

Department of the Army
Sacramento District, Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

A-E Guide Volume 1, General Instruction for
Army Projects

2 October 1990

1. These changes to A-E Guide Volume 1, General Instructions, January 1990, advises all organizational elements of the current changes to be implemented as of 12 October 1990.
2. The attached paragraphs have been updated to meet the latest Corps of Engineers, Sacramento District policies. Please see current changes listed below.

Change No.	Page No.	Disposition
1	iv	Remove and replace with new page iv.
2	I-6, 7, 8	Delete paragraphs 12.0, 12.1 thru 12.2.5 and replace with new paragraphs 12.0, 12.1 thru 12.2.5.
3	I-9	Delete paragraphs 17.0, 17.1 and replace with new paragraphs 17.0 and 17.1.
4	II-9	Delete paragraphs 3.0 and 3.1 and replace with new paragraphs 3.0 and 3.1.
5	III-9	Remove and replace with new page III-9.
6	III-11	Remove and replace with new page III-11.
7	III-12	Remove and replace with new page III-12.
8	III-14	Remove and replace with new page III-14.
9	III-15	Remove and replace with new page III-15.
10	III-16	Remove and replace with new page III-16.
11	III-33	Remove and replace with new page III-33.
12	III-42	Remove and replace with new page III-42.
13	III-43	Remove and replace with new page III-43.
14	III-44	Remove and replace with new page III-44.
15	III-46	Remove and replace with new page III-46.
16	Chap IV	Reference plates. Remove and replace with new page.
17		Following Plate #21, add new page, Plate #22.
18		Following Plate #22, add new page, Plate #23.
18a		Following Plate #23, add new page, Plate #23 page 2.
19	V-2	Remove and replace with new page V-2.
20	D-1	Remove and replace with new page D-1.

3. File this change sheet in front of the A-E Guide, Volume 1, General Instructions for Army Projects for reference purposes.

CHAPTER	SUBJECT	PAGE
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IV REFERENCE PLATES

- #1 Title Block (Cover Sheet Only)
- #2 Title Block
- #3 Title Block (COE Prepared Topo .
or Log of Borings Drawings)
- #4 Title Block (Site Adaptation
Cover Sheet)
- #5 Title Block (Site Adaptation -
Other than Cover Sheet)
- #6 Schedule of Drawings
- #7 Graphic Scales
- #8 Door Schedule
- #9 Window Types
- #10 Finish Schedule, Finish Legend and
Color Scheme Instructions
- #11 Sample Schedule for Plate #10
- #12 Example Floor Plan for Plate #10
- #13 Sample Exterior Color Schedule
- #14 Sample Vicinity Map
- #15 Sample Location Map
- #16 Handicapped Checklist (Blank)
- #17 Environmental Permit Matrix (Blank)
- #18 Gross Area Takeoff
- #19 Support Document Cover Sheet (Blank)
- #20 Air Force Form 108 - Air Conditioning
Load Estimate
- #21 Life Cycle Cost Summary Form
- #22 Design Annual Energy Use (DAE)
- #23 AMPRS Energy Conservation Compliance Codes Input Form

(REV 12/90 #2)

12.0 Review Process.

12.1 Automated Review Management System (ARMS). ARMS is a computerized method for transmittal and storage of design review comments. ARMS requires use of VT100 emulating terminal. The Sacramento District has established ARMS for use on all ARMY projects. An "Architect Engineer Response" package will be forwarded to you to explain use of the system. If you encounter any problems or have questions or comments, please call the ARMS Hotline at (916) 551-3126. A 24-hour answering machine is connected to this line.

12.2 Review Comments. All design data prepared by the A-E will be reviewed by the COE and other agencies for conformance with the contract requirements and technical as well as functional criteria. This review effort in no way replaces the A-E's review requirements outlined in paragraphs 10.0 above. Complete instructions on how the A-E is to handle review comments will be included with the comments in ARMS.

12.2.1 All review comments made by other than COE Design Quality Assurance (DQA) personnel will be "coordinated" by the DQA Section. That is, they will be reviewed for applicability to the project against the project's design criteria and annotated in ARMS with directions on the action the A-E is to take.

12.2.2 Review comments generated by DQA will not be annotated. All DQA comments are to be incorporated into the design documents.

12.2.3 Following A-E incorporation of the review comments into the design documents, DQA personnel will backcheck the actions taken. It is imperative the A-E indicate in ARMS where in the design documents the comment is being incorporated. If the A-E feels a comment is inappropriate, he may elect to rebut the comment in ARMS.

12.2.4 The resubmittal and backcheck process will continue until all appropriate comments are properly incorporated.

12.2.5 The A-E is encouraged to call and discuss any problematic comments with the appropriate reviewer in our DQA Section. The last name and phone number of each DQA reviewer appears in the upper left hand corner of the cover sheet accompanying the review comments sent to the A-E

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**A-E GUIDE, VOLUME 1, GENERAL INSTRUCTIONS
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17.0 Electronic Bulletin Board.

17.1 The Sacramento Electronic Bulletin Board called SPKSPECS is available for use by all Architect/Engineer firms. The Bulletin Board allows designers to retrieve guide specifications, engineering technical letters and other useful design criteria. Consult with your Corps of Engineers Project Manager for information access to the bulletin board and/or reference A-E Guide Vol 3. Criteria available on the Electronic Bulletin Board will not be furnished in hard copy unless there is a special request coordinated through the COE PM. All hard copy criteria requested by A-E's must be directly related to the project being designed. The final determination of criteria design applicability will lie with the COE Design Quality Assurance Section.

(REV 12/90 #4)

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3.0 Specifications.

3.1 Detailed instructions for preparation of specifications are presented in the A-E Guide Volume 3, Specifications. In the interest of uniform construction, it is mandatory for the A-E to use COE Guide Specifications on all projects unless otherwise noted in A-E Guide, Vol 3, Specifications. A-E's shall acquire all COE guide specifications via our SPKSPECS (Electronic Bulletin Board). The bulletin board provides the most current guide specifications available for use. Consult with COE PM for information on access to the bulletin board and/or reference A-E Guide Vol 3. It shall be noted that specifications should be followed without deviations; however, if a change is needed, the A-E must consult with COE PM.

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floor areas; hourly rating of fire/smoke walls; corridor lengths and dead ends; corridor and other rated doors. Provide the UL listing for all fire rated walls, floor/ceiling, roof/ceiling systems.

1.6.1.8.4 Extinguishing and/or fire sprinkler systems: Type (wet or dry system); special systems, such as "Carbon Dioxide", "Deluge", or "Standpipe", "AFFF", or "Halon" Systems. Coordinate with mechanical designer.

1.6.1.8.5 Fire alarm and evacuation system: Type, extent, and timing. Coordinate with electrical designer.

1.6.1.8.6 Operations involving use or storage of flammable and explosive liquids and gases, or accumulation of dusts: System shall be designed to comply with NFPA and UBC. Provide the flash point for all liquids. Describe type of electrical equipment, lighting fixtures, ventilation and other related fire protection features required to minimize hazard(s).

1.6.1.8.7 The analysis shall list applicable NFPA and UBC number references as well as "required" and "design" conditions.

1.6.1.8.8 "Means of egress" sketch shall be provided for each floor indicating exit access, door swings in path of egress, required fire separations, stairs and rated exit passageways. In addition, provide a location of exit sign sketch indicating exit lights including direction and locations for which "Not An Exit" signs may be required. Illumination of means of egress and exit markings shall comply with NFPA 101.

1.6.1.8.9 Roof clutter and the trade-off of cost versus acceptable aesthetics shall be discussed in the Design Analysis and at the Concept Review Conference.

1.6.1.9. Special Requirements for Addition/Alteration Projects.

1.6.1.9.1 Asbestos. See 1.2.4 Asbestos Removal.

1.6.1.9.2 Life Safety. Perform a life safety survey to identify existing violations of means of egress and fire separation per NFPA 101, NFPA 220 and the U.B.C. and describe how new work will impact existing life safety. State the building construction types and occupancy classification. Provide "means of egress" sketches to identify existing violations and recommended corrective actions.

1.6.1.9.3 Physical Security/Anti-Terrorism Features. Coordinate with the Architectural/Engineering Instructions, Chapter 10, Paragraph 6.

1.6.2. Drawings. The drawings shall contain sufficient detail to enable a bidder to successfully bid the project without a site visit.

1.6.2.1. Floor Plan for each floor at 1/4"=1' scale (except as stated below), showing: (1) overall dimensions, (2) functional arrangement, (3) label all rooms and spaces, (4) interior colors and finishes and exterior colors in tabular form. (Plates 10 and 13 of Chapter IV.)

1.6.2.1.1 For large, open structures, a smaller scale may be allowed on a case-by-case basis, subject to discussion with, and approval by, the

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comparison to the design analysis as an appendix. Provide a word description of all the candidate solutions and indicate that the most economical has been selected.

1.7.1.3. Design Loadings (TM 5-809-1/AFM 88-3, Chap. 11): Provide a discussion of live loadings to be used, to include floor loads, wind, snow, earthquake, etc., together with data to justify deviations from established criteria. Seismic design shall be in accordance with TM 5-809-10/AFM 88-3 Chap. 13. State the Seismic Zone, K, I, C, and Z values. State whether wind load or seismic load governs lateral design for each direction considered and for each independent structural system.

1.7.1.4. Applications to Existing Buildings For those cases in which additions are connected to existing structures (i.e., no seismic joints), the A-E shall provide calculations for the "integral structure" (i.e., new plus existing). In no case shall the strength of an existing "below code" structure be reduced. Where practicable, the A-E shall upgrade the lateral resistance of the existing systems to meet current code. In the projects involving alterations, modifications and/or additions, the A-E shall be responsible for the investigation and design necessary to strengthen existing structural members which are affected by additional loads. For pure alteration and repair projects, a seismic evaluation shall be performed per the following:

1.7.1.4.1. Major Alterations. When any building for which the cost of renovations or repairs exceeds 25 percent of the replacement cost of the existing building, both the existing building and the renovations must be made to resist the appropriate level of earthquake forces. An appropriate level of earthquake force is defined as that level prescribed in the latest edition of TM 5-809-10/AFM 88-3, Chap. 13. The foregoing does not preclude the use of site specific response spectra if already available, or if deemed appropriate for critical facilities.

1.7.1.4.2 Minor Alterations. Minor structural alterations may be made in existing buildings and other structures in conjunction with the upgrading of the total structure. However, the building structure's ability to resist lateral seismic forces shall not be less than that which existed before such alterations were made.

1.7.1.4.3 Seismic Evaluation Submittal Requirements. The seismic evaluation study, complete with conceptual fix (if required) and associated costs, shall be submitted. The seismic evaluation study shall be performed concurrent with other design work and coordinated with other design work to the maximum degree possible, (i.e., be feasible from a functional/architectural standpoint, etc.). The seismic evaluation study and its impact on the project current working estimate (CWE) shall be approved by the COE prior to incorporation into the project's bid documents. A minor alteration project's design documentation shall include routine structural narrative and calculations addressing structural modifications.

1.7.1.5. State the strength (working stresses or yield stresses) for all structural materials on the project.

soil investigations and survey. Describe type of piping for heating systems, insulation concealed or exposed, - of underground system per Specification Section C69 - 02695 (mandatory to use) including buildings - steam or high temperature hot water and whether above-ground or underground. State classification forced hot water or steam with direct radiation or unit heaters. Indicate type of heat distribution outside of conductiving system, i.e., forced water air with direct fired furnace or hot water coil, equipment items provided it does not and will not interfere with other systems or equipment. Discuss type of controls (DDC) is prohibited for HVAC controls, DDC may be used only for individual control of individual pressure and temperature, and capacity. Briefly discuss temperature control system. NOTE: Direct digital 1.8.1.2. Heating Systems, Indicate type of heating plant and justification for selection, operating

outside air or ventilation requirements and any other special conditions. proposed "u" factors for walls, ceilings, floors, etc., personnel load, equipment heat release (if any), 1.8.1.3. Design Conditions. State indoor and outdoor design temperatures for heating and cooling,

1.8.1. Design Analysis - Narrative/Calculations.

1.8. Mechanical Design

etc.

1.7.2.3. Roof Framing Plans: Show locations of framing members, overall shape and dimensions, diahrama, spacing, principal dimensions and shape of the building.

1.7.2.4. Floor Framing Plans: Show spacing of framing members, overall depth of floor structure, column tie beams, grade beams, etc.

1.7.2.5. Foundation and Floor Plans: Show type of foundation proposed, details of footings, relation of walls and floor slab to foundation system, overall dimensions, column spacing, joint pattern in slab-on-grade, have been made for future expansion, if this is the case.

1.7.2.6. Blast Design: For structures designed for blasts, type, INT equivilent, and location of explosive material which follows: (a) Comannication of detonation by fragments and high blast pressure; and (b) Mass detonation of explosives as a result of subsequent detonations produced by communication of detonation between two adjoining areas. Define blast wall, blast door, and fragible elements to complete the description of the protective construction design approach.

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- 1.8.1.3.5.1 If a computer simulation of the building is required, then a separate energy budget need not be performed.
- 1.8.1.3.5.2 Use Design Annual Energy Use (DAE) summary sheet with your calculations. (See #22) Include MPRs Energy Conservation Compliance Codes Input Form (See Plate #23).
- 1.8.1.4 Ventilating System. State whether the ventilating system is gravity or mechanical system. If a mechanical system, indicate whether it is supply or exhaust. State the requirement for outside air and the basis for determination of quantity, i.e., number of air changes per hour, or CFM per person, or others.
- 1.8.1.5 Air conditioning. State as applicable under Architectural/Engineering Instructions or TM 5-810-1 as authority to technical requirements or both. For technical requirements, show the extent authorized, and as to any authority for waiver of these criteria. State whether for comfort cooling or any other special tolerances for temperature and humidity control, the degree of air cleaning or purity required, and any other special considerations involved. A description of the air cleaning system proposed, including the capacity location of the air or components; cooling media (water or DX); zoning and duct arrangement; and type of controls. (See note for Direct Digital Control (DDC) in Paragraph 1.8.1.2, above). State requirements for outside air and the basis for determination of quantity, i.e., number of air changes per hour or CFM per person, or others.
- 1.8.1.6 Evaporative cooling. Reference Architectural/Engineering Instructions or TM 5-810-1 as authority of any authorized waiver of these criteria. Note if this is a single or two-stage process.
- 1.8.1.7 Cold Storage Projects. Indicate the room holding temperatures and commodities to be held in cold storage. (May be indicated on drawings). Also, show the approximate equipment sizes.
- 1.8.1.8 Service Piping Systems. Include determination and capacity of compressed air, vacuum, or other service piping systems.
- 1.8.1.9 Plumbing. Provide plumbing fixture determination listing quantity and types of fixtures identified by Federal Specifications. Indicate male and female building population. Describe domestic water heating and storage equipment including capacity, materials, piping types, and insulation requirements.
- 1.8.1.10 Seismic Considerations. State that design procedure to be used for support and anchorage for mechanical equipment is in accordance with TM 5-809-10.

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1.8.1.11 Hazardous Waste. Hazardous waste; Underground Fuel Storage and Waste Tanks. Specify only EPA approved materials, equipment and systems for use. All systems must comply with Federal, State and local regulations.

1.8.1.12. Fuel: State type, source, whether firm, or interruptible gas and metering arrangements. Indicate adequacy of existing gas distribution system and of existing gas supply to carry additional load. Indicate type of standby fuel for interruptible gas.

1.8.1.13. Energy Monitoring and Control System. Indicate if base-wide EMCS is existing, under construction, or planned within 5 years. For existing EMCS, identify system in operation.

1.8.1.13.1 Building EMCS shall terminate with the DTC (Data Terminal Cabinet). Individual buildings will be connected to the base-wide EMCS by a separate construction contract at a later date.

1.8.1.13.2 Use TM 5-815-2 for Criteria Reference. Include CEGS-10B/4 "Building Preparation For EMCS" in outline of specifications.

1.8.1.14. Fire protection. Coordinate with the Architect to ensure all aspects of the fire protection plan are addressed.

1.8.1.14.1 For sprinkler systems, indicate type "wet or dry" system, provide evidence that the system is in compliance with criteria referenced in "CRITERIA INDEX," Chapter V.

1.8.1.14.2 For Halon, carbon-dioxide, foam, dry-chemical, and other special extinguishing systems, show information justifying the arrangement, size, and coverage of each system. For AFFF systems, the designer shall make provisions for proper disposal of the AFFF in a manner acceptable to the installation environmental office and OEM.

1.8.1.14.3 Include a fire water flow curve, based on flow test data, and determine if the available water quantities and pressures are adequate to meet project requirements. See Fire Protection Handbook, Section 17, Chapter 8, Hydraulic Flow Curves and Analyzing Test Data. (Note that flow test data is normally provided by the installation Director of Engineering and Housing. Coordinate with your COE PM.) The mechanical and civil designers must coordinate their efforts to ensure adequate water quantity is available.

1.8.1.15. Special requirement for all rehab Projects. For asbestos requirements see Paragraph 1.2.4. Asbestos Removal.

1.8.1.16. Calculations.

1.8.1.16.1 Calculations of limited nature shall include heat gain, heat loss, and equipment sizing including the method for handling diversities in the air conditioning load and method for sizing boilers. Show typical air conditioning load calculations, preferably the building peak loads. Detailed room calculations are not required.

1.8.1.16.2 Show plumbing calculations necessary to determine the number of fixtures, cold and hot water capacity requirements, and equipment or capacities of miscellaneous and special systems.

1.8.2. Drawings.

1.8.2.1. Floor Plan. Prepare a floor plan showing heating, ventilating, and air conditioning equipment layout; chillers or refrigeration compressors; boilers; pumps; condensers or cooling towers; air handling units; fans; air distribution duct layout (may be single line); hoods; and other items of major equipment required for the facility.

1.8.2.2. Plumbing. Show the plumbing fixture layout, floor and area drains, and plumbing equipment layout (hot water generator, storage tanks, pumps, air compressors, etc.).

1.8.2.3. Mechanical Rooms.

1.8.2.3.1 Present a study of floor space in the mechanical room and roof space on roof plan by selecting the largest and heaviest of three competing makes of each piece of equipment to go into the rooms and to mount on the roof. The Mechanical designer shall inform the Structural designer of the selections in order to properly size the roof structure.

1.8.2.3.2 Adequate provisions shall be made in the mechanical rooms to allow for the removal of tubes from boilers, chillers, and condensers, and the removal of coils and filters from air handling units for maintenance or replacement. See "Mechanical Standard Details" by Sacramento District for the maintenance access and clearance zones required for the different types of mechanical equipment. To save room space, full use shall be made of knockout panels or doors on outside walls for tube and other equipment removal. Equipment shall be located to allow ample room for servicing and replacement. Show service clearance required for equipment per manufacturers recommendations. Piping and valves shall be arranged so that they will not prevent personnel movement within the equipment room and all valves shall be located for ready accessibility. Where necessary because of the location of valves and headers, catwalks or ladders shall be furnished for operating and servicing the valves. Gages and thermometers shall be of such size, scale, and location as to be easily read by operating personnel.

1.8.2.3.3 If an outdoor Mechanical Equipment yard is enclosed by a solid CMU fence, adequate air movement must be provided by openings in the wall, wall section overlap with air gap between, removing blocks at certain intervals, etc., for air cooled mechanical and electrical equipment.

1.9. Electrical Design.

1.9.1. Design Analysis - Narrative/Calculations.

1.9.1.1. General. Provide electrical characteristics (phase, voltage, and number of wires) of circuits.

1.9.1.2. Electrical Load Analysis. Include estimate of total connected load and demand factors, diversity, and resulting kilowatt demand. Breakdown of the estimated connected and demand load shall show: (1) Lighting and convenience outlet load; (2) power load for building equipment such as heating, air conditioning, etc., (3) loads for special operating equipment such as air compressors, generators, pumps, and for power receptacles being provided to energize special equipment. State power factor and size of transformers.

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2.6.3.2. Floor/Roof Framing Plans: Provide overall framing layouts (with dimensions) of the main structural elements. Show horizontal and vertical bracing locations and seismic joint locations.

2.7. Mechanical Design.

2.7.1. Design Analysis - Narrative.

2.7.1.1. See Concept submittal requirements. The designer shall provide solutions to any problems identified in the Concept submittal and justify or refine all assumptions made at concept stage (user shall be contacted if required).

2.7.1.2. Designs must meet EPA emission standards when No. 5 fuel oil, No. 6 fuel oil or coal is burned as fuel and when other hazardous emissions are produced.

2.7.1.3. Provide a list of energy saving features which have been incorporated into the project, such as run-around coils, thermal wheels, and double bundle condensers. Additional energy saving ideas may be found in the "Criteria Index," Chapter V, under "HVAC Computer Simulation for Buildings."

2.7.1.4. Indicate the pieces of equipment and controls that will be tied into a base wide EMCS. The A-E shall coordinate the selected points with the Base EMCS Specialist.

2.7.1.5. For physically handicapped requirements, state what provisions have been incorporated.

2.7.1.6. Provide the following information for liquid petroleum storage and distribution systems: describe the unloading facilities, the type of system, such as LPG vapor or central air mix; state the basis for storage capacity, rate of pumping and number of dispensing outlets; equipment power requirements, and a description of the tank.

2.7.1.7. Future expansion: Where buildings are to be designed for further expansion, discuss provisions to be taken to insure the projected construction will proceed in a trouble-free fashion. If no provisions have been made for future expansion, so state.

2.7.1.8. Meters. State type, number and location of Utility meters and environmental permits required IAW Architectural/ Engineering Instruction.

2.7.2 Design Analysis - Calculations:

2.7.2.1 See Concept submittal requirements.

2.7.2.2 Provide all calculations which are necessary to justify the systems selected on the basis of economic and environmental impact. If A/E uses computer calculations for cooling loads, he must fill out the enclosed load estimate form taking input and output from computer analysis. See Plate 20, Chapter IV.

2.7.2.3 Show plumbing calculations as necessary to determine equipment or capacities of miscellaneous and special systems.

3.8.3.5. Stirr Details Show all structural beams and connections that are shown supporting stairs usually detailed on the Architectural Drawings.

3.8.3.6. Structural data; State the soil bearing values and other pertinent information from the Geotechnical Report, design live loads for various areas of the building; design wind load; seismic zones 2, I, K, C, S values; whether or not the building has been designed for future horizontal or vertical loads; and any other notes necessary to clarify or complete the information shown on the drawings. Check all general structural notes for conflicts with the specificifications. The notes should not repeat the specifications. All structural data shall appear on the first sheet of the structural drawings.

3.8.3.7. Joints; The location and details of all joints shall be shown on the drawings. Include control joints in slabs-on-grade, construction joints in walls, floors, roofs, and expansion and seismic joints.

3.8.3.8. Wall Elevations; Wall elevations shall be provided for all precast or tilt-up concrete panels, showing 1 for each panel typically reinforcing, reinforcing around openings, connections, dimensions, panel ID markings and site locations, and all other abnormalities etc. The intent is to show a complete design on the drawings, even though manufacturers may prefer to detail things differently.

3.8.3.9. The structure should be carefully studied so that elaborate details are not required and all information necessary for construction is clearly and simply presented on the drawings. Typical sections shall be truly typical and not representative of one particular condition.

3.8.3.10. Drawings, Expand and fully develop drawings used in Concept and/or Preliminary submittals. Add any new sheets necessary to complete the presentation.

3.8.2.6. When submitting computer data, include one sample hand calculation of one item (e.g., a truss); under one loading condition (i.e., usually the most critical) for each major system (e.g., lateral systems) in spot checking the balance of the submitted computer data.

3.8.2.7. This will force an integral part of the Design Analysis in lieu of annual calculations otherwise required. These lists will be augmented by separate results where applicable, so that sufficient information is available to perfect manual checks of final results. Include a sample hand calculation of each structural element (e.g., a truss); under one loading condition (i.e., usually a sample hand calculation typically the most critical) for each major system (e.g., lateral system, beam framing, etc.). This will facilitate reviewers who are not familiar with your particular program to spot check the balance of the submitted computer data.

3.8.2.8. When a computer is utilized to perform design calculations, the analysis shall include copies of computer input data and output summaries presented in understandable language, accompanied by diagrams which identify joints, areas, etc., according to the notations used in the data lists.

3.8.3.6. Roof Details.

3.8.3.6.1 Show all fastener details of roof deck to supporting members.

3.8.3.6.2 Show all roof framing connections, including RC and CMU beam seats, column connections, and beam-to-girder connections (as appropriate).

3.8.3.6.3 Show all details that provide slip joints for temperature changes and all details that transfer lateral loads to the vertical shear system.

3.8.3.6.4 Show all additional framing needed to provide for concentrated vertical loads, including both at and between node(s) of roof trusses.

3.8.3.6.5 On roofs where the deck is not used as a diaphragm, indicate crossbracing between all roof framing members. Specifically on roof trusses, show cross bracing at 3'-0" maximum.

3.8.3.7 Composite construction and continuous framing. Where beam reactions are required on contract drawings for composite construction and continuous framing (as stipulated for Steel Framed Beam Connections in the AISC Manual of Steel Construction), the A/E is not relieved from drawing completely all of the various beam-to-beam and beam-to-column connection details that normally would be drawn for any construction that is non-continuous, non-composite, or both under service load.

3.9. Mechanical Design.

3.9.1. Design Analysis - Narrative. Complete the discussion of Mechanical features that was presented in the Concept and/or Preliminary submittals. Update the narrative to include any changes brought about by review comments.

3.9.2. Design Analysis - Calculations.

3.9.2.1. Finalize all calculations leading to sizing of distribution systems, selection of equipment, power requirements, controls, and selection of auxiliary equipment. Include calculations for noise/sound reduction. A-E must carefully select HVAC equipment locations and investigate any duct noise attenuation required to ensure that HVAC systems will not result in noise problems.

3.9.2.2. Equipment selection is restricted to regularly cataloged items of domestic manufacture, in commercial service for at least two (2) years prior to bid opening, and supplied by dealers having service organizations supporting the project location. Completely identify each piece of equipment with three manufacturers' names, model numbers, and characteristics. Do not indicate Proprietary manufacturers' names and model numbers on the drawings or in the specifications. Provide catalog cuts of selected equipment.

3.9.2.3. Provide complete tabulation of cooling loads. Psychrometric charts for all the air handling systems with cooling are required.

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3.9.2.4. Fire Pumps. If required fire pumps shall be sized per NFPA 20 and NFPA Handbook Section 17 Chapter 6. Indicate pump flow vs. pressure. Indicate combined (i.e., fire pump demand plus outside hydrant demand) to assure yard system pressure does not fall below 70 psig. Include catalog cuts and manufacturers published pump curve.

3.9.2.5. For projects being on shelf for one year or more, available fire water flow shall be verified a second time at the next submittal; the mechanical designer shall refer to base Fire Marshall to conduct one more flow test to be aware of all possible changes in water supply in this period of time.

3.9.3. Drawings. Expand and fully develop drawings used in Concept and/or Preliminary submittals. List room names and numbers on all plans and partial plans as shown on the architectural plans. Add any new sheets necessary to complete the presentation, including the following:

3.9.3.1. Plumbing. Provide the following:

3.9.3.1.1 Show water, waste and vent piping in two-dimensional riser diagrams for complicated plumbing systems, such as medical, dental facilities and others and for all buildings two or more stories high.

3.9.3.1.2 Provide a schedule of plumbing fixtures and equipment. Coordinate schedule with Table I of Specification Sections CEGS-15400 or 15410.

3.9.3.2. Heating, Ventilating and Air Conditioning (HVAC). Provide the following:

3.9.3.2.1 Double line air distribution ducts will be required for all cross sections, elevations, and in mechanical rooms. Single line ducts may be used for air distribution layout, provided sufficient cross sections are shown for congested areas, and for areas that are subject to potential structural interference.

3.9.3.2.2 If required for clarification of duct sizes and duct runs, show single line riser diagrams for supply, return, and exhaust air systems in multi-story buildings. Provide sections where needed to show special relations and indicate the typical location of lights, structural members, etc.

3.9.3.2.3 Locate and detail all fire dampers.

3.9.3.2.4 Provide piping schematics to show all complicated flow processes.

3.9.3.2.5 Provide a sequence of operation and control, and control system schematic diagrams for each Mechanical System.

3.9.3.3. Fire Protection. Provide the following:

3.9.3.3.1 Minor fire protection work may be shown on the plumbing plan. Title block shall indicate that the drawing is for both plumbing and fire protection.

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of pallets, or to minimize fire water requirements for storage height of less than 25 feet.

3.9.3.3.6.8.9 whether in-rack sprinklers are required at one level, two levels or at every tier.

3.9.3.3.6.8.10 in-rack sprinkler water demand

3.9.3.3.6.8.11 ceiling sprinkler density (GFM/GI)

3.9.3.3.6.8.12 design area of sprinkler operation

3.9.3.3.6.8.13 ceiling sprinkler water demand

3.9.3.3.6.8.14 inside hose stream demand (minimum 100 GPM)

3.9.3.3.6.8.15 combined inside and outside hose demand (minimum 500 GPM)

3.9.3.3.6.8.16 duration of water supply required (see NFPA 231C)

3.9.3.3.6.8.17 fire protection riser location(s)

3.9.3.3.6.8.18 fire wall/partition locations

3.9.3.3.6.8.19 water flow available at base of riser (GPM) flow rate and associated residual pressure

3.9.3.4. Energy Monitoring and Control Systems (EMCS).

3.9.3.4.1 The designer is required to coordinate selection of points to be monitored with the installation EMCS coordinator.

3.9.3.4.2 Provide schematic diagrams and I-O summary as shown in TM 5-815-2.

3.9.3.4.3 The EMCS schematic diagrams shall be separate from the control system diagrams as described above in Sub-paragraph 3.9.3.2.5.

3.10. Electrical Design.

3.10.1. Design Analysis - Narrative. Complete the discussion of electrical features that was presented in the Concept and/or Preliminary submittals. Update the narrative to include any changes brought about by review comments.

3.10.1.1. Describe any special switching or dimming systems required for any area.

3.10.1.2. Provide rationale for selection of reduced-voltage starting equipment.

3.10.1.3. Provide an energy impact analysis.

3.10.2. Design Analysis - Calculations.

CHAPTER 10

REFERENCE PLATES

1. TITLE BLOCK (Cover Sheet Only) PLATE #1
2. TITLE BLOCK PLATE #2
3. TITLE BLOCK (COE Prepared Topography Or Logs of PLATE #3
Entire Drawings)
4. TITLE BLOCK (Site Adaptation Cover Sheet) PLATE #4
5. TITLE BLOCK (Site Adaptation other
than Cover Sheet) PLATE #5
6. SCHEDULE OF DRAWINGS PLATE #6
7. GRAPHIC SCALES PLATE #7
8. DOOR SCHEDULE PLATE #8
9. WINDOW TYPES PLATE #9
10. FINISH SCHEDULE, FINISH LEGEND AND COLOR
SCHEME INSTRUCTIONS PLATE #10
11. SAMPLE SCHEDULE FOR PLATE 10 PLATE #11
12. EXAMPLE FLOOR PLAN FOR PLATE 10 PLATE #12
13. SAMPLE EXTERIOR COLOR SCHEDULE PLATE #13
14. SAMPLE VICINITY MAP PLATE #14
15. SAMPLE LOCATION MAP PLATE #15
16. HANDICAPPED CHECKLIST (BLANK) PLATE #16
17. ENVIRONMENTAL PERMIT MATRIX (BLANK) PLATE #17
18. GROSS AREA TAKEOFF PLATE #18
19. SUPPORT DOCUMENT COVER SHEET INSTRUCTIONS PLATE #19
20. AIR FORCE FORM 108 - AIR CONDITIONING
LOAD ESTIMATE PLATE #20
21. LIFECYCLE COST SUMMARY FORM PLATE #21
22. DESIGN ANNUAL ENERGY USE (DAE) SUMMARY PLATE #22
23. AMPS ENERGY CONSERVATION COMPLIANCE
CODES INPUT FORM PLATE #23

*17. It hasn't been reviewed,
it hasn't been developed.

PLATE #23

AMRS ENERGY Conservation COMPLIANCE CODES INPUT FORM

SUSPENSE DATE _____

PROJECT NUMBER OR NAME _____
AMRS PROJECT _____
PROJECT DESCRIPTION _____
LOCATION/STATION _____

There are six mandatory AMRS Energy Conservation Input Selections. Please complete the following input and return to the project manager by the suspense date noted above:

1. Data Item 0061- DESIGN ENERGY TARGET (DET) - Enter the Design Energy Target from AEI Table 11-1 (normalized as required) the appropriate table of AF Energy Budget ETL, or other energy budget used by the funding proponent. Up to six numeric characters.

DET = BTU/SQFT/YR

2. Data Item 0062 DESIGN ANNUAL ENERGY USE (DAE) - Enter the calculated Design Annual Energy Use Up to six numeric characters.

DAE = BTU/SQFT/YR

3. Data Item 1245, Character 3 - ENERGY CONSERVATION COMPLIANCE CODE - Select one letter from the following list to indicate the current status of compliance with the required Design Energy Target and enter on the space below:

_____ ENERGY CONSERVATION COMPLIANCE CODE

- A DAE LESS THAN OR EQUAL TO DET - COMPLIES
- B DAE GREATER THAN DET- REDESIGN UNDERWAY
- C DAE GREATER THAN DET- WAIVER REQUESTED
- D DAE GREATER THAN DET- WAIVER APPROVED

4. Data Item 1245, Character 4 - CALCULATION TOOL CODE - Select one letter from the list below to indicate the primary tool or method used to calculate the Design Annual Energy Use reported in Data Item 0062 and enter on the line below:

_____ CALCULATION TOOL CODE

- | | |
|--------------------------------|--------------------------------|
| A BLAST (Harris) | E BLAST (CBC) |
| C BLAST (INTERPRO Stand Alone) | D BLAST (INTERGRAPH Interface) |
| F BLAST (MICRO 386) | H BLAST (OTHER) |
| G BLAST (MACINTOSH) | J DOE 2 (MICRO) |
| I DOE 2 (MAINFRAME) | L OTHER HOUR BY HOUR |
| K ESP II | N ULTRATRACE |
| M TRACE (MAINFRAME) | P CARRIER HAP |
| O TRACE EASY | R CARRIER E20 |
| Q OTHER CONDENSED HOURLY | T ASEAN II |
| S ELITE | V VARIABLE DEGREE DAY |
| U OTHER MODIFIED BIN | X HAND CALCULATIONS |
| W OTHER NOT LISTED ABOVE | |

AMPRO ENERGY CONSERVATION COMPLIANCE CODES INPUT FORM

(Page 2)

5. Data Item 1245, Character 5 - Heating Fuel Code - Select one letter from the list below to indicate the primary heating fuel used in the facility and enter on the line below:

HEATING FUEL CODE		
A	NATURAL GAS (ON SITE)	B FUEL OIL (ON SITE)
C	COAL (ON SITE)	D ELECTRIC HEAT PUMP
E	ELECTRIC RESISTIVE (NEEDS WAIVER)	
F	OTHER ON SITE FUEL (I.E. WOOD REFUSE, ETC.)	
G	CENTRAL SYSTEM (OIL FIRED)	H CENTRAL STEAM (GAS FIRED)
I	CENTRAL STEAM (COAL FIRED)	J CENTRAL STEAM (OTHER)
K	CENTRAL HTHW (OIL FIRED)	L CENTRAL HTHW (GAS FIRED)
M	CENTRAL HTHW (COAL FIRED)	N CENTRAL LOW TEMP HW (GAS)
O	CNTR LOW TEMP HW (OIL)	P CENTRAL LOW TEMP HW (GAS)
Q	CNTR LOW TEMP HW (OTHER)	R PASSIVE SOLAR
S	ACTIVE SOLAR	T RADIANT (OVERHEAD GAS)
U	RADIANT (OVERHEAD ELEC)	V RADIANT (IN SLAB)
W	OTHER (NOT LISTED ABOVE)	X NO HEATING

6. Data Item 1245, Character 6-AIR CONDITIONING CODE - Select one letter from the list below to indicate the status of air-conditioning for the predominate portion of the facility design and place the letter in the space below:

COOLING SYSTEM CODE		
A	MECHANICAL VENTILATION ONLY	
B	MECHANICAL REFRIGERATION (ON SITE ELEC)	
C	MECHANICAL REFRIGERATION (ON SITE GAS)	
D	MECHANICAL REFRIGERATION (ON SITE OTHER FUEL)	
E	MECHANICAL REFRIGERATION (HEAT PUMP)	
F	CENTRAL CHILLED WATER	
G	AIR CONDITIONING (OTHER)	
H	EVAPORATIVE COOLING	

NAME OF PREPARER _____

OFFICE SYMBOL/TEL NO. _____

DATE _____

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PLATE #22
DESIGN ANNUAL ENERGY USE (DAE) SUMMARY

PROJECT:

DESIGN STAGE : DATE

DESIGN ENERGY TARGET (DET) BTU/SF-YR

CALCULATED DAE

HEATING: BTU/SF-YR

COOLING: " "

LIGHTING: " "

** VENTILATION: " "

DOMESTIC HOT WATER: " "

TOTAL: " "

PROCESS LOAD " "

GRAND TOTAL DAE " "

** A calculated "ventilation DAE " is required for buildings only authorized mechanical ventilation or evaporative cooling.

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design. In addition, an "index supplement" will be issued with each "SPK supplement" to track previous and/or current changes to the same design criteria.

6.0. BASIC DESIGN CRITERIA PACKAGE. Upon notification from the COE PM, the District's Design Quality Assurance (DQA) Section will transmit to the A-E a Basic Design Criteria Package. This package contains criteria that, for the most part, is generic to all designs. It includes such documents as the A-E Guide, Volumes 1, 2, and 3; Standard Details, the Seismic Design Manual TMS-809-1, Architectural and Engineering Instructions.) The A-E is requested not to re-request these documents unless absolutely necessary.

7.0. CRITERIA INDEX

7.1. The information that follows has been organized to facilitate the A-E's search for applicable criteria and the subsequent ordering of that criteria through the COE PM. The following pages contain:

7.1.1 DISCIPLINE/SUBJECT LISTING OF CRITERIA. To aid in your search for applicable criteria, this list has been developed with subjects presented in alphabetical order under each major discipline category. Please note that duplicative references to certain criteria may occur from discipline to discipline. Pay close attention to the remarks column. It will tell you if the document is not available from (N.A.F.) the COE.

7.1.2 NUMERICAL CRITERIA INDEX. This can be used as an "order form" simply by making a copy and circling the required documents. This list only contains those documents most frequently requested, therefore the A-E may find it necessary to add document numbers to this list.

7.2. All of the above shall be thoroughly examined by the A-E to make certain that all applicable criteria is utilized and adhered to. For guide specification lists the A-E is directed to the A-E Guide, Volume 3, Specifications.

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DD FORM 1354 DATA SHEETS FOR ARMY PROJECTS

1.0 General. The DD Form 1354 Data Sheet contains a summary of project information that is used by COE construction resident offices in completing the official DD Form 1354 upon completion of construction and transfer of the facility to the owner agency. The A-E shall utilize his design analysis narrative and information and cost estimate quantities and costs in completing the majority of information on the data sheets. Specific instructions for completion of the data sheets are contained on the data sheets themselves. Any questions should be directed to the COE Project Manager. For your convenience the attached blank data sheets are on our Electronic Bulletin Board. For access, contact your COE PM.

2.0 Submittal Requirements.

2.1 Concept/Preliminary Submittals. No submittal required.

2.2 Final Submittal. Submit completed DD Form 1354 Data Sheet with your final design submittal package as an appendix of your Design Analysis (bound separately) (see Chapter III).