AE shall provide the end product(s) as defined by contract. The AE is free to use any CAD/BIM design tool they feel appropriate in

preparing the agreed upon end product. USACE standard template, workspaces, standards and sheet borders are available from The CAD/BIM Technology Center for Facilities, Infrastructure and Environment (<https://cadbim.usace.army.mil>). Designs shall be prepared using these standards as a supplement to the A/E/C and NCS CAD standards.

At the time of final submittal and at the end of design, the AE shall provide both electronic files and paper documents. Electronic files include both the drawing sheet representations in .PDF format and the native CAD/BIM files. These electronic .PDF files will be provided to the prospective bidders as a part of the advertisement process. The native CAD/BIM files will be provided in all cases to the contractor for as-built preparation with all support files needed for the completion of as-built drawings during construction. The .PDF files shall be created such that they can be printed in black and white or grayscale and fully show the design intent of the drawings. Use of colors on the sheets to show design intent is not permitted.

2.4.1 READABILITY

Exercise particular care to insure that all work is prepared for printing at full size. Enlarge congested areas to a suitable scale. For any sheet or part of a sheet not meeting this standard, promptly rescale and resubmit, at no additional expense to the Government, a new drawing that is completely readable when reproduced.

Select scales to avoid overcrowded and cluttered conditions on the drawings. Carefully plan drawing layout with the appropriate scales to properly delineate the project. Where necessary to maintain proper scale, place drawings or large structures on two or more sheets. Graphic scales for each of the different scales used on the drawing sheet shall be provided. Acceptability of scale is determined by clarity of drawings at full scale.

Special care should be taken to distinguish between new and existing work. Use heavier line weights for new work than for existing work where they both occur on the same drawing to effectively distinguish between new and existing work on the full-size prints.

Provide separate demolition drawings at a readable scale.

2.4.2 ORGANIZATION

Provide plan sets with a cover and an index sheet or a combination of them. Orient plans for all disciplines consistently.

List legends of symbols on the first sheet of each discipline in each volume or set of drawings.

Cross reference sections and details to each other and plan sheets using callouts based on the discipline drawing number. Example: A detail specific to a mechanical item is called out with "Detail 1, M-502" on the plan sheet. The detail sheet identifies the plan sheet where the detail applies. Example: Detail 1 on sheet M-502 identifies plan sheet M-101 as the location where the detail applies. Where details apply to all instances, indicate typical. Example: Every duct take-off requires a manual balancing valve and there is only one detail for all; indicate "Typical" in the detail.

Cross reference between different discipline drawings by adding a note at the appropriate location stating for example: "*For Continuation, See Drawing _____.*" General statements such as "*See Civil Drawings*" are unacceptable.

For projects where more than one drawing sheet is required to show the entire floor plan, show "key plans" on all discipline floor and roof plans. Depict the area on each drawing by crosshatching accordingly on the "key plan". Show column lines and provide column line designations.

2.4.3 GENERAL INFORMATION SHEETS

Show the title and location of the project, schedule of drawings, a project location plan, a vicinity map, legend and list of abbreviations on General Information Sheets. As a minimum, place the following on the first General Information Sheet: the project title, installation name, project number and fiscal year.

- a. Schedule of Drawings. The schedule of drawings includes Sheet Reference (design discipline) numbers

and drawing titles. Leave spaces between each discipline's drawings to allow room for insertion of additional drawings if required by revisions to the design during design or construction.

- b. Vicinity Map. The vicinity map is a single-line type showing major cities, nearby towns, major rivers, streams, current routes of nearby highways and railroads, and a north arrow.
- c. Location Map. Show location of the project on a small scale location map indicating the general relationship between the new facility, and major existing structures and streets. This will facilitate identification of the proposed site. On the location map show the north arrow and highlight the approved project boundaries, the contractor's equipment yard, the contractor's entrance to the installation, haul roads, location of the USACE Resident/Area Office, location and phone numbers of nearest medical facility and fire department, location of the DPW/BCE office, the Property Disposal office, and the approved location of borrow and disposal areas. Show haul routes for the borrow and disposal areas. If there are no borrow or disposal areas on the Installation, provide a note to that effect on this sheet.

2.4.4 NUMBERING SYSTEM

The explanations given below refer to numbering required in title blocks.

- a. The Solicitation Number (SN) is a single, unique, alpha-numeric number set which denotes the specific construction bid Solicitation. Due to Government contracting requirements, this number must be secured and placed on all drawings just before solicitation for bid. The SN will be provided by USACE. USACE will add this information to the .PDF files provided by the designer previously.
- b. The Drawing Code, reflecting Army and Air Force criteria, defines facility classification, category, and sequence for that type facility. This unique number set should be obtained from the PE/A and placed on all design drawings in the set not later than the Final Design submittal.
- c. A SHEET REFERENCE NO. is assigned to each sheet by the designer/drafter. Use a discipline letter prefix for each sheet. Contracts that contain multiple buildings of varied types (e.g., administrative building, barracks, and dining facility) require some variation from the numbering plan outlined above. After the overall site preparation plans, group drawings for each building together separate from other building(s) drawings. In this case, assign an alphanumeric letter (A, B, C, etc.) and prefix the applicable discipline drawing for each building accordingly. Discipline drawings that show plans and details common to all buildings do not need to be prefixed. A single Solicitation Number will be applied by the USACE to all drawings in the contract set. Assign separate file numbers to each building or facility and to the overall project site preparation plans. Begin SHEET REFERENCE NO. anew with each building/facility.
- d. Site Adapted Drawings. When site-adapting drawings prepared by Louisville District, other agencies or A-E firms, or when utilizing USACE standard drawings, retain the original drawing and title block as is, except for the following items:
 - 1. Change the title block SHEET REFERENCE NO. to blend with other drawings in the new set. Retain the old file number.
 - 2. In the revision block, show:
 - i. "Adapted by (Firm's Name) and issued by Louisville District for (Name of Installation) under Solicitation No. _____."
 - ii. Fill in the appropriate data items (noted in parentheses) for the specific project.
- e. For-Information-Only Drawings. When drawings from previous contracts are deemed necessary for information purposes only, use the following procedure:
 - 1. Near the title block, add the following note:
 - i. "THIS SHEET ADDED FOR INFORMATION ONLY UNDER SOLICITATION NO. _____"
 - ii. Fill in the appropriate data items (noted in parentheses) for the specific project. Use lettering as large and bold as practicable (up to 1/4" text size) and be consistent throughout the set of drawings added. Outline the note with a bold, rectangular border.
 - iii. Make no change to the title block or the revision block.
 - iv. Add the drawing titles to the Index Sheet wherever they occur. However, they should also be annotated "FOR INFORMATION ONLY" on the Index Sheet. A dash should be inserted in the Index Sheet columns which would normally show SHEET REFERENCE NO., Sheet, and Drawing Code.

2.5 DESIGN ANALYSIS

Prepare a design analysis for each submittal describing general project parameters, functional and technical requirements, design objectives, design assumptions, feature/system narratives, and calculations applicable to the project. Comply with ER 1110-345-700, Appendix B for layout and other design analysis requirements. Comply with additional design analysis requirements in the various Chapters within this Guide.

Design calculations shall be checked for accuracy by a qualified design professional other than the preparer of the calculations. Include designer and checker names and firm names on calculations.

Provide a Design Analysis with a separate section for each discipline or subject as follows:

- a. General Description - include general information about the project such as building types and uses; basic site and building features/systems including the factors influencing selection; building design life; program information (Example: information from DD 1391); general design guidance including the date or version (Example: UFC which cover multiple disciplines, building code, etc.).
- b. Design Quality Control Plan
- c. Civil
- d. Structural
- e. Architectural
- f. Interior Design
- g. Mechanical
- h. Electrical
- i. Life Safety/Fire Protection
- j. Antiterrorism/Force Protection
- k. Energy Conservation
- l. Sustainable Design
- m. Geotechnical Information
- n. Surveying and Mapping Information (if applicable)
- o. Environmental Information
- p. Civil Calculations
- q. Structural Calculations
- r. Architectural Calculations
- s. Mechanical Calculations
- t. Electrical Calculations
- u. Energy Conservation Supporting Data (Energy Analyses)
- v. Meeting Minutes and Official Correspondence

Number each page of the design analysis consecutively by section, i.e., number the pages in Section 2 - Structural; 2-1, 2-2, 2-3, etc. Include a complete table of contents. Label and number each volume sequentially. Each volume shall include a cover page indicating the volume name and number and the total volumes for the project. The cover page shall also indicate the name and location of the project, project number and fiscal year, and identify the design agency. Electronic PDF files shall have each separate section bookmarked.

2.6 AMENDMENTS

When directed by the PE/A, prepare a summary of changes identify the specifications and sheets that are added, deleted, or replaced. Refer to Quality Management System (QMS)/Regional Business Process Manual (RBPM) 08580 LRL – Engineering Responsibilities for Construction Procurement for in-house design instructions. Refer to the design or design-build contract for instructions for design amendments for AE and DB contractor provided designs.

2.6.1 SPECIFICATIONS

When directed by the PE/A, furnish revised or marked-up specification pages showing all changes made by amendment. Refer to QMS/RBPM 08580 for in-house design instructions. Refer to the contract for AE design instructions.

2.6.1.1 Omitted Paragraphs

In preparing the original specifications, omitted paragraphs and subparagraphs were shown as "Not Used". In revising the specifications by amendments, the paragraphs being removed are shown as "Deleted" (Example 10.1.1 DELETED.)

2.6.2 DRAWINGS

When directed by the PE/A, furnish revised drawing sheets showing all changes made by amendment. Refer to QMS/RBPM 08580 for in-house design instructions. Refer to the AE Contracting sections of the Louisville District Military Design Guide for AE design instructions.

2.7 MODIFICATIONS

PE/A will provide the appropriate modification number and naming convention.

2.7.1 SPECIFICATIONS

Revisions to specifications for modifications shall be performed similarly to Amendments. The naming convention used to assign the name of the change shall be coordinated through the USACE PE/A with the USACE construction field office.

2.7.2 DRAWINGS

Drawing modifications shall be identified in accordance with USACE Engineer Research and Development Center (ERDC) CAD Drafting Standard. All amendments and modifications shall be initialed as approved by the appropriate party in the Issue Block.

Note that the change count (Mark number) represents changes to a particular drawing and does not represent the change to the contract.

Example: Naming convention is CASE 000x and the particular modification is CASE 0001. The drawing had 2 changes during advertisement, and this is the 3rd change. The revision block would include a Delta with a 3 inside next to CASE 0001 with a description of the change.

---END OF SECTION---