UFC 3-710-01A
01 March 2005

UNIFIED FACILITIES CRITERIA (UFC)

CODE 3 DESIGN WITH PARAMETRIC ESTIMATING

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UNIFIED FACILITIES CRITERIA (UFC)

CODE 3 DESIGN WITH PARAMETRIC ESTIMATING

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 802-01, dated 15 May 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 a document of a different number.

FOREWORD

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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.

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US Army Corps of Engineers®

TI 802-01

TECHNICAL INSTRUCTIONS

FOR

CODE 3 DESIGN WITH PARAMETRIC ESTIMATING

15 MAY 1998

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

TECHNICAL INSTRUCTIONS

CODE 3 DESIGN WITH PARAMETRIC ESTIMATING

Approved for public release; distribution is unlimited.

Record of Changes (changes indicated \1\... /1/)

No.	Date	Location

This Technical Instruction supersedes AEI Project Engineering with Parametric Estimating, dated 6 February 1996

FOREWORD

The Code 3 Design with Parametric Estimating process for Military Construction (MILCON) is an excellent project execution tool for installation support. This process fosters quality through customer involvement in the development of project definition, scope and budget cost estimates. It is our obligation to innovate our design process. We must be responsive to the needs of our installations; we must simplify our design and procurement processes. The key to success is to minimize cost and time growth while enhancing quality and customer satisfaction. We are making good progress in these areas.

This Technical Instructions (TI) applies to Major Subordinate Commands (MSC), district commands and technical centers, and other USACE field offices having MILCON responsibilities. This TI is intended to be used by USACE for the Army MILCON projects in support of Army installations, as appropriate, when Code 3 design directives are released.

This TI is effective upon issuance and distributed only in electronic media, primary through ***TECHINFO*** Internet site at ***http://w2.hnd.usace.army.mil/techinfo/ti/paramet.pdf***. Hard copies 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

Technical Instructions
No. 802-01

CODE 3
DESIGN WITH PARAMETRIC ESTIMATING

ENCLOSURE 1. Site/Location Plan Sketch
ENCLOSURE 2. Utilities Site Plan Sketch
ENCLOSURE 3. Functional Space Relationship Diagram
ENCLOSURE 4. Exterior Elevations
ENCLOSURE 5. Parametric Estimating Parameters
ENCLOSURE 6. Parametric Estimate Report
ENCLOSURE 7. ENG Form 3086

TECHNICAL INSTRUCTIONS FOR CODE 3 DESIGN WITH PARAMETRIC ESTIMATING

1. GENERAL.

a. Purpose. The purpose of this Technical Instructions (TI) is to provide design policy and technical guidance to the U.S. Army Corps of Engineers (USACE) for Army Military Construction (MILCON) projects when Code 3 design directives are released. Code 3 design directives are intended to accelerate early execution of project design, provide better definition of customer requirements, improve customer involvement, and implement the use of parametric estimating, at a minimum expenditure of Planning and Design (P&D) funds. The purpose of this TI is to define and develop the scope of a project, its site and cost requirements in sufficient details to assure the Office of the Secretary of Defense (OSD) and the Congress that the Army has an executable project.

b. Applicability. This TI is effective immediately and applies to Major Subordinate Commands (MSC), district commands and technical centers, and other USACE field offices having MILCON responsibilities, herein referred to as the design agency. It supersedes the AEI for Project Engineering with parametric Estimating published on 6 February 1996.

c. Reproduction. Local reproduction of this TI, or any subsequent editions, is authorized.

d. Proponent Office. This TI is a living document and will be periodically reviewed, updated, republished, and redistributed. The proponent office having responsibility for maintaining and publishing this TI is the Cost Engineering and Programs Formulation Branch, Engineering and Construction Division, Directorate of Military Programs, HQUSACE. The point of contact for this TI is Mr. Robert Wong (202) 761-1241, FAX (202) 761-0999, E-MAIL Robert.T.Wong @ USACE.ARMY.MIL. Recommended changes, with the rationale for the changes, should be sent to HQUSACE, ATTN: CEMP-EE, 20 Massachusetts Ave., NW, Washington, D.C. 20314-1000.

2. BACKGROUND.

a. Facilities Planning. During the 1987 Congressional session, the Air Force presented a parametric cost estimating system that could be used to prepare budget estimate submittals for military construction projects. As a result, the Congressional Armed Services Conference Report #101-331, 7 November 1989 (Page 678) stated that the conferees had no objection to the use of parametric facilities planning for the basis of budget requests for military construction projects.

b. Reengineering the Process. The traditional 35 percent project development and budget estimate can be costly and time consuming, especially when considering that some projects fail to be included in the President's budget submitted to the Congress. With the continuing emphasis on the reduction of the cost of doing business, simplification of the project formulation process must be implemented to reduce the efforts and costs of developing preliminary designs so as to minimize design breakage. The paucity of design and resources require the Army to reengineer the project and design development process utilizing Code 3 Design with Parametric Estimating, when applicable. This process:

(1) Allows for the development of reliable budget estimates with minimal project design.

(2) Reduces the design breakage for projects deleted from the MILCON program.

(3) Encourages design schedule continuity.

(4) Permits efficient use of limited P&D funds.

(5) Requires customer participation.

c. Project Application. This TI is applicable, but not be limited to the MCA projects authorized with Code 3 design directives and is best suit for construction projects where DA standard designs, USACE standard designs, design guide sketches, sketch designs or project designs exist that meet the requirements of the customer.

3. REFERENCES. The following up-to-date references should be used with this TI:

a. Project DD Form 1391, Military Construction Project Data.

b. Installation Real Property Master Plan.

c. Local Installation Design Guide, if available.

d. Department of the Army (DA) standard design packages, when applicable.

e. Technical Instructions (TI), Design Criteria, latest edition, and the criteria documents referenced therein.

f. Corps of Engineers Guide Specifications (CEGS).

g. Corps of Engineers Cost Engineering Instructions and Regulations.

(1) Engineering Instruction, EI 01D010, Construction Cost Estimates.

(2) Engineering Regulations, ER 1110-3-1300, Military Programs Cost Engineering.

h. AR 415-15, Army Military Construction Program Development and Execution.

i. Title 10 U.S.C. Sec. 2807(b), Architectural and Engineering Services and Construction Design.

j. Defense Federal Acquisition Regulation Supplement 236.601.

k. ER 5-1-11, Program and Project Management Regulations

4. CODE 3 DESIGN DIRECTIVES.

a. Design Directive. The design process for applicable projects is changed by substituting a Project Definition (PD) phase for the traditional 35 percent design phase. The PD phase will be authorized under a Code 3 design directive. Clear and final project definition requirements will be accomplished by the design agency, with customer involvement throughout the process.

b. Project Definition Services. As stated in AR 415-15, reference 3.h. above, under a Code 3 design release, the design agency will perform the following project definition services as applicable. The project scope and budget cost estimates will be developed based on the final project definition requirements. In the event that there is insufficient design funding, the design agency is responsible to coordinate with HQUSACE, ATTN: CEMP-M, to obtain additional funds or to simplify the project definition requirements as appropriate.

(1) Prepare preliminary sketches of a site plan and area plan showing project features such as proposed buildings, roads, parking areas, etc.

(2) Prepare pre-design level functional relationship diagram showing functional space arrangements.

(3) Review existing geo-technical data to determine possible impact on cost. If existing data is not available or is insufficient, limited geo-technical investigation should be conducted as required.

(4) Identify probable utility connection points.

(5) Provide a summary of environmental issues that would impact the cost of the project and require waivers and permits.

(6) Prepare pre-design level description narrative for mechanical, electrical, structural, and information systems. Determine approximate heating, cooling, and electrical loads.

(7) Identify unusual requirements (for example, special foundations, security and force protective design, asbestos or lead based paint abatement, special considerations, etc.,) that will influence the cost.

(8) Prepare a written report of the basis of design including design assumptions, and economic analysis considerations.

(9) The Code 3 design effort is not complete until it incorporates all valid comments and is approved by the using agency, installation, and MACOM.

(10) Thoroughly involve the user and obtain input and approval throughout all steps of this process.

(11) Prepare a parametric cost estimate based on the complete Code 3 design effort and submit a CWE for budget purposes to HQUSACE by 1 July of design year. This cost estimate is to be submitted electronically via the Eng Form 3086 in the Programming, Administration, and Execution System (PAX). The submitted CWE is to be reviewed, validated, and approved by HQUSACE (CEMP-E) prior to its submission to HQDA (DAIM-FD).

5. DESIGN PROCESS.

a. General

(1) Whenever possible, the same design entity (in-house personnel or an A-E firm) should be used to do the complete design of a project, including both the Code 3 design and final design. This approach maintains continuous design responsibility, and reduces design cost and time. The use of the same design entity for both the Code 3 design and final design depends on the schedule constraints, and procurement of an A-E contract.

(2) If there is sufficient time to contract with the same A-E Firm for both phases, a base contract for the Code 3 design, with an option for the final design, may be negotiated and awarded. The option for final design may not be awarded until receipt of the Code 6 authority and final design funds. Normally Code 6 authorizations will not be issued until September or October of the design year.

(3) If there is not enough time to procure the same A-E firm for both the Code 3 design and final design, the Code 3 design can be done by in-house personnel or by task order under an appropriate A-E indefinite delivery contract. Simultaneously, an A-E firm can be selected for final design. The contract for final design may be negotiated, but may not be awarded until receipt of the Code 6 authority and final design funds.

(4) The Customer. When a Code 3 design directive is received by the design agency, the customer will be immediately notified. The design agency will ensure that the customer is involved at every stage of project development. Customer input is important to establish accurate project requirements that can be translated into quality project definitions.

(5) Design Team. When a Code 3 design directive is received in the design agency, a design team will be established with a designated team leader and representatives from all of the engineering, architectural, cost engineering, and specification writing disciplines as required by ER 5-1-11, Program and Project Management Regulation, reference 3.k.

(a) The goal of the design team is to provide a functional energy efficient, durable, economical and safe facility that meets the expectations of the customer, is aesthetically pleasing, meets the functional and operational requirements of the customer within criteria, budget, and time restraints, is readily constructable with a minimum cost growth during construction, and is easily operable after occupancy.

(b) Each member of the design team will be required to apply his or her technical knowledge to the project, integral with that of the other members in order to satisfy the overall project objectives. Each member is responsible to coordinate with the other team members.

(c) The design team leader will be responsible for coordination with the project manager.

(6) Project Site Meeting. A meeting will be held with the customer, project manager and the design team at the project site to discuss:

(a) The project requirements.

(b) Gather site and other data.

(c) Establish the project costs and schedule.

(7) Charrette Process. A Charrette is an intense design effort to complete or resolve a design problem within a specified period of time and limited Planning and Design funds. Once all

the project data has been gathered and a tentative project scope defined, a Charrette, when applicable, that includes all team members and customers will be held to finalize the project definition, scope, and the parametric cost estimate.

b. Congressional Notification. If the total estimated cost of design, including the Code 3 design, is estimated to exceed $300,000.00, Congressional notification under Title 10 U.S.C. Sec. 2807(b) is required before the initiation of design (see Defense Federal Acquisition Regulation Supplement 236.601). This notification requirement applies whether the design is done by in-house personnel or by A/E contract, or by any combination thereof. Notification is made by OACSIM and communicated through command channels to the design agency.

6. PARAMETRIC COST ESTIMATING.

a. General.

(1) Parametric estimating consists of a computer-based methodology that uses factors based on engineering parameters developed from historical cost databases, construction practices, and engineering and construction technology. These factors include physical properties that describe project definition characteristics, such as size, building type, foundation type, exterior materials, roof type and materials, number of floors, functional space requirements, and utility requirements, etc.

(2) The major advantage of parametric estimating is that it can provide detailed construction cost breakdowns in Tri-Service work breakdown structure (WBS) quickly and at relatively low cost with only limited analysis of the facility.

(3) Parametric estimating is only as good as the effort expended in identifying the key project inputs. It must be based upon an accurately developed project definition and scope. Assumptions, for alternative building systems, must be documented to understand the potential cost problems to the overall project costs.

(4) Parametric estimating efforts are always critical during the development of budgetary estimates for OSD and Congressional appropriation and authorization.

b. Automated Cost Estimating. Using available Tri-Service parametric cost estimating software is highly recommended.

7. REPORT DOCUMENTATION.

A report for the parametric design and cost estimating includes a cover sheet, simplified

sketches, narrative description, and parametric estimate.

a. Cover Sheet. A 215 mm x 280 mm (8 ½" x 11") cover sheet will be provided for all projects. The cover sheet shall indicate the name and location of the design agency, name of the project and installation, the Fiscal Year, and approval signature blocks for the customer (Installation Commander) and the design agent (District Engineer). Other signature blocks may be provided, such as the Director for Public Works, Military Unit Commander designated to be the end-user, and/or the Chief, Engineering Division in the design agency.

b. Simplified Sketches. Simplified sketch drawings will be used to present the scope of projects, when applicable. All sketches should be high quality, clear, concise and uncluttered by extraneous detail for ease of reading.

(1) Format. Sketch drawings should be presented on 215 mm x 280 mm (8 ½" x 11") letter size sheets or, if necessary, with 280 mm x 430 mm (11" x 17") fold-out sheets, but no larger. A graphic bar scale and North Arrow should be provided on each separate sketch. A site/location plan, utilities site plan, floor plan or plans, and exterior elevations of the primary facility or facilities should be included, if applicable. A cross-section may be provided if appropriate. Freehand drafting and lettering is encouraged; however, Computer Aided Drafting (CAD) or a combination of freehand and CAD is recommended if it expedites project development.

(2) Site/Location Plan.

(a) At Enclosure 1 is a Sample Site/Location Plan Sketch. If necessary, site and location plans may be presented on separate sheets.

(b) As much of the project area as necessary should be included to convey meaningful information to someone who has not visited the location. The following should be included:

- Project location in relation to major landmarks or features on the installation.

- Proximity of related facilities which could influence the project operation.

- Major project features such as buildings, roads, parking areas, etc.

(c) Inserts with an overall view of the installation should be used to show widely separated but related facilities.

(d) Sketches for pavement projects only can be effectively shown by a combined

site/location plan and cross-sections.

(e) In the event that there is no selected site for the project, or if the project is moved to another site during the course of project development, then HQUSACE, ATTN: CEMP-M will be immediately notified by the design agency.

(3) Utilities Site Plans, if applicable.

(a) At Enclosure 2 is a Sample Utilities Site Plan Sketch.

(b) Utilities site sketches should be prepared based on accurate information obtained during on-site visits and surveys or based on previous information available if sufficiently accurate. The building location, the size and capacities of existing utilities and their connection points, and the estimated size and capacities of new utilities needed for the project, including electric, water, gas, steam, voice and data communication and other utilities, should be shown.

(c) Sketches for utility projects only can be shown by a combined site/location plan with a key for utility system identification.

(4) Floor Plans, Exterior Elevations and Cross-Sections, if applicable.

(a) DA standard designs must be used when applicable.

(b) At Enclosure 3 is a Sample Functional Space Relationship Diagram. Floor plan or plans in simple sketch form, either single line or double lines as appropriate, for buildings and structures should be provided showing functional spaces and areas, utilization, and major pieces of building equipment. DA standard designs will be photocopy reduced to the 215 mm x 280 mm (8 ½" x 11") letter size format. Only significant layouts and dimensions should be shown. The proposed use of partitioned areas on the floor plan or plans should be shown using standard and well known room designations. A numbering system should be used that is keyed to descriptions to label functional areas if space is limited on the sketch drawings. A typical room or module with its basic dimensions should be used where appropriate for repetitive areas such as in UEPH.

(c) At Enclosure 4 is a Sample Exterior Elevation and Cross-Section. Exterior elevations and cross-sections should be provided to facilitate visualizing the project, if applicable. The architectural style, significant materials and dimensions, if available, should be clearly shown in the exterior elevations.

(d) Isometric sketches are optional and may be used if necessary for clarification of the project. Isometric sketches should only be used when necessary to show details that are not

readily evident from the floor plans and exterior elevations.

c. Narrative Report. A narrative report in 215 mm x 280 mm (8 ½" x 11") letter size format will be prepared indicating information, as appropriate, but not shown on the sketch drawings. The report should be typed. The use of personnel computers (PC) to generate the report is encouraged. This report should include, but not be limited to, the following:

(1) Minutes of all investigative and fact finding conferences and meetings with the customer, including the results of the Charrette, when applicable.

(2) A general summary statement indicating the basic project design, including, but not limited to, design assumptions, preliminary calculations, economic analysis considerations, fire protection, and life safety and energy conservation considerations. The total cost of these features must be also included in the Code 3 design. Systems, equipment and materials listed as design requirements must be validated as environmentally sound, technically feasible accordance with the criteria requirements outlined in the TI for Design Criteria, reference 3.e.

(a) In addition, an energy and water conservation narrative will be provided, verifying that the design complies with all Federal energy and water conservation criteria, and incorporates feasible, functional and cost effective energy and water conservation alternatives. Innovative energy and water conservation designs, such as solar, thermal storage, desiccant cooling, and grey water will be considered, and where cost effective, will be included in the Code 3 design. The TI for Design Criteria, the Corps of Engineers Guide Specifications, and other criteria include Federal requirements for energy and water conservation.

(b) Special type contracting alternatives, such as Demand Side Management, Performance Contracting , and available utility rebate programs will be pursued to the maximum extent possible and included in the Code 3 design, when applicable.

(3) Results of the survey of the site, soil borings, subsurface investigations if required, and existing utilities including their capacities and expansion capabilities, and other site data. If applicable, indicate the type of heat distribution systems (for example, high temperature water, low temperature heating water, steam) and indicate whether the system will be above ground, shallow concrete trench or direct buried pipe.

(4) An architectural compatibility statement indicating conformance to the Installation Design Guide, if available.

(5) A description of the floor and roof loads (dead and live loads), wind loads, seismic requirements, and any unusual structural spans, if applicable.

(6) A listing of all applicable fire and life safety codes.

(7) A description of structural, mechanical, electrical, fire protection and information systems, as well as preliminary heating, cooling and electrical load calculations, if applicable.

(8) A description of off-site utilities requirements, including central energy plants, if applicable.

(9) A description of unique design features, such as special foundations, security and protective design, asbestos or lead base paint abatement, as well as the demolition and removal of existing facilities, if required.

(10) A description of interior design requirements, and the procurement of furniture and furnishings, if applicable.

(11) A description of government furnished and installed equipment, such as food service equipment, that will be procured by the installation or using agency, if applicable.

(12) A general summary statement indicating environmental issues and identifying required waivers and permits.

(13) Special studies and analyses will be kept to a minimum during the Code 3 phase. When applicable, Code 3 studies should include the energy and water conservation analyses, the energy budget compliance check, and other studies that will normally impact on construction costs. Each project must be analyzed to determine which studies may be delayed until the Code 6 final design.

d. Parametric Cost Estimates.

(1) Format. The parametric estimates and the ENG Form 3086 will be prepared in accordance with latest Tri-Service work breakdown structure (WBS) for military construction cost estimates as described in the references g.(1) and g.(2) respectively, and submitted in 215 mm x 280 mm (8 ½" x 11") letter size format.

(2) Parameters. Enclosure 5 is a listing of typical parametric estimating parameters.

(3) Cost Estimate WBS. Enclosure 6 provides a sample WBS of parametric cost estimate.

(4) ENG Form 3086. Enclosure 7 provides a sample ENG Form 3086.

e. Reproduction and Printing

(1) General. All printing must be clear and easily read. Particular care must be exercised so that reducing the sketch drawings does not render the printing unreadable. The sketch drawings, narrative report and parametric estimate will be reproducible by photocopying.

(2) Sheet Sizes. Copying machine-sized sheets, 215 mm x 280 mm (8 ½" x 11") and/or 280 mm x 430 mm (11" x 17") for sketch drawings will be used to the maximum extent possible.

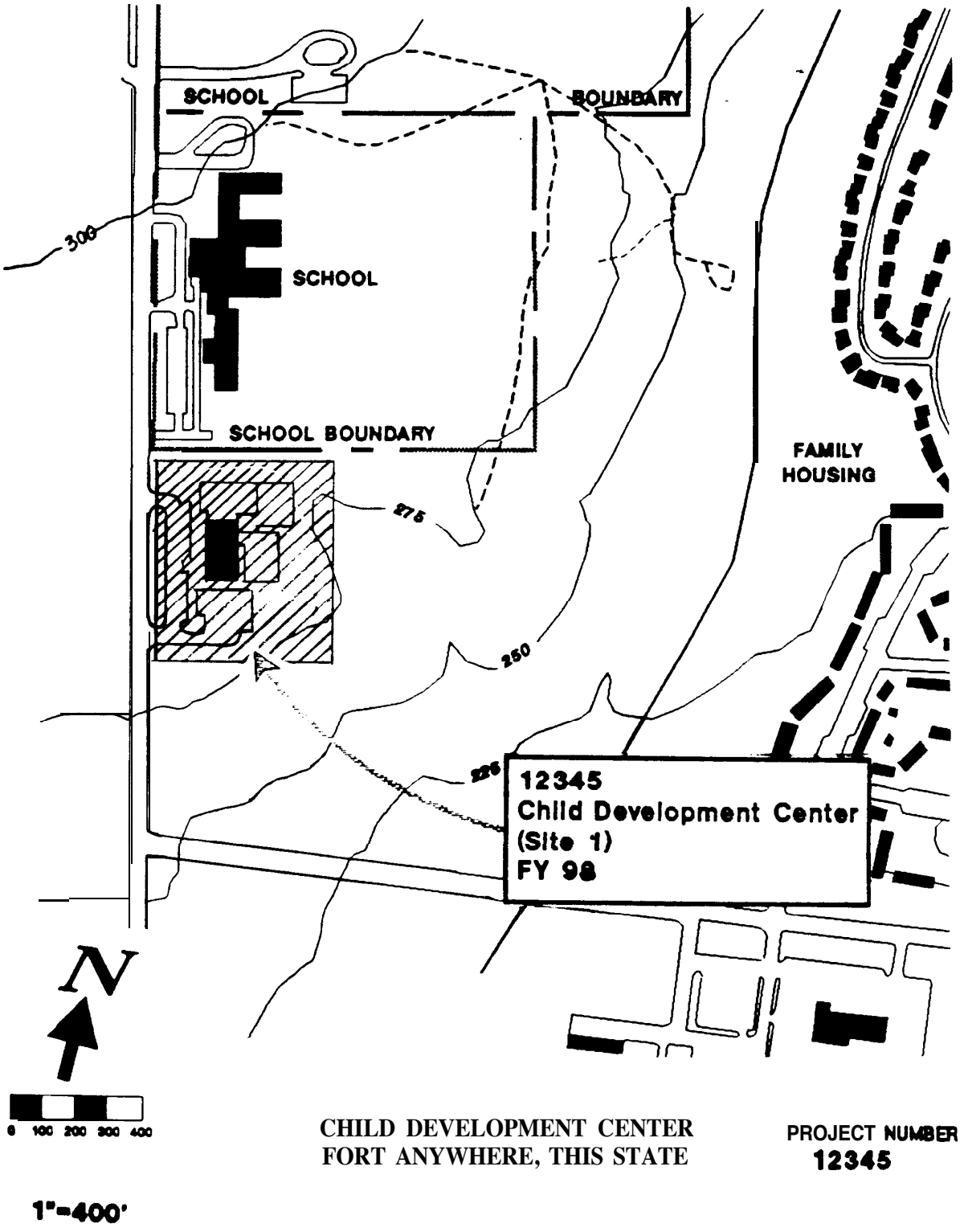
(3) Photocopying. The use of photocopying machines is extremely beneficial and is one of the keys to the simplification of the Code 3 design release process.

(a) Existing drawings for location plans, site plans, and building floor plans from standard designs should be photo-reduced and used, provided they are legible when reproduced. Exterior elevations and cross-sections from standard designs should also be used when applicable to the requirements of the project.

(b) An alterative to the copy machine is the use of a graphic scanner and Computer Aided Design and Drafting (CADD) system. Scanned existing drawings for location plans, site plans and building floor plans from standard designs can be modified and vectorized, if need be, on the CADD and prepared for final presentation. The quality of the final drawings will often depend on the quality of the drawings being scanned.

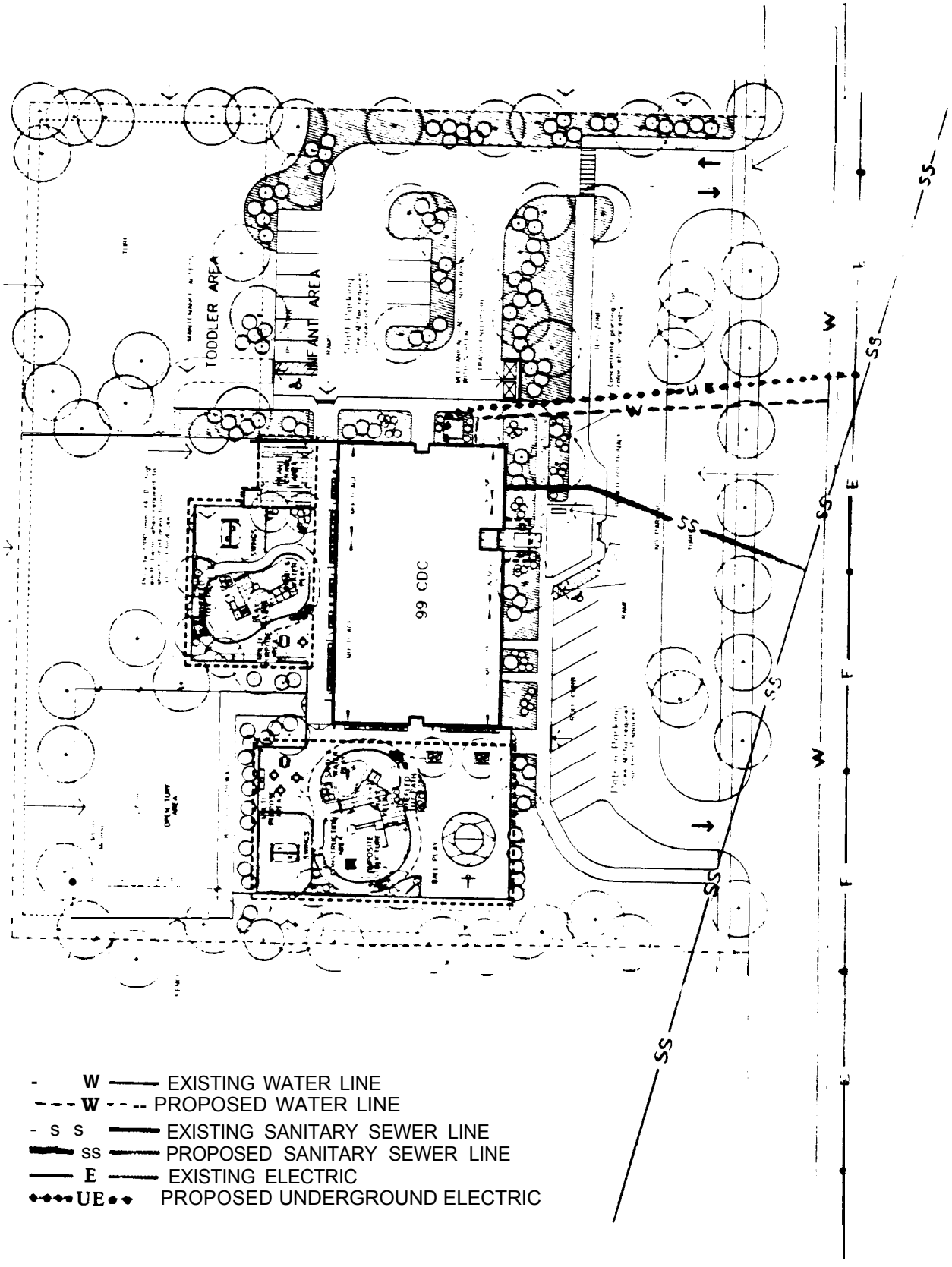
f. Submittals. The report documentations for projects developed by Code 3 design directives will be submitted by the design agency, to the installation for review and approval. An electronic ENG Form 3086 based on the parametric estimate will be submitted to HQUSACE, ATTN: CEMP-EE, not later than 1 July of the Design Year.

7 Encls



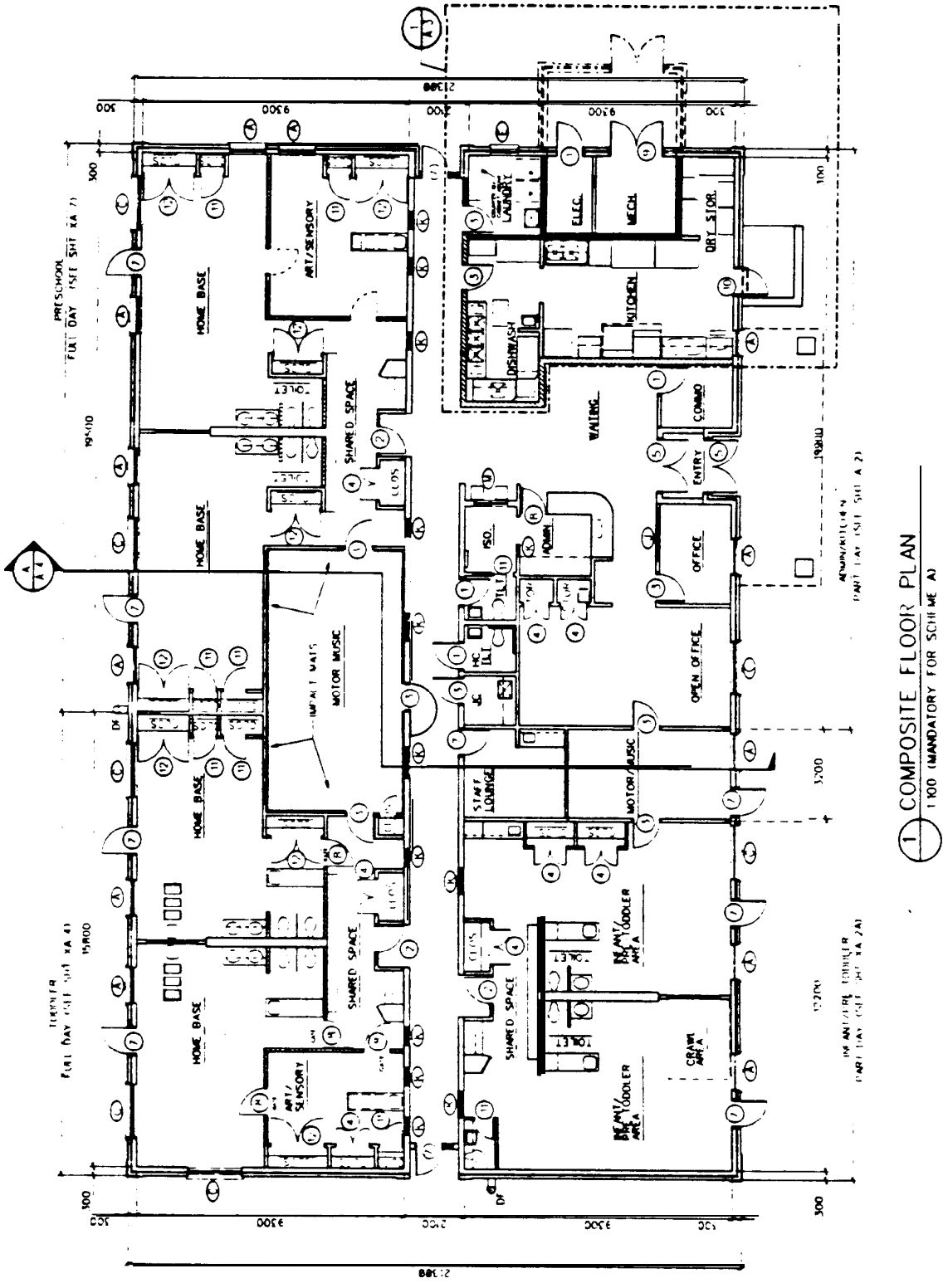
SITE/LOCATION PLAN SKETCH

Enclosure 1



UTILITIES SITE SKETCH PLAN

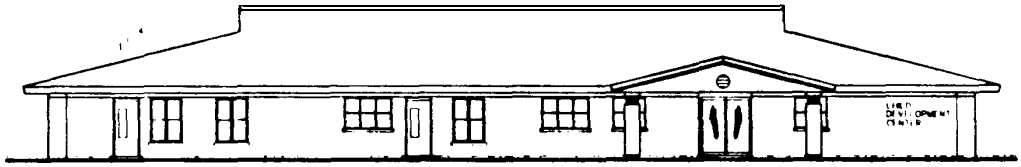
Enclosure 2



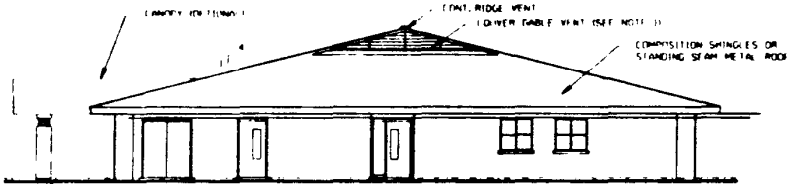
-FUNCTIONAL SPACE RELATIONSHIP DIAGRAM

Enclosure 3

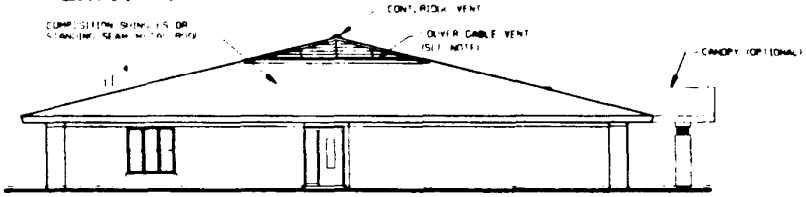
NORTH ELEVATION



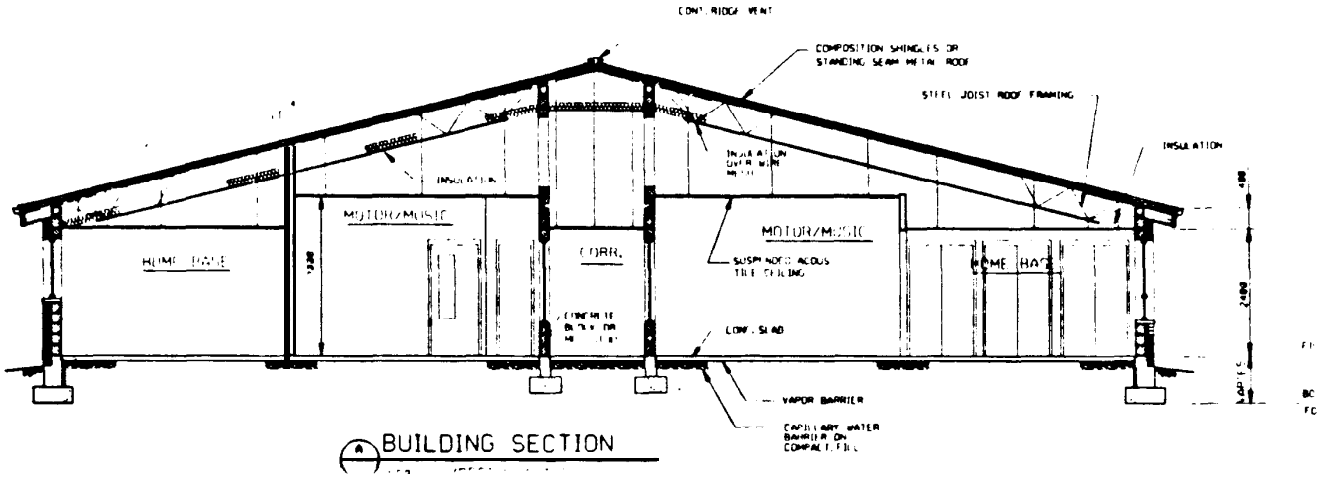
SOUTH ELEVATION



EAST ELEVATION



WEST ELEVATION



BUILDING SECTION

EXTERIOR ELEVATIONS

Enclosure 4

PARAMETRIC ESTIMATING PARAMETERS

1. FACILITY PARAMETERS
   a. Total facility scope
   b. Number of stories above grade.
   c. Number of stories below grade.
2. LOCATION MODIFIERS.
   a. Seismic zone.
   b. Summer day temperature (degrees).
   c. Winter day temperature (degrees).
   d. Frost line depth (millimeters).
3. FUNCTIONAL SPACE AREAS.
   a. Office areas (closed)
   b. Office areas (open).
   c. Data processing rooms.
4. QUANTITY PARAMETERS.
   a. Footprint (square meters).
   b. Perimeter (meters).
   c. Roof area (square meters).
   d. Floor to floor height above grade (meters).
   e. Floor to floor height below grade (meters).
   f. Exterior wall area (square meters).
   g. Exterior window area (square meters).
   h. Exterior doors (each).
   i. Floor to ceiling height above grade (meters).
   j. Floor to ceiling height below grade (meters).
   k. Number of stairwells (each).
   l. Number of elevators (each).
   m. Heating load (MBH).
   n. Cooling load (tons).
   o. Electric load (amps).
   p. Plumbing, domestic water supply (each).
   q. Plumbing, sanitary water system (each).
5. DESCRIPTIVE PARAMETERS.
   a. Soil type.
   b. Floor structure.
   c. Roof structure.
   d. Span length.
   e. Stair type.
   f. Exterior wall type.
   g. Wall back up.
   h. Heating system.
   i. Cooling system.
6. DENSITY PARAMETERS BY FUNCTIONAL SPACE AREA.
   a. Interior doors (each).
   b. Interior wall finishes (square meters).
   c. Interior partitions (square meters).
   d. Plumbing fixtures (each).
7. PROJECT MODIFIERS.
   a. Start of construction.
   b. Construction duration.
8. SITE WORK PARAMETERS.
   a. Grading and Drainage.
   b. Landscaping.

Enclosure 5

REQUIRED BUILDING PARAMETERS

BUILDING NAME: Child Care Center

Seismic Zone Calculated Values Switch - On
Structure Dimensions Calculated Values Switch - On
Total Facility Scope [SF]: 9152.00
Actual Gross Scope [SF]: 9152.00
Structure Dimensions (Model) - Footprint [SF]: 9152.00
Structure Dimensions (User) - Footprint [SF]: 9152.00
Structure Dimensions (Model) - Perimeter [LF]: 391.00
Structure Dimensions (User) - Perimeter [LF]: 391.00
Structure Dimensions (Model) - Roof Area [SF]: 9494.00
Structure Dimensions (User) - Roof Area [SF]: 9494.00
Structure Dimensions (Model) - Floor - Floor Height Above Ground [FT]: 15.00
Structure Dimensions (User) - Floor - Floor Height Above Ground [FT]: 15.00
Structure Dimensions (Model) - Floor - Floor Height Below Ground [FT]: 0.00
Structure Dimensions (User) - Floor - Floor Height Below Ground [FT]: 0.00
Structure Dimensions (Model) - Exterior Wall Area [SF]: 8136.00
Structure Dimensions (Model) - Exterior Window Area [SF]: 8136.00
Structure Dimensions (User) - Exterior Wall Area [SF]: 8136.00
Structure Dimensions (User) - Exterior Window Area [SF]: 8136.00
Interior Parameters (Model) - Exterior Doors [EA]: 10.00
Interior Parameters (User) - Exterior Doors [EA]: 10.00
Interior Parameters (Model) - Exterior OH Door & Special Doors [EA]: 0.00
Interior Parameters (User) - Exterior OH Door & Special Doors [EA]: 0.00
Interior Parameters (Model) - Floor to Ceiling Height Above Grade [FT]: 10.00
Interior Parameters (User) - Floor to Ceiling Height Above Grade [FT]: 10.00
Interior Parameters (Model) - Floor to Ceiling Height Below Grade [FT]: 0.00
Interior Parameters (User) - Floor to Ceiling Height Below Grade [FT]: 0.00
Interior Parameters (Model) - Number of Stairwells [EA]: 0.00
Interior Parameters (User) - Number of Stairwells [EA]: 0.00
Interior Parameters (Model) - Number of Elevators [EA]: 0.00
Interior Parameters (User) - Number of Elevators [EA]: 0.00
MEP Parameters (User) - Heating Load [MBH]: 519.00
MEP Parameters (User) - Cooling Load [TONS]: 15.17
MEP Parameters (Model) - Plumbing Domestic H20 Supply Fixtures [EA]: 7.00
MEP Parameters (User) - Plumbing Domestic H20 Supply Fixtures [EA]: 7.00
MEP Parameters (Model) - Sanitary Waste System Fixtures [EA]: 17.00
MEP Parameters (User) - Sanitary Waste System Fixtures [EA]: 17.00
MEP Parameters (Model) - Plumbing Special System Fixtures [EA]: 1.00
MEP Parameters (User) - Plumbing Special System Fixtures [EA]: 1.00
MEP Parameters (Model) - Plumbing Equipment [EA]: 1.00
MEP Parameters (User) - Plumbing Equipment [EA]: 1.00
MEP Parameters (Model) - Electrical Load [Amps]: 1150.00
MEP Parameters (User) - Electrical Load [Amps]: 1150.00
Winter Dry Bulb: 22.00
Summer Dry Bulb: 94.00
Seismic Zone: Minor Damage
Frost line Depth [In]: 3.00

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TRACES PBMW SYSTEM FOR WINDOWS
PARAMETER REPORT

Soil Bearing Capacity: Average 2000-3500 PSF (Default)
Floor Structure: Steel Frame Lt Load-Mtl Joist-Stl Deck w/Conc Fill
Roof Structure: Load Bear Msnry Ext Wall - Mtl Joist w/Stl Roof Deck
Stair Type: Metal Pan
Exterior wall Type: Brick Veneer
Wall Backup: 8 in. Masonry / Painted
Roof Type: Standing Seam metal
Heating System: N/A
Cooling System: Reciprocating-Direct Expansion

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
01 SUBSTRUCTURE									
0101 STANDARD FOUNDATION									
010101 WALL FOUNDATIONS			$5,231	$9,939	$247	$15,417			
010102 COLUMN FOUNDATIONS & PILE CAPS			$329	$1,417	$23	$1,769			
TOTAL SUBSYSTEM 0101 STANDARD FOUNDATION			$5,560	$11,356	$270	$17,186			1.20%
Subsystem Units [SF]: 9,520							$1.81		
0103 SLAB ON GRADE									
010301 STANDARD SLAB ON GRADE			$6,223	$17,573	$1,204	$24,999			
TOTAL SUBSYSTEM 0103 SLAB ON GRADE			$6,223	$17,573	$1,204	$24,999			1.74%
Subsystem Units [SF]: 9,520							$2.63		
TOTAL SYSTEM 01 SUBSYSTEM	9,520		$11,783	$28,929	$1,474	$42,185			2.94%
							$4.44		
02 SUPERSTRUCTURE									
0202 ROOF CONSTRUCTION			$12,622	$32,655	$4,696	$49,973			
020201 STRUCTURAL FRAME			$12,622	$32,655	$4,696	$49,973			3.48%
TOTAL SUBSYSTEM 0202 ROOF CONSTRUCTION									
Subsystem Units [SF[:							$0.00		
TOTAL SUBSYSTEM 02 SUPERSTRUCTURE			$12,622	$32,655	$4,696	$49,973			3.48%

Costs are inclusive of all markups (Contract Cost).

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
03 EXTERIOR CLOSURE									
0301 EXTERIOR WALLS									
030101 EXTERIOR SKIN			$22,109	$28,692	$608	$51,410			
030102 INSULATION & VAPOR BARRIER			$55	$256	$1	$313			
030103 INTERIOR SKIN			$5,503	$4,321	$170	$9,994			
030108 EXTERIOR SOFFITS			$683	$3,048	$50	$3,780			
TOTAL SUBSYSTEM 0301 EXTERIOR WALLS			$28,350	$36,317	$830	$65,497			4.56%
Subsystem Units [SF]:							$0.00		
0302 EXTERIOR WINDOWS									
030201 WINDOWS			$2,827	$20,528	$53	$23,408			
TOTAL SUBSYSTEM 0302 EXTERIOR WINDOWS			$2,827	$20,528	$53	$23,408			1.63%
Subsystem Units [SF]:							$0.00		
0303 EXTERIOR PERSONNEL DOORS									
030301 GLAZED DOORS			$2,715	$15,841	$67	$18,624			
030302 SOLID DOORS			$627	$3,117	$19	$3,763			
TOTAL SUBSYSTEM 0303 EXTERIOR PERSONNEL DOORS			$3,342	$18,958	$86	$22,387			1.56%
Sunsystem Units [EA]:							$0.00		
TOTAL SUBSYSTEM 03 EXTERIOR CLOSURE			$34,519	$75,803	$970	$111,292			7.75%
0									
04 ROOFING									
0401 ROOFING									
040101 ROOF COVERINGS			$3,092	$86,612	$1,635	$91,339			
040103 ROOF INSULATION & FILL			$2,128	$7,074	$48	$9,250			

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
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SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
0401 ROOFING									
040105 ROOF OPENINGS & SUPPORTS			$279	$310	$9	$599			
040106 GUTTERS AND DOWNSPOUTS			$878	$1,101	$30	$2,009			
TOTAL SUBSYSTEM 0401 ROOFING			$6,377	$95,097	$1,723	$103,197			7.19%
Subsystem Units [SF]:							$0.00		
TOTAL SYSTEM 04 ROOFING			$6,377	$95,097	$1,732	$103,197			7.19%
0									
05 INTERIOR CONSTRUCTION									
0501 PARTITIONS									
050101 FIXED PARTITIONS			$3,236	$12,065	$179	$18,480			
050103 RETRACTABLE PARTITIONS			$3,460	$27,731	$96	$31,287			
050104 INTERIOR BALUSTRADES & SCREENS			$54	$859	$8	$921			
050105 INTERIOR WINDOWS			$732	$4,090	$10	$4,832			
050106 GLAZED PARTITIONS & STOREFRONTS			$236	$1,349	$4	$1,589			
TOTAL SUBSYSTEM 0501 PARTITIONS			$10,718	$46,094	$297	$57,109			3.98%
Subsystem Units [SF]: 9,149							$6.24		
0502 INTERIOR PERSONNEL DOORS									
050201 STANDARD INTERIOR DOORS			$8,754	$23,275	$269	$32,298			
050202 GLAZED INTERIOR DOORS			$2,595	$12,887	$75	$1,557			
050203 FIRE DOORS			$1,504	$6,079	$47	$7,630			
TOTAL SUBSYSTEM 0502 INTERIOR PERSONNEL DOORS			$12,853	$42,241	$391	$55,485			3.87%
Subsystem Units [LEF]: 79							$702.35		
0504 INTERIOR SPECIALTIES									
050401 COMPARTMENTS, CUBICLES, AND TOILET PARTITIONS			$379	$3,119	$10	$3,508			

TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
0504 INTERIOR SPECIALTIES									
050402 TOILET & BATH ACCESSORIES			$750	$7,089	$20	$7,859			
050403 CHALKBOARDS & TACKBOARDS			$82	$296	$2	$380			
050404 IDENTIFYING DEVICES			$22	$253	$1	$276			
050405 LOCKERS			$648	$7,194	$22	$7,864			
050406 SHELVING			$697	$2,756	$25	$3,478			
050407 FIRE EXTINGUISHER CABINETS			$621	$3,277	$16	$3,915			
TOTAL SUBSYSTEM 0504 INTERIOR SPECIALTIES			$3,200	$23,983	$96	$27,279			1.90%
0505 CASEWORK									
050501 COUNTERS			$1	$10	$0	$11			
050502 CABINETS			$3,561	$35,946	$97	$39,604			
TOTAL SUBSYSTEM 0505 CASEWORK			$3,561	$35,956	$97	$39,615			2.76%
TOTAL SYSTEM 05 INTERIOR CONSTRUCTION			$30,333	$148,275	$882	$179,489			12.51%
06 INTERIOR FINISHES									
0601 WALL FINISHES									
060102 PLASTER WALL FINISHES			$408	$1,088	$30	$1,526			
060103 GYPSUM WALLBOARD FINISHES			$12,070	$10,372	$330	$22,772			
060104 TILE & TERRAZZO WALL FINISHES			$212	$727	$6	$945			
060105 PAINTING TO WALL			$2,112	$8,252	$97	$10,461			
060106 WALL COVERINGS			$2,741	$14,031	$55	$16,826			
060107 ACOUSTICAL TILES & PANELS TO WALLS			$959	$1,082	$25	$2,066			
TOTAL SUBSYSTEM 0601 WALL FINISHES			$18,502	$35,553	$542	$54,596			3.80%
0602 FLOORING & FLOOR FINISHES									
060201 TILE FLOOR FINISHES			$232	$898	$6	$1,136			

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
0602 FLOORING & FLOOR FINISHES									
060204 RESILIENT FLOORING			$833	$4,207	$23	$5,062			
060205 CARPETING			$2,242	$14,502	$52	$16,796			
060206 MASONRY & STONE FLOORING			$453	$685	$12	$1,123			
TOTAL SUBSYSTEM 0602 FLOORING & FLOOR FINISHES			$3,759	$20,266	$94	$24,118			1.68%
0603 CEILING & CEILING FINISHES									
060303 GYPSUM WALLBOARD CEILING FINISHES			$1,267	$1,320	$35	$2,622			
060304 ACOUSTIC CEILING TILES & PANELS			$1,496	$4,421	$39	$5,956			
060306 PAINTING & STAINING CEILINGS			$168	$682	$8	$857			
060307 SUSPENSION SYSTEM			$4,959	$7,305	$145	$12,409			
TOTAL SUBSYSTEM 0603 CEILING & CEILING FINISHES			$7,889	$13,728	$227	$21,844			1.52%
TOTAL SYSTEM 06 INTERIOR FINISHES			$30,150	$69,546	$863	$100,559			7.01%
08 PLUMBING									
0801 PLUMBING FIXTURES									
080101 WATER CLOSETS			$1,120	$6,062	$43	$7,225			
080102 URINALS			$153	$926	$6	$1,086			
080103 LAVATORIES			$1,057	$4,116	$41	$5,213			
080104 SINKS			$743	$1,248	$29	$2,021			
080106 DRINKING FOUNTAINS & COOLERS			$231	$659	$9	$899			
080190 OTHER PLUMBING FIXTURES			$140	$1,728	$4	$1,872			
TOTAL SUBSYSTEM 0801 PLUMBING FIXTURES Subsystem Units [EA]: 41			$3,443	$14,740	$132	$18,315	$446.71		1.28%
0802 DOMESTIC WATER SUPPLY									
080201 PIPE & FITTINGS			$8,089	$10,887	$406	$19,382			

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
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SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
0802 DOMESTIC WATER SUPPLY									
080202 VALVES & HYDRANTS			$50	$435	$2	$487			
080204 INSULATION & IDENTIFICATION			$1,779	$4,667	$54	$6,499			
080205 SPECIALTIES			$16	$45	$1	$62			
TOTAL SUBSYSTEM 0802 DOMESTIC WATER SUPPLY			$9,934	$16,034	$462	$26,430			1.84%
Subsystem Units [EA]:							$0.00		
0803 SANITARY WASTE & VENT SYSTEM									
080301 WASTE PIPE & FITTINGS			$3,461	$7,457	$132	$11,050			
080302 VENT PIPE & FITTINGS			$542	$506	$21	$1,069			
080303 FLOOR DRAINS			$87	$406	$3	$496			
TOTAL SUBSYSTEM 0803 SANITARY WASTE & VENT SYSTEM			$4,090	$8,369	$156	$12,615			0.88%
Subsystem Units [EA]:							$0.00		
0805 PLUMING EQUIPMENT									
080501 DOMESTIC WATER SUPPLY EQUIPMENT			$85	$4,847	$3	$4,935			
TOTAL SUBSYSTEM 0805 PLUMING EQUIPMENT			$85	$4,847	$3	$4,935			0.34%
Subsystem Units [EA]:							$0.00		
TOTAL SYSTEM 08 PLUMBING			$17,553	$43,990	$753	$62,296			4.34%
Subsystem Units [EA]:	41						$1,519.40		
09 H.V.A.C.									
0901 ENERGY SUPPLY									
090102 GAS SUPPLY SYSTEM			$394	$1,687	$15	$2,096			
TOTAL SUBSYSTEM 0901 ENERGY SUPPLY			$394	$1,687	$15	$2,096			0.15%
Subsystem Units [MBH]:							$0.00		
0902 HEAT GENERATING SYSTEM									

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
090202 HOT WATER BOILERS AND PIPING			$3,208	$32,924	$345	$36,476			
090204 FUEL FIRED UNIT HEATERS			$525	$2,179	$17	$2,721			
TOTAL SUBSYSTEM 0902 HEAT GENERATING SYSTEM			$3,733	$35,102	$362	$39,197			2.73%
Subsystem Units [MBH]:							$0.00		
0903 COOLING GENERATING SYSTEM									
090301 CHILLED WATER SYSTEMS			$4,467	$38,407	$295	$43,169			
TOTAL SUBSYSTEM 0903 COOLING GENERATING SYSTEM			$4,467	$38,407	$295	$43,169			3.01%
Subsystem Units [MBH]:							$0.00		
0904 DISTRIBUTION SYSTEMS									
090401 AIR DISTRIBUTION, COOLING AND HEATING			$15,311	$38,742	$578	$54,631			
090407 EXHAUST VENTILATION SYSTEMS			$1,294	$4,615	$51	$5,959			
TOTAL SUBSYSTEM 0904 DISTRIBUTION SYSTEMS			$16,605	$43,357	$629	$60,590			4.22%
Subsystem Units [MBH]:							$0.00		
0906 CONTROLS & INSTRUMENTATION									
090601 HVAC CONTROLS			$15,123	$31,208	$254	$46,585			
TOTAL SUBSYSTEM 0906 CONTROLS & INSTRUMENTATION			$15,123	$31,208	$254	$46,585			3.25%
Subsystem Units [MBH]:							$0.00		
0907 SYSTEMS TESTING & BALANCING									
090701 WATER SIDE TESTING & BALANCING, HEATING AND COOLING			$1,026	$486	$35	$1,546			
090702 AIR SIDE TESTING & BALANCING, HEATING & EXH SYST			$4,862	$546	$164	$5,572			
TOTAL SUBSYSTEM 0907 SYSTEMS TESTING & BALANCING			$5,888	$1,032	$199	$7,118			0.50%
Subsystem Units [MBH]:							$0.00		

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
TOTAL SYSTEM 09 H.V.A.C.			$46,210	$150,793	$1,754	$198,756			13.58%
Subsystem Units [MBH]: 0									
10 FIRE PROTECTION SYSTEMS									
1001 WATER SUPPLY (FIRE PROTECTION)									
100101 WATER SUPPLY EQUIPMENT & PIPING			$1,575	$14,394	$591	$16,560			
TOTAL SUBSYSTEM 1001 WATER SUPPLY (FIRE PROTECTION)			$1,575	$14,394	$591	$16,560			1.15%
Subsystem Unite [EA]:							$0.00		
1002 SPRINKLERS									
100201 SPRINKLER HEADS & RELEASE DEVICES			$0	$9,915	$0	$9,915			
TOTAL SYSTEM 1002 SPRINKLERS			$0	$9,915	$0	$9,915	$0.00		0.69%
Subsystem Unite [EA]:									
1004 FIRE EXTINGUISHERS									
100401 FIRE EXTINGUISHING DEVICES			$47	$151	$2	$199			
TOTAL SUBSYSTEM 1004 FIRE EXTINGUISHERS			$47	$151	$2	$199			0.01%
Subsystem Units [EA]:							$0.00		
TOTAL SYSTEM 10 FIRE PROTECTION SYSTEMS			$1,622	$244,559	$593	$26,674			1.86%
11 ELECTRIC POWER & LIGHTING									
1101 SERVICE AND DISTRIBUTION									
110101 MAIN TRANSFORMER			$1,355	$19,316	$77	$20,748			
110102 SECONDARY			$1,201	$6,054	$29	$7,285			
110104 INTERIOR DISTRIBUTION TRANSFORMERS			$810	$4,037	$47	$4,893			
110105 PANELS			$5,476	$13,490	$57	$19,024			

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
TOTAL SUBSYSTEM 1101 SERVICE AND DISTRIBUTION			$8,842	$42,897	$211	$51,950			3.62%
Subsystem Units [AMP]:							$0.00		
1102 LIGHTING & BRANCH WIRING									
110201 BRANCH WIRING			$8,190	$10,455	$82	$18,727			
110202 LIGHTING EQUIPMENT			$20,072	$18,738	$215	$39,025			
TOTAL SUBSYSTEM 1102 LIGHTING & BRANCH WIRING			$28,262	$29,193	$297	$57,752			4.02%
TOTAL SYSTEM 11 ELECTRIC POWER & LIGHTING			$37,104	$72,090	$508	$109,702			7.64%
12 ELECTRICAL SYSTEMS									
1201 COMMUNICATION, SECURITY & ALARM SYSTEMS									
120101 FIRE ALARM SYSTEMS			$12,324	$10,407	$131	$22,863			
120103 TELEPHONE SYSTEMS			$1,026	$815	$11	$1,852			
120107 TELEVISION SYSTEMS			$338	$1,317	$3	$1,658			
TOTAL SUBSYSTEM 1201 COMMUNICATION, SECURITY, & ALARM SYSTEMS			$13,688	$12,539	$145	$26,372			1.84%
TOTAL SYSTEM 12 ELECTRICAL SYSTEMS			$13,688	$12,539	$145	$26,372			
13 EQUIPMENT									
1301 FIXED & MOVEABLE EQUIPMENT									
130108 MISC. COMMON FIXED & MOVEABLE EQUIPMENT			$220	$2,031	$4	$2,255			
TOTAL SUBSYSTEM 1301 FIXED & MOVEABLE EQUIPMENT			$220	$2,031	$4	$2,255			0.16%
TOTAL SYSTEM 13 EQUIPMENT			$220	$2,031	$4	$2,255			0.16%

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
17 SITE PREPARATION									
1701 SITE CLEARING									
170101 CLEARING			$2,426	$0	$4,227	$6,653			
170102 TREE REMOVAL			$348	$0	$2,282	$2,630			
170103 STUMP REMOVAL			$1,391	$0	$9,128	$10,519			
170105 GRUBBING			$357	$0	$1,199	$1,556			
TOTAL SUBSYSTEM 17 SITE PREPARATION			$4,522	$0	$16,835	$21,358			1.49%
Subsystem units [ACRE]:							$0.00		
1702 SITE DEMOLITION & RELOCATION									
170204 DEBRIS DISPOSAL			$0	$5,634	$0	$5,634			
TOTAL SUBSYSTEM 1702 SITE DEMOLITION & RELOCATION			$0	$5,634	$0	$5,634			6.10%
Subsystem Units [SY]:							$0.00		
1703 SITE EARTHWORK									
170301 GRADING			$2,265	$0	$5,938	$8,203.00			
170302 COMMON EXCAVATION & DISPOSAL			$5,398	$1,602	$21,914	$28,915.00			
170304 FILL & BORROW			$2,715	$10,601	$4,253	$17,569.00			
170305 COMPACTION			$4,171	$0	$1,357	$5,528.00			
170310 TEMPORARY DEWATERING			$12	$181	$0	$194.00			
TOTAL SUBSYSTEM 1703 SITE EARTHWORK			$14,561	$12,385	$33,463	$60,409			4.21%
Subsystem Units [CY]:							0.0		
1704 SITE CLEANUP									
170401 SITE CLEANUP			$134	$0	$46	$180.00			
TOTAL SUBSYSTEM 1704 SITE CLEANUP			$134	$0	$46	$180.00			
Subsystem Units [SY]:							$0.00		

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NAVFACENGCOM ANYDIV
ANYWHERE NAS
CONSEPT DESIGN PHASE ESTIMATE
ESTIMATOR: Paul Bryan McWilliam

TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
TOTAL SYSTEM 17 SITE PREPARATION			$19,218	$18,019	$50,344	$87,581			6.10%
18 SITE IMPROVEMENTS									
1801 ROADWAYS									
180101 BASES AND SUBBASES			$199	$7,675	$505	$8,379			
180102 DRAINS, INLETS, CURBS & GUTTERS			$1,777	$3,161	$409	$5,348			
180103 PAVED SURFACES			$747	$6,412	$996	$8,156			
TOTAL SUBSYSTEM 1801 ROADWAYS			$2,723	$17,248	$1,910	$21,882			1.52%
Subsystem Units [CY]:							$0.00		
1802 PARKING LOTS									
180202 DRAINS, CURBS & GUTTERS			$1,960	$7,423	$146	$9,529			
180204 MARKINGS & SIGNAGE			$67	$33	$3	$103			
TOTAL SUBSYSTEM 1802 PARKING LOTS			$2,027	$7,456	$149	$9,632			0.67%
Subsystem Units [SPA]:							$0.00		
1803 WALKS, STEPS, RAMPS & TERRACES									
180303 PAVED SURFACES			$2,536	$6,020	$90	$8,647			
TOTAL SUBSYSTEM 1803 WALKS, STEPS, RAMPS & TERRACES			$2,536	$6,020	$90	$8,647			0.60%
Subsystem Units [SF]:							$0.00		
1804 SITE DEVELOPMENT									
180401 FENCING & GATES			$851	$3,182	$28	$4,060			
TOTAL SUBSYSTEM 1804 SITE DEVELOPMENT			$851	$3,182	$28	$4,060			0.28%
Subsystem Units [EA]:							$0.00		

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
1805 LANDSCAPING									
180501 FINE GRADING & SOIL PREPARATION			$43	$0	$151	$194			
180504 SEEDING & SODDING			$879	$1,958	$2,079	$4,916			
TOTAL SUBSYSTEM 1805 LANDSCAPING			$921	$1,958	$2,231	$5,110			0.36%
Subsystem Units [SY]:							$0.00		
TOTAL SYSTEM 18 SITE IMPROVEMENTS			$9,059	$35,864	$4,407	$49,331			3.44%
19 SITE CIVIL/MECHANICAL UNITS									
1901 WATER SUPPLY & DISTRIBUTION SYSTEMS									
190102 POTABLE WATER DISTRIBUTION			$3,435	$24,913	$1,302	$29,650			
TOTAL SUBSYSTEM 190102 POTABLE WATER DISTRIBUTION			$3,435	$24,913	$1,302	$29,650			2.07%
Subsystem Units [LF]:							$0.00		
1902 SANITARY SEWER SYSTEMS									
190201 SANITARY SEWER PIPING			$1,583	$6,280	$1,136	$8,998			
190202 SANITARY SEWER MANHOLES & CLEANOUTS			$494	$1,956	$212	$2,662			
TOTAL SUBSYSTEM 1902 SANITARY SEWER SYSTEMS			$2,077	$8,236	$1,347	$11,660			0.81%
Subsystem Units [LF]:							$0.00		
1903 STORM SEWER SYSTEMS									
190301 STORM SEWER PIPING			$2,186	$23,154	$708	$26,048			
190304 CULVERTS			$571	$2,505	$605	$3,682			
190399 OTHER STORM SEWER			$43	$914	$13	$970			
TOTAL SUBSYSTEM 1903 STORM SEWER SYSTEMS			$2,800	$26,574	$1,326	$30,700			2.14%
Subsystem Units [LF]:							$0.00		

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
1905 HEATING DISTRIBUTION SYSTEMS									
190505 OVERHEAD STEAM SYSTEMS			$10,902	$28,915	$522	$40,339			
190505 TRENCH BOXES			$7,646	$11,722	$6,325	$25,693			
TOTAL SUBSYSTEM 1905 HEATING DISTRIBUTION SYSTEMS			$18,548	$40,637	$6,847	$66,033			4.60%
Subsystem Units [LF]:							$0.00		
1906 COOLING DISTRIBUTION SYSTEMS									
190601 OVERHEAD COOLING SYSTEMS			$5,890	$58,654	$6,822	$71,366			
TOTAL SUBSYSTEM 1906 COOLING DISTRIBUTION SYSTEMS			$5,890	$58,654	$6,822	$71,366			4.97%
Subsystem Units [LF]:							$0.00		
1907 NATURAL & PROPANE GAS DISTRIBUTION SYSTEM									
190701 GAS DISTRIBUTION PIPING			$1,141	$11,186	$84	$12,411			
TOTAL SUBSYSTEM 1907 NATURAL & PROPANE GAS DISTRIBUTION SYSTEM			$1,141	$11,186	$84	$12,411			0.86%
Subsystem Units [LF]:							$0.00		
TOTAL SUBSYSTEM 19 SITE CIVIL/MECHANICAL UTILITIES			$33,892	$170,201	$17,727	$221,820			15.45%
20 SITE ELECTRICAL UTILITIES									
2002 EXTERIOR ELECTRICAL DISTRIBUTION									
200205 UNDERGROUND ELECTRIC CONDUCTORS			$2,416	$19,126	$980	$22,523			
200206 DUCTBANKS, MANHOLES, HANDHOLES & RACEWAYS			$10,203	$18,716	$429	$29,348			
TOTAL SUBSYSTEM 2002 EXTERIOR ELECTRICAL DISTRIBUTION			$12,620	$37,842	$1,409	$51,871	$0.00		3.61%
Subsystem Units [LF]:									

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TRACES PBMW SYSTEM FOR WINDOWS
ASSEMBLY CATEGORY SUMMARY
Report Started at Level: CHILD DEVELOPMENT CENTER I

SYSTEM/SUBSYSTEM/ASSEMBLY CATEGORY	QTY	UM	LABOR	MATERIAL	EQUIPMENT	TOTAL	Unit Cost per WBS UM	Unit Cost per Total Facility Scope	%
2004 EXTERIOR COMMUNICATIONS & ALARM SYSTEMS									
200401 TELEPHONE SYSTEMS			$907	$7,987	$11	$8,905			
TOTAL SUBSYSTEM 2004 EXTERIOR COMMUNICATIONS & ALARM SYSTEM Subsystem Units [LF]:			$907	$7,987	$11	$8,905	$0.00		0.62%
2006 CATHODIC PROTECTION									
200601 SACRIFICIAL ANODE SYSTEM			$1,066	$1,661	$304	$3,030			
TOTAL SUBSYSTEM 2006 CATHODIC PROTECTION Subsystem Units [LF]:			$1,066	$1,661	$304	$3,030	$0.00		0.21%
TOTAL SYSTEM 20 SITE ELECTRICAL UTILITIES			$14,592	$47,490	$1,724	$63,806			4.45%
TOTAL ESTIMATED FACILITY COST			**$318,943**	**$1,027,780**	**$88,566**	**$1,435,289**			100.00%

Costs are inclusive of all markups (Contract Cost).

DD1391 FORM: 12345 DATE PRINTED: 04/28/1998
PERM PROJNO: 12345 DATE REVISED: 04/28/1998
Fort Bragg, NC Child Development Center
North Carolina ACF = 0.86 TYPE OF CONSTRUCTION: NPM New Permanent

BASIS OF ESTIMATE: NAME AND ADDRESS OF AE:
Parametric Design "R" Us
STATUS OF DESIGN: Anywhere, U.S.A.
CONCEPT 42.86% FINAL 15.00% Anywhere, U.S.A.

PREP BY: Cost Engineering APP BY:
OFF: CEMP-EE PH: (202)761-1241 OFF: PH:

CONST CAT CODE	DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST ($000)
Primary Facilities					1088
74014	Child Development Center	SF	9520.00	106.40	(1013)
	Substructure	SF	9520.00	5.81	55.3
	Superstructure	SF	9520.00	12.77	121.6
	Exterior Closure	SF	9520.00	12.48	118.8
	Roofing	SF	9520.00	4.00	38.1
	Interior Construction	SF	9520.00	9.98	95.0
	Interior Finishes	SF	9520.00	10.09	96.1
	Conveying Systems	SF	9520.00	0.00	0.0
	Plumbing	SF	9520.00	12.12	115.4
	HVAC	SF	9520.00	17.61	167.6
	Fire protection systems	SF	9520.00	0.37	3.5
	Electric Power & Lighting	SF	9520.00	12.69	120.8
	Electrical Systems*	SF	9520.00	2.52	24.0
	Equipment	SF	9520.00	0.00	0.0
	Furnishings	SF	9520.00	5.96	56.7
	Special Construction	SF	9520.00	0.00	0.0
80800	Building Information Systems	LS			(75)
Support Facility					275
	Electric Service	LS			(106)
	Aerial Primary System	LS			2.0
	U.G. Primary	LS			81.6
	Pad Mounted Transformer	LS			22.5
	Water, Sewer, & Gas	LS			(26)
	6"ater Line	LF	95.00	52.06	4.9
	3" Water Line	LF	100.00	27.26	2.7
	3" Gate Valve	EA	1.00	685.93	0.7
	6" Gate Valve	EA	1.00	1216.05	1.2
	6" P.I. Line	EA	1.00	1372.04	1.4
	4" Sanitary Line	LF	1090.00	11.36	12.4
	4" Tie-In To Exist Sanitary	EA	1.00	181.55	0.2
	Manhole	EA	1.00	2143.80	2.1

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CONST CAT CODE	DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST ($000)
Support Facility (Continued)					
	Water, Sewer, & Gas (Continued)				
	Steam And/Or Chilled Water Distr	LS			(30)
	1 1/2" Dual Pipe Htw Distribution	LF	360.00	32.32	11.6
	4" Chw Pipe	LF	180.00	62.85	11.3
	24" Arch-Tile System	LF	70.00	95.19	6.7
	Gate Valves	EA	2.00	363.53	0.7
	Paving, Walks, Curbs, & Gutters	LS			(26)
	1-1/2" Bit. w/6" Base	SY	52.00	38.49	2.0
	Concrete Sidewalk	SF	6807.00	3.28	22.3
	Curb & gutter	LF	60.00	24.17	1.5
	Pavement Marking	EA	2.00	63.18	0.1
	Signage	EA	2.00	38.82	0.1
	Concrete Stairs	LS			0.1
	Storm Drainage	LS			(20)
	Catch Basin	EA	4.00	604.21	2.4
	Grate Inlet	EA	4.00	1212.78	4.9
	15" R.C. Pipe	LF	520.00	22.57	11.7
	Storm manhole	EA	1.00	977.49	1.0
	Curb Inlet	EA	1.00	348.58	0.3
	Site Imp(45)/Demo(0)	LS			(45)
	Remove Curb & Gutter	LF	33.00	3.94	0.1
	Remove Volleyball Court	EA	1.00	508.35	0.5
	Remove Dumpster Pad	EA	1.00	435.73	0.4
	Remove Htw Pipe & Asb. Plan	LF	95.00	87.93	8.4
	Unclassified Excavation	CY	1956.00	3.63	7.1
	Strip and Spread Topsoil	CY	6.06	5.81	0.0
	Landscaping-Tree/Shrubs	LS			4.6
	Grassing	SY	5400.00	3.41	18.4
	Stone Outlet Sediment Trap	EA	3.00	1140.86	3.4
	Drainage Structure Sediment Trap	EA	2.00	236.54	0.5
	Erosion Control Netting	SY	200.00	9.28	1.9
	Relocate 5 Willow Oak Tree	EA	1.00	5.81	0.0
	Information Systems	LS			(21)
	Telephone/Fiber Optics	LF	1760.00	11.76	20.7
	Other	LS			(0)

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ESTIMATED CONTRACT COST	1362
CONTINGENCIES 5.0%	68
SUBTOTAL	1431

CONST CAT CODE	DESCRIPTION	UOM	QUANTITY	UNIT COST	TOTAL COST ($000)
ESTIMATED CONTRACT COST					1362
CONTINGENCIES 5.0%					68
SUBTOTAL					1431
SIOH 6.0%					86
PROJECT COST					1516
PROJECT COST (ROUNDED)					1500
INSTALLED EQUIPMENT					0
DESIGN COST					0

CONSTRUCTION DATES

CONSTRUCTION START DATE	1 Mar 1998	
CONSTRUCTION MIDPOINT	1 Sep 1998	2156
CONSTRUCTION COMPLETE	1 Mar 1999	