UFC 1-300-05A
16 January 2004

UNIFIED FACILITIES CRITERIA (UFC)

INSTALLATION SUPPORT

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UNIFIED FACILITIES CRITERIA (UFC)

INSTALLATION SUPPORT

U.S. ARMY CORPS OF ENGINEERS (Preparing Activity)

NAVAL FACILITIES ENGINEERING COMMAND

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

Record of Changes (changes are indicated by **1**\ ... /**1**/)

Change No.	Date	Location

This UFC supersedes TI 800-04, dated 3 August 1998. The format of this UFC does not conform to UFC 1-300-01; however, the format will be adjusted to conform at the next revision. The body of this UFC is the previous TI 800-04, dated 3 August 1998.

FOREWORD

\1\
The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD(AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the more stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Civil Engineer Support Agency (AFCESA) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content of UFC is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: Criteria Change Request (CCR). The form is also accessible from the Internet sites listed below.

UFC are effective upon issuance and are distributed only in electronic media from the following source:

- Whole Building Design Guide web site http://dod.wbdg.org/.

Hard copies of UFC printed from electronic media should be checked against the current electronic version prior to use to ensure that they are current.

AUTHORIZED BY:

DONALD L. BASHAM, P.E.
Chief, Engineering and Construction
U.S. Army Corps of Engineers

DR. JAMES W WRIGHT, P.E.
Chief Engineer
Naval Facilities Engineering Command

KATHLEEN I. FERGUSON, P.E.
The Deputy Civil Engineer
DCS/Installations & Logistics
Department of the Air Force

Dr. GET W. MOY, P.E.
Director, Installations Requirements and Management
Office of the Deputy Under Secretary of Defense (Installations and Environment)

TI 800-04
3 August 1998

US Army Corps
of Engineers®

Technical Instructions

Installation Support

Headquarters
U.S. Army Corps of Engineers
Engineering and Construction Division
Directorate of Military Programs
Washington, DC 20314-1000

TECHNICAL INSTRUCTIONS

Installation Support

Approved for public release; distribution is unlimited

Record of Changes (changes indicated \1\... /1/)
No. Date Location

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This Technical Instruction supersedes AEI, Installation Support, dated 17 October 1996.

FOREWORD

These technical instructions (TI) provide design and construction criteria and apply to all U.S. Army Corps of Engineers (USACE) commands having military construction responsibilities. TI will be used for all Army projects and for projects executed for other military services or work for other customers where appropriate.

TI are living documents and will be periodically reviewed, updated, and made available to users as part of the HQUSACE responsibility for technical criteria and policy for new military construction. CEMP-ET is responsible for administration of the TI system; technical content of TI is the responsibility of the HQUSACE element of the discipline involved. Recommended changes to TI, with rationale for the changes, should be sent to HQUSACE, ATTN: CEMP-ET, 20 Massachusetts Ave., NW, Washington, DC 20314-1000.

TI are effective upon issuance. TI are distributed only in electronic media through the TECHINFO Internet site *http://www.hnd.usace.army.mil/techinfo/index.htm* and the Construction Criteria Base (CCB) system maintained by the National Institute of Building Sciences at Internet site *http://www.nibs.org/ccb/.* Hard copies of these instructions produced by the user from the electronic media should be checked against the current electronic version prior to use to assure that the latest instructions are used.

FOR THE DIRECTOR OF MILITARY PROGRAMS.

KISUK CHEUNG, P.E.
Chief, Engineering and Construction Division
Directorate of Military Programs

US Army Corps of Engineers®
Headquarters

Architectural and Engineering Instructions

For

Installation Support

Second Edition

17 October 1996

Headquarters
U.S. Army Corps of Engineers
Directorate of Military Programs
Engineering Division
Washington, D.C. 20314-1000

TABLE OF CONTENTS

ARCHITECTURAL AND ENGINEERING INSTRUCTIONS FOR INSTALLATION SUPPORT PART I - GENERAL INSTRUCTIONS

1. GENERAL.

a. Purpose. These Architectural and Engineering Instructions (AEI) provides design and engineering elements of the U.S. Army Corps of Engineers (USACE) with policy and technical guidance for design of small projects (e.g., usually under $500,000, however some contracts can have a cumulative value of $3-4 million), including maintenance and repair type design and services projects supporting military installations.

b. Organization. This AEI is organized in five parts as follows:

(1) Part I - General Instructions.

(2) Part II - Construction Phase (Post Award) Services.

(3) Part III - Types of Support.

(4) Part IV - Types Of Contracts Available for Execution of Designs.

(5) Part V - Examples, Forms, and Sample Drawings.

c. Applicability. This AEI is effective immediately and applies to the design and engineering elements within the responsibility of the Director of Military Programs of all Major Subordinate Commands (MSC), District Commands, and other USACE Field Offices having Military Construction (MILCON) "technical product" responsibilities. Hereafter referred to as "Design Agency." This AEI does not apply to Civil Works elements of USACE.

d. Reproduction. Local reproduction of this AEI, or any subsequent editions, is authorized.

e. Second Edition. This AEI supersedes the First Edition, same title, dated 4 April 1996.

f. Proponent Office. This AEI will be periodically reviewed, updated, republished, and redistributed by the Architectural and Planning Branch, Engineering Division, Directorate of Military Programs, HQUSACE. The Champion for the Engineering Division is Mr. Stanley

Swofford, R.A., CEMP-EA, telephone DSN 763-0441 or COM (202) 761-0441; facsimile DSN 763-8815 or COM (202) 761-8815; Internet stanley.swofford@inet.hq.usace.army.mil. Recommended changes, along with the rationale for the changes, should be sent to HQUSACE, ATTN: CEMP-EA, 20 Massachusetts Ave., N.W., Washington, D.C. 20314-1000.

2. GUIDELINES FOR CUSTOMER CARE. The following guidelines should be used by design agencies when providing Installation Support:

a. Customer service is our currency.

b. Make the customer's problems ours and provide solutions.

c. Be exceptional at doing small and difficult jobs.

d. Provide total service.

e. Give the customer extraordinary assistance.

f. Be cost effective.

g. Be imaginative.

h. Keep communication with the customer open and informative.

i. Maintain frequent contact with the customer.

j. Know the needs and requirements of the customer.

k. Humor foibles (Overlook people's little weaknesses).

3. REFERENCES. The following references and additional information sources are available for use with this AEI.

a. Code of Federal Regulation (CFR), 10 CFR 435, *Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings*.

b. Code of Federal Regulation (CFR), 10 CFR 436, *Federal Energy Management and Planning Programs.*

c. Federal Acquisition Regulation (FAR).

d. Defense Federal Acquisition Regulation Supplement (DFARS).

e. Army Federal Acquisition Regulation Supplement (AFARS).

f. Engineer Federal Acquisition Regulation Supplement (EFARS).

g. Army Regulations.

(1) AR 415 series, including: AR 415-15, *Military Construction, Army (MCA) Program Development.*

(2) AR 420 series, including:

(a) AR 420-10, *Management of Installation Directorates of Engineering and Housing.*

(b) AR 420-46, *Water and Sewage.*

(c) AR 420-47, *Solid Waste Management.*

(d) AR 420-49, *Heating, Energy Selection and Fuel Storage, Distribution, and Dispensing Systems.*

h. DFAS-IN Regulation 37-1, *Finance and Accounting Policy Implementation*.

i. Installation Real Property Master Plans.

j. Local Installation Design Guide, if available.

k. Engineering Regulations.

(1) ER 1110-3-109, *Corps-Wide Centers of Expertise Assigned to Major Subordinate Commands and Districts*.

(2) ER 5-7-1 (FR), *Project Management.*

l. Engineering Pamphlet, EP 420-1-1, *Installation Support Handbook*

m. Tri-Services Draft TR CADD-95, *Tri-Services for CADD and GIS*.

n. Engineering Manual, EM 1110-1-1300, *Engineering and Design, Construction Cost Estimates*.

o. Engineering Circulars.

(1) EC 25-1-243, Tri-Service Center, Architectural, Engineering and Construction (A/E/C) Computer-Aided Design and Drafting (CADD) Standards.

(a) Part 1, Standards Manual.

(b) Part 2, Users Manual.

(c) Part 3, Systems Manual.

(d) Part 4, Cell Libraries.

(2) EC 5-1-49, *Corps-Wide Centers of Expertise*.

p. *Architectural and Engineering Instructions (AEI), Design Criteria*, latest edition, and the criteria documents referenced therein.

4. BACKGROUND.

a. Conventional Process. The conventional project development process normally used to prepare contract documents for large MILCON installation projects, can be unnecessarily costly and time consuming when applied to small projects. The process for scoping, designing, and awarding of small Installation Support projects should not be the same as for a MILCON project.

b. Re-engineering Process.

(1) The need to reduce time and cost, and improve quality and customer satisfaction for small Installation Support projects requires that USACE re-engineer the entire process. Despite the current shortfall in funds and resources, design agencies must continue to dedicate their resources for Installation Support and forge close and responsive working relationships with installation Directors of Public Works (DPW).

(2) The Installation Support process provided in this AEI dramatically reduces production

efforts and costs and helps the design agency develop clear, concise, and simplified documents. These new procedures encourage designers to use minimum sized paper; simple design details, abbreviated specifications; and photocopying machines, graphic scanners, photographic drafting, digital imaging, and color printers (when appropriate).

(3) The possible uses of this AEI are wide and far-reaching with the only limitations being imagination, management, customer support, applicable Public Laws, and the FAR. **This flexibility must be used to develop new and innovative ideas to reduce the cost of design, construction, and services to our customers. These new ways of doing business must be shared with other USACE team members.**

c. Support. Important to the success of Installation Support is the support of management both in the design agency and military installations, design agency operating procedures tailored to Installation Support, and teamwork with the customer and within the design agency.

5. INSTALLATION SUPPORT AND DESIGN TEAMS.

a. General.

(1) USACE Design Champions for Installations Support (DCIS). This team was established to improve design and engineering support for military installation customers (See Part V, Enclosure 1 for the implementing memorandum.). This team is comprised of design and engineering representatives from each of MILCON MSC, District Command and HQUSACE. Each USACE DCIS team member should coordinate continuously with his or her counterpart in the Installation Support channels of his or her MSC or District Command, and provide input to the HQUSACE Champion member. This coordination and input by the USACE DCIS team members will provide a continuous source of energy to revitalize the Installation Support process. The HQUSACE Champion will establish a USACE Installation Support Network so that innovative ideas and success stories can be shared electronically.

(2) Operating Procedures. The establishment of Installation Support operating procedures tailored to the design agency and teamwork with the customer will assist in the success of the program. Installation Support efforts must be a continuous effort; from inception to the end of service. Each design agency should develop and publish Installation Support operating procedures or general guidelines that will minimize the cost and time for the delivery of services and products to the customer while maintaining a high level of quality. These operating procedures should include project management, engineering, construction, contracting, resource management, and counsel.

b. Design Team Concept. This concept also applies to non-design work (e.g., master plans,

engineering studies, privatization studies, etc.) performed by the engineering elements of the design agency.

(1) Alternative One. A project design team can be established for each Installation Support project. The design team should consist of all of the technical disciplines needed to complete the design of a specific project. In some cases, this may require one, two, or three technical disciplines and in other cases, all technical disciplines may be required. A design team leader will be appointed for each design team and each member of the team must understand the objectives of the project, and work under the direction and guidance of the design team leader. The design team leader must coordinate and verify all external design team requirements with the project manager. See ER 5-7-1 (FR), for the role of the project manager regarding installation support.

(2) Alternative Two. One Installation Support design team can be established for all Installation Support projects in a design agency. This design team should consist of all of the technical disciplines required for Installation Support. For each Installation Support project, the required technical disciplines and design team leader will be selected from the Installation Support design team. This team will operate the same as the project design team in Alternative One above.

(3) Alternative Three. This design team can operate in the same manner as the project design teams in Alternatives One and Two, except that the design team leader will always be the same for all Installation Support projects.

(4) Goals.

(a) The goal of the design team regarding facilities is to provide facilities which are functional, operational, durable, economical, sanitary, and safe; are aesthetically pleasing; are readily constructable with a minimum of cost growth during construction; are easily operable after occupancy; are maintainable at a reasonable cost; and, exceed all customer expectations and requirements, including those with respect to criteria, budget, timeliness, and quality.

(b) The goal of the design team regarding services, including Operational and Maintenance (O&M) activities and products, is to provide services and products to military installations that are readily available at a reasonable cost, and exceed all customer expectations, and requirements, including requirements with respect to performance and quality.

(c) The goal for both, the design team and the district team regarding facilities, services, and products should also include exceeding the customer's expectations and requirements on warranty follow-up and providing all maps, manuals, drawings, and technical data at the final or within three months of the turnover.

(5) Design Team Members and Responsibilities.

(a) Each member of the team should apply his or her design knowledge to the project and integrate his or her responsibility with other design team members to satisfy the overall objectives of the project. This guidance is also applicable to investigations and studies.

(b) The design team should work in concert with construction, services activities (e.g., training for installation staff) and the customer to establish an overall understanding and procedure that is responsive to the customer's needs and that the design, construction, and services activities can follow to streamline the process to investigate, study, design, and construct the project.

(6) Design Team Leader.

(a) Each Installation Support project must have a design team leader responsible for the design and coordination among the design team members, with the project manager (see ER 5-7-1 (FR), for the role of the project manager regarding installation support), and the customer, as well as construction, counsel, resource management, and contracting. The interrelationships of the technical disciplines will vary with the responsibilities that will be established for each project.

(b) As stated above, some projects will involve more than one technical discipline, and in those cases, the selection of the design team leader should depend on the predominate technical discipline. For example, a project dealing primarily with the architectural discipline should have an architect as the leader. Whereas, a project dealing primarily with the electrical engineering discipline should have an electrical engineer as the leader. Design team leaders should also possess leadership and communication skills. This guidance is also applicable to O&M projects. This guidance is not applicable if Alternative Three above is selected.

c. Centers of Expertise. Some of the Centers of Expertise listed in ER 1110-3-109 and EC 5-1-49 have contracts in place to provide services under their purview. The U.S. Army Center for Public Works (CPW), which is not listed in either, ER 1110-3-109 or EC 5-1-49, also has contracts available in most technical areas including some specialty areas. In some cases these contracts provide a variety of options ranging from planning and site surveys to turnkey installation of equipments. Any design agency can use these contracts to expedite Installation Support. Availability of existing contracts can be determined by contacting the CPW (Mr. Fred Reed, CEPW- FM, telephone (703) 428- 6358) or the appropriate Center of Expertise listed in the referenced ER and EC.

6. INITIAL PLANNING.

a. General. In the initial planning stages, the design team should evaluate the type (e.g., service, product, design, and/or construction) and complexity of the project to determine if the Installation Support process would be applicable. If the process is applicable, then the design team needs to determine the type of Installation Support method, including the use of "in-house" design support, which is most appropriate. The design team must work closely with the project manager when making these determinations so that the project manager can provide guidance to the design team.

b. Project Approval. The installation commander or the DPW must sign the project approval documentation (e.g., DD Form 1391 or DA Form 4283, *Facilities Engineering Work Request.*). This is necessary to comply with the requirements of AR 420-10, and to classify the work properly where some or all of the work may be classified as minor construction. The DPW has the responsibility for project approval and work classification, regardless of the source of funds.

c. Project Budgeting. The project must conform to applicable ARs, and any other pertinent regulations that cover Installation Support project budgeting. Working closely with the design agency project manager and the resource management specialists can help in assuring that the project complies with the applicable regulations.

d. Communications. The customer should be involved at all stages of project development and design. A meeting should be held with the customer at an early stage to determine the requirements of the project. Customer input is crucial in establishing accurate requirements so that misunderstandings and subsequent costly modifications during contract administration are avoided. Accurate requirements translate into quality services or products and/or design and construction. The customer should get what they want unless it is in violation of public law, federal procurement regulations or other mandatory requirements. The design agency should be aware of the customer's stockage (types of materials on hand) and usage requirements (e.g., frequency and type of use) and/or problems.

e. Typical Scope of Work (SOW) for Architect-Engineers (A-E) Contracts. A SOW is an important part of the initial planning. The SOW should be standardized with examples of the requirements to be given to the A-E as guidance on the type of design process they will be doing and the type of procurement process to which their design will be submitted. A typical example may include an information paper, letter size Computer-Aided Design and Drafting (CADD) drawings, and a SOW. More than one typical SOW may be needed to cover the vast range of services required under Installation Support.

f. Site Planning.

(1) Survey Information. Prior to the initiation of detailed project development, the design team should have a meeting with the customer at the project site to ensure the appropriate use of the Installation Support process. This survey should include, but not be limited to:

(a) Identifying the customer (s).

(b) Identifying the customers' requirements and expectations.

(c) Clarifying the SOW and services, products and/or design requirements, including a thorough review of the DD Form 1391, if applicable to the type of project, DA Form 4283, type of funds required, verifying approval limits, obtaining as-built/record drawings and documents, and other planning data.

(d) Determining the extent of investigation required, to include a deficiency tabulation, and to resolve technical problems such as structural damage; seismic, adequacy of utilities, fire protection deficiencies, corrosion; extent of modifications to electrical, plumbing and HVAC systems; and similar conditions, if applicable to the type of project.

(e) Determining the requirement for a security survey. Coordination with the installation security officer to assure that all physical and electronic security and antiterrorism concerns are incorporated into the siting and facility design, if applicable to the type of project.

(f) Resolving engineering environmental issues such as the presence of lead base paint or friable and non-friable asbestos, contaminated soil, the extent of environmental surveys required, if any, and the need for infrared, x-ray or other types of surveys of roofs, if applicable to the type of project.

(g) Determining the project cost including the design effort required and costs, and an estimate of the construction costs, if design and construction are required for the type of project.

(h) Determine the customers' funds availability and budget for the project.

(2) Importance of the Survey. Sound and early planning are important between the design team and the customer so that unnecessary effort and costs are reduced and so that the customer is provided a satisfactory product. For maintenance and repair projects, major design modifications are often required late in project development because poor initial site investigations do not reflect the true conditions of existing structures. Removal work by the building contractor often results in numerous unforeseen site conditions that are not shown on the as-built/record drawings. One way to reduce redesign costs and additional construction costs is to perform a thorough site investigation and deficiency tabulation with photographs, using digital cameras

when possible.

7. QUALITY ASSURANCE.

a. Mandatory Requirements. Design agencies preparing Installation Support contract documents are responsible for ensuring that the quality and details of the documents meet all applicable Public Laws, Executive Orders, FAR, DFARS, AFARS, EFARS, CFRs (e.g., 10 CFR 435 regarding energy related issues and 10 CFR 436 regarding cost effective designs), DoD directives and instructions, Army regulations, fire and life safety codes, and the customers' needs. Using the *AEI, Design Criteria* (see Paragraph 12), the Corps of Engineers Guide Specifications (CEGS), and the Corps of Engineers Abridged Guide Specifications (CEAGS) facilitates compliance with all mandatory requirements. However, the *AEI, Design Criteria*, the CEGS, or the CEAGS are not mandatory references for Installation Support work.

b. Simplicity and Quality. Simplicity and assurance of quality must be achieved for each project. However, design agencies are cautioned that over-simplification of contract documents can result in the omission of important details that could increase the cost and the amount of change orders during contract administration. An incorrect project SOW (e.g., over or under scope) can also increase the cost and the amount of contract modifications during contract administration.

8. PROJECT DRAWINGS. Each project is different in scope and/or requirements. Therefore, the number of drawings will vary. There is no standard number of drawings for a particular project. When preparing design documents using the Installation Support process, experience has shown that a typical drawing package may contain some, but not all, of the following types of drawings. These drawings should be combined, if possible, to keep the total number of sheets to a minimum. Again, local variations are authorized and encouraged based on the practices in each design agency.

a. Title Sheet with Revision, Signature and Approval Blocks, and Schedule of Drawings.

b. Location Map and Site Plan.

c. Scope of Work.

d. Demolition Plan.

e. Foundation Plan.

f. Floor Plans.

g. Roof Framing and Roof Plans.

h. Door and Window Schedules.

i. Exterior and Interior Finish Schedules.

j. Building Elevations.

k. Building and Wall Sections.

l. Photographs (Indicate where photos were taken).

m. Standard Details.

n. Structural Drawings.

o. Mechanical Drawings.

p. Electrical Drawings.

q. Plumbing Drawings.

r. Miscellaneous Details.

9. DRAWING PRODUCTION (If Applicable).

a. General. Normally, title sheets, schedule of drawings, or revision sheets are not required for projects with four or less sheets of drawings.

b. Title Sheets and Schedule of Drawings. Title sheets should provide signature and approval blocks for the responsible government officials in the design agency and at the military installation representing the customer and a schedule of drawings if appropriate.

c. Drawing Numbers. Consecutive sheet numbers in a circle (ring numbers) should be provided in the lower right corner of each drawing sheet, except the title sheet and schedule of drawings. Location codes, prefixes, and drawing numbers should be in accordance with local design agency practices.

d. Schedule of Drawings. The schedule of drawings should have a description of drawings including, drawing and sheet numbers, ring numbers, and revision status. This information should be inserted in accordance with local design agency practices. Avoid using words like "minimum" or "maximum" to describe work.

e. Revision Sheets. Revision sheets should be used to list all revisions to the drawings in accordance with local design agency practices. The revision sheets should show the sheet number, revision letter designation, zone, description, date, and initials of the person making the revision and the checker.

f. General Notes. General notes should provide instructions and clarifications to the contractor. Narrative descriptions should be used to identify, quantify, and specify the work.

g. Pre-Printed Drawing Sheet Sizes.

(1) The most economical sizes of pre-printed drawing sheets are copying machine sized drawings metric sheet size A4, 210 mm x 297 mm (8-1/2”x11”) , or A3 297 mm x 420 mm (11”x17”). These drawings serve as a handy reference for the designer at the job site. Copying machine size drawings should be used to the maximum extent possible.

(2) For small projects, especially when using the Simplified Acquisition Procedures (SAP) method (see Part IV, paragraphs 2.a and 2.b), copying machine letter-sized drawings metric sheet size A4, 210 mm x 297 mm (8-1/2”x11”) may be used if this size drawing provides sufficient space for the information that should be given to the contractor. The letter-sized drawings may be attached directly to the technical provisions. A document that includes both drawings and technical provisions is very handy at the project site.

(3) Design agencies are encouraged to develop their own set of standard Installation Support drawings to meet local design agency practices. **Design agencies are also encouraged to share their Installation Support standard drawing sheets, standard details, formats, documents, and lessons learned with other design agencies and HQUSACE (CEMP-EA).**

h. Production.

(1) Drawings can be drafted by hand, done free-hand, prepared by Computer Aided Drafting (CAD), or produced using a combination of methods. With the advent of Computer-Aided Design and Drafting (CADD), the process for standard sheets and standard details can be economically automated to reduce time and cost.

(2) The use of Personal Computers (PC) to generate hardware schedules, window

schedules, door schedules, and details should be considered. (Note: The PC should also be considered when using the "short" or abbreviated form of specifications. See paragraph 14 below.)

(3) CADD should be employed for most projects. However, legible free-hand drafting and lettering may be necessary to expedite projects. Care should be taken to ensure that the size of the lettering can be read when the original is photo-reduced.

(4) The use of the stick-on method (details drawn on Mylar or paper with adhesive backing) to transfer details from other projects is encouraged when CADD is not appropriate. This method will reduce the drafting effort and costs.

10. STANDARD DETAILS.

a. CADD Reference Files. Currently, the Tri-Service CADD/GIS Technology Center is sponsoring an initiative to prepare and maintain active reference files and generic details. The center is located at the USACE Waterways Experiment Station, ATTN: CEWES-IM-DA, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199. Design agencies are encouraged to participate in this effort.

b. Tri-Service Center, Architectural, Engineering and Construction (A/E/C) Computer-Aided Design and Drafting (CADD) Standards (EC 25-1-243). This manual sets standards that provide a consistent and compatible platform for CADD system use throughout USACE. The uniform CADD platform provides a means for rapid and accurate transfer and integration of most project-related information throughout the life cycle of the facility, regardless of the CADD system used. Included in the manual are graphic standards, discipline specific cell libraries, description of deliverables, and data exchange formats. This manual is applicable to all HQUSACE elements, MSC and design agencies, and should be used to the maximum extent practicable under the Installation Support process. Additionally, it is critically important that the CADD products produced are compatible with the customers' CADD needs, systems, and standards.

c. Design Agency Standard Details.

(1) Each design agency should consider developing a standard set of details, unique to that design agency, that could be used with Installation Support contracts. **Design agencies are encouraged to share their Installation Support standard details with other design agencies and HQUSACE (CEMP-EA).**

(2) The standard details should be stored in CADD or PC format for ease of usage. A

method for obtaining CADD or PC details should be included in the SOW for A-E contractors. The SOW should include submittal of details that the A-E developed during a design contract.

11. DRAWING REPRODUCTION.

a. Photocopying Machine.

(1) The use of photocopying is one key to simplifying the Installation Support process. As-built/record drawings for location maps, site plans, and building drawings should be photo reduced to copying machine sized drawings metric sheet size A4, 210 mm x 297 mm (8-1/2”x11”) or A3 280 mm x 430 mm (11”x17”) and used as contract drawings, provided they are legible and accurate when reproduced.

(2) Another way to simplify the process is to use existing floor plans, exterior elevations, and cross-sections photographs reduced to copying machine sized drawings metric sheet size A4, 210 mm x 297 mm (8-1/2”x11”) or A3 280 mm x 430 mm (11”x17”) to show the annotations (e.g., modification work, repair work, and/or maintenance work) by pencil/pen and ink changes and notes.

(3) When floor plans, exterior elevations, and cross-sections are photo reduced, a graphic scale should be included on the drawings to show the reduction so that the dimensions can be “scaled off” if necessary.

b. Scanning. An alternative to the photocopying machine is the graphic scanner and CADD system. Scanned drawings of existing location maps, site plans, and buildings as-built/record drawings can often be reused quickly and effectively. The quality of the final drawings will often depend on the quality of the drawings being scanned. If necessary and appropriate for fast turnaround, scanned drawings can be vectorized and modified on CADD.

c. Photographic Drafting. The use of photographic drafting should be maximized whenever possible. Photographic drafting provides instant visual information for the contractor, cost engineers, and design agency field personnel. Photographic drafting can reduce disputes and claims by contractors because photographs superbly portray original conditions.

(1) Photographs of existing conditions can be reproduced by a photocopying machine and notes can be added to the photographic drawings to provide instructions for the required work. Since the photographs will not be to scale, dimensions may have to be provided on the photographic drawings and/or additional drawings may have to be prepared, depending on the required work.

(2) The location of where each photograph was taken should be shown on a site plan or floor plan as applicable.

d. Digital Imaging (if available). Digital imaging may be used in lieu of photographic drafting. The use of digital images can eliminate film processing time, improve printed image quality, and reduce the effort required to produce photographic drawings.

(1) Like photographic drafting, digital images can be used to show existing conditions and provide instructions for the required work. The location of each image should be shown on a key plan for reference.

(2) Digital imaging involves three phases:

(a) First, the digital images are "captured" with a digital camera or a graphics scanner;

(b) Second, the digitized images are transferred to a PC or CADD workstation for viewing and editing in appropriate graphic standard formats; and

(c) Third, the images are printed on copying machine sized drawings metric sheet size A4, 210 mm x 297 mm (8-1/2”x11”) or A3 280 mm x 430 mm (11”x17”).

(3) Other advantages of digital images include:

(a) Storage of the image files on a network or CADD server.

(b) The ability to send and receive entire design packages electronically by Fax or E-Mail.

e. Color Printouts. Color printouts can add a new dimension to photographic drawings, utility drawings, graphics, and digital images. Colored photographs, graphics, and digital images are useful in communicating paints (colors, textures) that are needed to match existing interior and exterior building conditions. In addition, color-coded utility lines can often add clarity to utility drawings. Use when feasible!

f. Clarification of Photographs and Digitized Images.

(1) Lighting. Clarity of the final reproduced photographs, both conventional film photographs and digital images, often depends on the quality of the original photograph or image. Although correct lighting is always desirable in photographs, it may not always be available even

with a flash. For conventional film photographs, care is needed during picture taking and reproduction to ensure clarity in the final reproduced product. Insufficient or excessive lighting may diminish the clarity of a photograph by making the photocopies too dark or too light. A major advantage of digital imaging is the ability to modify or edit images to correct for lighting. This can be accomplished after the image is captured using PC software.

(2) Digital Cameras. Economical point and shoot digital cameras (some under $500) with adequate image resolution are available now. Some camera models come with Liquid Crystal Display (LCD) screens that allow immediate viewing of captured images. This can help in determining whether an image may or may not be adequate for photocopying before returning to the office.

(3) Reduce Travel Costs. In order to reduce travel costs to remote locations, consideration should be given to have resident offices purchase digital cameras. The images can be transmitted electronically to the designer's PC and workstation.

12. DESIGN CRITERIA AND ANALYSIS (if applicable). Designs should comply with the *AEI, Design Criteria* (when applicable) and pertinent regulations, including AR 415-15. Additionally, for utility systems, designs should comply with all applicable regulations, including AR 420-46, AR 420-47, and AR 420-49. For energy related issues refer to Federal Regulation 10 CFR 435. For cost effective design related issues refer to Federal Regulation 10 CFR 436.

a. General. Design analyses should be complete and kept to the minimum necessary to ensure the adequacy of the design.

b. Renovations and Replacements. The design analysis should reflect the customer (s) articulated needs and desires. When applicable, the design analysis will also substantiate that all building components and systems, renovated or replaced, will be upgraded or replaced to comply with the latest, life cycle, cost-effective technologies, where technically feasible for the application at hand. Additionally, renovated and replaced components and systems must be upgraded or replaced to comply with all applicable, life safety, environmental, fire protection, energy and water conservation, seismic, accessibility, and similar standards, laws, and regulations. The *AEI, Design Criteria* is recommended as the primary source of reference to identify current, applicable standards, laws, and regulations. For existing interrelated systems, such as Utility and Monitoring and Control Systems (UMCS), HVAC control systems, and telecommunication systems, replacement components and systems should be compatible, where technically and economically practicable.

c. Standard Design Analysis Sheets. Standard design analysis sheets should be developed by each design agency for use with the Installation Support process. The Installation Support

design analysis should provide the following as a minimum:

(1) The project description.

(2) The project location.

(3) The programmed amount (if applicable).

(4) Funding sources and expiration date of funds.

(5) Identify those funds that could be returned for new use, if not used for stated purpose.

(6) Work classification and type of funding.

(7) Scope of Work.

(8) Minutes of conferences with the customer.

(9) Predesign memorandums and correspondences.

(10) Applicable design criteria.

(11) Results of the site investigation.

(12) Demolition and disposal sites.

(13) Environmental and utilities coordination.

(14) Project phasing requirements.

(15) Materials standardization requirements.

(16) Government Furnished Information (GFI), Government Furnished Materials (GFM), and Government Furnished Equipment (GFE).

(17) Outline of specifications (if applicable).

(18) Pertinent and abbreviated discipline analysis computations (if applicable).

(19) Applicable building codes.

(20) Project approval documentation (e.g., DA Form 4283, DD Form 1391, if applicable).

(21) Any additional back up documentation required.

d. Checklists. Design agencies are encouraged to maximize the use of checklists. A typical example is the "Fire Protection Checklist for U.S. Funded Projects" developed by the Japan District. This checklist identifies repetitive types of deficiencies (e.g., appropriate funding, appropriate architectural hardware for doors) in a simplistic "yes and no" format.

13. SPECIAL STUDIES (if applicable). When using the Installation Support process, the number and extent of special studies should be kept to a minimum. For example, special energy conservation and life cycle cost studies are not required if a project provides for the re-roofing of a building, painting the exterior walls, and the caulking of existing windows only. Each project should be analyzed to determine which special studies are absolutely required. However, recognized that there is a risk of overlooking some life cycle cost savings if studies are determined to be unnecessary too readily.

14. SPECIFICATIONS.

a. General. Installation Support specifications should be concise, and describe only the minimum requirements necessary to obtain the desired materials, services, and level of quality required. Specifications should reference industry standards whenever possible as the briefest way to adequately define project requirements for products and services. To speed up contract administration, requirements for contractor submittals (e.g., such as shop drawings, test reports, and certificates) should be minimized to the extent possible with the concurrence of the design agency Construction Division and the installation customers.

b. Trade (Brand) Names and Proprietary Items. Generally, materials, systems, equipment, and methods should be specified by reference to industry standards in a way that does not unnecessarily restrict competition. When adequate industry reference standards are not available, project specifications may be developed using proprietary and brand name Aor equal" descriptions in accordance with DFARS 210.004 (b) (3). This option should be considered early in the design process and **only** after close coordination, and approval by, contracting and counsel.

c. Format. Installation Support specifications should be printed either on copying machine sized drawings, metric sheet size A4, 210 mm x 297 mm (8-1/2@x11"), or directly on the project drawings, as appropriate. The use of personal computers should be considered for developing, editing, storing, and retrieving specification information to reduce the time and cost of

specification preparation.

d. The Corps of Engineers Abridged Guide Specifications (CEAGS). The CEAGS are developed and maintained by HQUSACE and are intended for small projects, minor elements of large projects, and maintenance and repair projects. These documents are a condensed version of the Corps of Engineers Guide Specifications (CEGS) and are well-suited as guides for use in developing Installation Support project specifications. There are two official media for distributing all HQUSACE MILCON guide specifications: *TECHINFO* and Construction Criteria Base (CCB).

(1) TECHINFO. TECHINFO is a computer-based construction criteria information system that is managed by the U.S. Army Engineering and Support Center, Huntsville. The system is designed to facilitate the flow of information to and from USACE technical users and contains the most current editions of guide specifications and HQUSACE design and engineering criteria documents. *TECHINFO* may be accessed through the USACE Home Page on Internet (located at http://www.usace.army.mil) or by dialing the system data line at (205) 895-1799 via a personal computer and modem. *TECHINFO* questions may be addressed to the system operator, telephone (205) 895-1826.

(2) Construction Criteria Base. Construction Criteria Base (CCB) is a Department of Defense sponsored compact disk-read only memory (CD-ROM) system distributed by the National Institute of Building Sciences (NIBS). In addition to the guide specifications, CCB contains HQUSACE design and engineering criteria and standards, and criteria and guide specifications issued by other military departments, Federal agencies, and private industry. The CCB CD-ROM is updated and issued quarterly, and is available on a yearly subscription basis. CCB information may be obtained from HQUSACE (CEMP-EA), telephone (202) 761-1203.

15. SPECIAL CONTRACT REQUIREMENTS. The design agency should determine whether special contract requirements, instructions, conditions and notices to offerors, or any other statements can be referenced in the solicitation. This option should be considered **only** after close coordination with, and approval by, customer(s), construction staff, contracting and counsel.

16. COST ESTIMATES.

a. Cost Engineers. The role of the cost engineers in the success of the Installation Support process is very important. The cost engineer may, when preparing his or her detailed estimate, identify design and constructibilty issues (from a cost engineering perspective) while preparing his or her unit prices and reviewing the associated scope. Potential design and construction pitfalls should be reported to the design team leader.

(1) Scope. The cost engineer is required to ensure that the proper scope is reflected in all the estimates, that the scope and work classification described in the DA Form 4283 or the DD Form 1391 (if applicable to the type of project) is accurately reflected in the final cost estimate. Deviations from funds available should be reconciled with the project scope prior to advertizing or negotiating. Deviations should be reported to the design team leader who will then coordinate with the project manager. See ER 5-7-1 (FR), for the relationship between the project manager and design and engineering elements of the design agency.

(2) Funds Available or Program Amount (PA). Cost engineers are required to know the amount of funds available for the project they are estimating; whether a budget estimate was prepared, or a DD Form 1391 with a PA, or an O&M project with a funding line. Projects with costs above funding limitations or PA cannot be either advertized or negotiated. The Government estimate should remain within funding limitations.

(3) Unit Cost. Unit costs within the body of the estimate should reflect the type of estimate being prepared. JOC type contracts should reflect unit costs found in the negotiated contract. Where cost data are not available through previously negotiated or in place contracts, the procedures developed in EM 1110-1-1300, should be closely followed in developing unit costs. Final costs should reflect all burdens required by a prudent contractor in the normal accomplishment of his or her work (e.g., profit and overhead).

b. Required Adjustments. Design agencies should look at how cost estimating will be affected by the Installation Support approach, and adjust their internal procedures and methods to reduce estimating time and costs without reducing quality or compromising the Government estimate. The cost engineer must use the most appropriate tools and the simplest methods for preparing an estimate. From spread sheets to TRACES parametric, to MCACES, the estimator must select the methodology that will provide the best product in a timely and economical manner. "DO NOT DO BUSINESS AS USUAL." The MCACES/TRACES cost estimating method should not be excluded nor is it a mandatory requirement for use in Installation Support type contracts. Use as appropriate!

(1) A simple informal estimate is required for a small project with an amount of less than $100,000 (using Federal Acquisition Computer Network (FACNET), which can be issued under a Purchase Request and Commitment (PRC) or other Simplified Acquisition Procedures (SAP). The purpose of the estimate is to evaluate the contractor's bid in terms of reasonableness.

(2) A Government Estimate (a signed formal estimate) is required for projects with construction costs exceeding $100,000. It can be issued under an Invitation for Bid (IF) or Request for Proposal (RFP).

c. Point of Contact (POC). The POC for additional information on cost estimates is Mr. Ronald Hatwell, CEMP-EC, COM (202) 761-1240 or DSN 763-1240; facsimile COM (202) 761-0999 or DSN 763-0999; Internet ronald.hatwell@inet.hq.usace.army.mil.

ARCHITECTURAL AND ENGINEERING INSTRUCTIONS
FOR
INSTALLATION SUPPORT
PART II - CONSTRUCTION PHASE (Post Award) SERVICES

1. ENGINEERING DURING CONSTRUCTION AND SHOP DRAWINGS. One of the keys to achieving quality is to assure sound architectural and engineering surveillance during construction and shop drawing reviews. The design team must be in very close coordination with construction, contracting, resource management, project management (funding issues), and the customer (s) to obtain their concurrence and approval when doing engineering during construction and shop drawing efforts that are discussed below.

a. Shop Drawing Submittals. The design team should evaluate specific systems, especially those related to issues such as fire protection, roofing, and HVAC, to require submittal of shop drawings. This must be done prior to Invitation For Bids (IFB) on a construction contract.

b. Continuation of Design. The design team should determine issues to be reviewed as a continuation of design during construction (e.g., automatic sprinkler systems and structural steel fabrication). Shop drawing review for HVAC requires detailed surveillance. Roofing is another system requiring shop drawings to assure that documents correctly address problems related to substrate repair, release of trapped moisture, and types of roofing. This must be done prior to IF on a construction contract.

2. AS-BUILT/RECORD DRAWINGS. The following options should be considered for maintaining as-built/record drawings. The design team members must be in very close coordination with the customer, construction, contracting, and project management to obtain their concurrence and approval when providing as-built/record drawings efforts that are discussed below.

a. Scanning Images or Stick-on Method. When a project involves the maintenance and repair of a small building or part of a large building with floor plans and exterior elevations at a scale of 1:100, then the as-built/record drawings can be transferred to large scale drawings by scanning images when a CADD system is employed or by the stick-on method.

b. Photocopying Machines and Scanners. For large buildings requiring photo enlarged plans and exterior elevations, the project drawings can be enlarged to conventional drawing sizes by use of the photocopying machine and a scanner. This method is dependent on the quality of the project drawings.

c. Photographic Drafting (if required). After completion of a project, photographs of the new work could be taken and included with the as-built/record drawings. This process should be employed for all projects utilizing photographic drafting.

d. CADD Drawings. When plans are developed using CADD, conventional drawing sizes can be reproduced for the as-built/record drawings.

e. Storage Procedures. As-built/record drawings storage procedures should be determined by the customer.

3. OPERATIONS AND MAINTENANCE (O&M) MANUALS. The applicability and the issue of whether or not to provide and/or maintain operations manuals should be addressed for each Installation Support project. The design team members must coordinate closely with the customer, and the project manager (funding issues) when performing O&M manual efforts. O&M manuals should be included in the cost estimates of all projects for which an O&M manual is deemed necessary. An overall systems manual should be prepared that consolidates the information from each O&M manual. This systems manual effort also requires the design team to coordinate closely with the customer, project manager, and the CPW representative when appropriate.

4. MAINTAINABILITY OF FACILITIES. The maintainability of facilities should be addressed for each Installation Support project that involves a facility. The design team members must be in very close coordination with the customer and the project manager (funding issues) to obtain their concurrence and approval when performing maintainability of facilities efforts. The maintainability of facilities should be included in all cost estimates of projects when maintaining facilities is applicable.

ARCHITECTURAL AND ENGINEERING INSTRUCTIONS FOR INSTALLATION SUPPORT PART III - TYPES OF SUPPORT

1. GENERAL.

a. Available Tools. In support of the Chief's re-engineering initiatives to improve support to military installation customers, every available tool should be used by USACE for Installation Support. The design team members must be in very close coordination with the customer, contracting, construction, project management, resource management, and counsel in determining how to meet customer needs.

b. Funding. Support to customers is funded in two ways: direct or reimbursable. Normally, direct funds are issued by higher headquarters for major items of work, such as MILCON projects. A very large part of customer orders, however, are accomplished on a reimbursable basis, normally by way of a Military Departmental Purchase Request (MIPR) from the customer directly. This latter process requires that the design agency use its own funds, then bill the customer for reimbursement. There are several alternatives to this process, such as direct citing (obligates the customer's account) the customer's account and advance billings. Design team leaders should be sensitive to the fact that both the amount and the timing of the availability of customer funds may influence or dictate how and when the work can be accomplished. Therefore, it is advisable that the funding arrangements be settled during the early discussions with the customer, to ensure the "right" funds, in the "right" amounts are received at the "right" time.

2. TYPES OF SUPPORT.

USACE can provide a broad range of design support to military installations. This support can be divided into three types as summarized below. Certain specific methods and/or contract types for providing this support are discussed in more detail later.

a. Planning and Studies. Typical services include real property master planning, preparation of DD Forms 1391, engineering investigations and feasibility studies, economic analyses, space planning, maintenance and repair project scopes and cost estimates for DPW work management data base, and digitizing of installation or base maps. This work can be accomplished with design agency in-house personnel and/or Architect-Engineer (A-E) firms. If performed by A-E, the services are typically procured by either a Firm-Fixed-Price (FFP) contract for that particular work or an order under an A-E Indefinite Delivery Contract (IDC). FAR 36.6, and the corresponding DFARS, AFARS, and EFARS provide the policy on procuring A-E services; FAR

16.2 provides the policy on FFP contracts; and FAR and EFARS 16.5 provide the policy on IDC.

b. Design of Projects. Design agencies can design, contract, and manage maintenance, repair or minor construction projects which are installation funded. Whenever possible, the Simplified Design Methods (SDM) should be used to prepare Installation Support designs. This work can be accomplished with design agency in-house personnel and/or A-E firms. Typically, the A-E services are provided using an order under an IDC. However, a FFP A-E contract may be used if the work is highly specialized or exceeds the monetary limitations of an IDC.

c. Preparation of Specifications for Contracts to Support Installation Operations. Design agencies can develop technical specifications for a variety of contracts to support installation operations, such as:

(1) Job Order Contracts (JOC) for small repair and renovation projects. JOC Guide, AFARS, and EFARS 17.90 provide the policy on JOC.

(2) Contracts for janitorial, grounds maintenance, facilities operation, and testing toxic materials; operating Government-owned equipment, facilities, and systems; routine recurring maintenance of real property; dismantling, or removal of buildings; and other real property structures, etc. These contracts are either construction or service depending upon the nature of the particular work. FAR Part 37 provides the general policy on Service Contracts.

(3) A variety of contract types can be used depending on the nature of the services, such as:

(a) Firm-Fixed-Price (FFP).

(b) Requirements Contracts (RC) (see FAR 16.503) for facilities maintenance (housing maintenance, roofing, painting, paving, asbestos removal, carpeting, etc.) and repair.

(c) Time and Materials (T&M) contracts (see FAR 16.601).

(d) Indefinite Quantity (IDQ) contracts (see FAR 16.504). Design agencies can procure the basic IDQ contract in accordance with the installation's requirements.

3. SIMPLIFIED DESIGN METHODS (SDM).

a. Description.

(1) The AEI for SDM, dated 22 January 1990, is superseded by this AEI and the SDM

AEI has been included in these instructions.

(2) SDM has been used successfully for maintenance, repair, and minor construction projects. SDM is a streamlined approach to planning, development of construction specifications for various projects including, but not limited to, maintenance and repair projects. The strength of SDM compared to conventional methods is that SDM simplifies design analysis, design documentation (including drawings and specifications), and contract methods. (See Part V, Enclosure 2 for an example.)

(3) Not all maintenance and repair projects, or minor construction projects, are simple and therefore are not always suitable for SDM. Complex and large-scale facilities, such as a large aircraft hangar requiring extensive repair of the structure, HVAC, electrical, and fire protection, may not be suitable for SDM.

(4) SDM is not based on a unit price schedule but on the project cost estimate. For example, conventional Requirements Contracts (RC) are sometimes used to retrofit repetitive type work where the design "dove-tail" with the conditions. For unique projects, SDM should be used to provide contract requirements with supporting design and installation details. SDM is a different way to prepare the plans and specifications. Implementing SDM does not change the preparation of the cost estimate. Cost estimates for SDM should reflect the simplicity of design. Estimates should be developed individually and be based mostly on quotes from local manufacturers and the experience developed by the design agency cost engineers. [Note: Cost estimating is covered in PART I, Paragraph 16 above.]

(5) SDM addresses primarily simplification of the designs process. Recent workshops and experience emphasizes the need to simplify the "cradle to grave process" or tentatively called "Simplified Acquisition Methodology"(SAM). This philosophy covers simplification of the inception of the project to beneficial occupancy and includes planning, design, contract administration, safety, QA/QC etc. SAM requires team effort of all disciplines involved in the design, contracting and construction processes to make this effort a success. As USACE gains further experience on SAM, standard operating procedures, scopes of works etc. will be developed for the benefit of all concerned. The simplification process is envisioned as a panacea to repair decaying facilities at installations throughout our nation and overseas.

b. Application. The following are examples of the application of SDM, [Note: SDM should not be limited to the examples listed below, all projects should be evaluated for SDM application and techniques]:

(1) SDM is ideal for repair portions of operational, administration, community, family housing, maintenance etc, facilities.

(2) Typical projects are:

(a) Repair bathrooms and kitchens for a small to large number of family housing units.

(b) Renovate:

1) Classrooms.

2) Offices and conference rooms in administration facility.

3) Kitchens in child development center.

4) Quarters in guest houses and visitors lodges.

5) Paint spray rooms, welding shops, repair bays in vehicle maintenance shops.

6) New additions to a variety of buildings.

(c) Electrical:

1) Electrical distribution systems of small installations.

2) Replacement of electrical lighting and outlets.

3) Replacement of transformers, generators etc.

(d) Mechanical:

1) Replacement of HVAC for part of a facility.

2) Repair of plumbing for family housing.

3) Replace and repair of boilers in energy plants.

4) Installation of forced air system in class rooms.

(e) Landscaping and Civil Projects. Examples of simple landscaping and civil project designs that are ideally suited for SDM are:

1) Installation, replacement, and maintenance of shrubs and trees.

2) Installation of exterior site furnishings.

3) Resurfacing and restripping of parking areas.

4) Repair or installation of exterior signage or lighting.

5) Repair or installation of lawn sprinkler systems.

6) Regrading and replanting for drainage.

(f) Interior Design Projects. Copying machine sized drawings, metric sheet size A4, 210 mm x 297 mm (8-1/2"x11"), and the photographic drafting process are ideally suited for certain types of interior design projects. Procurement specifications, catalog cuts, and photographs can be presented in copying machine sized formats, metric sheet size A4, 210 mm x 297 mm (8-1/2"x11"). Larger sized sheets, A3 280 mm x 430 mm (11"x17") fold outs, can used for furniture plan layouts.

c. Advantages. SDM is a proven method to simplify the **design** process for O&M, repair, and minor construction projects while retaining engineering and construction quality. The major advantage of SDM compared to conventional design is that it saves the customer valuable dollars and time.

4. OTHER INSTALLATION SUPPORT EFFORTS. The following is a listing of some of the other areas where a design agency could or should provide Installation Support to its customers:

a. Planning and Design.

(1) Preparing installation funded and procured collateral equipment and/or furniture and furnishings lists.

(2) Provide real property turnover information, e.g., when a project is completed, the design agency should provide real property information (if a chiller was replaced, what kind, specifications, size, and other pertinent information). This should be required on all Installation Support projects that had addressed real property products. The following is needed for real property at turnover (coordination should be made with the DPW to determine if additional needs are required for local reasons):

(a) All manuals pertaining to the products, service, and operations and maintenance of real property (except those turned over if a system was accepted for use earlier).

(b) Set of marked-up current as-built/record drawings (suggest that the final be due in three months of Building Occupancy Date (BOD)).

(c) Start of project date.

(d) End of project date.

(e) Cost broken down by funding sources.

(f) Description of work by funding sources.

(g) Name and information of the contractor, including the POC and telephone number.

(h) USACE Office, POC and telephone number.

(i) Warranty items, warranty dates and POC.

(j) Tools, keys (with key diagram).

(k) List of equipment provided in the contract by type category (e.g., kitchen, classroom, playground).

(3) Acceptance and Commissioning Document. USACE recently developed this acceptance and commissioning document to ensure that equipment (especially mechanical and electrical) have gone through operational tune-up procedures and all systems are working in accordance with their design specifications. These documents and procedures should be required for every project that has equipment. Close coordination should be made with the DPW to advise of this option when appropriate, and informed of the cost and advantages. Additional information on these documents can be obtained by contacting the CPW
(CEPW- FM, telephone (703) 428- 6358).

b. Communicating.

(1) Providing “tool-box” (ready available) engineering.

(2) Solving recurring technical and contracting problems through partnering, education, and training. All problems should be communicated up-front to the military installation.

(3) Conducting in-house prepared training courses for designers, construction personnel,

and customers.

(4) Establishing a feedback and lessons learned system for designers, construction personnel, and customers.

(5) Fostering partnering sessions with designers, construction personnel, and customers, including Tri-Service CADD/GIS Center, Technical Working Groups.

(6) Periodically conducting, annually if possible, Senior Architect and Engineer Partnering Sessions to improve Installation Support for customers.

(7) Establishing and maintaining coordination between the design agency, CPW, DPW, and environmental community.

ARCHITECTURAL AND ENGINEERING INSTRUCTIONS
FOR
INSTALLATION SUPPORT
PART IV - TYPES OF CONTRACTS AVAILABLE FOR EXECUTION OF DESIGNS

1. SPECIFIC PROCEDURES AND CONTRACT TOOLS. Discussed below are some of the specific procedures and contract tools that a design agency should use in providing Installation Support to military installations:

a. Simplified Acquisition Procedures (SAP).

(1) Description. SAP uses either, Standard Form 18, *Request for Quotation* or FACNET solicitation (resulting in a DD Form 1155, *Order for Supplies and Services*), depending on the type of order being requested. Whenever a small project is evaluated for design and/or service requirements, the SAP method should be considered. (See Part V, Enclosure 3 for an example.)

(a) The SAP employs the principles of Installation Support with simplification of solicitation documents, specifications, copying machine sized drawings metric sheet size A4, 210 mm x 297 mm (8-1/2”x11”) or A3 280 mm x 430 mm (11"x17") that can be Faxed and/or “E-Mailed” to potential bidders. These small SAP projects enable design agencies to help their customers with the smallest of jobs, and often can make a big difference in enhancing grassroots quality of life for military installations.

(b) SAP projects are ideal for in-house work. A single SAP project can be done instantly in shorter time required to prepare an A-E contract for the same work. Accordingly, recommend each design agency organize a prototype “SAP Rapid Deployment Force”. The savings, especially done in-house, for development of design using SAP compared to traditional O&M contracts exceeding $25K is estimated at 50% or more. When A-E’s are contracted for SAP projects such contracts should include a package of perhaps five to ten projects. These SAP projects should be concentrated in the same area to reduce travel costs. The construction contract package should consist of an Estimated Construction Cost (ECC) of less than $100K to benefit from the advantages of SAP.

(c) SAP methodology should include the simplified acquisition methodology (SAM) to portray the need of simplification of the entire planning, design, contracting and construction processes. True re-engineering involves the entire process.

(d) Labor, reproduction, and other costs associated with processing documents are reduced because the usual solicitation and technical provisions are not required.

(2) Application. This process can be used very successfully for projects under $100,000. For Contracting Offices that are Interim FACNET Certified (an electronic means of advertising for bids), the threshold is $100,000 using FACNET. Some of the areas in which SAP may be used include:

(a) Replace windows, doors and or architectural hardware.

(b) Repair substrate for damaged exterior and interior substrates I.E. damaged cement plaster, removal of sheathing, replacement of gypsum ball board.

(c) Repair damaged floor, walls, ceiling and install new finishes.

(d) Replace counters, cabinets storage racks etc..

(e) Install air conditioning units for a classroom or office.

(f) Replace lighting fixtures and outlets in rooms.

(g) Install concrete pads for mechanical and electrical equipment.

(h) Install new ladders with safety fixtures leading to roofs.

(3) Advantages. This procedure has an advantage over other types of procedures, because it enables design agencies to help their customers with the smallest of jobs. With the increase of the SAP and PRC to $100,000, more repair work projects can be developed with substantial savings for the customers as well as reduction in design solicitation and reproduction costs by use of contracts that have less paper.

b. Requirements Contracts (RC). RC is similar to an IDC, except that there is no minimum guarantee. Also, a RC may permit faster deliveries when production lead time is involved, because contractors are usually willing to maintain limited stocks when the Government will obtain ALL of its actual purchase requirements from the contractor. For example, if the Government awards a RC for paving at a installation, then the installation must issue all paving requirements at the installation to that requirements contractor. There is no flexibility. A Delivery Order cannot be issued under a JOC or a T&M contract for paving to a military installation that has a paving RC in place. (See Part V, Enclosure 4 for an example.)

c. Requirements Contracts with Engineered Technical Requirements (RC/ETR). Currently being developed!

d. Service Contracts (SC).

(1) Description. The SC directly engages the time and effort (hired labor) of a contractor whose primary purpose is to perform an identifiable task, rather than to furnish an end item of supply. (See Part V, Enclosure 5 for an example.)

(2) Application. SC are generally used for all types of maintenance jobs. Some of the areas in which SC may be used include:

(a) Overhaul, repair, servicing, rehabilitation, salvage, modernization or modification of mechanical and electrical systems, or equipment.

(b) Routine recurring maintenance of real property.

(c) Housekeeping and installation services.

(d) Testing toxic material.

(e) Operation of Government-owned equipment, facilities, and systems.

(f) Ground maintenance including trimming trees.

(g) Dismantling, demolition, or removal of buildings and other real property structures.

(h) Transportation and related services.

(i) Repairs of site utilities.

(3) Advantages. Used as a supplement to JOC, this SC in the form of an IDC with fixed-unit-costs only for maintenance work and labor services, can easily reduce a backlog of items of work, since Orders can be issued immediately.

e. Total Housing Maintenance (THM) Contracts.

(1) Description. THM contracts are restricted to a multiple of pre-determined items of construction and service work. The typical THM contract consists of approximately 1,000 pre-priced items, found within a military installation's housing inventory, that each have a unit of measure and unit price. (See Part V, Enclosure 6 for an example.)

(a) These contracts are similar (indefinite delivery/indefinite quantity type contract) to

JOC yet are dedicated to the military installation's housing mission and contain both, construction and service contract work. The THM contract concept was developed by the Kansas City District and Fort Riley DPW for use at Fort Riley, Kansas.

(b) The scope of work is defined within the project specifications and includes both, construction and limited services, such as pest control, cleaning, or mowing.

(2) Application. These contracts are used for military installation housing missions.

(3) Advantages. The advantage of using a THM versus a JOC, is that a THM is dedicated only to the military installation's housing mission (e.g., repair, service, and maintenance). Whereas, a JOC is not solely dedicated to the military installation's total housing mission.

f. Indefinite Delivery Contract (IDC).

(1) Description.

(a) The overall scope and type of work are defined within the basic contract specifications. The Bid Schedule is comprised of a number of separate line items for various items (types) of work with contractors bidding a firm fixed price for each of the line items. For example, on a roofing IDC, line items may be the cost per square area of roofing or the linear length of flashing. An IDC could be limited to built-up roofing or cover all types of roofing materials.

(b) Orders may be placed against these fixed price line items. Only the quantity or amount of effort required for a specific project needs to be negotiated. The only obligation the Government has is the contract guaranteed minimum which is two percent of the stated contract maximum or $500,000, whichever is less. For any option period that is exercised, the minimum amount shall be one percent of the stated maximum or $250,000, whichever is less. (Reference EFARS).

(c) The contract will have a set maximum amount per contract period. The military installation determines what amount they think they might need per contract period (e.g., $3M, $4M, $5M).

(d) The IDC permits flexibility in both quantities and delivery scheduling and ordering of supplies or services after requirements materialize. IDCs limit the Government's obligation to the minimum quantity specified in the contract. The IDC is generally the most often used for Installation Support.

(2) Application. This type of contract is restricted to the specific types of work defined within the contract. In USACE support for automated facilities management programs such as PAVER, RAILER, and ROOFER, training should be made available before the work is attempted, including both the design agency personnel and the A-E, and coordination should be made with the program proponent (Mr. Fred Reed, CEPW- FM, telephone (703) 428- 6358). This type of contract is generally used for simple type projects, as follows:

(a) Roofing.

(b) Interior and/or exterior painting.

(c) Environmental services (however, many of these projects are complex).

(d) ADP services.

(e) Paving.

(f) Asbestos removal.

(g) Underground storage tanks.

(h) Playground construction.

(i) base fencing.

(j) turfing.

(k) antenna repairs.

(l) A-E services. Orders must be handled by design agencies work force (1100 series). Military installations can only issue orders.

(3) Advantages. This type of contract has an advantage over a Job Order Contract (JOC) (indefinite delivery/indefinite quantity type contract) because the maximum estimated value for JOC at the military installation level cannot exceed $300,000 (Per AFARS, JOC Orders have a $2,000 minimum and $300,000 maximum), where as A-E IDC have an annual limit of $1,000,000 per year.

g. Job Order Contracts (JOC).

(1) Description. A typical JOC consists of approximately 25,000 pre-priced items, each have a unit of measure and unit price. (See Part V, Enclosure 7 for an example.)

(a) In general, JOC involves an indefinite delivery/indefinite quantity type contract, but contemplates the use of negotiated, definitive and bilateral Orders. This type of contract is typically issued for an initial 12-month period and four one-year options. These options allow the military installation the flexibility to extend the contract under the proper circumstances.

(b) The scope of work and line items are defined within the project specifications. Line items are pre-priced and consolidated into a Unit Price Book. Contractors bid mark-up (coefficients) to be applied to the Unit Price Book line items. The JOC has two coefficient factors; one for normal working hours and one for other than normal working hours. Coefficient means a numerical factor that represents costs (generally indirect costs) not considered to be included in the Unit Price Book unit prices (e.g., general and administrative and other overhead costs, insurance costs, protective clothing, contingencies such as changes in wage rates, and the effect of inflation in option years, and also the contractor's profit).

(c) The Government must define the scope of work for each Order. If the desired work is complex in nature, the Government must prepare design documents to issue to the contractor. Recommend the use of SDM to prepare design documents for use under JOC in this instance.

(d) Orders are issued based on the quantities of each line item that are expected to be accomplished. Order price is determined by multiplying the estimated quantities by the Unit Price Book price and by the contractor's coefficient factor. A Order can include up to ten percent of non-pre-priced items of work (work items not included in the original 25,000 pre-priced items).

(e) Each signed Order becomes, in effect, a fixed price, lump sum contract and is managed accordingly.

(2) Application. Restricted to a multiple of pre-determined items of construction work.

(a) This contracting method is used to fulfill requirements for real property maintenance and repair or minor construction projects with an estimated value exceeding $2,000, but not exceeding $300,000, at the military installation level.

(b) In general, proposed projects valued at $2,000 or less are considered INAPPROPRIATE for ordering under JOC because of the administrative costs associated with processing JOC orders and the simplified purchase methods available for these actions. (Reference AFARS 17.9000).

(3) Advantages. The advantage of using a JOC versus an IDC, is that a JOC is suitable for a broader range of construction services.

h. Time and Materials (T&M) Contracts.

(1) Description.

(a) A time-and-materials contract provides for acquiring supplies or services on the basis of (1) direct labor hours at specified fixed hourly rates that include wages, overhead and profit and (2) materials at cost, including materials handling costs, if appropriate.

(b) The Order will state the effort to be accomplished, the labor categories and associated man-hours estimated to be necessary to complete the work, and the estimated cost.

(c) Project specifications do not contain specific scopes of work, but are loosely defined (e.g., minor construction within existing facilities). The Bid Schedule is comprised of a few line items for the contractor's professional level personnel. Contractors are selected based primarily upon their technical proposals (which include management strategy, prior experience, subcontractor pool), as well as prices for the professional level personnel.

(d) Scopes of work are developed by the Government. Detailed work plans can be determined by either the Government or the contractor, after a site visit. The contractor can be tasked to fully develop the project work plan as long as the contractor's efforts do not include the development of professional design documents (plans and specifications). If the contractor or the Government determines that a design is required, then the Government must prepare the design using its own in-house forces or the services of an A-E firm that has been selected in accordance with the Brooks Act professional services acquisition procedures.

(e) Orders may be issued as Time and Materials, which means the contractor performs the work required, within a specified not-to-exceed amount, and bills the Government for the actual cost of doing the work (supported by invoices, subcontractor quotes indicating adequate competition, professional level hours expended, etc.). Orders may also be issued as firm-fixed-price, which means the contractor and the Government arrive at a mutual agreement with regards to price and time prior to the work taking place.

(2) Application. Almost unrestricted as to the types of work that can be performed.

(a) Work is predominantly of a maintenance and repair nature, but can include minor new construction within Operations and Maintenance, Army (O&M) funding restrictions.

(b) The T&M contracts used for Installation Support are intended to provide broad flexibility and rapid response to maintenance, repair or minor construction of real property.

(3) Advantages. The advantage of using a T&M contract are that it is highly flexible and has an almost unrestricted range of construction services. Upon receipt of the scope of work and after a site visit, the contractor can develop a detailed work plan for the Government. **However, this type of contract is more intensive to manage and shift's more risk to the government. Additionally, this type of contract may be used only after the contracting officer determines that no other type of contract is suitable.**

i. Summary of Differences and Advantages Between IDC, JOC, and T&M Contracts.

(1) Primary Difference. The primary difference between IDC, JOC, and T&M contracts is the range of services available within each contract or simply, their flexibility.

(2) Total Cost. In terms of total costs, least expensive to most expensive contract costs would be IDC, JOC, then T&M contracts. The IDC generally results in lower cost to the Government because of greater definition of scope and forward fixed pricing of a limited bid schedule (usually resulting in the selection of a specialized prime contractor). A JOC is generally more expensive than an IDC because of the broader and less defined range of requirements the contractor must be able to provide and the size of the prime contractor required, multiple subcontractors, overhead costs, etc. necessary to execute the larger contract. The T&M contract is even less defined than the JOC. However, if a IDC is inappropriately selected and poorly administered, it could result in more cost to the Government than a JOC or T&M contract.

(3) Advantages and Disadvantages. Why would one contract be selected over another?

(a) There is more flexibility in an indefinite delivery-indefinite quantity type contract (IDC) since there are no limitations on Orders, except self imposed limits. (Exception: AFARS 36.6 sets limits for an A-E IDC.)

(b) JOC is usually best for real property maintenance, or minor construction. Orders under JOC have a floor of $2,000 and a ceiling of $300,000. The T&M contract can be used for those projects under the $2,000 and over the $300,000 or anywhere in between.

(c) There will be times when either the IDC, JOC, or T&M contract could be used for a project.

(d) Under normal circumstances (non-emergencies), If the required work is a roofing project, then the roofing IDC could be selected. If the required work is a building renovation

project including roofing, painting, and window replacement, then the Government would have a choice in how execution is to proceed. The project could be divided into three separate projects and IDC Orders could be awarded for each type of work.

(e) The T&M contract has an advantage over the JOC in that there are no minimum or maximum amounts for Orders. Orders can be issued quickly for emergency repairs. This is normally quicker than getting a Purchase Order/SAP executed. Under this type of contract, a Order can be issued within a few hours for Not To Exceed (NTE) Orders. However, FFP contracts offer much greater controls on costs. This option should be considered **only** after close coordination, and approval by, project management, resource management, contracting and counsel.

(f) If a military installation has each of the various contract types available, **the T&M contract is generally used as a last resort method of execution. The T&M contract is a back-up to other types of contracts.**

j. Solicitation Documents. As a reminder for CONUS construction solicitations, EFATS 52.102-1, "Incorporation By Reference", allows to incorporate solicitations, provisions, or contract clauses by reference. The reference must include the exact date of the provision or clause.

2. "GOOD NEWS STORIES" AND THOUGHTS

a. Examples. At Part V, Enclosure 8, Examples A&B, are "Good News Stories" and Thoughts of Installation Support efforts provided by USACE to the Army, Navy, Air Force, Marine Corps, Defense Logistics Agency, DoD schools, and other Government agencies.

b. New Good Stories and Thoughts. Design agencies are encouraged to submit their Good News Stories and Thoughts for updating this AEI directly to the USACE DCIS team member, Mr. Stanley Swofford, R.A., CEMP-EA, telephone DSN 763-0441 or COM (202) 761-0441, facsimile DSN 763-8815 or COM (202) 761-8815, Internet stanley.swofford@inet.hq.usace.army.mil.

3. CUSTOMER SATISFACTION. Each design agency must strive to be the professional <u>team of choice</u>, providing quality design, engineering and technical services that is focused on <u>customer satisfaction</u>. The goal should be to **exceed** our customers' expectations! This goal can be met by working jointly with the customer to deliver a quality product in a reliable, responsive, cooperative, innovative, and efficient matter! Total Quality Management (TQM) and new innovative ways in the design team process for Installation Support should be considered.

ARCHITECTURAL AND ENGINEERING INSTRUCTIONS
FOR
INSTALLATION SUPPORT
PART V - EXAMPLES, FORMS, AND SAMPLE DRAWINGS

1. **Enclosure 1:** Memorandum to Establish the NTCT/IS (USACE DCIS).

2. **Enclosure 2:** Examples of Simplified Design Methods (SDM), Examples A&B.*

3. **Enclosure 3:** Example of a Simplified Acquisition Procedure (SAP), Examples A&B.*

4. **Enclosure 4:** Example of a Requirements Contract (RC).*

5. **Enclosure 5:** Example of a Service Contract (SC).*

6. **Enclosure 6:** Example of a Total Housing Maintenance (THM) Contract.*

7. **Enclosure 7:** Example of a Job Order Contract (JOC).*

8. **Enclosure 8:** Examples of "Good News Stories" and Thoughts, Examples A&B.

***NOTE:** These enclosures can be obtained from our USACE *TECHINFO* Home-Page [**http://w2.hnd.usace.army.mil/techinfo/aei/is_aei.asc**] or our USACE *Installation Support* Home-Page [**http://www.hq.usace.army.mil/cemp/e/chmp_lst.htm**].