CHAPTER 1

GENERAL INFORMATION

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1.1 OBJECTIVE

The Louisville District Military Design Guide (LDMDG) prescribes general procedures and instructions for preparing construction documents under the direction of the Louisville District, U.S. Army Corps of Engineers (USACE). The Architect-Engineer (A-E) (use of the terminology "A-E" hereinafter refers to both Architect-Engineer and USACE in-house design team) is to take into account that these procedures may differ from their usual procedures. This may require a more complete and extensive analysis and documentation than is customary in private practice.

The procedures and instructions in the LDMDG are a part of the design contract and all applicable requirements must be strictly followed unless specifically exempted by the contract or by direction of the USACE PE/A or Contracting Officer's Representative. In case of conflict between this Guide and the A-E's design contract or the design-build contract, the most stringent requirements take precedence. However, bring conflicts to the immediate attention of the USACE PE/A or Contracting Officer's Representative for resolution. Use of this document and adherence to its requirements in no way relieves the A-E of any of his or her professional, legal, or any other responsibility to deliver a safe, functional, useable design that complies with all relevant codes and standards.

1.2 ORGANIZATION

The Louisville District Military Design Guide is organized into chapters, each including requirements of a specific design discipline or aspect of the design product. Each chapter has a unique weblink accessed through the Louisville District, USACE public website:

https://www.lrd.usace.army.mil/Mission/Military-Construction-Reserve/Design-Guides/

The Louisville District, USACE proponent for each chapter is listed within the chapter. For in-house design projects, questions, comments, and other input regarding each chapter should be directed to the chapter proponent. A-E firms under contract, either directly or through design-build contracts, shall direct questions or comments to the USACE PE/A or Contracting Officer's Representative as applicable.

1.3 DESIGN/BUILD

The Louisville District Military Design Guide includes requirements for design applicable to both design-bid-build and design-build projects. Design and construction for design-build projects shall conform to the requirements of this design guide where specifically referenced from the design-build contract. All applicable requirements must be strictly followed unless directed by the USACE PE/A or Contracting Officer as applicable. In the event of a conflict between the contract documents and the LDMDG, the most stringent requirements govern.

1.4 KICK-OFF MEETING/DESIGN CHARRETTE

Typically, Army and Air Force customers prefer a combined kick-off and design charrette meeting. Some customers prefer a separate kick-off meeting and design charrette. The USACE PE/A or Contracting Officer's Representative will determine the appropriate application of these meetings. For A-E firm design and design-build contracts, the required meetings will be identified in the contract.

The meetings require participation from decision-makers representing the Directorate of Public Works (DPW) or Base Civil Engineer (BCE) or equivalent including representatives from maintenance, environmental, safety, and security. Utility, communications, fire department, and user representatives are also necessary for the meeting. Full engagement by the USACE Project Manager is encouraged and attendance by a representative of the local USACE field office is recommended.

1.4.1 COMBINED KICK-OFF MEETING/DESIGN CHARRETTE

A combined kick-off meeting/design charrette is the default option. The USACE PE/A or Contracting Officer's

Representative will confirm this approach is acceptable with the customers. The intent of this approach is to obtain site information and project requirements at the beginning of the meeting and spend the subsequent time developing site and floor plans with active involvement by designers and stakeholders with the goal of having site and floor plans accepted by the customer and stakeholders at the end of the meeting.

In preparation for the kick-off meeting or design charrette, the A-E shall review, to the extent available, the project DD Form 1391; other functional criteria; the customer concept design (CCD) for Air Force projects or the project definition report (PDR) for Army projects; applicable technical criteria, design guides, and standards; and installation-specific plans or guidance. It is recommended that site floor plan studies be accomplished to gain familiarity with the allowances and limitations, but no advance plans are expected.

The A-E shall conduct the meeting which is characterized by an informal exchange of information and ideas between users and designers that establish project requirements early in the meeting. The topics discussed include the scope of the project, functional and technical criteria, functional adjacencies/interactions, information necessary to support the design, and other information pertinent to the project. The A-E's lead designers in each applicable discipline shall attend. The meeting then progresses into design development where the team leader shall facilitate design decisions relative to the site plan and the floor plan. The design team shall develop feasible site and floor plan solutions throughout the course of the meeting which are presented to all participants for comment and suggestions. The plans shall be updated to reflect comments and suggestions as necessary. The end goal of the meeting is to have participants agree to a rough site and floor plan in terms of functional arrangements and desired features. Exterior finishes and HVAC systems are discussed; particularly understanding what may or may not be acceptable for the participants.

Detailed minutes covering the meeting shall be prepared by the A-E and distributed to all attendees for verification and project record along with electronic copies (PDF format) of the accepted floor plans, site layout, and narrative describing the exterior materials and building systems discussed. Relative to the site and floor plans, this is agreed to as the concept design with comments incorporated prior to moving to the next milestone. See paragraph CHARRETTE DOCUMENT in Chapter 2 DELIVERABLES.

During and after the combined kick-off meeting and design charrette, the building energy and water systems shall be optimized. See paragraph ENERGY/WATER OPTIMIZATION in Chapter 10 SUSTAINABLE DESIGN/ENERGY CONSERVATION.

1.4.2 SEPARATE KICK-OFF MEETING/DESIGN CHARRETTE

The design charrette may be separate from the kick-off meeting with concurrence from the customer. The USACE PE/A or Contracting Officer's Representative will confirm this approach is acceptable with the customers. The intent of this approach is to have a kick-off meeting to establish project requirements and gather site information in order to prepare alternative site and floor plans in advance of a design charrette. The design charrette is held in order to select and refine the site and floor plan alternatives with the goal of having site and floor plans accepted by the customer and stakeholders at the end of the charrette.

1.4.2.1 Kick-Off Meeting

In preparation for the kick-off meeting, the A-E shall review, to the extent available, the project DD Form 1391; other functional criteria; the customer concept design (CCD) for Air Force projects or the project definition report (PDR) for Army projects; applicable technical criteria, design guides, and standards; and installation-specific plans or guidance. The A-E shall review a space allocation table provided by the customer prior to or during the kick-off meeting, if the table is provided.

The A-E shall conduct a kick-off meeting characterized by an informal exchange of information and ideas between users and designers that establish project requirements. The topics discussed include the scope of the project, functional and technical criteria, functional adjacencies/interactions, information necessary to support the design, and other information pertinent to the project. The A-E's lead designers in each applicable discipline shall attend. By the end of the kick-off meeting, the A-E should have a clear understanding of the project scope, goals, and criteria and should have all information necessary to begin design development. Detailed minutes covering the meeting shall be prepared by the A-E and distributed to all attendees for verification and project record.

1.4.2.2 Design Charrette

In preparation for the design charrette, at least two alternative site layouts and floor plans shall be developed and provided prior to the charrette. The site layout shall show building footprints, AT/FP setbacks, parking and general location of other paved areas, access roads, and fences. The floor plans shall have sufficient detail to show the massing of the building, the relative placement and general size of rooms, and location of building entrances, exits, stairwells, elevators, and circulation space. A narrative description of the major systems proposed for the project or for further analysis shall be provided to include exterior enclosure materials; finishes; mechanical, electrical, lighting, and structural systems; fire protection systems; mass notification; IT systems; and any special systems or features such as electronic security systems (ESS), TEMPEST, SIPR, etc.

The design charrette meeting results in final decisions regarding the floor plan and site plan for the project as well as building materials and HVAC systems. The alternative floor plans and site layouts shall be revised during the design charrette to incorporate any necessary changes or features discussed during this meeting. After revision of the floor plan and site layout, the meeting participants accept the floor plan and site layout to use for the project. The A-E prepares detailed meeting minutes for distribution to all participants with electronic copies (PDF format) of the accepted floor plan, site layout, and narrative describing the exterior materials and building systems discussed.

1.5 CRITERIA

1.5.1 FUNCTIONAL CRITERIA

The design shall conform to the Department of Defense (DD) Form 1391, which identifies the authorized requirements, including programmed funding amount, for facility. Additional functional criteria may be provided from the Using Service or unit. In the event of a conflict, the DD Form 1391 criteria shall govern. Bring all such conflicts to the attention of the USACE PE/A or Contracting Officer's Representative for resolution.

1.5.2 PROJECT DEFINITION REPORT/CUSTOMER CONCEPT DESIGN

A Project Definition Report (PDR) for Army projects or a Customer Concept Design (CCD) for Air Force projects may be available. The PDR/CCD is developed during planning to better capture the project scope, requirements, and costs prior to finalizing the project programming/funding. These documents may contain valuable information for the design development; however, are not criteria documents. The A-E shall review the PDR/CCD prior to the design kick-off meeting or design charrette in order to better understand the project scope. The information provided by the PDR/CCD may be outdated and is subject to error; therefore, all information shall be verified by the A-E before applying to the design.

1.5.3 TECHNICAL CRITERIA

The design shall conform to all applicable requirements of applicable criteria. Any deviations from applicable criteria, including criteria obtained from the Using Service, must receive prior approval of the USACE PE/A or Contracting Officer's Representative. Where the applicable technical criteria are not met, the A-E will be required to redesign to the established criteria at their own time and expense. Promptly submit any questions or problems encountered in following the established criteria to the USACE PE/A or Contracting Officer's Representative for resolution. In those instances where the Government does not possess applicable criteria for a specific element of the work, describe the criteria used and the reasoning for its use to substantiate the development of specifications and design details for this work.

Most applicable criteria can be found at the Whole Building Design Guide, Construction Criteria Base (CCB) at:

http://www.wbdg.org/ccb/ccb.php
Additional criteria may be cited in the chapters or appendices for each technical discipline within this document.

When deviation from technical criteria is necessary, a waiver from the appropriate agency may be required. The A-E may need to prepare a justification for the waiver. Justifications may include narratives, analyses, and computations. Coordinate with the USACE PE/A or Contracting Officer's Representative to determine waiver

requirements when necessary.

1.5.3.1 UNIFIED FACILITIES CRITERIA

Comply with all applicable Unified Facilities Criteria (UFC) Documents. UFC provide planning and design criteria applicable to all Military Departments (Army, Air Force, Navy, Reserve components, etc.), Defense Agencies, and Department of Defense Field Activities and represent most of the criteria for a military project. UFC that have been unified for use by all agencies have no alphabetical letter at the end of the document number. UFC that are Service or Agency specific have an alphabetical letter at the end of the document. Letter "A" indicates USACE/Army, "F" indicates Air Force, "N" indicates Navy, and a combination of two letters indicates that the documents are used by two agencies. The introductory paragraphs of the UFC may establish the applicability of the UFC where the document number is insufficient to determine applicability.

UFC 1-200-01 General Building Requirements establishes the use of consensus building codes and standards, identifies "core" UFC, and identifies unique military requirements. The UFC adopts the International Code Council (ICC) consensus building codes with modifications and substitutions as indicated in UFC 1-200-02 and other UFC.

1.5.3.2 USING AGENCY CRITERIA

In addition to UFC, criteria applicable to each Using Service or Agency may be found at Whole Building Design Guide, Construction Criteria Base. Examples: Engineering and Construction Bulletins (ECB) provide temporary or interim criteria or guidance applicable to the Army or other Using Services to the extent indicated within the ECB. Air Force Engineering Technical Letters (AFETL) are applicable to Air Force projects to the extent indicated in the AFETL.

Comply with such documents to the extent that they apply to the specific project and agency. A number of criteria documents have already been incorporated into the UFC documents. Where confusion exists regarding what criteria to follow, request direction from the USACE PE/A or Contracting Officer's Representative.

1.5.4 STANDARDIZATION

Designs shall conform to any applicable standards established through the Centers of Standardization. The DD Form 1391 typically identifies the standard that shall be applied; otherwise, coordinate with the USACE PE/A or Contracting Officer's Representative to determine if a particular standard applies.

1.5.5 INSTALLATION/SERVICE DESIGN GUIDES

The Using Service or Agency or installation may have additional applicable guidance and criteria. These may be installation master plans, installation sustainability plans, technical design guides, etc. Comply with any such criteria. Coordinate with the PE/A to identify applicable criteria. Conflicts between UFC, other Service-specific criteria, and installation-specific criteria shall be brought to the attention of the USACE PE/A or Contracting Officer's Representative for resolution. Generally, DoD and Service-specific criteria will supercede installation-specific criteria.

1.5.6 DESIGN WITHIN AVAILABLE FUNDS

A-E Firms must provide designs such that construction costs do not exceed the estimated construction costs stated in the A-E contract. Immediately notify the Contracting Officer's Representative if the estimated construction cost will be exceeded.

In-house design teams must provide designs such that construction costs do not exceed the Construction Cost Limit (CCL) established in the ED Service Agreement for Military Construction (MILCON) funded projects. For SRM/O&M funded projects, the design team will design, to the extent possible, within the cost estimate provided by the customer for the project; however, the costs are not typically validated until near the end of design. Immediately notify the USACE PE/A if the CCL or customer estimate will be exceeded.

1.5.7 BUY AMERICAN ACT

All construction materials must be provided from the US or Designated Countries in accordance with the Buy American Act and related trade agreements. Refer to Federal Acquisition Regulation (FAR) Part 25 and Defense

Federal Acquisition Regulation Supplement (DFARS) Subpart 225. The AE must provide a design that can be constructed using construction materials from US or Designated Countries. In the event an exception is required, coordinate with the USACE PE/A to pursue approval. Approval of these exceptions involves a lengthy process, possibly up to 6 months. Identify the need for an exception early in project design.

1.6 HEALTH AND SAFETY STANDARDS

Incorporate the facilities, systems and equipment design standards of Engineering Manual 385-1-1 into all engineering products as applicable. Promptly bring to the attention of the USACE PE/A or Contracting Officer's Representative, for decision, any problem in incorporating these standards due to conflict with other technical criteria. The latest version of EM 385-1-1 may be downloaded at:

http://www.publications.usace.army.mil/USACE-Publications/Engineer-Manuals

There are several versions available at the website; use the latest version.

1.7 CENTERS OF EXPERTISE

The US Army Corps of Engineers concentrates expertise in specific design and construction disciplines or subjects to centers of expertise. Technical Centers of Expertise are available for support; however, their use is not mandated. Projects meeting specific criteria must utilize some Mandatory Centers of Expertise (MCX) for design and construction submittal reviews. The USACE PEA, in partnership with the USACE Project Manager, will coordinate with the appropriate MCX. In order to support the USACE PEA and Project Manager, when a team member or A-E is aware of a potential MCX requirement, they should alert the USACE PEA. The mandatory services for each MCX and the thresholds/criteria that mandate use is typically described in an associated Engineering Regulation (ER) or, temporarily, in an Engineering and Construction Bulletin (ECB). A current list of MCX (as of January 2020) is shown below. Those specifically applicable to Civil Works are not shown:

a. Ballistic Missile Defense Systems (HNC)
b. Control System Cyberecurity (HNC)
c. Cost Engineering (NWW)
d. Electronic Security Systems (HNC)
e. Facilities Explosives Safety (HNC)
f. Fuels Facilities (Petroleum, Oils, and Lubricants) (NWO)
g. Medical Facilities (HNC)
h. Protective Design (NWO)
i. Transportation Systems (NWO)
j. Utility Monitoring & Control Systems (HNC)

1.8 DESIGN QUALITY CONTROL

1.8.1 PURPOSE

Design Quality Control shall be in accordance with ER 1110-1-12, for in-house projects, or A-E contract as applicable. The responsibility of the A-E for checking and coordination of all design documents cannot be overemphasized. The A-E is responsible for producing complete, technically adequate, properly coordinated, and thoroughly checked design documents within agreed schedules. The design intent must be free from ambiguity or uncertainty. It is, therefore, a requirement for the A-E to have a logical and functional quality control program to assure that errors and deficiencies in all submittals are minimal. The A-E's obligation to provide complete, well coordinated, and error free documents has far-reaching consequences. Therefore, the A-E is cautioned to place special emphasis on this aspect of the DQCP.

1.8.2 DESIGN QUALITY CONTROL PLAN (DQCP)

A formal quality control plan shall be prepared for all projects upon initiation of design. The DQCP defines how

quality control will be executed for products. At a minimum, the DQCP must:

a. Include a project schedule showing design submittal milestones.
b. Describe the quality/technical checks and reviews to be performed during design development.
c. Describe how Independent Technical Review (ITR) will be performed.
d. List the project design team, technical/quality checkers, and ITR team members and their review responsibilities.
e. State the risks inherent in the project.
f. Address any special considerations and/or crucial design features that must be addressed.

1.8.3 TECHNICAL/QUALITY CHECKING

Technical/quality checking is a review by a qualified team member (checker) for each discipline. The checker must not be the designer. The checker may be a supervisor, team leader, or a member of senior-level staff. The check is a sheet-by-sheet, page-by-page review of design analyses, drawings, and specifications. The design check includes a comprehensive evaluation of:

a. Correct application of methods
b. Adequacy of data
c. Design assumptions
d. Correctness of calculations (the goal is error free)
e. Completeness and correctness of documentation
f. Compliance with criteria, codes, standards, and guidance
g. Biddability, constructability, and operability
h. Sustainability and environmental compliance

1.8.3 INDEPENDENT TECHNICAL REVIEW

Independent Technical Review is a review by a qualified team not involved in the day-to-day production of the project/product for the purpose of confirming proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. While ITR is a critical component of quality control, it will not replace checks or other quality control processes. ITR team members shall have senior-level competence in the type of work being reviewed. The ITR objectives are to ensure that:

a. The project meets the customer's scope, intent, and quality objectives.
b. Concepts and project costs are valid.
c. Appropriate computer models and methods of analysis were used and basic assumptions are valid and used for intended purpose.
d. The source, amount, and level of detail of the data used in the analyses are appropriate for the complexity of the project.
e. Content and project documentation is sufficiently complete for the current phase of the project and provides an adequate basis for future development efforts.
f. The product, across all disciplines, is coordinated and consistent.
g. Contract documents are clear and enforceable.

1.8.4 COMMON DESIGN ERRORS

The A-E is cautioned to give special attention to the following five most common design errors in decreasing order of frequency:

a. Lack of coordination between disciplines.
b. Conflicts between drawings and specifications.
c. Inadequate site inspection leading to poor coordination between existing and new conditions.
d. Cost estimates in wrong format and/or poorly prepared.
e. Failure to provide all necessary specifications even for items included on the drawings.
f. Permit applications not handled correctly.
g. Utility agreements not coordinated.
h. Errors resulting in cutting and pasting text, images, etc. from previous projects.

1.9 REVIEW PROCESS

1.9.1 DRCHECKS

DrChecks is an internet-based design review and checking application. DrChecks allows stakeholders to communicate and resolve design issues. DrChecks shall be used to submit, evaluate, backcheck, and resolve comments unless specifically exempted by contract.

1.9.2 REVIEW COMMENTS

The USACE and other agencies review all design data prepared by the A-E for conformance with the contract requirements, quality assurance, and technical as well as functional criteria. This review effort in no way replaces the A-E's quality control requirements.

1.9.2.1

The A-E must evaluate review comments generated by all reviewers and incorporate necessary changes into the design documents. After the corrected final submission, upload to DrChecks a PDF file showing any changes made to address outstanding comments.

1.9.2.2

After incorporation of the changes into the design documents by the A-E, the USACE backchecks the actions taken. The A-E shall indicate, in DrChecks evaluations, the location in the design documents the comment is being addressed. If the A-E feels a comment is inappropriate or is out of scope, A-E must provide rebuttals in DrChecks indicating reasons for not complying with the comment. This shall be done by the A-E as soon as possible; definitely before the next submittal.

1.9.2.3

The resubmittal and backcheck process will continue until all comments are properly resolved.

1.9.2.4

The A-E is encouraged to call and discuss any problematic comments with the appropriate reviewer. The name and phone number of each reviewer appears in DrChecks.

1.10 PROJECT CORRESPONDENCE

The A-E shall promptly advise the USACE PE/A or Contracting Officer’s Representative of all significant developments during the design process. The A-E shall furnish USACE with a summary of all significant discussions or correspondence between the A-E and other project stakeholders promptly after they occur. The design analysis shall include a copy of all significant correspondence and the summary of discussions. Significant correspondence includes design direction, decisions, and approval of the direction/decisions; the correspondence that supported or led to the direction or decision and approval; correspondence associated with scope, schedule, or budget changes; and critical information from other project stakeholders that influence the design or contract.

1.11 VALUE ENGINEERING

The USACE reserves the right to conduct value engineering studies on projects either during or after completion of design. The value engineering studies may be performed by the USACE or other A-E firm(s) designated by the USACE. The USACE, at its discretion, may modify the A-E's contract to implement any or all design changes resulting from the value engineering studies or the engineering evaluations during or after completion of design. During the course of the design, look for and identify those high-cost, low-value items which may be accomplished in other ways at less cost.

1.12 SITE VISITS

1.12.1 COORDINATION

Each time the A-E makes a visit to the project site, for whatever reason, check in at the nearest USACE Resident/Area Office or Project Office. USACE construction field personnel can be invaluable in facilitating the A-E's access to the project site and in contacting information sources through the DPW/BCE office at the Installation. Contact the USACE PE/A or Contracting Officer's Representative for the location of the nearest USACE construction Resident/Area Office, and provide at least two day notice before the visit. Coordinate all site visits with the USACE PE/A or Contracting Officer's Representative and the Resident/Area Engineer. The A-E must be accompanied by USACE personnel when visiting construction sites or when meeting with construction contractors/subcontractors and owner/user representatives.

1.12.2 TRIP REPORTS

Whenever the A-E visits the site furnish a brief report of the visit documenting conclusions reached or commitments made.

1.12.3 PHOTOGRAPHS

Each installation has different security requirements regarding photographs. Before taking any photographs, coordinate requirements with the USACE PE/A or Contracting Officer's Representative and Area/Resident Engineer.

1.13 A-E RESPONSIBILITY FOR ERRORS AND OMMISSIONS.

The A-E is required to support the District after completion of their design contract if errors or omissions in the documents prepared by the A-E create problems in bidding or administering the contract for construction. The support provided by the A-E takes whatever form is necessary to correct the errors or omissions in the original documents. Accomplish the required design corrections in a timely manner.

1.14 DELEGATED DESIGN

For some features of the project, the design may not be completely developed by the A-E. This occurs when either the A-E elects to have, or the Guide Specification directs the manufacturer, supplier, fabricator, etc. to design and supply component systems for which they have special capability. Coordinate with the Contracting Officer's Representative regarding determination of acceptable delegated design and the extent to which an A-E firm may transfer "Engineer of Record" responsibility.

The A-E must identify, in the specifications, any delegated design submittals necessary to demonstrate compliance with the contract requirements. This includes a listing of offices with mailing addresses that are to receive the submittals with number and type of each submittal for each office and a listing of design professionals required and necessary credentials and professional experience. Submittal requirements must be included in the submittal register.

Clarify delegated design requirements on drawings where necessary to ensure clear understanding and identification of the construction contractor's responsibility.

In addition to incorporating requirements for delegated design into the technical specifications and drawings, the A-E must provide a listing of the delegated design elements of the project including the feature of work and the associated specification section and drawings for inclusion in specification section 00 80 00.00 06 SPECIAL PROVISIONS.

1.14.1 CONSTRUCTION CONTRACTOR ENGINEER OF RECORD

Some United Facilities Guide Specifications (UFGS) have been written with the intent of placing the construction contractor in the position of the "Engineer of Record" for a particular facet of work. Two such examples are UFGS 03 11 19.00 10 INSULATING CONCRETE FORMING and UFGS 21 13 13.00 10 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION. Any such requirement must clearly place the “Engineer of Record” responsibility on the construction contractor. This may require updating language in the UFGS. For cases where the Guide Specification intent is to hold the construction contractor accountable as the "Engineer of Record", A-E must provide or show only that information required for the construction contractor to complete the design.

1.14.2 A-E ENGINEER OF RECORD

In some cases, “Engineer of Record” responsibility will not be transferred to the contractor along with the delegated design. In such cases, the A-E remains the “Engineer of Record” and must review the delegated design submittals. An example would be the ER 1110-345-53 STRUCTURAL STEEL CONNECTIONS requirement that delegated simple shear connections do not relieve the A-E of design liability.

1.15 A-E ACCOUNTABILITY

The A-E is accountable as the "Engineer of Record" for the entire design effort, excluding only those portions which are transferred to the construction contractor through standard Guide Specification language.

----END OF SECTION----