RFP MANUAL
WSAAF BARRACKS EXPANSION
FORT DRUM, NEW YORK

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DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

Contracts Branch
Contracting Division

SUBJECT: Central Contractor Registration

TO ALL PROSPECTIVE CONTRACTORS:

Please be advised that it is now required to register with the CCR (Central Contractor Registration) in order to perform work for the Federal Government. For additional information, please refer to the instruction sheet on the back of this letter, which includes the appropriate websites and telephone numbers.

Sincerely,

Ella D. Snell
Contracting Officer

CENTRAL CONTRACTOR REGISTRATION

HTTP://WWW.ACQ.OSD.MIL/EC

1(800) 334-3414

The Central Contractor Registry (CCR) is the Government's new national storing house of commercial and financial information on current and would-be contractors.

CCR eliminates the requirement for current and future contractors to submit Standard Form 129 and provides a single location for registering to conduct business with the Federal Government. Access to the register is available via the World Wide Web. A registration workbook is available for downloading from this site. It is highly recommended you review it prior to processing CCR to ensure all required information is available. Contractors are required to have a DUNS (Data Universal Numbering System) assigned by Dunn & Bradstreet at no charge (call 1-800-333-0505).

The initial Web Site application capability is for the initial contractor registration only. The ability to change, update or cancel a registration and query contractor information via the Web is currently in effect. After submitting a registration, contractors may use the Web application to inquire as to the status of their registration. Typically, a registration will be activated within 48 hours after receiving a complete and accurate application via the Internet. To register via the Internet, go to *http://ccr.edi.disa.mil*. Registration of an applicant through fax or mail may take up to 30 days. The mailing addresses are as follows: For firms with Legal business names beginning with the letters A-K or a number use CCR Registration Assistance Center, 2000 South Loop 256, Suite 11, Palestine, Texas 75801, FAX NO: (903) 729-7988. For firms with Legal business names beginning with the letters L-Z or a number use CCR Registration Assistance Center, 1450 Scalp Avenue, Johnstown, PA. 15904 FAX NO: (814) 262-2326. For those Contractor's who chose to register by mail, a paper registration form can be used and sent or faxed to the appropriate above address who will also furnish the form. Once successfully registered in CCR, a notice will be sent via email, fax, or regular post with information that a Trading Partner Identification Number (TPIN) will soon follow. For CCR implementation and contract questions please contact Robert Cooper at (703) 681-7573.

Anyone may access CCR via the Web to inquire whether vendor is registered at the following site: *http://ccr.edi.disa.mil.*

Information or assistance is available from your local Electronic Commerce Resources Center or Electronic Commerce Information Center at 1-800-334-3414 (8am-8pm), Monday-Friday, except Federal Holidays.

Additionally, your local Procurement Technical Assistance Center (PTAC) employs highly skilled professionals to help businesses like ours earn Federal and State Government contracts; assist with your CCR enrollment. The PTAC can provide Government specifications, daily listings of bid opportunities, bid history and contract award results, training and assistance with Electronic Data Exchange (EDI).

To find the office nearest you, the national PTAC directory can be accessed at Website *http://www.fedmarket.com/tecassis.html.*

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO. W912DS-04-R-0010	2. TYPE OF SOLICITATION [ ] SEALED BID (IFB) [X] NEGOTIATED *(RFP)*	3. DATE ISSUED 03-Jun-2004	PAGE OF PAGES 1 OF 60

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. W16ROE-4068-6489	6. PROJECT NO.

7. ISSUED BY CODE W912DS	8. ADDRESS OFFER TO *(If Other Than Item 7)* CODE
US ENGINEER DISTRICT, NEW YORK US ARMY CORPS OF ENG, NYD NEW YORK NY 10278 TEL:212-264-0238 FAX: 212-264-3013	**See Item 7** TEL: FAX:

9. FOR INFORMATION CALL:	A. NAME	B. TELEPHONE NO. *(Include area code)* *(NO COLLECT CALLS)*
	SHAUKAT M SYED	212-264-6707

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying no., date):*

Wheeler Sack Army Airfield Barracks, Fort Drum, NY

THIS PROJECT IS UNRESTRICTED.
NAICS CODE: 237990, Size Standard: 28.5 million

Contract Specialist: Shaukat Syed, (212)264-6707
Technical Manager: Jeff Crowley, (315)772-1567

PURSUANT TO SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM

NOTE NEW REQUIREMENT: BONDS, POWERS OF ATTORNEY, STATEMENTS OF AUTHENTICITY AND CONTINUING VALIDITY, AND ALL RELATED DOCUMENTS MUST NOT BEAR COMPUTER PRINTER GENERATED SIGNATURES AND/OR SEALS. DOCUMENTS BEARING SIGNATURES AND/OR SEALS GENERATED AS PART OF A DOCUMENT, AS OPPOSED TO BEING AFFIXED TO THE DOCUMENT AFTER ITS GENERATION, WILL NOT BE ACCEPTED. SUBMISSION OF SUCH DOCUMENTS MAY RENDER THE BID OR OFFER NON-RESPONSIVE AND INELIGIBLE FOR AWARD. PLEASE REVIEW ALL BONDS AND ACCOMPANYING DOCUMENTS REQUIRED TO BE SUBMITTED.

11. The Contractor shall begin performance within 5 calendar days and complete it within 913 calendar days after receiving [ ] award, [X] notice to proceed. This performance period is [X] mandatory, [ ] negotiable. *(See _____.)*

12 A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)* [X] YES [ ] NO	12B. CALENDAR DAYS 10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 1 copies to perform the work required are due at the place specified in Item 8 by 02:00 PM *(hour)* local time 19 Jul 2004 *(date).* If this is a sealed bid solicitation, offers must be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee [X] is, [ ] is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

SOLICITATION, OFFER, AND AWARD (Continued)

(Construction, Alteration, or Repair)

OFFER ***(Must be fully completed by offeror)***

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*		15. TELEPHONE NO. *(Include area code)*
		16. REMITTANCE ADDRESS *(Include only if different than Item 14)* **See Item 14**
CODE	FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal to or greater than the minimum requirements stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)*

AMOUNTS	SEE SCHEDULE OF PRICES

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS

(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD ***(To be completed by Government)***

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN *(4 copies unless otherwise specified)*	**ITEM**	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c) ☐ 41 U.S.C. 253(c)
26. ADMINISTERED BY CODE		27. PAYMENT WILL BE MADE BY: CODE

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.

☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)* TEL: EMAIL:
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

Section 00010 - Solicitation Contract Form

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001			Dollars, U.S.		
	FFP Base (All buildings, parking, utilities, etc) PURCHASE REQUEST NUMBER: W16ROE-4068-6489				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002			Dollars, U.S.		
	Design Fee FFP				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0003			Dollars, U.S.		
	As-Builts FFP				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0004			Dollars, U.S.		
	Final 10% Construction Completion FFP				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0005			Dollars, U.S.		
OPTION	Option #1 FFP Geothermal for Barracks (May be exercised within 180 days after NTP) (Also referred to as Option A - Complete Construction of Geothermal at Barracks Buildings in Technical Specifications)				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0006			Dollars, U.S.		
OPTION	Option #2 FFP Water Treatment Plant (May be exercised within 180 days after NTP) (Also referred to as Option E - Complete Construction of Water Treatment Plant in Technical Specifications)				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0007			Dollars, U.S.		
OPTION	Option #3 FFP DFAC Equipment (May be exercised within 180 days after NTP) (Also referred to as Option C - Complete Purchase and Install of Dining Facility Equipment in Technical Specifications)				
				NET AMT	

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0008			Dollars, U.S.		
OPTION	Option #4 FFP DFAC Furniture (May be exercised within 180 days after NTP) (Also referred to as Option B - Complete Purchase and Install of Dining Facility Furniture in Technical Specifications)				
				NET AMT	_____

FOB: Destination

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0009			Dollars, U.S.		
OPTION	Option #5 FFP Tear Down Existing Tower (May be exercised within 180 days after NTP) (Also referred to as Option D - Decommission Existing Airfield Water Tower in Technical Specifications)				
				NET AMT	_____

See Exhibit A
FOB: Destination

TOTAL

TOTAL BASE BID $_____

TOTAL BASE BID PLUS OPTIONS $_____

BOND LANGUAGE
US ARMY ENGINEER DISTRICT, NEW YORK

REQUEST FOR PROPOSAL NO. W912DS-04-R-0010

CHECK LIST FOR BIDDERS

ATTACHED IS RFP NO. W912DS-04-R-0010
Construction of Wheeler Sack Army Airfield Barracks, Fort Drum, NY

ALL INFORMATION REQUIRED BY THE TERMS OF THIS SOLICITATION MUST BE FURNISHED. MISTAKES OR OMISSIONS MAY RENDER YOUR BID INELIGIBLE FOR AWARD. IMPORTANT ITEMS FOR YOU TO CHECK ARE INCLUDED IN BUT NOT LIMITED TO THOSE LISTED BELOW. THIS INFORMATION IS FURNISHED ONLY TO ASSIST YOU IN SUBMITTING A PROPER BID.

__HAVE YOU ACKNOWLEDGED ALL AMENDMENTS?

__HAVE YOU COMPLETED THE “REPRESENTATIONS AND CERTIFICATIONS” (SECTION 00600) PORTION OF THE SOLICITATION?

__IS YOUR DUNS NUMBER LISTED ON THE STANDARD FORM 1442?

__IS YOUR BID PROPERLY SIGNED?

__A BID BOND IS REQUIRED. HAS YOUR SURETY PROVIDED YOU WITH A BID BOND ON STANDARD FORM 24 (SF 24) OR A SIMILAR FORM CONTAINING THE SAME LANGUAGE AS A STANDARD FORM 24?

__IS YOUR BID GUARANTEE IN THE PROPER AMOUNT?

__IS YOUR BID GUARANTEE PROPERLY SIGNED BY BOTH THE BIDDER AND SURETY AND ARE ALL REQUIRED SEALS AFFIXED?

__ DO THE BID BOND AND ACCOMPANYING DOCUMENTS BEAR SIGNATURES AND SEALS AFFIXED **AFTER** THE DOCUMENT WAS GENERATED, AS OPPOSED TO COMPUTER PRINTER-GENERATED SIGNATURES AND/OR SEALS?

__IS THE NAME IN WHICH YOU SUBMITTED THE BID THE SAME ON YOUR BID AS ON THE BID BOND?

__IS YOUR BID BOND INCLUDED WITH YOUR BID? (A LATE BID GUARANTEE IS TREATED THE SAME AS A LATE BID)

__HAVE YOU ENSURED THAT YOU HAVE NOT RESTRICTED YOUR BID BY ALTERING THE PROVISIONS OF THE SOLICITATION?

__WHEN REQUIRED, HAVE YOU ENTERED A UNIT PRICE FOR EACH BID ITEM? (THE SOLICITATION SPECIFICALLY STATES WHEN THIS IS NECESSARY.)

__ARE DECIMALS IN YOUR PRICES IN THE PROPER PLACE? ARE YOUR FIGURES LEGIBLE?

__IF YOU HAVE MADE ERASURES OR CORRECTIONS ON YOUR BID, ARE THEY INITIALED BY THE PERSON SIGNING THE BID?

__DOES THE ENVELOPE CONTAINING YOUR BID PROPERLY IDENTIFY THAT IT ISA SEALED BID AND DOES IT CONTAIN THE CORRECT SOLICITATION NUMBER AND BID OPENING TIME?

__WILL YOUR BID ARRIVE ON TIME? (SEE PARAGRAPH ENTITLED “LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS” IN THE INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS, SECTION 00100 OF THE SOLICITATION.)

NOTE: THERE ARE INCREASED SECURITY MEASURES AT JACOB K. JAVITS FEDERAL BUILDING, 26 FEDERAL PLAZA THAT MAY AFFECT THE TIME IT TAKES TO ENTER THE BUILDING. BIDDERS IS RESPONSIBLE TO ENSURE THAT ITS BID IS SUBMITTED TIMELY.

CLAUSES INCORPORATED BY FULL TEXT

52.204-6 DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER (OCT 2003)

(a) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation “DUNS” or “DUNS+4” followed by the DUNS number or “DUNS+4” that identifies the offeror's name and address exactly as stated in the offer. The DUNS number is a nine-digit number assigned by Dun and Bradstreet, Inc. The DUNS+4 is the DUNS number plus a 4-character suffix that may be assigned at the discretion of the offeror to establish additional CCR records for identifying alternative Electronic Funds Transfer (EFT) accounts (see Subpart 32.11) for the same parent concern.

(b) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one.

(1) An offeror may obtain a DUNS number--

(i) If located within the United States, by calling Dun and Bradstreet at 1-866-705-5711 or via the Internet at http://www.dnb.com; or

(ii) If located outside the United States, by contacting the local Dun and Bradstreet office.

(2) The offeror should be prepared to provide the following information:

(i) Company legal business name.

(ii) Tradestyle, doing business, or other name by which your entity is commonly recognized.

(iii) Company physical street address, city, state and Zip Code.

(iv) Company mailing address, city, state and Zip Code (if separate from physical).

(v) Company telephone number.

(vi) Date the company was started.

(vii) Number of employees at your location.

(viii) Chief executive officer/key manager.

(ix) Line of business (industry).

(x) Company Headquarters name and address (reporting relationship within your entity).

(End of provision)

52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

52.215-1 INSTRUCTIONS TO OFFERORS--COMPETITIVE ACQUISITION (JAN 2004)

(a) Definitions. As used in this provision--

“Discussions” are negotiations that occur after establishment of the competitive range that may, at the Contracting Officer's discretion, result in the offeror being allowed to revise its proposal.

“In writing or written” means any worded or numbered expression which can be read, reproduced, and later communicated, and includes electronically transmitted and stored information.

“Proposal modification” is a change made to a proposal before the solicitation's closing date and time, or made in response to an amendment, or made to correct a mistake at any time before award.

“Proposal revision” is a change to a proposal made after the solicitation closing date, at the request of or as allowed by a Contracting Officer as the result of negotiations.

“Time”, if stated as a number of days, is calculated using calendar days, unless otherwise specified, and will include Saturdays, Sundays, and legal holidays. However, if the last day falls on a Saturday, Sunday, or legal holiday, then the period shall include the next working day.

(b) Amendments to solicitations. If this solicitation is amended, all terms and conditions that are not amended remain unchanged. Offerors shall acknowledge receipt of any amendment to this solicitation by the date and time specified in the amendment(s).

(c) Submission, modification, revision, and withdrawal of proposals. (1) Unless other methods (e.g., electronic commerce or facsimile) are permitted in the solicitation, proposals and modifications to proposals shall be submitted in paper media in sealed envelopes or packages (i) addressed to the office specified in the solicitation, and (ii) showing the time and date specified for receipt, the solicitation number, and the name and address of the offeror. Offerors using commercial carriers should ensure that the proposal is marked on the outermost wrapper with the information in paragraphs (c)(1)(i) and (c)(1)(ii) of this provision.

(2) The first page of the proposal must show--

(i) The solicitation number;

(ii) The name, address, and telephone and facsimile numbers of the offeror (and electronic address if available);

(iii) A statement specifying the extent of agreement with all terms, conditions, and provisions included in the solicitation and agreement to furnish any or all items upon which prices are offered at the price set opposite each item;

(iv) Names, titles, and telephone and facsimile numbers (and electronic addresses if available) of persons authorized to negotiate on the offeror's behalf with the Government in connection with this solicitation; and

(v) Name, title, and signature of person authorized to sign the proposal. Proposals signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(3) Submission, modification, or revision, of proposals.

(i) Offerors are responsible for submitting proposals, and any modifications, or revisions, so as to reach the Government office designated in the solicitation by the time specified in the solicitation. If no time is specified in the solicitation, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that proposal or revision is due.

(ii)(A) Any proposal, modification, or revision received at the Government office designated in the solicitation after the exact time specified for receipt of offers is “late” and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late offer would not unduly delay the acquisition; and--

(1) If it was transmitted through an electronic commerce method authorized by the solicitation, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of proposals; or

(2) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of offers and was under the Government's control prior to the time set for receipt of offers; or

(3) It is the only proposal received.

(B) However, a late modification of an otherwise successful proposal that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(iii) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the proposal wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(iv) If an emergency or unanticipated event interrupts normal Government processes so that proposals cannot be received at the office designated for receipt of proposals by the exact time specified in the solicitation, and urgent Government requirements preclude amendment of the solicitation, the time specified for receipt of proposals will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(v) Proposals may be withdrawn by written notice received at any time before award. Oral proposals in response to oral solicitations may be withdrawn orally. If the solicitation authorizes facsimile proposals, proposals may be withdrawn via facsimile received at any time before award, subject to the conditions specified in the provision at 52.215-5, Facsimile Proposals. Proposals may be withdrawn in person by an offeror or an authorized representative, if the identity of the person requesting withdrawal is established and the person signs a receipt for the proposal before award.

(4) Unless otherwise specified in the solicitation, the offeror may propose to provide any item or combination of items.

(5) Offerors shall submit proposals in response to this solicitation in English, unless otherwise permitted by the solicitation, and in U.S. dollars, unless the provision at FAR 52.225-17, Evaluation of Foreign Currency Offers, is included in the solicitation.

(6) Offerors may submit modifications to their proposals at any time before the solicitation closing date and time, and may submit modifications in response to an amendment, or to correct a mistake at any time before award.

(7) Offerors may submit revised proposals only if requested or allowed by the Contracting Officer.

(8) Proposals may be withdrawn at any time before award. Withdrawals are effective upon receipt of notice by the Contracting Officer.

(d) Offer expiration date. Proposals in response to this solicitation will be valid for the number of days specified on the solicitation cover sheet (unless a different period is proposed by the offeror).

(e) Restriction on disclosure and use of data. Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall--

(1) Mark the title page with the following legend: This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed--in whole or in part--for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of--or in connection with-- the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets [insert numbers or other identification of sheets]; and

(2) Mark each sheet of data it wishes to restrict with the following legend: Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal.

(f) Contract award. (1) The Government intends to award a contract or contracts resulting from this solicitation to the responsible offeror(s) whose proposal(s) represents the best value after evaluation in accordance with the factors and subfactors in the solicitation.

(2) The Government may reject any or all proposals if such action is in the Government's interest.

(3) The Government may waive informalities and minor irregularities in proposals received.

(4) The Government intends to evaluate proposals and award a contract without discussions with offerors (except clarifications as described in FAR 15.306(a)). Therefore, the offeror's initial proposal should contain the offeror's best terms from a cost or price and technical standpoint. The Government reserves the right to conduct discussions if the Contracting Officer later determines them to be necessary. If the Contracting Officer determines that the number of proposals that would otherwise be in the competitive range exceeds the number at which an efficient competition can be conducted, the Contracting Officer may limit the number of proposals in the competitive range to the greatest number that will permit an efficient competition among the most highly rated proposals.

(5) The Government reserves the right to make an award on any item for a quantity less than the quantity offered, at the unit cost or prices offered, unless the offeror specifies otherwise in the proposal.

(6) The Government reserves the right to make multiple awards if, after considering the additional administrative costs, it is in the Government's best interest to do so.

(7) Exchanges with offerors after receipt of a proposal do not constitute a rejection or counteroffer by the Government.

(8) The Government may determine that a proposal is unacceptable if the prices proposed are materially unbalanced between line items or subline items. Unbalanced pricing exists when, despite an acceptable total evaluated price, the price of one or more contract line items is significantly overstated or understated as indicated by the application of

cost or price analysis techniques. A proposal may be rejected if the Contracting Officer determines that the lack of balance poses an unacceptable risk to the Government.

(9) If a cost realism analysis is performed, cost realism may be considered by the source selection authority in evaluating performance or schedule risk.

(10) A written award or acceptance of proposal mailed or otherwise furnished to the successful offeror within the time specified in the proposal shall result in a binding contract without further action by either party.

(11) If a post-award debriefing is given to requesting offerors, the Government shall disclose the following information, if applicable:

(i) The agency's evaluation of the significant weak or deficient factors in the debriefed offeror's offer.

(ii) The overall evaluated cost or price and technical rating of the successful and the debriefed offeror and past performance information on the debriefed offeror.

(iii) The overall ranking of all offerors, when any ranking was developed by the agency during source selection.

(iv) A summary of the rationale for award.

(v) For acquisitions of commercial items, the make and model of the item to be delivered by the successful offeror.

(vi) Reasonable responses to relevant questions posed by the debriefed offeror as to whether source-selection procedures set forth in the solicitation, applicable regulations, and other applicable authorities were followed by the agency.

(End of provision)

52.217-5 EVALUATION OF OPTIONS (JUL 1990)

Except when it is determined in accordance with FAR 17.206(b) not to be in the Government's best interests, the Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. Evaluation of options will not obligate the Government to exercise the option(s).

(End of provision)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from Chief, Contracting Division, 26 Federal Plaza, Room 1843, New York, NY 10278

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) Site visits may be arranged during normal duty hours by contacting:
Name: Jeff Crowley
Address: 4895 Nininger Street, Fort Drum, NY 13602
Telephone: (315)772-1567

(End of provision)

52.236-28 PREPARATION OF PROPOSALS--CONSTRUCTION (OCT 1997)

(a) Proposals must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a proposal must initial each erasure or change appearing on any proposal form.

(b) The proposal form may require offerors to submit proposed prices for one or more items on various bases, including--

(1) Lump sum price;

(2) Alternate prices;

(3) Units of construction; or

(4) Any combination of paragraphs (b)(1) through (b)(3) of this provision.

(c) If the solicitation requires submission of a proposal on all items, failure to do so may result in the proposal being rejected without further consideration. If a proposal on all items is not required, offerors should insert the words “no proposal” in the space provided for any item on which no price is submitted.

(d) Alternate proposals will not be considered unless this solicitation authorizes their submission.

(End of provision)

252.204-7004 REQUIRED CENTRAL CONTRACTOR REGISTRATION ALTERNATE A (NOV 2003)

(a) Definitions. As used in this clause--

“Central Contractor Registration (CCR) database” means the primary Government repository for contractor information required for the conduct of business with the Government.

“Commercial and Government Entity (CAGE) code” means--

(1) A code assigned by the Defense Logistics Information Service (DLIS) to identify a commercial or Government entity; or

(2) A code assigned by a member of the North Atlantic Treaty Organization that DLIS records and maintains in the CAGE master file. This type of code is known as an “NCAGE code.”

“Data Universal Numbering System (DUNS) number” means the 9-digit number assigned by Dun and Bradstreet, Inc. (D&B) to identify unique business entities.

“Data Universal Numbering System +4 (DUNS+4) number” means the DUNS number assigned by D&B plus a 4-character suffix that may be assigned by a business concern. (D&B has no affiliation with this 4-character suffix.) This 4-character suffix may be assigned at the discretion of the business concern to establish additional CCR records for identifying alternative Electronic Funds Transfer (EFT) accounts (see Subpart 32.11 of the Federal Acquisition Regulation) for the same parent concern.

“Registered in the CCR database” means that--

(1) The Contractor has entered all mandatory information, including the DUNS number or the DUNS+4 number, into the CCR database;

(2) The Contractor's CAGE code is in the CCR database; and

(3) The Government has validated all mandatory data fields and has marked the records “Active.”

(b)(1) By submission of an offer, the offeror acknowledges the requirement that a prospective awardee shall be registered in the CCR database prior to award, during performance, and through final payment of any contract, basic agreement, basic ordering agreement, or blanket purchasing agreement resulting from this solicitation.

(2) The offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation “DUNS” or “DUNS +4” followed by the DUNS or DUNS +4 number that identifies the offeror's name and address exactly as stated in the offer. The DUNS number will be used by the Contracting Officer to verify that the offeror is registered in the CCR database.

(c) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one.

(1) An offeror may obtain a DUNS number--

(i) If located within the United States, by calling Dun and Bradstreet at 1-866-705-5711 or via the Internet at http://www.dnb.com; or

(ii) If located outside the United States, by contacting the local Dun and Bradstreet office.

(2) The offeror should be prepared to provide the following information:

(i) Company legal business.

(ii) Tradestyle, doing business, or other name by which your entity is commonly recognized.

(iii) Company Physical Street Address, City, State, and Zip Code.

(iv) Company Mailing Address, City, State and Zip Code (if separate from physical).

(v) Company Telephone Number.

(vi) Date the company was started.

(vii) Number of employees at your location.

(viii) Chief executive officer/key manager.

(ix) Line of business (industry).

(x) Company Headquarters name and address (reporting relationship within your entity).

(d) If the Offeror does not become registered in the CCR database in the time prescribed by the Contracting Officer, the Contracting Officer will proceed to award to the next otherwise successful registered Offeror.

(e) Processing time, which normally takes 48 hours, should be taken into consideration when registering. Offerors who are not registered should consider applying for registration immediately upon receipt of this solicitation.

(f) The Contractor is responsible for the accuracy and completeness of the data within the CCR database, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to review and update on an annual basis from the date of initial registration or subsequent updates its information in the CCR database to ensure it is current, accurate and complete. Updating information in the CCR does not alter the terms and conditions of this contract and is not a substitute for a properly executed contractual document.

(g)(1)(i) If a Contractor has legally changed its business name, “doing business as” name, or division name (whichever is shown on the contract), or has transferred the assets used in performing the contract, but has not completed the necessary requirements regarding novation and change-of-name agreements in Subpart 42.12, the Contractor shall provide the responsible Contracting Officer a minimum of one business day's written notification of its intention to (A) change the name in the CCR database; (B) comply with the requirements of Subpart 42.12 of the FAR; and (C) agree in writing to the timeline and procedures specified by the responsible Contracting Officer. The Contractor must provide with the notification sufficient documentation to support the legally changed name.

(ii) If the Contractor fails to comply with the requirements of paragraph (g)(1)(i) of this clause, or fails to perform the agreement at paragraph (g)(1)(i)(C) of this clause, and, in the absence of a properly executed novation or change-of-name agreement, the CCR information that shows the Contractor to be other than the Contractor indicated in the contract will be considered to be incorrect information within the meaning of the “Suspension of Payment” paragraph of the electronic funds transfer (EFT) clause of this contract.

(2) The Contractor shall not change the name or address for EFT payments or manual payments, as appropriate, in the CCR record to reflect an assignee for the purpose of assignment of claims (see FAR Subpart 32.8, Assignment of Claims). Assignees shall be separately registered in the CCR database. Information provided to the Contractor's CCR record that indicates payments, including those made by EFT, to an ultimate recipient other than that Contractor will be considered to be incorrect information within the meaning of the “Suspension of payment” paragraph of the EFT clause of this contract.

(h) Offerors and Contractors may obtain information on registration and annual confirmation requirements via the internet at http://www.ccr.gov or by calling 1-888-227-2423, or 269-961-5757.

(End of clause)

CLAUSES INCORPORATED BY FULL TEXT

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that --

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to –

(i) Those prices,

(ii) The intention to submit an offer, or

(iii) The methods of factors used to calculate the prices offered:

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory --

(1) Is the person in the offeror's organization responsible for determining the prices offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) of this provison _____ (insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) of this provision.

(c) If the offeror deletes or modifies subparagraph (a)(2) of this provision, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

(End of clause)

52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (APR 1991)

(a) The definitions and prohibitions contained in the clause, at FAR 52.203-12, Limitation on Payments to Influence

Certain Federal Transactions, included in this solicitation, are hereby incorporated by reference in paragraph (b) of this Certification.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that on or after December 23, 1989,--

(1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement;

(2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, OMB standard form LLL, Disclosure of Lobbying Activities, to the Contracting Officer; and

(3) He or she will include the language of this certification in all subcontract awards at any tier and require that all recipients of subcontract awards in excess of $100,000 shall certify and disclose accordingly.

(1) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, United States Code. Any person who makes an expenditure prohibited under this provision, shall be subject to a civil penalty of not less than $10,000, and not more than $100,000, for each such failure.

(End of provision)

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions.

“Common parent,” as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

“Taxpayer Identification Number (TIN),” as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M, and implementing regulations issued by the IRS. If the resulting contract is subject to the payment reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN).

___ TIN:._____

___ TIN has been applied for.

___ TIN is not required because:

___ Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;

___ Offeror is an agency or instrumentality of a foreign government;

___ Offeror is an agency or instrumentality of the Federal Government.

(e) Type of organization.

___ Sole proprietorship;

___ Partnership;

___ Corporate entity (not tax-exempt);

___ Corporate entity (tax-exempt);

___ Government entity (Federal, State, or local);

___ Foreign government;

___ International organization per 26 CFR 1.6049-4;

___ Other _____

(f) Common parent.

___ Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.

___ Name and TIN of common parent:

Name _____

TIN _____

(End of provision)

52.204-5 WOMEN-OWNED BUSINESS (OTHER THAN SMALL BUSINESS) (MAY 1999)

(a) Definition. Women-owned business concern, as used in this provision, means a concern that is at least 51 percent owned by one or more women; or in the case of any publicly owned business, at least 51 percent of its stock is owned by one or more women; and whose management and daily business operations are controlled by one or more women.

(b) Representation. [Complete only if the offeror is a women-owned business concern and has not represented itself as a small business concern in paragraph (b)(1) of FAR 52.219-1, Small Business Program Representations, of this solicitation.] The offeror represents that it ( ) is a women-owned business concern.

(End of provision)

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (DEC 2001)

(a)(1) The Offeror certifies, to the best of its knowledge and belief, that-

(i) The Offeror and/or any of its Principals-

(A) Are ( ) are not ( ) presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ( ) have not ( ), within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

(C) Are ( ) are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision.

(ii) The Offeror has ( ) has not ( ), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification,

in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

52.215-6 PLACE OF PERFORMANCE (OCT 1997)

(a) The offeror or respondent, in the performance of any contract resulting from this solicitation, ( ) intends, ( ) does not intend (check applicable block) to use one or more plants or facilities located at a different address from the address of the offeror or respondent as indicated in this proposal or response to request for information.

(b) If the offeror or respondent checks "intends" in paragraph (a) of this provision, it shall insert in the following spaces the required information:

Place of Performance(Street Address, City, State, County, Zip Code)	**Name and Address of Owner and Operator of the Plant or Facility if Other Than Offeror or Respondent**

(End of provision)

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (APR 2002)

(a)(1) The North American Industry Classification System (NAICS) code for this acquisition is 237990.

(2) The small business size standard is 28.5 million.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) Representations. (1) The offeror represents as part of its offer that it ( ) is, ( ) is not a small business concern.

(2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it ( ) is, ( ) is not a small disadvantaged business concern as defined in 13 CFR 124.1002.

(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a women-owned small business concern.

(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a veteran-owned small business concern.

(5) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that it ( ) is, ( ) is not a service-disabled veteran-owned small business concern.

(6) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, as part of its offer, that--

(i) It ( ) is, ( ) is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR part 126; and

(ii) It ( ) is, ( ) is not a joint venture that complies with the requirements of 13 CFR part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. (The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:_____.) Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

(c) Definitions. As used in this provision--

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

"Small business concern," means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

"Women-owned small business concern," means a small business concern --

(1) That is at least 51 percent owned by one or more women; in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Notice.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the

preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall--

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(iii) Be ineligible for participation in programs conducted under the authority of the Act.

(End of provision)

52.219-2 EQUAL LOW BIDS. (OCT 1995)

(a) This provision applies to small business concerns only.

(b) The bidder's status as a labor surplus area (LSA) concern may affect entitlement to award in case of tie bids. If the bidder wishes to be considered for this priority, the bidder must identify, in the following space, the LSA in which the costs to be incurred on account of manufacturing or production (by the bidder or the first-tier subcontractors) amount to more than 50 percent of the contract price.

_____

_____

(c) Failure to identify the labor surplus area as specified in paragraph (b) of this provision will preclude the bidder from receiving priority consideration. If the bidder is awarded a contract as a result of receiving priority consideration under this provision and would not have otherwise received award, the bidder shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

52.219-22 SMALL DISADVANTAGED BUSINESS STATUS (OCT 1999)

(a) General. This provision is used to assess an offeror's small disadvantaged business status for the purpose of obtaining a benefit on this solicitation. Status as a small business and status as a small disadvantaged business for general statistical purposes is covered by the provision at FAR 52.219-1, Small Business Program Representation.

(b) Representations.

(1) General. The offeror represents, as part of its offer, that it is a small business under the size standard applicable to this acquisition; and either--

___ (i) It has received certification by the Small Business Administration as a small disadvantaged business concern consistent with 13 CFR 124, Subpart B; and

(A) No material change in disadvantaged ownership and control has occurred since its certification;

(B) Where the concern is owned by one or more disadvantaged individuals, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(C) It is identified, on the date of this representation, as a certified small disadvantaged business concern in the database maintained by the Small Business Administration(PRO0Net); or

___ (ii) It has submitted a completed application to the Small Business Administration or a Private Certifier to be certified as a small disadvantaged business concern in accordance with 13 CFR 124, Subpart B, and a decision on that application is pending, and that no material change in disadvantaged ownership and control has occurred since its application was submitted.

(2)___ For Joint Ventures. The offeror represents, as part of its offer, that it is a joint venture that complies with the requirements at 13 CFR 124.1002(f) and that the representation in paragraph (b)(1) of this provision is accurate for the small disadvantaged business concern that is participating in the joint venture. [The offeror shall enter the name of the small disadvantaged business concern that is participating in the joint venture: _____.]

(c) Penalties and Remedies. Anyone who misrepresents any aspects of the disadvantaged status of a concern for the purposes of securing a contract or subcontract shall:

(1) Be punished by imposition of a fine, imprisonment, or both;

(2) Be subject to administrative remedies, including suspension and debarment; and

(3) Be ineligible for participation in programs conducted under the authority of the Small Business Act.

(End of provision)

52.223-13 CERTIFICATION OF TOXIC CHEMICAL RELEASE REPORTING (AUG 2003)

(a) Executive Order 13148, of April 21, 2000, Greening the Government through Leadership in Environmental Management, requires submission of this certification as a prerequisite for contract award.

(b) By signing this offer, the offeror certifies that--

(1) As the owner or operator of facilities that will be used in the performance of this contract that are subject to the filing and reporting requirements described in section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023) and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106), the offeror will file and continue to file for such facilities for the life of the contract the Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of EPCRA and section 6607 of PPA; or

(2) None of its owned or operated facilities to be used in the performance of this contract is subject to the Form R filing and reporting requirements because each such facility is exempt for at least one of the following reasons: (Check each block that is applicable.)

( ) (i) The facility does not manufacture, process, or otherwise use any toxic chemicals listed in 40 CFR 372.65;

( ) (ii) The facility does not have 10 or more full-time employees as specified in section 313.(b)(1)(A) of EPCRA 42 U.S.C. 11023(b)(1)(A);

( ) (iii) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

( ) (iv) The facility does not fall within the following Standard Industrial Classification (SIC) codes or their corresponding North American Industry Classification System sectors:

(A) Major group code 10 (except 1011, 1081, and 1094.

(B) Major group code 12 (except 1241).

(C) Major group codes 20 through 39.

(D) Industry code 4911, 4931, or 4939 (limited to facilities that combust coal and/or oil for the purpose of generating power for distribution in commerce).

(E) Industry code 4953 (limited to facilities regulated under the Resource Conservation and Recovery Act, Subtitle C (42 U.S.C. 6921, et seq.), 5169, 5171, or 7389 (limited to facilities primarily engaged in solvent recovery services on a contract or fee basis); or

( ) (v) The facility is not located within the United States or its outlying areas.

(End of clause)

52.225-11 BUY AMERICAN ACT--CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (JAN 2004)

(a) Definitions. As used in this clause--

Component means an article, material, or supply incorporated directly into a construction material.

Construction material means an article, material, or supply brought to the construction site by the Contractor or subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

Cost of components means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the construction material (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

Designated country means any of the following countries: Aruba, Austria, Bangladesh, Belgium, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Canada, Cape Verde, Central African Republic, Chad, Comoros, Denmark.

Djibouti, Equatorial Guinea, Finland, France, Gambia, Germany, Greece, Guinea, Guinea-Bissau, Haiti, Hong Kong, Ireland, Israel, Italy, Japan.

Kiribati, Korea, Republic of, Lesotho, Liechtenstein, Luxembourg, Malawi, Maldives, Mali, Mozambique, Nepal, Netherlands, Niger, Norway, Portugal, Rwanda.

Sao Tome and Principe, Sierra Leone, Singapore, Somalia, Spain, Sweden, Switzerland, Tanzania U.R., Togo, Tuvalu, Uganda, United Kingdom, Vanuatu, Western Samoa, Yemen.

Designated country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a designated country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different construction material distinct from the materials from which it was transformed.

Domestic construction material means--

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

Foreign construction material means a construction material other than a domestic construction material.

Free Trade Agreement country means Canada, Chile, Mexico, or Singapore.

Free Trade Agreement country construction material means a construction material that--

(1) Is wholly the growth, product, or manufacture of a Free Trade Agreement (FTA) country; or

(2) In the case of a construction material that consists in whole or in part of materials from another country, has been substantially transformed in a FTA country into a new and different construction material distinct from the materials from which it was transformed.

United States means the 50 States, the District of Columbia, and outlying areas.

(b) Construction materials. (1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) by providing a preference for domestic construction material. In addition, the Contracting Officer has determined that the Trade Agreements Act and Free Trade Agreements (FTAs) apply to this acquisition. Therefore, the Buy American Act restrictions are waived for designated country and FTA country construction materials.

(2) The Contractor shall use only domestic, designated country, or NAFTA country construction material in performing this contract, except as provided in paragraphs (b)(3) and (b)(4) of this clause.

(3) The requirement in paragraph (b)(2) of this clause does not apply to the construction materials or components listed by the Government as follows: none

(4) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(3) of this clause if the Government determines that--

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the restrictions of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent;

(ii) The application of the restriction of the Buy American Act to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American Act.

(1)(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(4) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;

(C) Quantity;

(D) Price;

(E) Time of delivery or availability;

(F) Location of the construction project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(2) If the Government determines after contract award that an exception to the Buy American Act applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(4)(i) of this clause.

(3) Unless the Government determines that an exception to the Buy American Act applies, use of foreign construction material is noncompliant with the Buy American Act.

(d) Data. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) \1\
Item 1:			

Foreign construction material.... ....
Domestic construction material... ....
Item 2:
Foreign construction material.... ....
Domestic construction material... ....

\1\ Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).
List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.
Include other applicable supporting information.

(e) United States law will apply to resolve any claim of breach of this contract.

(End of clause)

52.230-1 COST ACCOUNTING STANDARDS NOTICES AND CERTIFICATION (JUN 2000)

Note: This notice does not apply to small businesses or foreign governments. This notice is in three parts, identified by Roman numerals I through III.

Offerors shall examine each part and provide the requested information in order to determine Cost Accounting Standards (CAS) requirements applicable to any resultant contract.

If the offeror is an educational institution, Part II does not apply unless the contemplated contract will be subject to full or modified CAS coverage pursuant to 48 CFR 9903.201-2(c)(5) or 9903.201-2(c)(6), respectively.

I. DISCLOSURE STATEMENT--COST ACCOUNTING PRACTICES AND CERTIFICATION

(a) Any contract in excess of $500,000 resulting from this solicitation will be subject to the requirements of the Cost Accounting Standards Board (48 CFR Chapter 99), except for those contracts which are exempt as specified in 48 CFR 9903.201-1.

(b) Any offeror submitting a proposal which, if accepted, will result in a contract subject to the requirements of 48 CFR Chapter 99 must, as a condition of contracting, submit a Disclosure Statement as required by 48 CFR 9903.202. When required, the Disclosure Statement must be submitted as a part of the offeror's proposal under this solicitation unless the offeror has already submitted a Disclosure Statement disclosing the practices used in connection with the pricing of this proposal. If an applicable Disclosure Statement has already been submitted, the offeror may satisfy the requirement for submission by providing the information requested in paragraph (c) of Part I of this provision.

CAUTION: In the absence of specific regulations or agreement, a practice disclosed in a Disclosure Statement shall not, by virtue of such disclosure, be deemed to be a proper, approved, or agreed-to practice for pricing proposals or accumulating and reporting contract performance cost data.

(c) Check the appropriate box below:

(1) Certificate of Concurrent Submission of Disclosure Statement.

The offeror hereby certifies that, as a part of the offer, copies of the Disclosure Statement have been submitted as follows: (i) original and one copy to the cognizant Administrative Contracting Officer (ACO) or cognizant Federal

agency official authorized to act in that capacity (Federal official), as applicable, and (ii) one copy to the cognizant Federal auditor.

(Disclosure must be on Form No. CASB DS-1 or CASB DS-2, as applicable. Forms may be obtained from the cognizant ACO or Federal official and/or from the loose-leaf version of the Federal Acquisition Regulation.)

Date of Disclosure Statement: _____ Name and Address of Cognizant ACO or Federal Official Where Filed: _____

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the Disclosure Statement.

(2) Certificate of Previously Submitted Disclosure Statement.

The offeror hereby certifies that the required Disclosure Statement was filed as follows:

Date of Disclosure Statement: _____ Name and Address of Cognizant ACO or Federal Official Where Filed: _____

The offeror further certifies that the practices used in estimating costs in pricing this proposal are consistent with the cost accounting practices disclosed in the applicable Disclosure Statement.

(3) Certificate of Monetary Exemption.

The offeror hereby certifies that the offeror, together with all divisions, subsidiaries, and affiliates under common control, did not receive net awards of negotiated prime contracts and subcontracts subject to CAS totaling more than $50 million (of which at least one award exceeded $1 million) in the cost accounting period immediately preceding the period in which this proposal was submitted. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

(4) Certificate of Interim Exemption.

The offeror hereby certifies that (i) the offeror first exceeded the monetary exemption for disclosure, as defined in (3) of this subsection, in the cost accounting period immediately preceding the period in which this offer was submitted and (ii) in accordance with 48 CFR 9903.202-1, the offeror is not yet required to submit a Disclosure Statement. The offeror further certifies that if an award resulting from this proposal has not been made within 90 days after the end of that period, the offeror will immediately submit a revised certificate to the Contracting Officer, in the form specified under subparagraph (c)(1) or (c)(2) of Part I of this provision, as appropriate, to verify submission of a completed Disclosure Statement.

CAUTION: Offerors currently required to disclose because they were awarded a CAS-covered prime contract or subcontract of $50 million or more in the current cost accounting period may not claim this exemption (4). Further, the exemption applies only in connection with proposals submitted before expiration of the 90-day period following the cost accounting period in which the monetary exemption was exceeded.

II. COST ACCOUNTING STANDARDS--ELIGIBILITY FOR MODIFIED CONTRACT COVERAGE

If the offeror is eligible to use the modified provisions of 48 CFR 9903.201-2(b) and elects to do so, the offeror shall indicate by checking the box below. Checking the box below shall mean that the resultant contract is subject to the Disclosure and Consistency of Cost Accounting Practices clause in lieu of the Cost Accounting Standards clause.

( ) The offeror hereby claims an exemption from the Cost Accounting Standards clause under the provisions of 48 CFR 9903.201-2(b) and certifies that the offeror is eligible for use of the Disclosure and Consistency of Cost

Accounting Practices clause because during the cost accounting period immediately preceding the period in which this proposal was submitted, the offeror received less than $50 million in awards of CAS-covered prime contracts and subcontracts. The offeror further certifies that if such status changes before an award resulting from this proposal, the offeror will advise the Contracting Officer immediately.

CAUTION: An offeror may not claim the above eligibility for modified contract coverage if this proposal is expected to result in the award of a CAS-covered contract of $50 million or more or if, during its current cost accounting period, the offeror has been awarded a single CAS-covered prime contract or subcontract of $25 million or more.

III. ADDITIONAL COST ACCOUNTING STANDARDS APPLICABLE TO EXISTING CONTRACTS

The offeror shall indicate below whether award of the contemplated contract would, in accordance with subparagraph (a)(3) of the Cost Accounting Standards clause, require a change in established cost accounting practices affecting existing contracts and subcontracts.

( ) YES ( ) NO

(End of clause)

ADDITIONAL INFORMATION

THE NEXT SECTION CONTAINS SECTION 00700, ENTITLED "CONTRACT CLAUSES". SOME CLAUSES MIGHT HAVE ADDITIONAL INFORMATION OR EXPANSION; THEREFORE OFFERORS SHOULD ALSO REFER TO SECTION 00800, ENTITLED "SPECIAL CONTRACT REQUIREMENTS OF TECHNICAL SPECIFICATIONS.

CLAUSES INCORPORATED BY REFERENCE

52.202-1 Alt I	Definitions (Dec 2001) --Alternate I	MAY 2001
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-6	Restrictions On Subcontractor Sales To The Government	JUL 1995
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price Or Fee Adjustment For Illegal Or Improper Activity	JAN 1997
52.203-12	Limitation On Payments To Influence Certain Federal Transactions	JUN 2003
52.204-2	Security Requirements	AUG 1996
52.204-4	Printed or Copied Double-Sided on Recycled Paper	AUG 2000
52.211-13	Time Extensions	SEP 2000
52.215-10	Price Reduction for Defective Cost or Pricing Data	OCT 1997
52.215-11	Price Reduction for Defective Cost or Pricing Data--Modifications	OCT 1997
52.215-12	Subcontractor Cost or Pricing Data	OCT 1997
52.222-24	Preaward On-Site Equal Opportunity Compliance Evaluation	FEB 1999
52.223-3	Hazardous Material Identification And Material Safety Data	JAN 1997
52.227-14	Rights in Data--General	JUN 1987
52.228-1	Bid Guarantee	SEP 1996
52.228-5	Insurance - Work On A Government Installation	JAN 1997
52.232-5	Payments under Fixed-Price Construction Contracts	SEP 2002
52.232-27	Prompt Payment for Construction Contracts	OCT 2003
52.233-1	Disputes	JUL 2002
52.233-3	Protest After Award	AUG 1996
52.236-4	Physical Data	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements	APR 1984
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-13	Accident Prevention	NOV 1991
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-16	Quantity Surveys	APR 1984
52.236-17	Layout of Work	APR 1984
52.236-21	Specifications and Drawings for Construction	FEB 1997
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
52.243-4	Changes	AUG 1987
52.244-6	Subcontracts for Commercial Items	APR 2003
52.245-3	Identification of Government-Furnished Property	APR 1984
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.247-34	F.O.B. Destination	NOV 1991
52.249-2 Alt I	Termination for Convenience of the Government (Fixed-Price) (Sep 1996) - Alternate I	SEP 1996

52.249-10	Default (Fixed-Price Construction)	APR 1984
52.253-1	Computer Generated Forms	JAN 1991
252.203-7001	Prohibition On Persons Convicted of Fraud or Other Defense-Contract-Related Felonies	MAR 1999
252.204-7003	Control Of Government Personnel Work Product	APR 1992
252.205-7000	Provision Of Information To Cooperative Agreement Holders	DEC 1991
252.209-7000	Acquisition From Subcontractors Subject To On-Site Inspection Under The Intermediate Range Nuclear Forces (INF) Treaty	NOV 1995
252.209-7004	Subcontracting With Firms That Are Owned or Controlled By The Government of a Terrorist Country	MAR 1998
252.215-7000	Pricing Adjustments	DEC 1991
252.219-7003	Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DOD Contracts)	APR 1996
252.225-7012	Preference For Certain Domestic Commodities	FEB 2003
252.225-7031	Secondary Arab Boycott Of Israel	APR 2003
252.227-7022	Government Rights (Unlimited)	MAR 1979
252.236-7000	Modification Proposals-Price Breakdown	DEC 1991
252.236-7001	Contract Drawings, Maps, and Specifications	AUG 2000
252.236-7008	Contract Prices-Bidding Schedules	DEC 1991
252.243-7002	Requests for Equitable Adjustment	MAR 1998
252.244-7000	Subcontracts for Commercial Items and Commercial Components (DoD Contracts)	MAR 2000

CLAUSES INCORPORATED BY FULL TEXT

52.204-1 APPROVAL OF CONTRACT (DEC 1989)

This contract is subject to the written approval of Contracting Officer and shall not be binding until so approved.

(End of clause)

52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within 5 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than .913 calendar days after the date the Contractor receives the notice to proceed.

*The Contracting Officer shall specify either a number of days after the date the contractor receives the notice to proceed, or a calendar date.

(End of clause)

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Firm-Fixed Priced contract resulting from this solicitation.

(End of clause)

52.219-4 NOTICE OF PRICE EVALUATION PREFERENCE FOR HUBZONE SMALL BUSINESS CONCERNS (JAN 1999)

(a) Definition. HUBZone small business concern, as used in this clause, means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

(b) Evaluation preference. (1) Offers will be evaluated by adding a factor of 10 percent to the price of all offers, except--

(i) Offers from HUBZone small business concerns that have not waived the evaluation preference;

(ii) Otherwise successful offers from small business concerns;

(iii) Otherwise successful offers of eligible products under the Trade Agreements Act when the dollar threshold for application of the Act is exceeded (see 25.402 of the Federal Acquisition Regulation (FAR)); and

(iv) Otherwise successful offers where application of the factor would be inconsistent with a Memorandum of Understanding or other international agreement with a foreign government.

(2) The factor of 10 percent shall be applied on a line item basis or to any group of items on which award may be made. Other evaluation factors described in the solicitation shall be applied before application of the factor.

(3) A concern that is both a HUBZone small business concern and a small disadvantaged business concern will receive the benefit of both the HUBZone small business price evaluation preference and the small disadvantaged business price evaluation adjustment (see FAR clause 52.219-23). Each applicable price evaluation preference or adjustment shall be calculated independently against an offeror's base offer.

These individual preference amounts shall be added together to arrive at the total evaluated price for that offer.

(c) Waiver of evaluation preference. A HUBZone small business concern may elect to waive the evaluation preference, in which case the factor will be added to its offer for evaluation purposes. The agreements in paragraph (d) of this clause do not apply if the offeror has waived the evaluation preference.

___ Offeror elects to waive the evaluation preference.

(d) Agreement. A HUBZone small business concern agrees that in the performance of the contract, in the case of a contract for

(1) Services (except construction), at least 50 percent of the cost of personnel for contract performance will be spent for employees of the concern or employees of other HUBZone small business concerns;

(2) Supplies (other than procurement from a nonmanufacturer of such supplies), at least 50 percent of the cost of manufacturing, excluding the cost of materials, will be performed by the concern or other HUBZone small business concerns;

(3) General construction, at least 15 percent of the cost of the contract performance incurred for personnel will be will be spent on the concern's employees or the employees of other HUBZone small business concerns; or

(4) Construction by special trade contractors, at least 25 percent of the cost of the contract performance incurred for personnel will be spent on the concern's employees or the employees of other HUBZone small business concerns.

(e) A HUBZone joint venture agrees that in the performance of the contract, the applicable percentage specified in paragraph (d) of this clause will be performed by the HUBZone small business participant or participants.

(f) A HUBZone small business concern nonmanufacturer agrees to furnish in performing this contract only end items manufactured or produced by HUBZone small business manufacturer concerns. This paragraph does not apply in connection with construction or service contracts.

(End of clause)

52.219-8 UTILIZATION OF SMALL BUSINESS CONCERNS (OCT 2000)

(a) It is the policy of the United States that small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency, including contracts and subcontracts for subsystems, assemblies, components, and related services for major systems. It is further the policy of the United States that its prime contractors establish procedures to ensure the timely payment of amounts due pursuant to the terms of their subcontracts with small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns, small disadvantaged business concerns, and women-owned small business concerns.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

Definitions. As used in this contract--

HUBZone small business concern means a small business concern that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration.

Service-disabled veteran-owned small business concern--

(1) Means a small business concern--

(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and

(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.

(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).

Small business concern means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto.

Small disadvantaged business concern means a small business concern that represents, as part of its offer that--

(1) It has received certification as a small disadvantaged business concern consistent with 13 CFR part 124, subpart B;

(2) No material change in disadvantaged ownership and control has occurred since its certification;

(3) Where the concern is owned by one or more individuals, the net worth of each individual upon whom the certification is based does not exceed $750,000 after taking into account the applicable exclusions set forth at 13 CFR 124.104(c)(2); and

(4) It is identified, on the date of its representation, as a certified small disadvantaged business in the database maintained by the Small Business Administration (PRO-Net).

Veteran-owned small business concern means a small business concern--

(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and

(2) The management and daily business operations of which are controlled by one or more veterans.

Women-owned small business concern means a small business concern--

(1) That is at least 51 percent owned by one or more women, or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and

(2) Whose management and daily business operations are controlled by one or more women.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as a small business concern, a veteran-owned small business concern, a service-disabled veteran-owned small business concern, a HUBZone small business concern, a small disadvantaged business concern, or a women-owned small business concern.

(End of clause)

52.219-9 SMALL BUSINESS SUBCONTRACTING PLAN (JAN 2002)

(a) This clause does not apply to small business concerns.

(b) Definitions. As used in this clause--

Commercial item means a product or service that satisfies the definition of commercial item in section 2.101 of the Federal Acquisition Regulation.

Commercial plan means a subcontracting plan (including goals) that covers the offeror's fiscal year and that applies to the entire production of commercial items sold by either the entire company or a portion thereof (e.g., division, plant, or product line).

Individual contract plan means a subcontracting plan that covers the entire contract period (including option periods), applies to a specific contract, and has goals that are based on the offeror's planned subcontracting in support of the specific contract, except that indirect costs incurred for common or joint purposes may be allocated on a prorated basis to the contract.

Master plan means a subcontracting plan that contains all the required elements of an individual contract plan, except goals, and may be incorporated into individual contract plans, provided the master plan has been approved.

Subcontract means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The offeror, upon request by the Contracting Officer, shall submit and negotiate a subcontracting plan, where applicable, that separately addresses subcontracting with small business, veteran-owned small business, HUBZone small business concerns, small disadvantaged business, and women-owned small business concerns. If the offeror is submitting an individual contract plan, the plan must separately address subcontracting with small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns, with a separate part for the basic contract and separate parts for each option (if any). The plan shall be included in and made a part of the resultant contract. The subcontracting plan shall be negotiated within the time specified by the Contracting Officer. Failure to submit and negotiate the subcontracting plan shall make the offeror ineligible for award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted for an individual contract plan; or the offeror's total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan;

(ii) Total dollars planned to be subcontracted to small business concerns;

(iii) Total dollars planned to be subcontracted to veteran-owned small business concerns;

(iv) Total dollars planned to be subcontracted to HUBZone small business concerns;

(v) Total dollars planned to be subcontracted to small disadvantaged business concerns; and

(vi) Total dollars planned to be subcontracted to women-owned small business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to--

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) HUBZone small business concerns;

(iv) Small disadvantaged business concerns; and

(v) Women-owned small business concerns.

(4) A description of the method used to develop the subcontracting goals in paragraph (d)(1) of this clause.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone, small disadvantaged, and women-owned small business trade associations). A firm may rely on the information contained in PRO-Net as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business source list. Use of PRO-Net as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, or publicizing subcontracting opportunities) in this clause.

(6) A statement as to whether or not the offeror in included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with—

(i) Small business concerns;

(ii) Veteran-owned small business concerns;

(iii) HUBZone small business concerns;

(iv) Small disadvantaged business concerns; and

(v) Women-owned small business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business, veteran-owned small business, HUBZone small business, small disadvantaged business and women-owned small business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause of this contract entitled ``Utilization of Small Business Concerns'' in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) that receive subcontracts in excess of $500,000 ($1,000,000 for construction of any public facility) to adopt a subcontracting plan that complies with the requirements of this clause.

(10) Assurances that the offeror will--

(i) Cooperate in any studies or surveys as may be required;

(ii) Submit periodic reports so that the Government can determine the extent of compliance by the offeror with the subcontracting plan;

(iii) Submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with paragraph (j) of this clause. The reports shall provide information on subcontract awards to small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, small disadvantaged business concerns, women-owned small business concerns, and Historically Black Colleges and Universities and Minority Institutions. Reporting shall be in accordance with the instructions on the forms or as provided in agency regulations.

(iv) Ensure that its subcontractors agree to submit SF 294 and SF 295.

(11) A description of the types of records that will be maintained concerning procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of the offeror's efforts to locate small business, veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated)

(i) Source lists (e.g., PRO-Net), guides, and other data that identify small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small business, veteran-owned small business, HUBZone small business, small disadvantaged business, or women-owned small business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than $100,000, indicating--

(A) Whether small business concerns were solicited and, if not, why not;

(B) Whether veteran-owned small business concerns were solicited and, if not, why not;

(C) Whether HUBZone small business concerns were solicited and, if not, why not;

(D) Whether small disadvantaged business concerns were solicited and, if not, why not;

(E) Whether women-owned small business concerns were solicited and, if not, why not; and

(F) If applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact--

(A) Trade associations;

(B) Business development organizations;

(C) Conferences and trade fairs to locate small, HUBZone small, small disadvantaged, and women-owned small business sources; and

(D) Veterans service organizations.

(v) Records of internal guidance and encouragement provided to buyers through--

(A) Workshops, seminars, training, etc.; and

(B) Monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having commercial plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns in all ``make-or-buy'' decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small business, veteran-owner small business, HUBZone small business, small disadvantaged business, and women-owned small business firms.

(4) Provide notice to subcontractors concerning penalties and remedies for misrepresentations of business status as small, veteran-owner small business, HUBZone small, small disadvantaged, or women-owned small business for the purpose of obtaining a subcontract that is to be included as part or all of a goal contained in the Contractor's subcontracting plan.

(f) A master plan on a plant or division-wide basis that contains all the elements required by paragraph (d) of this clause, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided--
(1) the master plan has been approved, (2) the offeror ensures that the master plan is updated as necessary and provides copies of the approved master plan, including evidence of its approval, to the Contracting Officer, and (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) A commercial plan is the preferred type of subcontracting plan for contractors furnishing commercial items. The commercial plan shall relate to the offeror's planned subcontracting generally, for both commercial and Government business, rather than solely to the Government contract. Commercial plans are also preferred for subcontractors that provide commercial items under a prime contract, whether or not the prime contractor is supplying a commercial item.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization Of Small Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.

(j) The Contractor shall submit the following reports:

(1) Standard Form 294, Subcontracting Report for Individual Contracts. This report shall be submitted to the Contracting Officer semiannually and at contract completion. The report covers subcontract award data related to this contract. This report is not required for commercial plans.

(2) Standard Form 295, Summary Subcontract Report. This report encompasses all of the contracts with the awarding agency. It must be submitted semi-annually for contracts with the Department of Defense and annually for contracts with civilian agencies. If the reporting activity is covered by a commercial plan, the reporting activity must report annually all subcontract awards under that plan. All reports submitted at the close of each fiscal year (both individual and commercial plans) shall include a breakout, in the Contractor's format, of subcontract awards, in whole dollars, to small disadvantaged business concerns by North American Industry Classification System (NAICS) Industry Subsector. For a commercial plan, the Contractor may obtain from each of its subcontractors a predominant NAICS Industry Subsector and report all awards to that subcontractor under its predominant NAICS Industry Subsector.

(End of clause)

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --

(a) ( ) It has, ( ) has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;

(b) ( ) It has, ( ) has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

(End of provision)

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

(b) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation for each trade	Goals for female participation for each trade

2.5%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Fort Drum, NY.

(End of provision)

52.222-24 PREAWARD ON-SITE EQUAL OPPORTUNITY COMPLIANCE EVALUATION (FEB 1999)

If a contract in the amount of $10 million or more will result from this solicitation, the prospective Contractor and its known first-tier subcontractors with anticipated subcontracts of $10 million or more shall be subject to a preaward compliance evaluation by the Office of Federal Contract Compliance Programs (OFCCP), unless, within the preceding 24 months, OFCCP has conducted an evaluation and found the prospective Contractor and subcontractors to be in compliance with Executive Order 11246.

(End of provision)

52.222-26 EQUAL OPPORTUNITY (APR 2002)

(a) Definition. United States, as used in this clause, means the 50 States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, American Samoa, Guam, the U.S. Virgin Islands, and Wake Island.

(b) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of $10,000, the Contractor shall comply with paragraphs (b)(1) through (b)(11) of this clause, except for work performed outside the United States by employees who were not recruited within the United States. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. However, it shall not be a violation of this clause for the Contractor to extend a publicly announced preference in employment to Indians living on or near an Indian reservation, in connection with employment opportunities on or near an Indian reservation, as permitted by 41 CFR 60-1.5.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination, (vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor. The Contractor shall also file Standard Form 100 (EEO-1), or any successor form, as prescribed in 41 CFR part 60-1. Unless the Contractor has filed within the 12 months preceding the date of contract award, the Contractor shall, within 30 days after contract award, apply to either the regional Office of Federal Contract Compliance Programs (OFCCP) or the local office of the Equal Employment Opportunity Commission for the necessary forms.

(8) The Contractor shall permit access to its premises, during normal business hours, by the contracting agency or the OFCCP for the purpose of conducting on-site compliance evaluations and complaint investigations. The Contractor shall permit the Government to inspect and copy any books, accounts, records (including computerized records), and other material that may be relevant to the matter under investigation and pertinent to compliance with Executive Order 11246, as amended, and rules and regulations that implement the Executive Order.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended; in the rules, regulations, and orders of the Secretary

of Labor; or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraphs (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting officer may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.

(End of clause)

52.223-10 WASTE REDUCTION PROGRAM (AUG 2000)

(a) Definitions. As used in this clause--

Recycling means the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of products other than fuel for producing heat or power by combustion.

Waste prevention means any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they are discarded. Waste prevention also refers to the reuse of products or materials.

Waste reduction means preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

(b) Consistent with the requirements of Section 701 of Executive Order 13101, the Contractor shall establish a program to promote cost-effective waste reduction in all operations and facilities covered by this contract. The Contractor's programs shall comply with applicable Federal, State, and local requirements, specifically including Section 6002 of the Resource Conservation and Recovery Act (42 .S.C. 6962, et seq.) and implementing regulations (40 CFR part 247).

(End of clause)

52.228-15 PERFORMANCE AND PAYMENT BONDS--CONSTRUCTION (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

52.232-16 PROGRESS PAYMENTS (APR 2003)

The Government will make progress payments to the Contractor when requested as work progresses, but not more frequently than monthly, in amounts of $2,500 or more approved by the Contracting Officer, under the following conditions:

(a) Computation of amounts. (1) Unless the Contractor requests a smaller amount, the Government will compute each progress payment as 80 percent of the Contractor's total costs incurred under this contract whether or not actually paid, plus financing payments to subcontractors (see paragraph (j) of this clause), less the sum of all previous progress payments made by the Government under this contract. The Contracting Officer will consider cost of money that would be allowable under FAR 31.205-10 as an incurred cost for progress payment purposes.

(2) The amount of financing and other payments for supplies and services purchased directly for the contract are limited to the amounts that have been paid by cash, check, or other forms of payment, or that are determined due and will be paid to subcontractors--

(i) In accordance with the terms and conditions of a subcontract or invoice; and

(ii) Ordinarily within 30 days of the submission of the Contractor's payment request to the Government.

(3) The Government will exclude accrued costs of Contractor contributions under employee pension plans until actually paid unless--

(i) The Contractor's practice is to make contributions to the retirement fund quarterly or more frequently; and

(ii) The contribution does not remain unpaid 30 days after the end of the applicable quarter or shorter payment period (any contribution remaining unpaid shall be excluded from the Contractor's total costs for progress payments until paid).

(4) The Contractor shall not include the following in total costs for progress payment purposes in paragraph (a)(1) of this clause:

(i) Costs that are not reasonable, allocable to this contract, and consistent with sound and generally accepted accounting principles and practices.

(ii) Costs incurred by subcontractors or suppliers.

(iii) Costs ordinarily capitalized and subject to depreciation or amortization except for the properly depreciated or amortized portion of such costs.

(iv) Payments made or amounts payable to subcontractors or suppliers, except for --

(A) completed work, including partial deliveries, to which the Contractor has acquired title; and

(B) Work under cost-reimbursement or time-and-material subcontracts to which the Contractor has acquired title.

(5) The amount of unliquidated progress payments may exceed neither (i) the progress payments made against incomplete work (including allowable unliquidated progress payments to subcontractors) nor

(ii) the value, for progress payment purposes, of the incomplete work. Incomplete work shall be considered to be the supplies and services required by this contract, for which delivery and invoicing by the Contractor and acceptance by the Government are incomplete.

(6) The total amount of progress payments shall not exceed 80 percent of the total contract price.

(7) If a progress payment or the unliquidated progress payments exceed the amounts permitted by subparagraphs (a)(4) or (a)(5) above, the Contractor shall repay the amount of such excess to the Government on demand.

(8) Notwithstanding any other terms of the contract, the Contractor agrees not to request progress payments in dollar amounts of less than $2,500. The Contracting Officer may make exceptions.

(b) Liquidation. Except as provided in the Termination for Convenience of the Government clause, all progress payments shall be liquidated by deducting from any payment under this contract, other than advance or progress payments, the unliquidated progress payments, or 80 percent of the amount invoiced, whichever is less. The Contractor shall repay to the Government any amounts required by a retroactive price reduction, after computing liquidations and payments on past invoices at the reduced prices and adjusting the unliquidated progress payments accordingly. The Government reserves the right to unilaterally change from the ordinary liquidation rate to an alternate rate when deemed appropriate for proper contract financing.

(c) Reduction or suspension. The Contracting Officer may reduce or suspend progress payments, increase the rate of liquidation, or take a combination of these actions, after finding on substantial evidence any of the following conditions:

(1) The Contractor failed to comply with any material requirement of this contract (which includes paragraphs (f) and (g) below).

(2) Performance of this contract is endangered by the Contractor's

(i) failure to make progress or

(ii) unsatisfactory financial condition.

(3) Inventory allocated to this contract substantially exceeds reasonable requirements.

(4) The Contractor is delinquent in payment of the costs of performing this contract in the ordinary course of business.

(5) The unliquidated progress payments exceed the fair value of the work accomplished on the undelivered portion of this contract.

(6) The Contractor is realizing less profit than that reflected in the establishment of any alternate liquidation rate in paragraph (b) above, and that rate is less than the progress payment rate stated in subparagraph (a)(1) above.

(d) Title.

(1) Title to the property described in this paragraph (d) shall vest in the Government. Vestiture shall be immediately upon the date of this contract, for property acquired or produced before that date. Otherwise, vestiture shall occur when the property is or should have been allocable or properly chargeable to this contract.

(2) "Property," as used in this clause, includes all of the below-described items acquired or produced by the Contractor that are or should be allocable or properly chargeable to this contract under sound and generally accepted accounting principles and practices.

(i) Parts, materials, inventories, and work in process;

(ii) Special tooling and special test equipment to which the Government is to acquire title under any other clause of this contract;

(iii) Nondurable (i.e., noncapital) tools, jigs, dies, fixtures, molds, patterns, taps, gauges, test equipment, and other similar manufacturing aids, title to which would not be obtained as special tooling under subparagraph (ii) above; and

(iv) Drawings and technical data, to the extent the Contractor or subcontractors are required to deliver them to the Government by other clauses of this contract.

(3) Although title to property is in the Government under this clause, other applicable clauses of this contract; e.g., the termination or special tooling clauses, shall determine the handling and disposition of the property.

(4) The Contractor may sell any scrap resulting from production under this contract without requesting the Contracting Officer's approval, but the proceeds shall be credited against the costs of performance.

(5) To acquire for its own use or dispose of property to which title is vested in the Government under this clause, the Contractor must obtain the Contracting Officer's advance approval of the action and the terms. The Contractor shall (i) exclude the allocable costs of the property from the costs of contract performance, and (ii) repay to the Government any amount of unliquidated progress payments allocable to the property. Repayment may be by cash or credit memorandum.

(6) When the Contractor completes all of the obligations under this contract, including liquidation of all progress payments, title shall vest in the Contractor for all property (or the proceeds thereof) not--

(i) Delivered to, and accepted by, the Government under this contract; or

(ii) Incorporated in supplies delivered to, and accepted by, the Government under this contract and to which title is vested in the Government under this clause.

(7) The terms of this contract concerning liability for Government-furnished property shall not apply to property to which the Government acquired title solely under this clause.

(e) Risk of loss. Before delivery to and acceptance by the Government, the Contractor shall bear the risk of loss for property, the title to which vests in the Government under this clause, except to the extent the Government expressly assumes the risk. The Contractor shall repay the Government an amount equal to the unliquidated progress payments that are based on costs allocable to property that is damaged, lost, stolen, or destroyed.

(f) Control of costs and property. The Contractor shall maintain an accounting system and controls adequate for the proper administration of this clause.

(g) Reports and access to records. The Contractor shall promptly furnish reports, certificates, financial statements, and other pertinent information reasonably requested by the Contracting Officer for the administration of this clause. Also, the Contractor shall give the Government reasonable opportunity to examine and verify the Contractor's books, records, and accounts.

(h) Special terms regarding default. If this contract is terminated under the Default clause, (i) the Contractor shall, on demand, repay to the Government the amount of unliquidated progress payments and (ii) title shall vest in the Contractor, on full liquidation of progress payments, for all property for which the Government elects not to require delivery under the Default clause. The Government shall be liable for no payment except as provided by the Default clause.

(i) Reservations of rights. (1) No payment or vesting of title under this clause shall (i) excuse the Contractor from performance of obligations under this contract or (ii) constitute a waiver of any of the rights or remedies of the parties under the contract.

(2) The Government's rights and remedies under this clause

(i) Shall not be exclusive but rather shall be in addition to any other rights and remedies provided by law or this contract and

(ii) Shall not be affected by delayed, partial, or omitted exercise of any right, remedy, power, or privilege, nor shall such exercise or any single exercise preclude or impair any further exercise under this clause or the exercise of any other right, power, or privilege of the Government.

(j) Financing payments to subcontractors. The financing payments to subcontractors mentioned in paragraphs (a)(1) and (a)(2) of this clause shall be all financing payments to subcontractors or divisions, if the following conditions are met:

(1) The amounts included are limited to--

(i) The unliquidated remainder of financing payments made; plus

(ii) Any unpaid subcontractor requests for financing payments.

(2) The subcontract or interdivisional order is expected to involve a minimum of approximately 6 months between the beginning of work and the first delivery; or, if the subcontractor is a small business concern, 4 months.

(3) If the financing payments are in the form of progress payments, the terms of the subcontract or interdivisional order concerning progress payments--

(i) Are substantially similar to the terms of this clause for any subcontractor that is a large business concern, or this clause with its Alternate I for any subcontractor that is a small business concern;

(ii) Are at least as favorable to the Government as the terms of this clause;

(iii) Are not more favorable to the subcontractor or division than the terms of this clause are to the Contractor;

(iv) Are in conformance with the requirements of FAR 32.504(e); and

(v) Subordinate all subcontractor rights concerning property to which the Government has title under the subcontract to the Government's right to require delivery of the property to the Government if--

(A) The Contractor defaults; or

(B) The subcontractor becomes bankrupt or insolvent.

(4) If the financing payments are in the form of performance-based payments, the terms of the subcontract or interdivisional order concerning payments--

(i) Are substantially similar to the Performance-Based Payments clause at FAR 52.232-32 and meet the criteria for, and definition of, performance-based payments in FAR Part 32;

(ii) Are in conformance with the requirements of FAR 32.504(f); and

(iii) Subordinate all subcontractor rights concerning property to which the Government has title under the subcontract to the Government's right to require delivery of the property to the Government if--

(A) The Contractor defaults; or

(B) The subcontractor becomes bankrupt or insolvent.

(5) If the financing payments are in the form of commercial item financing payments, the terms of the subcontract or interdivisional order concerning payments--

(i) Are constructed in accordance with FAR 32.206(c) and included in a subcontract for a commercial item purchase that meets the definition and standards for acquisition of commercial items in FAR Parts 2 and 12;

(ii) Are in conformance with the requirements of FAR 32.504(g); and

(iii) Subordinate all subcontractor rights concerning property to which the Government has title under the subcontract to the Government's right to require delivery of the property to the Government if--

(A) The Contractor defaults; or

(B) The subcontractor becomes bankrupt or insolvent.

(6) If financing is in the form of progress payments, the progress payment rate in the subcontract is the customary rate used by the contracting agency, depending on whether the subcontractor is or is not a small business concern.

(7) Concerning any proceeds received by the Government for property to which title has vested in the Government under the subcontract terms, the parties agree that the proceeds shall be applied to reducing any unliquidated financing payments by the Government to the Contractor under this contract.

(8) If no unliquidated financing payments to the Contractor remain, but there are unliquidated financing payments that the Contractor has made to any subcontractor, the Contractor shall be subrogated to all the rights the Government obtained through the terms required by this clause to be in any subcontract, as if all such rights had been assigned and transferred to the Contractor.

(9) To facilitate small business participation in subcontracting under this contract, the Contractor shall provide financing payments to small business concerns, in conformity with the standards for customary contract financing payments stated in Subpart 32.113. The Contractor shall not consider the need for such financing payments as a handicap or adverse factor in the award of subcontracts.

(k) Limitations on undefinitized contract actions. Notwithstanding any other progress payment provisions in this contract, progress payments may not exceed 80 percent of costs incurred on work accomplished under undefinitized contract actions. A "contract action" is any action resulting in a contract, as defined in Subpart 2.1, including contract modifications for additional supplies or services, but not including contract modifications that are within the scope and under the terms of the contract, such as contract modifications issued pursuant to the Changes clause, or funding and other administrative changes. This limitation shall apply to the costs incurred, as computed in accordance with paragraph (a) of this clause, and shall remain in effect until the contract action is definitized. Costs incurred which are subject to this limitation shall be segregated on Contractor progress payment requests and invoices from those costs eligible for higher progress payment rates. For purposes of progress payment liquidation, as described in paragraph (b) of this clause, progress payments for undefinitized contract actions shall be liquidated at 80 percent of the amount invoiced for work performed under the undefinitized contract action as long as the contract action remains undefinitized. The amount of unliquidated progress payments for undefinitized contract actions shall not exceed 80 percent of the maximum liability of the Government under the undefinitized contract action or such lower limit specified elsewhere in the contract. Separate limits may be specified for separate actions.

(l) Due date. The designated payment office will make progress payments on the 30th day after the designated billing office receives a proper progress payment request. In the event that the Government requires an audit or other review of a specific progress payment request to ensure compliance with the terms and conditions of the contract, the designated payment office is not compelled to make payment by the specified due date. Progress payments are considered contract financing and are not subject to the interest penalty provisions of the Prompt Payment Act.

(m) Progress payments under indefinite--delivery contracts. The Contractor shall account for and submit progress payment requests under individual orders as if the order constituted a separate contract, unless otherwise specified in this contract.

(End of clause)

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 15 percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

52.236-2 DIFFERING SITE CONDITIONS (APR 1984)

As prescribed in 36.502, insert the following clause in solicitations and contracts when a fixed-price construction contract or a fixed-price dismantling, demolition, or removal of improvements contract is contemplated and the contract amount is expected to exceed the small purchase limitation. The Contracting Officer may insert the clause in solicitations and contracts when a fixed-price construction or a fixed-price contract for dismantling, demolition, or removal of improvements is contemplated and the contract amount is expected to be within the small purchase limitation.

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of

(1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or

(2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

(End of clause)

52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to

(1) conditions bearing upon transportation, disposal, handling, and storage of materials;

(2) the availability of labor, water, electric power, and roads;

(3) uncertainties of weather, river stages, tides, or similar physical conditions at the site;

(4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the

Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

(End of clause)

52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)

If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

(End of clause)

52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es):

http://www.arnet.gov/far
http://farsite.hill.af.mil
http://www.asq.osd.mil/dp/dars/dfars.html

(End of provision

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es):

http://www.arnet.gov/far
http://farsite.hill.af.mil
http://www.asq.osd.mil/dp/dars/dfars.html

(End of clause)

252.201-7000 CONTRACTING OFFICER'S REPRESENTATIVE (DEC 1991)

(a) "Definition. Contracting officer's representative" means an individual designated in accordance with subsection 201.602-2 of the Defense Federal Acquisition Regulation Supplement and authorized in writing by the contracting officer to perform specific technical or administrative functions.

(b) If the Contracting Officer designates a contracting officer's representative (COR), the Contractor will receive a copy of the written designation. It will specify the extent of the COR's authority to act on behalf of the contracting officer. The COR is not authorized to make any commitments or changes that will affect price, quality, quantity, delivery, or any other term or condition of the contract.

(End of clause)

252.227-7023 DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF GOVERNMENT. (MAR 1979)

All designs, drawings, specifications, notes and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design or construction without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared" for the purpose of authorship in any copyrightable work under 17 U.S.C. 201(b). With respect thereto, the Contractor agrees not to assert or authorize others to assert any rights nor establish any claim under the design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish all retained works on the request of the Contracting Officer. Unless otherwise provided in this contract, the Contractor shall have the right to retain copies of all works beyond such period.

(End of clause)

252.232-7007 LIMITATION OF GOVERNMENT'S OBLIGATION (AUG 1993)

(a) Contract line item(s) 0001 through 0009 are incrementally funded. For these item(s), the sum of $49,000,000.00 of the total price is presently available for payment and allotted to this contract. An allotment schedule is set forth in paragraph (i) of this clause.

(b) For items(s) identified in paragraph (a) of this clause, the Contractor agrees to perform up to the point at which the total amount payable by the Government, including reimbursement in the event of termination of those item(s) for the Government's convenience, approximates the total amount currently allotted to the contract. The Contractor will not be obligated to continue work on those item(s) beyond that point. The Government will not be obligated in any event to reimburse the Contractor in excess of the amount allotted to the contract for those item(s) regardless of anything to the contrary in the clause entitled "TERMINATION FOR THE CONVENIENCE OF THE GOVERNMENT." As used in this clause, the total amount payable by the Government in the event of termination of applicable contract line item(s) for convenience includes costs, profit and estimated termination settlement costs for those item(s).

(c) Notwithstanding the dates specified in the allotment schedule in paragraph (i) of this clause, the Contractor will notify the Contracting Officer in writing at least ninety days prior to the date when, in the Contractor's best judgment, the work will reach the point at which the total amount payable by the Government, including any cost

for termination for convenience, will approximate 85 percent of the total amount then allotted to the contract for performance of the applicable item(s). The notification will state (1) the estimated date when that point will be reached and (2) an estimate of additional funding, if any, needed to continue performance of applicable line items up to the next scheduled date for allotment of funds identified in paragraph (i) of this clause, or to a mutually agreed upon substitute date. The notification will also advise the Contracting Officer of the estimated amount of additional funds that will be required for the timely performance of the item(s) funded pursuant to this clause, for subsequent period as may be specified in the allotment schedule in paragraph (i) of this clause, or otherwise agreed to by the parties. If after such notification additional funds are not allotted by the date identified in the Contractor's notification, or by an agreed substitute date, the Contracting Officer will terminate any item(s) for which additional funds have not been allotted, pursuant to the clause of this contract entitled "TERMINATION FOR THE CONVENIENCE OF THE GOVERNMENT".

(d) When additional funds are allotted for continued performance of the contract line item(s) identified in paragraph (a) of this clause, the parties will agree as to the period of contract performance which will be covered by the funds. The provisions of paragraph (b) through (d) of this clause will apply in like manner to the additional allotted funds and agreed substitute date, and the contract will be modified accordingly.

(e) If, solely by reason of failure of the Government to allot additional funds, by the dates indicated below, in amounts sufficient for timely performance of the contract line item(s) identified in paragraph (a) of this clause, the Contractor incurs additional costs or is delayed in the performance of the work under this contract and if additional funds are allotted, an equitable adjustment will be made in the price or prices (including appropriate target, billing, and ceiling prices where applicable) of the item(s), or in the time of delivery, or both. Failure to agree to any such equitable adjustment hereunder will be a dispute concerning a question of fact within the meaning of the clause entitled "disputes."

(f) The Government may at any time prior to termination allot additional funds for the performance of the contract line item(s) identified in paragraph (a) of this clause.

(g) The termination provisions of this clause do not limit the rights of the Government under the clause entitled "DEFAULT." The provisions of this clause are limited to work and allotment of funds for the contract line item(s) set forth in paragraph (a) of this clause. This clause no longer applies once the contract if fully funded except with regard to the rights or obligations of the parties concerning equitable adjustments negotiated under paragraphs (d) or (e) of this clause.

(h) Nothing in this clause affects the right of the Government to this contract pursuant to the clause of this contract entitled "TERMINATION FOR CONVENIENCE OF THE GOVERNMENT."

(i) The parties contemplate that the Government will allot funds to this contract in accordance with the following schedule:

On execution of contract.....$49,000,000.00
September 30, 2005.....$48,000,000.00

(End of clause)

WAGE RATES
GENERAL DECISION: **NY20030029** 05/28/2004 NY29

Date: May 28, 2004 sg 5/28/04
General Decision Number: **NY20030029** 05/28/2004

Superseded General Decision Number: NY020029

State: New York

Construction Types: Residential

Counties: Clinton, Essex, Franklin, Fulton, Hamilton,
Jefferson, Lewis and St Lawrence Counties in New York.

RESIDENTIAL CONSTRUCTION PROJECTS (Consisting of single family homes and apartment up to and including 4 stories)

Modification Number	Publication Date
0	06/13/2003
1	05/28/2004

ELEC0236-005 05/01/2000

FULTON AND HAMILTON COUNTIES

	Rates	Fringes
Electrician	$ 14.95	5.55

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* ELEC0910-003 04/01/2003

CLINTON, ESSEX, FRANKLIN, JEFFERSON, LEWIS AND ST LAWRENCE COUNTIES

	Rates	Fringes
Electrician	$ 13.06	7.24

SUNY2000-001 10/27/2000

	Rates	Fringes
Carpenter	$ 13.16	
Cement Mason/Finisher	$ 15.09	4.19
Laborer, Unskilled	$ 10.06	

Painter (Brush & Roller).....$ 11.98

Pipefitter.....$ 14.07 1.66

Plumber.....$ 13.86 1.80

Roofer.....$ 10.90

Sheet metal worker.....$ 10.92 .62

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

General Decision Number: **NY030009** 06/13/2003

Superseded General Decision No. NY020009

State: New York

Construction Type:
BUILDING

County(ies):
JEFFERSON

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	06/13/2003 sg 4/7/04

COUNTY(ies):
JEFFERSON

BRNY0002H 07/01/2002

	Rates	Fringes
WATERTOWN CHAPTER		
BRICKLAYERS	22.55	8.64
TILE SETTERS	19.94	7.49
TILE FINISHERS	17.39	7.50

ELEC0910M 04/01/2001

	Rates	Fringes
ELECTRICIANS	22.80	9.83

SHEE0058A 05/01/2002

	Rates	Fringes
SHEET METAL WORKERS:		
Projects 5 million or less	22.60	11.51
Projects over $5 million	23.60	11.51

SUNY1003A 05/01/1996

	Rates	Fringes
CARPENTERS	16.81	5.52
CEMENT MASONS	19.75	5.82
LABORERS	14.06	5.36
PLUMBERS	19.24	4.26
POWER EQUIPMENT OPERATORS:		
Forklift	20.64	8.70
ROOFERS	16.99	5.47

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

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Wage and Hour Division
U. S. Department of Labor
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Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board

U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

SECTION 00110

SUBMISSION REQUIREMENTS AND INSTRUCTIONS

1.0 NOTICE TO OFFERORS

1.1 Acquisition

This is a Best Value, Trade-Off solicitation, with price evaluation preference for HUBZone small business concerns in accordance with FAR Contract Clause 52.219-4, for the design and construction (design-build) of WSAAF Barracks Expansion, Ft Drum, New York. The successful Offeror must design and construct a complete and useable facility, as described in the RFP documents.

1.2 Target Price

The target price for contract award for design and construction is $86,600,000 for this project. The Government cannot guarantee that additional funds can be made available for award. Offerors are under no obligation to approach this amount.

1.3 Who May Submit

A single design firm or construction contractor with a subcontracted A-E services, a jointed ventured combination of an AE firm with a construction contractor or construction manager (CM), an A-E contractor with a subcontracted construction contractor (s), or a CM with an AE as a subcontractor are examples offerors who may submit. For the purpose of this solicitation, no distinction is made between formally organized design-build entities and project specific design-build association. Both are referred to as the design-build Offeror (or simply Offeror), or the design-build contractor (or simply contractor), after award of a contract.

1.4 Professional Registration

The Offeror, or Offeror's subcontractor(s), must have on its permanent staff professional architects and engineers registered in the appropriate technical disciplines for design activities. The design of architectural, electrical, civil, or other engineering features of the work shall be accomplished or reviewed and approved by architects or engineers registered to practice in the particular professional field involved in a State or possession of the United States.

1.5 Page Limit and Size of Printed Materials

In order to effectively and equitably evaluate all proposals, the Contracting Officer must receive information sufficiently detailed to clearly address submission requirements as outlined below. The written portion of the proposal (Volume I - Technical Proposal), however, shall not exceed 150 pages. This does not include drawings or other graphics, Volume II - Cost Proposal, or Volume III - Subcontracting Plan. A page printed on two sides will be counted as two pages. Pages containing text shall be submitted on 8-1/2 x 11 inch paper. Each page shall be minimally single spaced with a minimum 12-point font and one inch margins all around. Drawings or other graphics shall be reduced only to the extent legibility is not lost and shall be in half size sets of 16 x 23-inch in size.

2.0 PROPOSAL SUBMISSION REQUIREMENTS AND INSTRUCTIONS

2.1 Proposal Requirements and Submission

The proposals sought by this solicitation shall contain three separate volumes:

Volume I - Technical Proposal

Volume II - Price Proposal
Volume III - Subcontracting Plan

Do not submit any material not required by this solicitation (such as company or system brochures). Offerors must meet all technical portions (design/construction criteria) of the RFP. The fact that section 01010 and many of the drawings are not required to be submitted and evaluated does not relieve the offerors from meeting all technical, or other requirements of the RFP.

2.2 Where to Submit

Offerors shall submit their proposal packages to the United States Army Corps of Engineers (USACE) at the address shown in Block 8 of Standard Form 1442.

2.3 Submission Deadline

USACE must receive proposals not later than the time and date specified in Block 13 of Standard Form 1442.

2.4 Incurring Costs

The Government is not liable for any costs incurred by the Offeror submitting an offer in response to this solicitation.

2.5 Format Requirements

All proposals shall contain the volume number and the name, address and telephone number of the Prime and Subcontractors, Joint Venture, or other entity identified on the cover. The original proposal must be clearly marked as “ORIGINAL” and the original signatures must be in blue ink. Copies of the proposals must also be clearly marked as “COPY x of y (i.e. COPY 1 of 6)”. Proposal clarity and material organization in each volume are mandatory. No material shall be incorporated by reference.

Each volume will be submitted separately bound. The proposal shall address and contain the information listed below. The information will be used by the Source Selection Board to evaluate each proposal. Offerors are advised that conciseness and relevance of the proposal is important and unrelated information will not be evaluated. Proposals that provide only superficial coverage of the information required below, may not receive additional consideration and may be excluded from the competitive range. Additionally, should the proposal include any standard company terms and conditions that conflict with the terms and conditions of the solicitation, the proposal may be determined to be "unacceptable" and thus ineligible for award.

3.0 VOLUME I - TECHNICAL PROPOSAL (VOLUME I)

The technical proposal shall be submitted in one three-ring binder with tabbed dividers separating the main sections with a detailed Table of Contents and List of Appendixes, labeled "Volume I - Technical Proposal". The sections shall parallel the submission requirements identified below. Provide six copies of bound material (folded and bound in Volume I).

3.1 Introduction (SHALL NOT BE EVALUATED)

The introduction shall include the following information:

a. Name and address of organization.
b. Location of the principal office.
c. The type of organization (corporation, partnership, joint venture).
d. The number of years the Offeror's organization has been in business.

e. The number of years the Offeror's organization has been in business under its present business name.
f. Other or former names the Offeror's organization operated under, and during which calendar years the organization operated under these other or former names.

3.1.1 If a corporation, provide the date of incorporation, state of incorporation, names and addresses of principal offices of the corporations, and state if the corporation is publicly held.

3.1.2 If a partnership, provide the date of organization, the type of partnership (general or limited), and names and addresses of all partners.

3.1.3 If a joint venture, provide the information contained above, for each element of the joint venture as may be appropriate.

3.2 Factor 1 - Past Experience of Offeror's Team

The Offeror as a Team will demonstrate past experience by providing recent and relevant Design-Build Experience and/or Design-Bid-Build Experience.

- Design-Build Experience
  - Design Architect/Engineer and the Contractor as a team shall demonstrate not less than one (1) but no more than four (4) examples of projects not less than 75% complete or physically completed within the last seven (7) years and shall be similar in scope, magnitude and complexity. Physical completion is defined as the date the facility was turned over to, or occupied by the owner. Projects of a similar nature may include but are not limited to the following: complexes with multiple dormitories, barracks, apartments, housing or residential development complexes (including Federal, State, local government or privately funded projects). Past experience may include information regarding predecessor companies, company's key personnel, and/or subcontractors that will perform major critical aspects of the project. Any firm acting as a subcontractor may submit projects for past experience if they performed work on major critical aspects of the project and their portion of the work is not less than 75% complete.

- Design-Bid-Build Experience
  - Architect/Engineer shall demonstrate not less than two (2) but no more than four (4) examples of past experience in design and the Contractor shall demonstrate not less than two (2) but no more than four (4) examples of past experience in construction. The past design and construction projects shall be not less than 75% complete or physically completed within the last seven (7) years and shall be similar in scope, magnitude and complexity. Physical completion is defined as the date the facility was turned over to, or occupied by the owner. Projects of a similar nature may include but are not limited to the following: complexes with multiple dormitories, barracks, apartments, housing or residential development complexes (including Federal, State, local government or privately funded projects). Past experience may include information regarding predecessor companies, company's key personnel, and/or subcontractors that will perform major critical aspects of the project. Any firm acting as a subcontractor may submit projects for past experience if they performed work on major critical aspects of the project and their portion of the work is not less than 75% complete.

No more than eight (8) total fact sheets shall be submitted.

Information shall be provided on the form found in Paragraph 6.0, Relevant Project Information Sheet that includes the following:

a. Company/firm name.

b. Project name.
c. Project location.
d. Project size (square footage and number of units).
e. Project relevance (i.e. barracks, dormitories, etc.).
f. Type of contract (design-build or design-bid-build).
g. Role (i.e. prime, joint venture, subcontractor) and work company/firm self-performed on project.
h. Project award amount and completion amount.
i. Project original contract duration and completion date and project final contract duration and completion date.
j. Client/agency (if Government give contract number and name of Contracting Officer) and point of contact, phone number, and address for information on the role the Offeror had in the project.
k. Designer of record.
l. Construction contractor and subcontractor(s).
m. Contractors Project Manager, Contractors Quality Control Manager, Design Quality Control Manager, Construction Quality Control Managers, Construction Quality Control Representatives, Design/Construction Liaison, Design Team Members (all engineering disciplines), Superintendent, Contractors' Subcontractor Manager, Independent Technical Review Team, Safety Manager.

3.3 Factor 2 – Proposed Engineering Systems

- Based upon the Sustainable Project Rating Tool (SpiRiT) provide a completed score sheet for each building and description of the Offeror's plan to achieve a minimum of gold rating for the barracks and a minimum of bronze for all remaining buildings except the Hanger COFs. The Hanger COFs need not be rated. Description should explain the subfactors where points are taken and the methods planned to meet the requirements of the subfactor. Score sheet and description will be rated on compliance with the RFP, score

- Submit site specific 90% plans and specifications for the design of the water tower. Plans shall have a note "Not For Construction", but shall be stamped by a Professional Engineer. Plans should include elevations, foundation plan, utility plan, grading plan, and lighting plan. Included in the submission shall be the manufacturer's proposed delivery and schedule showing completion not later than 3 June 2005.

- Typical Wall Sections: Include the typical vertical elevations for each building type, including ceiling height, foundation, roof section including materials and ventilated spaces, floor to floor height and clear heights for mechanical, electrical and structural components. Sections should also show/describe architectural and structural wall components.

- Exterior Renderings: Provide two exterior renderings showing building elevations including all exterior materials and special details, patterns, etc. The first rendering shall show the Barracks, Dining Facility, and COF compound. The second shall show the Battalion Headquarters buildings and at least one of the Hanger COFs. Renderings shall describe each proposed exterior material to be used, masonry patterns, accents, special units, WSAAF terrain and physical features etc. Renderings should be 2'x3' mounted on ¼" foam board and have a laminated or other protective cover. Provide four copies of each rendering.

3.4 Factor 3 - Past Performance of Offeror's Team

Provide performance and evaluation information on the provided Past Performance Customer Questionnaire for projects submitted under Factor 1. The Offeror shall provide an explanation if the performance is less than satisfactory. Offeror shall request Past Performance Customer Questionnaires, found Paragraph 7.0, Past Performance Customer Questionnaire, to be filled out and returned directly to the USACE at the address shown in Block 8 of Standard Form 1442. Questionnaires should be received by the USACE by the proposal submission deadline in order to be considered. The offeror shall provide a copy of the front page of all Past Performance Customer Questionnaires in the technical proposal that were sent to

clients as proof that the questionnaires were requested. Formal performance evaluations are those that are similar to the Corps of Engineers Construction Performance Evaluation Form DD 2626, or the submission of the DD 2626 or similar for Government projects. The Government reserves the right to verify previous performance by reviewing the USACE Construction Contractor or Architect-Engineers Appraisal Support System (CCASS/ACASS), or to interview owner or references. Provide information and an explanation for terminated design or construction projects where any of the Offeror's Team members were involved with the project at the time of the termination. In the event a Final Revised Proposal is requested, and the Offeror wishes to submit different examples from what was submitted in the original proposal, an attempt shall be made by the Offeror to provide performance and evaluation information on the provided Past Performance Customer Questionnaire for the new projects submitted. Offeror's shall provide documentation of any terminated contracts with address and phone listings of the owner or owner's representative.

3.5 Factor 4 - Qualifications of the Offeror's Team

The Offeror shall provide the following to show qualifications of the team

- The Offeror shall identify in the construction portion of the team the areas and percent of construction they intend to self perform and the areas and percent of construction they intend to subcontract along with the names of the subcontractors.

- Provide an organization chart showing key personnel for the Offeror's Design-Build Team. At a minimum, the organizational chart shall identify the key personnel, the contractor and/or subcontractor entities, their responsibilities, structure and lines of authority. The following minimum key personnel shall be identified by name: Contractors Project Manager, Contractors Quality Control Manager (and alternate), Design Quality Control Manager (and alternate), Construction Quality Control Manager (and alternate), Construction Quality Control Representatives, Design/Construction Liaison, Design Team Members (all engineering disciplines), Superintendent, Contractors' Subcontractor Manager, Independent Technical Review Team, Safety Manager. A sample organizational chart is provided in Section 00110 Attachment A. Sample chart is provided for information only. The Offeror shall develop a chart specific to their organization. Individual resumes in the format found in Section 00110, Paragraph 8.0, Key Personnel Resume Form, shall be provided and that includes the following information:

a. Name.
b. Management title on this project.
c. Number of years with firm and other firms.
d. Number of years in this management title or role.
e. Specialization.
f. Professional registration.
g. Specific experience and qualifications relevant to this project.

Contractor's Project Manager: (Overall Manager of the Project)

(1) Performs all project management duties of the project.

(2) Serves as the Governments' sole point of contact in all matters relating to work including, but not limited to, contract compliance, progress of work, overall project scheduling, financial matters, and change orders.

(3) Attends all job meetings.

(4) On site a minimum of 30% of the time.

(5) The Overall Project Manager shall have a minimum of ten years of project management experience in design and/or construction on projects of comparable complexity, scope and cost.

Contractor's Quality Control Manager: (Manager of Field and Office Quality Control Personnel)

(1) Performs all quality control management duties required of the Contractor.

(2) Serves as the Governments' primary point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures.

(3) The Contractor shall identify the CQC System Manager as an individual within his organization that is completely responsible for all Quality Issues and shall perform overall management of CQC system and have the authority to act in all CQC matters for the Contractor. This person shall at a minimum perform a monthly site visit and attend all partnering meetings to discuss, address quality issues during both design and construction and be on site during critical construction activities. This person shall be directly employed by the prime contractor (not a subcontractor) and shall have complete authority in all aspects of Quality Control. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

The Contractor’s Quality Control Manager shall meet the following requirement:

Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 4 years construction experience and a minimum of 4 years of design experience, at a minimum one of the years experience must have been as a Quality Control or Quality Assurance Representative.

(4) May serve as the Design/Construction Liaison, but if he/she takes on this additional duty then they must visit construction site a minimum of three times a week.

(5) Attends all job meetings.

(6) Reports all deficiencies to the Government and the Contractor's Project Manager for correction.

(7) Works directly under, and is responsible to the Project Manager.

(8) An **alternate** for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

Design Quality Control Manager: (Principal in Charge of Design Quality Issues and Coordination of Design Quality Control)

(1) The Contractor shall identify the Design Quality Control Representative as an individual employed by the design firm or by the prime contractor that is completely responsible for all Design Quality Issues and shall perform coordination between the contractor, subcontractors, and the designer and have the authority to act in all design quality control matters for the prime contractor. During design this person shall at a minimum perform a bi-monthly coordination meeting to discuss coordination and quality issues concerning the design of the project. During construction this person shall at a minimum perform a monthly site visit and attend all partnering meetings to discuss and address design quality issues. This person shall be employed by the design firm or by the prime contractor and shall have complete authority in all aspects design coordination and design quality control for the Prime contractor. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

(2) Attends during the design phase a bi-monthly coordination meeting to discuss coordination and quality issues. Hold a current state Professional Engineer's license. Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 6 years experience in design or design coordination.

(3) Has no other duties except Design Quality Control.

(4) Have complete authority in all aspects of design coordination and design quality control for the prime contractor.

(5) An **alternate** for the Design Quality Control Representative will be identified in the plan to serve in the event of the Representative 's absence. The requirements for the alternate will be the same as for the designated Design Quality Control Representative.

Construction Quality Control Managers: (Principal in Charge of Construction Quality Issues and Coordination of Construction Quality Control)

(1) The Contractor shall identify the Construction Quality Control Manager as an individual within his organization that is completely responsible for all Construction Quality Issues and shall perform coordination between the contractor, subcontractors, and any Independent Testing Labs and have the authority to act in all construction quality control matters for the prime contractor. During design this person shall at a minimum attend the bi-monthly coordination meeting to discuss coordination and quality issues concerning the design of the project. During construction this person shall be onsite at all times performing Construction Quality Control duties to include, but not limited to, implementation of the three-phase inspection system for all aspects of the construction work specified. This person shall have complete authority in all aspects of Construction Quality control. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

(2) The Construction Quality Control Manager shall meet one of the following requirements:

a) Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 4 years experience in construction.

b) Shall have a minimum of 6 years of construction experience at a minimum level of a project superintendent.

(3) Attends a bi-monthly coordination meeting during the construction phase to discuss coordination and quality issues.

(4) On site at all times during construction performing construction quality control duties.

(5) Has no other duties except construction Quality Control.

(6) Directly employed by the prime contractor.

(7) An **alternate** for the Construction Quality Control Representative will be identified in the plan to serve in the event of the Representative’s absence. The requirements for the alternate will be the same as for the designated Construction Quality Control Representative.

Construction Quality Control Representatives (Three individuals who assist the Construction Quality Control Manager with Construction Quality Issues and Construction Quality Control)

(1) The Contractor shall identify three individuals within his organization that will assist the Construction Quality Control Manager in all associated quality control and coordination issues. One of the individual will be responsible for site and structural/building systems, one will be responsible for electrical, and the third responsible for mechanical.

(2) Representatives shall have a minimum of 5 years of construction experience within the discipline they will oversee at a minimum of the journeymen level.

(3) Representatives shall attend bi-monthly coordination meeting during the construction phase to discuss coordination and quality issues.

(4) Representatives shall be on site at all times during construction performing construction quality control duties.

(5) Representatives have no other duties except construction Quality Control.

(6) Directly employed by the prime contractor.

(7) The Construction Quality Control Manager may serve as one of the Quality Control Representatives.

Design/Construction Liaison:

(1) Coordinates design activities throughout the life of the project for construction document development and construction activities.

` (2) Must meet one of the following:

BS in engineering with a minimum of 4 years design experience; or

Four (4) years construction experience and a minimum of two (2) years experience in technical design coordination.

(3) Is allowable to perform the function of a Site Safety Officer, provided he/she meets the qualifications.

(4) Supervises the commissioning phase of the contract.

Design Team Leader:

(1) An individual having the leadership role in the production of the product.

(2) For engineering products this individual is the project engineer/architect (PE/A).

(3) For all projects the PE/A must be a registered professional.

(4) This person is responsible for coordination between all disciplines, and ensures excellent integration of trades in both drawings and specifications.

Design Team:

The proposed design team shall, as a minimum, be comprised of the following disciplines: Architect, Civil Engineer, Structural Engineer, Mechanical Engineer, Electrical Engineer, Fire Protection, and Geotechnical Engineer. At least one person in a lead role of each discipline must be registered to practice in their professional field of engineering in the United States or its possessions (52.236-0025). Any substitutions in key personnel after award shall require Contracting Officer approval. The Offeror shall submit this information regarding their design team by providing all the information requested on STD forms SF 254 and SF 255 and the information listed below.

1) Full name
2) Years of construction and/or design experience
3) Professional backgrounds
4) Professional and/or contractor's licenses
5) Length of service with your organization
6) Other companies employed by in the past including time frames
7) Project related experience including time frames and brief project descriptions, including any design-build experience

Superintendent:(Overall Field Manager Responsible for Construction)

(1) Performs all superintendent duties required of the Contractor, except any duties required under "Superintendence of Subcontractors" below.

(2) Serves as the Governments' on site point of contact in all matters relating to the work including, but not limited to, scheduling of work, utility interruptions, and testing.

(3) Attends all job meetings.

(4) On site at all time during all construction activities.

(5) Serves under, and reports directly to, the Contractor's Project Manager.

(6) The On-Site Construction Superintendent shall have a minimum of 10 years construction experience on projects of comparable complexity, scope and cost.

Contractor's Subcontract Manager:

(1) Performs all subcontract management/superintendent duties required of the Contractor, and any duties required under contract clause titled SUPERINTENDENCE OF SUBCONTRACTORS.

(2) Serves as the Governments' final "Field" point of contact in all matters relating to the subcontracted work including, but not limited to, scheduling of work, utility interruptions, and testing.

(3) Attends all job meetings.

(4) Serves as the alternate in the event the Superintendent is absent.

(5) On site at all times during construction activities of subcontracted work.

(6) Works under, and reports directly to, the Contractor's Project Manager.

ITR Team:

(1) Independent Technical Review (ITR) shall be preformed as follows, all design submissions are reviewed by a qualified person or team, not affiliated with the development of a project/product, for the purpose of confirming the proper application of clearly established criteria in the RFP, regulations, laws, codes, principles and professional procedures. It includes the verification of assumptions, methods, and level of complexity of the analysis. It also verifies the alternatives evaluated, appropriateness of data used, reasonableness of the results and functionality of the product relative to the customer's requirements.

Independent Technical Review Team (ITRT): An interdisciplinary group formed to perform the ITR.

ITRT Leader - The ITRT Leader is responsible for coordinating all activities associated with the technical review. This coordination includes receipt of review documents from the PE/A, distributing these documents to the ITRT members which may require coordinating the sharing of documents if there are not adequate copies for each member to have their own. The leader must also assure that the reviews are completed on schedule, collect the review comments from the various members and compile all comments into a single package. This package will then be provided to the PE/A. Additional responsibilities include:

• Assist the PE/A (when requested) in the development of the QCP Plan

• Attend the pre-design conference Determine the need for attendance at all major planning/design team meetings.

•Select review team members who will attend the selected planning/design team meetings for in-progress reviews

• Conduct a team meeting early in the QC process to assure an understanding by the ITRT of the role and responsibility of each member

• Assure that ITR comments have been incorporated into the certified final design

• Obtaining signatures of ITRT members for the ITR certification and providing certification to PE/A

ITRT Members - The ITRT Member is responsible for performing an Independent Technical Review of the assigned planning/design component. Whenever the review calls for a level of specialized knowledge, experience, or training not possessed by ITRT members, the ITRT leader and the ITRT members will seek assistance from district functional chiefs in finding appropriate sources of review expertise within or outside the district. In addition are responsible for:

• Signing ITR certification

• Assuring his/her ITR comments have been incorporated into the certified final design

• ITR members must have minimum 5 years experience in their field of review and be a senior engineer in their field

Safety Manager: (Principal in Charge of Enforcing Safety Codes for the Project)

(1) Performs all safety management duties required of the Contractor including duties of the Site Safety Officer (reference Section 01420).

(2) Serves as the Governments' sole point of contact for all matters relating to safety.

(3) Continually enforces and implements the safety requirements of the contract including the Accident Prevention Plan.

(4) On site at all times during building activities, foundations work, structural steel erection, and exterior wall construction. During all other construction activities the Site Safety Officer may fulfill the position requirements of the Safety Manager (reference Section 01420).

(5) Works under and reports to the Contractor's Project Manager.

3.4 (a) Substitution of Team Members:

a. Each of the key personnel must have the experience as noted in the specifications for their specialty.
b. The Offerors are advised that substitution of proposed key personnel will not be permitted unless
approved by the Contracting Officer/ Source Selection Authority and an administrative modification to
the contract is issued to incorporate the change. The authority for substitution of key personnel lies solely with the Contracting Officer and will not be delegated to the ACO or COR.
c. Substitution of key personnel will only be allowed under the following conditions:
- Change of Employment
- Would pose hardship upon the employee which was not known at the time the proposal was submitted
- Sickness
- Substitution of team members from proposal to execution phase is not allowed without the approval of the Contracting Officer
d. Any proposed team member replacement shall meet or exceed the qualifications noted in the specifications for their specialty and also meet or exceed the qualifications of their predecessor.

3.5 Factor 5 – Performance Schedule

This factor rates the offerors simplified bar chart of the proposed project schedule and the Gantt Chart of the proposed project schedule, which includes elapsed design and construction time showing the major elements of design and construction events. The schedules will be evaluated on the basis of comprehensiveness and realism.

a. Proposed Design Schedule demonstrating 100% design complete not later than 16 May 2005
b. Proposed Water Tower delivery and erection schedule demonstrating completion no later than 3 June 2005.
c. Proposed Construction Schedule
d. Comprehensiveness of Design-Build Gantt Chart (with major construction event elements and the critical path)

Capability: Provide a narrative, describing your scheduling capability and planning organization. Address how you maintain, update, and use your schedule. Describe the equipment and software/hardware you intend to use.

Schedule: Submit a preliminary schedule for the overall design and construction of the project. Schedules or diagrams may be provided separately in a size that is easily read, but shall be bound and clearly labeled as Volume I. The preliminary schedule will, after contract award, be replaced with a final schedule as

required in Section 01310, "Project Schedule". The schedules shall be task oriented, indicating the number of calendar days, after Notice To Proceed (NTP), by which milestones are to be achieved. Offeror may use a critical path, Gantt Chart, or other method of his choice, however, schedules shall be graphically represented. The Preliminary Project Schedule shall reflect the Total Contract Duration you proposed in the Bidding Schedule. Give special attention to the following features.

Show the design effort, design submittal, and contract required minimum review periods, and identify any fast-tracking of the design and construction activities.

Show the construction start and finish dates for each building, and include mobilization, material approvals, major activities and milestone dates, and any overlapping of construction activities for each building. Show the overall contract completion date.

Show the schedule for delivery and storage or stockpiling of major items of materials and equipment, including:

Water Tower
Doors/Frames
Windows
Exterior Wall Components
Roofing Materials

Show the CQC completion and joint turnover inspections.

Show O & M Manual submissions and required operator training.

Show As-Built submissions.

The Offeror shall provide evidence of conformance to the minimum project schedule contained in this RFP. The Offeror, beginning with Notice to Proceed (NTP), should identify time frames in the schedule that can be shortened, and the methods in which this can be accomplished (i.e., construction phasing, material lead times, etc.). Pertinent information, such as proposed construction methods, and site security, shall also be included in the schedule. If the Offeror's Performance Schedule is less than the maximum completion time allowed in this RFP, the proposed schedule, adjusted to the actual NTP, shall become binding, if the Offeror's proposal is accepted for award.

4.0 VOLUME II - PRICE PROPOSAL

The price proposal shall be submitted in a separate binder labeled "Volume II - Price Proposal". The sections shall parallel the submission requirements identified in the bid schedule. The design effort for the optional bid items will be included in the cost for the optional bid items. Provide six copies of bound written material (folded and bound in Volume II).

5.0 VOLUME III - SUBCONTRACTING PLAN

Factor 6 - The subcontracting plan shall be submitted in a separate binder labeled "Volume III - Subcontracting Plan". Large business concerns must submit as part of their proposal their subcontracting projections for this project in accordance with FAR Contract Clauses 52.219-8 and 52.219-9. To be acceptable, plans must adequately address the six required statutory elements and provide sufficient information to enable the Contracting Officer to answer affirmatively questions A through H of Appendix CC, Part 2, AFARS 19.705. Provide 3 copies of bounded written material (folded and bounded in Volume III).

The six statutory elements are:

1) The extent to which firms are specifically identified in proposals
2) The extent of commitment to use such firms
3) The complexity of and variety of work small firms are to perform
4) The realism of the proposal
5) Past performance of Large Business Firms complying with formal subcontracting plan requirement and all firms, large or small, in complying with the contract clauses for utilization of small, small business disadvantaged, and women-owned small business firms.
6) The extent of participation by such firms with respect to total value of the contract

Percentage goals apply to the total amount being subcontracted. The current goals for the New York District are 57% to Small Business, 8.9% to Small and Disadvantaged Business, 8.1% to Woman Owned Small Business, 3.0% to HUBZone Business, and 3.0% to Service Disabled Veterans. The Offeror is put on notice that any targets represented in submitted proposal will be incorporated into and become part of any resulting contract. All proposed SDB concerns must be certified by the Small Business Administration and listed in the online database PRO-Net. SDB concerns may register in PRO-Net at <http://pronet.sba.gov>.

a. Subcontracting Plan. (Applies to Large Businesses only.) All large businesses shall submit a subcontracting plan with their technical and price/cost proposals. The plan should be prepared in accordance with FAR 52.219-9. Failure to submit an acceptable subcontracting plan may make the Offeror ineligible for award of the contract. The submission of the subcontracting plan is in no way advantageous to large businesses over any small business in the evaluation process.

b. Small Disadvantaged Business (SDB) Utilization Plan. (Applies to all Offerors.) Offerors shall submit a SDB Utilization Plan, to include the following information:

(1) Identification of each SDB concern proposed and the work each is to perform.

(2) Targets expressed in dollars and percentages representing each SDB concern's participation of the total contract value.

(3) Total target value of all SDB participation, expressed in dollars and percentages, of the total contract value.

6.0 REVELANT PROJECT INFORMATION SHEET

PRIME CONTRACTOR/SUBCONTRACTOR EXPERIENCE

Company/Firm Name: _____

Project Name: _____

Project Location: _____

Project Size (square footage and number of units): _____

Project Relevance (i.e. barracks, dormitory, etc.): _____

Type of Contract (design-build or design-bid-build): _____

Role (i.e. prime, joint venture, subcontractor) and work Company/Firm self-performed on this project:

_____

Project Award Amount: _____ Project Completion Amount: _____

Project Original Contract Duration and Completion Date: _____

Project Final Contract Duration and Completion Date: _____

Client/Agency (if Government, give contract number and name of Contracting Officer): _____

_____

Client/Agency Point of Contact, Phone Number and Address (if Government, give contract number and name of Contracting Officer): _____

_____

_____

Designer of Record: _____

Construction Contractor and Subcontractor(s): _____

_____

Overall Design and Construction Project Manager: _____

Project Architect: _____

Mechanical Engineer: _____

Electrical Engineer: _____

On-Site Construction Superintendent: _____

Quality Control Engineer/Manager: _____

7.0 PAST PERFORMANCE CUSTOMER QUESTIONNAIRE

The Offeror/Contractor listed is being considered in a Source Selection by the US Army Corps of Engineers, New York District. This is a request for past performance information on a project the Offeror has identified as being relevant to this solicitation. This information will be used in the evaluation of the Offeror's performance of that project. The following information, once submitted, will be treated as confidential and will not be released. This information will only be used to evaluate this Offeror for this solicitation. Please complete the following questionnaire utilizing the following guidance:

a. Handwritten responses are sufficient.
b. Circle a rating as listed below and provide a brief supporting narrative for your area of administrative responsibility. In the event of any unsatisfactory performance, please describe the cause and corrective actions, and any other pertinent information relative to the contractor's inadequate performance.
c. The assessment questions contained in this questionnaire shall be rated pursuant to the following definitions:

Exceptional (E) - Indicates the contractor's performance exceeded the contractual requirements.
Satisfactory (S) - Indicates there were no major problems that were not quickly and effectively solved by the contractor, and the contractor was meeting all contractual requirements.
Marginal (M) - Indicates the area of evaluation contained major problems that were not effectively solved by the contractor. The contractor met basic contract requirements with assistance from the customer. Please include any written documentation supporting this rating.
Unsatisfactory (U) - Indicates a serious problem existed on the part of the contractor that precluded the contractor from meeting the contractual requirement(s). Please include any written documentation supporting this rating.
N/A - Not applicable or observed.

d. Please return the completed forms to the US Army Corps of Engineers, New York District at the following mailing address or via fax at (212) 264-3013:

US Army Corps of Engineers, New York District
Room 1843
Jacob K. Javits Federal Building
26 Federal Plaza
New York, NY 10278-0090

PAST PERFORMANCE CUSTOMER QUESTIONNAIRE

PROJECT: WSAAF BARRACKS EXPANSION, FORT DRUM, NY

"The U.S. Army Corps of Engineers, New York District, is interested in your assessment of the name company's "past performance". Past performance refers to the company's record of conforming to contract requirements and to standards of good workmanship; the company's record of forecasting and controlling costs; the company's adherence to contract schedules including administrative aspects of performance; the company's history of reasonable and cooperative behavior and commitment to customer satisfaction; and the company's general business-like concern for the interest of the customer. These questions relate to work performed by:

Contractor under review: (Insert Company Name)
Name and Location of Project:

Respondent Identification:

Name
Date
Company/Organization
Position/Job Title
Telephone Number

Questionnaire:

1. Is the information provided by the contractor on the attached Project Fact Sheet accurate and correct to the best of your knowledge? Yes ( ) No ( )

2. What type of work did the contractor perform?

_____

_____

_____

3. How would you rate the contractor's overall performance?

E S M U N/A

_____

_____

_____

4. How would you rate the contractor's overall corporate management, integrity, reasonableness, and cooperative conduct?

E S M U N/A

_____

_____

_____

5. How would you rate the contractor's quality control program and performance on delivery of quality work?

E S M U N/A

_____

_____

_____

6. How effective was the contractor in meeting completion requirements including punch list items and warranty work?

E S M U N/A

_____

_____

_____

7. How efficient and timely were the services performed (compliance with the schedules of completion)?

E S M U N/A

_____

_____

_____

8. Please circle the statement that best describes your feelings with regard to the contractor.

a. They were an outstanding contractor in every respect. Problems were solved in a spirit of teamwork. Quality work, timely actions, and complete documentation were routinely achieved. We would pay a premium price to contract with them again.
b. They were an above average contractor to whom we would not hesitate to award to again. Problems encountered were minor and solutions were found with little difficulty.
c. They were an average contractor meeting the minimum requirements of the contract. Performance deficiencies improved when identified by the client/agency.
d. They were a below average contractor. Numerous problems developed that were a result of their lack of cooperation and failure to perform as required. An aggressive inspection program was required to ensure compliance.
e. They were a poor contractor who we would not want again under any circumstances. We would have been within our rights to terminate them for default.
f. None of the above. Please provide your statement. _____

_____

_____

9. Was the contractor given any of the following (or anything of a similar nature)?

Cure Notice: Yes No
Show Cause Notice: Yes No
Termination for Default: Yes No

10. If there are any additional comments, information, etc. that you would like to add to the survey that does not fall into any of the above categories, please indicate below:

_____

_____

_____

Return to:

U.S. Army Corps of Engineers, New York District
Attn: Contracting Division, Shaukat Syed
Jacob K. Javits Federal Building
26 Federal Plaza, Room 1843
New York, N.Y. 10278-0090
212-264-0238
212-264-3013 (Fax)

8.0 KEY PERSONNEL RESUME FORM

Name:_____

Management Title:_____

Number of Years: With this firm _____ With other firms_____

Number of Years in this position or role: _____

Specialization: _____

_____

Professional Registration (Type and State of Registration): _____

_____

Experience and Qualifications Relevant to this Project: _____

_____

_____

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SMALL BUSINESS SUBCONTRACTING PLAN
Identification Data

Contractor:

Address:

Solicitation & Contract Number:_____
_____

Item/Service: _____

Total Amount or Contract (Including options) $ _____

Period of Contract Performance (DAY, MO. & YR.)_____

* Federal Acquisition Regulation (FAR), paragraph 19.708(b)(1)) prescribes the use of the clause at FAR 52.219-9 entitled "Small Business Subcontracting Plan." The following is a suggested model for use when formulating such subcontracting plan. While this model plan has been designed to be consistent with FAR 52.219-9, other formats of a subcontracting plan may be acceptable. However, failure to include the essential information as exemplified in this model may be cause for either a delay in acceptance or the rejection of a bid or offer where the clause is applicable. Further, the use of this model is not intended to waive other requirements that may be applicable under FAR 52.219-9. "SUBCONTRACT," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a federal government prime contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

1. TYPE OF PLAN (check one)

a. Individual Plan (All elements developed specifically for this contract and applicable for the full term of this contract, including any option periods.)
b. Master Plan (Goals developed for this contract; all other elements standard; must be renewed every year.)
c. Commercial Products Plan (Contractor sells large quantities of off-the-shelf commodities to many Government agencies. Plans/goals negotiated by a lead agency on a company-wide basis rather than for individual contracts. Plan effective only during the year for which it is approved. The contractor must provide a copy of the lead agency approval.)

(version 1/2002)

2. GOALS

State separate dollar and percentage goals, expressed in terms of percentages of total subcontracting dollars, for the use of small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs in the following format. (**For a contract with options, provide a separate statement for the basic contract and individual statements for each option year.**)

a. Total estimated dollar value and percent of planned subcontracting with small businesses (include veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business concerns): (% of "c")
$_____ and _____%

b. Total estimated dollar value and percent of planned subcontracting with large businesses (all business concerns classified as "other than small"): (% of "c")
$_____ and _____ %

c. Total estimated dollar value of all planned subcontracting for an individual contract plan; or the offerors total projected sales, expressed in dollars, and the total value of projected subcontracts to support the sales for a commercial plan; i.e., the sum of a and b above: $ (100 Percent)
$_____ and _____%

d. Total estimated dollar value and percent of planned subcontracting with veteran-owned small businesses: (% of "c")
$_____ and _____%

e. Total estimated dollar value and percent of planned subcontracting with service-disabled veteran-owned small businesses: (% of "c")
$_____ and _____ %

f. Total estimated dollar value and percent of planned subcontracting with HUBZone small businesses: (% of "c")
$_____and _____ %

g. Total estimated dollar value and percent of planned subcontracting with small disadvantaged businesses: (% of "c")
$ _____and _____ %

h. Total estimated dollar value and percent of planned subcontracting with women-owned small businesses: (% of "c")

$_____ and _____ %

3. DESCRIPTION OF PRODUCTS AND/OR SERVICES TO BE SUBCONTRACTED:
Provide a description of all the products and/or services to be subcontracted under this contract, and indicate the types of businesses supplying them: i.e., OTHER THAN SMALL BUSINESS (OTHER, e.g., LARGE BUSINESS), SMALL BUSINESS (SB), VETERAN-OWNED SMALL BUSINESS (VOSB), SERVICE-DISABLED VETERAN-OWNED SMALL BUSINESS (SDVOSB), HUBZONE SMALL BUSINESS, SMALL DISADVANTAGED BUSINESS (SDB), AND WOMEN-OWNED SMALL BUSINESS (WOSB):

(Check all that apply)

Subcontracted Product/Service	Other	SB	VOSB	SDVOSB	HUBZone	SDB	WOSB

(Attach additional sheets if necessary.)

4. A description of the method used to develop the subcontracting **GOALS**:

_____
_____
_____
_____

5. A description of the method used to identify potential **SOURCES** for solicitation purposes (e.g., whether you used existing company source lists, the Procurement Marketing and Access Network (PRO-Net) of the Small Business Administration (SBA), veterans service organizations, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small, HUBZone small, small disadvantaged, and women-owned small business trade associations. A firm may rely on the information contained in PRO-Net (at http://pro-net.sba.gov/) as an accurate representation of a concern's size and ownership characteristics for the purposes of maintaining a small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, and women-owned small business source list. Use of PRO-Net as its source list does not relieve a firm of its responsibilities (e.g., outreach, assistance, counseling, publicizing subcontracting opportunities) in this clause.

_____
_____

_____
_____(Attach additional sheets if necessary.)

6. Indirect costs have _____ have not _____ been included in the dollar and percentage subcontracting goals stated above. (Check one.)
If indirect costs have been included, explain the method used to determine the proportionate share of such costs to be allocated as subcontracts to small, veteran-owned small business, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business concerns.
_____
_____
_____

7. PROGRAM ADMINISTRATOR
Name, title, position within the corporate structure, and duties and responsibilities of the employee who will administer the contractor's subcontracting program.
Name:
Title:
ADDRESS:
Telephone:
Facsimile:
Email:

Duties: Has general overall responsibility for the contractor's subcontracting program, i.e., developing, preparing, and executing individual subcontracting plans and monitoring performance relative to the requirements of this particular plan. These duties include, but are not limited to, the following activities:

a. Developing and promoting company-wide policy initiatives that demonstrate the company's support for awarding contracts and subcontracts to small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business; and assure that small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small businesses are included on the source lists for solicitations for products and services they are capable of providing;
b. Developing and maintaining bidder's lists of small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business concerns from all possible sources;
c. Ensuring periodic rotation of potential subcontractors on bidders lists;
d. Ensuring that procurement "packages" are designed to permit the maximum possible participation of small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small businesses;
e. Make arrangements for the utilization of various sources for the identification of small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small businesses such as the SBA's PRO-Net, the National Minority Purchasing Council Vendor Information Service, the Office of Minority Business Data Center in the Department of Commerce, the facilities of local small business, minority associations, and contact with federal agencies' Small Business Specialists;
f. Overseeing the establishment and maintenance of contract and subcontract award records;
g. Attending or arranging for the attendance of company counselors at Business Opportunity Workshops, Minority Business Enterprise Seminars, Trade Fairs, Procurement Conferences, etc.;
h. Ensure that small, veteran owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business concerns are made aware of subcontracting opportunities and how to prepare responsive bids to the company;
i. Conducting or arranging for the conduct of training for purchasing personnel regarding the intent and impact of Section 8(d) of the Small Business Act on purchasing procedures;

j. Monitoring the company's performance and making any adjustments necessary to achieve the subcontract plan goals;
k. Preparing, and submitting timely, required subcontract reports;
l. Coordinating the company's activities during the conduct of compliance reviews by federal agencies;
m. Providing technical assistance; e.g., engineering, quality control, and managerial assistance to small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small businesses.
n. Other duties:

_____
_____
_____

8. EQUITABLE OPPORTUNITY

Describe efforts the offeror will make to ensure that small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business concerns will have an equitable opportunity to compete for subcontracts. These-efforts include, but are not limited to, the following activities:

a. Outreach efforts to obtain sources:
1. Contacting minority, women's, and small business trade associations;
2. Contacting business development organizations;
3. Attending small, veteran's, minority, and women's business procurement conferences and trade fairs;
4. Requesting sources from the Small Business Administration's (SBA) PRO-Net;
5. Utilizing newspaper and magazine ads to encourage new sources.

b. Internal efforts to guide and encourage purchasing personnel:
1. Presenting workshops, seminars, and training programs;
2. Establishing, maintaining, and using small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business source lists, guides, and other data for soliciting subcontracts; and
3. Monitoring activities to evaluate compliance with the subcontracting plan.

c. Additional efforts:

_____
_____
_____

9. FLOW-DOWN CLAUSE

The contractor agrees to include the provisions under FAR 52.219-8, "Utilization of Small Business Concerns," in all subcontracts that offer further subcontracting opportunities. All subcontractors, except small business concerns, that receive subcontracts in excess of $500,000 ($1,000,000 for construction) must adopt and comply with a plan similar to the plan required by FAR 52.219-9, "Small Business Subcontracting Plan."

10. REPORTING AND COOPERATION

The contractor gives assurance of: (1) cooperation in any studies or surveys that may be required; (2) submission of periodic reports which show compliance with the subcontracting plan; (3) submission of Standard Form (SF) 294, "Subcontracting Report for Individual Contract," and SF-295, "Summary Subcontract Report," in accordance with the instructions

on the forms; and (4) ensuring that large business subcontractors with subcontracting plans agree to submit Standard Forms 294 and 295.

Reporting Period Report Due Date
Oct 1 - March 31 SF-294 4/30
Apr 1 - Sept 30 SF-294 10/30
Oct 1 - Sept 30 SF-295 10/30

Addresses

a. **SF-294 to be submitted to the cognizant Small Business Representative for the New York District (Kathleen Hirschy, 26 Federal Plaza, NY NY 10278 Room 21-130) or as otherwise specified in the contract; and**
b. **SF-295 to be submitted as above to the cognizant SBA Commercial Market Representative.**

11. RECORDKEEPING

The following is a recitation of the type of records the contractor will maintain to demonstrate the procedures adopted to comply with the requirements and goals in the subcontracting plan. These records will include, but not be limited to, the following:

a. If the prime contractor is not using PRO-Net as its source for small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business concerns, list the names of guides and other data identifying such vendors;
b. Organizations contacted in an attempt to locate small, veteran-owned small, service-disabled veteran-owned small, HUBZone small, small disadvantaged, and women-owned small business sources;
c. On a contract-by-contract basis, records on each subcontract solicitation resulting in an award of more than $100,000 indicating: (1) whether small business concerns were solicited, and if not, why not; (2) whether veteran-owned small business concerns were solicited, and if not, why not; (3) whether service-disabled veteran-owned small business concerns were solicited, and if not, why not; (4) whether HUBZone small business concerns were solicited, and if not, why not; (5) whether small disadvantaged business concerns were solicited, and if not, why not; (6) whether women-owned small business concerns were solicited, and if not, why not; and (7) if applicable, the reason that the award was not made to a small business concern;
d. Records to support other outreach efforts, e. g., trade associations, business development organizations; conferences and trade fairs to locate small, HUBZone small, small disadvantaged, and women-owned small business sources; and veterans service organizations;
e. Records to support internal guidance and encouragement provided to buyers through (1) workshops, seminars, training programs, incentive awards, and (2) monitoring of activities to evaluate compliance; and
f. On a contract-by-contract basis, records to support subcontract award data including the name, address, and business size of each subcontractor. (This item is not required on a contract-by-contract basis for company or division-wide commercial plans.)
g. Additional records:

This subcontracting plan was submitted by:
Signature: _____
Typed Name: _____
Title: _____
Date Prepared: _____

Phone Number: _____
Facsimile Number: _____
Email Address:_____

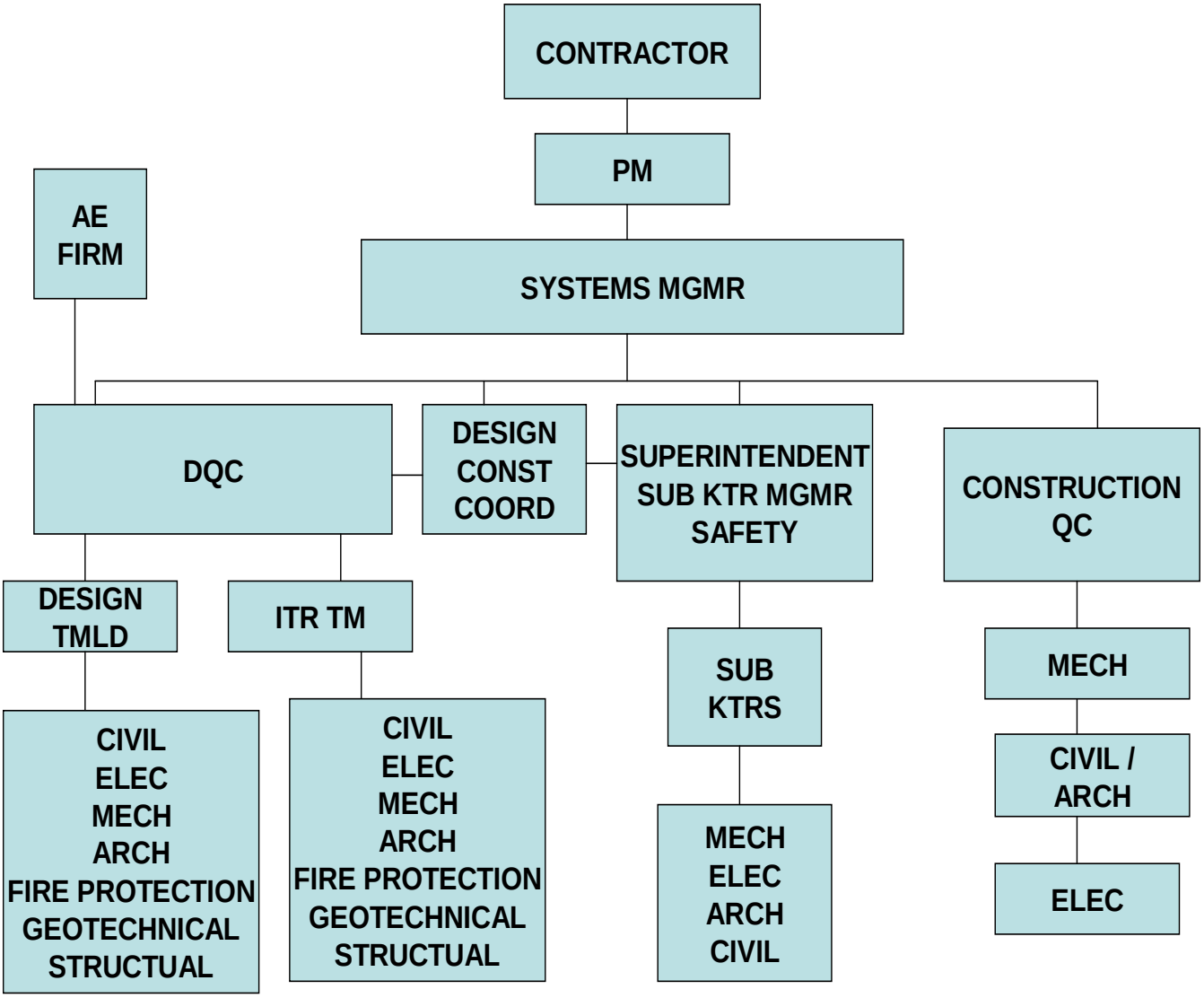
New York District Deputy for Small Business Recommendation:
_____/Date_____
Kathleen Hirschy
Phone 212 264 0147
Email: Kathleen.hirschy@usace.army.mil

Small Business Administration Approval:
Agency: U.S. Small Business Administration
Signature: _____
Typed Name: Debra B. Libow
Title: SBA Procurement Center Representative
Date Approved: _____
Phone Number: 212-264-4395
Facsimile Number: 212-264-3013

Contracting Officer Approval: _____/Date_____

ATTACHMENT A

SAMPLE ORGANIZATION CHART



SECTION 00120

PROPOSAL EVALUATION AND CONTRACT AWARD

1.0 TECHNICAL/QUALITY EVALUATION AND GENERAL SCORING SYSTEM

1.1 Definitions

1.1.1 A “weakness” is a flaw in the proposal that increases the risk of unsuccessful contract performance.

1.1.2 A "significant weakness" is a flaw in the proposal that appreciably increases the risk of unsuccessful contract performance.

1.1.3 A deficiency is a material failure of a proposal to meet a Government requirement or a combination of significant weaknesses in a proposal that increases the risk of unsuccessful contract performance to an unacceptable level.

1.1.4 A deviation occurs when a proposal takes exception to, implies or specifically offers something below or above the specified criteria. The Offeror may or may not have called the deviation to the attention of the Government. A deviation that is below, or does not meet, the specified criteria is a deficiency. Evaluators must identify deviations.

1.1.5 Clarification is a limited exchange with an Offeror for the sole purpose of eliminating minor irregularities, informalities, or apparent clerical mistakes in the proposal or to address adverse past performance not previously addressed with the Offeror. Clarifications do not give an Offeror the opportunity to revise or modify its proposal and are used, as necessary, when not opening discussions.

1.1.6 Communications are a limited exchange with an Offeror used to assist in determinations of the competitive range. Communications are limited to enhancing Government understanding of proposals and addressing adverse past performance information not previously addressed if said information is the determining factor preventing an Offeror from being included in the competitive range. Such communications shall not be used to cure proposal deficiencies or material omissions, or otherwise revise the proposal.

1.1.7 Discussions offer the opportunity to resolve deficiencies or weaknesses in the proposals, based on the requirement and the evaluations factors set forth in the solicitation. If the Source Selection Evaluation Board (SSEB) determines it is necessary to open discussions, they must discuss with all Offerors in the competitive range. Offerors have the opportunity to revise their proposals at the conclusion of discussions.

1.2 Quality Evaluation and Scoring System(s)

1.2.1 The SSEB will perform an in-depth review of the proposals. The SSEB will rate each evaluation factor and sub-factor for each proposal against the specified evaluation criteria in the Request for Proposal (RFP). The evaluation committee will not compare proposals against each other.

1.2.2 The evaluation factors and sub- factors are listed below. All factors and sub- factors will be color rated in accordance with the rating sheet prepared by the SSEB. Technical factors are listed in order of decreasing importance; Factor 1 is more important than factor 2, which in turn is more important than factor 3, and so on. Within each factor, sub-factors are of equal importance. Award for this procurement will be based on technical factors and price, which together constitute a best value to the Government, although not necessarily to the lowest price.

The Offerors shall submit, with their proposal, sufficient material to permit evaluation of the criteria listed below. Submission requirements are described in Section 00110, Submission Requirements and Instructions.

1.2.2.1 Proposal Submission: The proposal shall meet the submission and format requirements.

1.2.2.2 Volume I - Technical Proposal :

Introduction: The Offeror shall provide information on the organization with respect to name, type of organization, principal office location, number of years in business, and former names that the organization has operated under and Primary subcontractors and their role in the project.

Deviations to the concept plans and minimums set in specification section 01010 are not allowed unless prior approval is granted by government.

Do not submit any material not required by this solicitation (such as company or system brochures). It is assumed that the offerors will meet all technical portions (design/construction criteria) of the RFP. The fact that section 01010 and the drawings are not evaluated factors during solicitation does not relieve the offerors from meeting all technical, or other, requirements of the RFP.

Factor 1 - Past Experience of Offeror's Team: The Offeror as a Design-Build Team shall demonstrate past experience by providing recent and relevant design-build experience and/or design-bid-build experience.

Factor 2 – Proposed Engineering Systems: The Offeror shall demonstrate their understanding of the project design requirements by submitting key features of work as part of the proposal. These include Sustainable Project Rating Tool score sheets and descriptions, water tower design, wall sections, and building elevations.

Factor 3 - Past Performance of Offeror's Team: The Offeror as a Design-Build Team shall demonstrate at a minimum satisfactory performance and evaluation information, including timely completion of punch list and warranty work, for the projects submitted. In the case of an Offeror without a record of relevant past performance or for whom information on past performance is not available, the Offeror may not be evaluated by this factor (factor will be excluded).

Factor 4 - Qualifications of the Offeror's Team: The Offeror shall identify the areas and percent of construction they intend to self perform and the areas and percent of construction they intend to subcontract along with the names. Also they shall provide an organization chart and the key personnel for the Offeror's Design-Build Team.

Factor 5 – Performance Schedule: The Offeror shall provide a detailed project schedule demonstrating their understanding of the project requirements and ability to complete the project in a timely manner.

1.2.2.3 Volume II - Price Proposal: The price proposal shall parallel the submission requirements identified in the bid schedule.

1.2.2.4 Volume III - Subcontracting Plan :

Factor 6 - Plans shall adequately address the six required statutory elements and provide sufficient information to enable the Contracting Officer to answer affirmatively questions A through H of Appendix CC, Part 2, AFARS 19.705.

1.2.3 Evaluation of the Technical Proposal (Volume I) and the Subcontracting Plan (Volume III) will be conducted using color adjectival ratings. Definitions of rating guidelines are as follows:

Color	Rating	Definition
Dark Blue	**Exceptional**	Proposal demonstrates excellent understanding of

		requirements and approach that significantly exceeds performance or capability standards. Has exceptional strengths that will significantly benefit the Government.
Purple	**Very Good**	Proposal demonstrates good understanding of requirements and approach that exceeds performance or capability standards. Has one or more strengths that will benefit the Government.
Green	**Satisfactory**	Proposal demonstrates acceptable understanding of requirements and approach that meets the performance or capability standards. Acceptable solution. Few or no strengths.
Yellow	**Marginal**	Proposal demonstrates shallow understanding of requirements or approach that only marginally meet performance or capability standards necessary for minimal but acceptable contract performance.
Red	**Unsatisfactory**	Fails to meet most contractual requirements. The evaluation standard being assessed contained serious problem(s) for which the Offeror's corrective actions appear or were ineffective.

2.0 AWARD OF CONTRACT

2.1 The Government will award a Design-Build contract to the responsible Offeror whose technical proposal meets the following:

Factor 1: Past Experience of Offeror's Team: The Government will not award to an offeror that receives an unsatisfactory (red) in this factor. The factor will be considered unsatisfactory (red) when:

- A minimum of one (1) relevant design-build project is not submitted.

OR

- Two (2) relevant design and two (2) relevant construction projects under design-bid-build are not submitted.
- No projects submitted are similar in scope, magnitude, and complexity.
- Minimum number of fact sheets not submitted.

Factor 2: Proposed Engineering Systems: The Government will not award to an offeror that receives an unsatisfactory (red) rating in this factor. The factor will be considered unsatisfactory (red) when:

- The minimum requirements of either the SpiRiT sub-evaluation factor.

OR

- The water tower site specific plans and manufacturer's delivery and completion schedule are not provided.

OR

- The typical wall sections are not provided.

OR

- The exterior renderings are not provided.

Factor 3: Past Performance of Offeror's Team: The Government will not award to an offeror that receives an unsatisfactory (red) rating in this factor when:

- One (1) design-build project receives an unsatisfactory rating

OR

- A total of two (2) projects (design and/or construction) under design-bid-build receives an unsatisfactory rating

Factor 4: Qualifications of the Offeror's Team: The Government will not award to an offeror that receives an unsatisfactory (red) rating in this factor. The factor will be considered unsatisfactory (red) when:

- The organizational chart fails to show the key personnel by name, responsibilities, structure and lines of authority.

OR

- The minimum qualifications are not met for Superintendent, Contractor's Quality Control Manager or the Construction Quality Control Manager

OR

- More than three (3) of the key personnel listed (Contractors Project Manager, Design Quality Control Manager, Design/Construction Liaison, Design Team Members (all engineering disciplines), Contractors' Subcontractor Manager, Safety Manager) do not meet the minimum qualifications.

Factor 5: Performance Schedule: The Government will not award to an offeror that receives an unsatisfactory (red) rating in this factor. The factor will be considered unsatisfactory (red) when:

- The schedule provided exceeds the number of completion days allowed in Section 00800 of the RFP.

OR

- The schedule does meet any contract required milestone dates.

OR

- The schedule provided is incomprehensive or unrealistic.

Factor 6: Subcontracting Plan: The Offerors will be considered acceptable when they meet the requirements of Section 00120 Paragraph 2.1.4. The Government will not award to an offeror that receives an unsatisfactory (red) rating in this factor. The factor will be considered unsatisfactory (red) when:

- The Subcontracting goals are not met.

2.1.1 **No award will be made to an Offeror receiving either:**

- An unacceptable (red) rating in any evaluation factor is given.

OR

- A rating below satisfactory (green) in Factor #1

OR

- An satisfactory rating in Factor#1 but having more than two marginal(yellow) ratings in any other factors is given.

2.1.2 Overall technical merit will be assessed by a consideration of meeting the requirements of the RFP.

2.1.3 Price will be evaluated for adequacy and reasonableness and will include price evaluation preference for HUBZone small business concerns in accordance with FAR Contract Clause 52.219-4.

2.1.4 The subcontracting plan must adequately address the six required statutory elements and provide sufficient information to enable the Contracting Officer to answer affirmatively questions A through H of Appendix CC, Part 2, AFARS 19.705.

2.2 Offerors have been reminded to include their best technical and price terms in their initial offer and not to automatically assume that they will have an opportunity to participate in discussions or be asked to submit a revised offer. The Government may make award of an acceptable proposal without discussions, if deemed to be within the best interest of the Government.

The price proposal will be reviewed independently and will not influence the technical/quality evaluation.

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SECTION 00800

SPECIAL CONTRACT REQUIREMENTS

00800.1 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK.

a. The Contractor shall be required to (I) commence work under this contract within 5 calendar days after the date the Contractor receives the notice to proceed, (ii) prosecute the work diligently, and (iii) complete the entire work ready for use not later than 913 calendar days after the date the Contractor receives the notice to proceed, except in case the Contracting Officer determines that seeding is not feasible during the construction period, the Contractor shall accomplish such seeding in the first planting period following the contract completion date. This action will not operate to extend the performance time for the balance of the work. The time stated for completion shall include final cleanup of the premises.

b. KEY PERSONNEL, SUBCONTRACTORS AND OUTSIDE ASSOCIATES OR CONSULTANTS: In connection with the services covered by this contract, any in-house personnel, subcontractors, and outside associates or consultants will be limited to individuals or firms that were specifically identified and agreed to during negotiations. The contractor shall obtain the Contracting Officers written consent before making any substitution for these designated in-house personnel, subcontractors, associates, or consultants.

c. Location: The site of work is located at Fort Drum, New York. The site of the work is on a military reservation and all rules and regulations issued by the Commanding Officer covering general safety, security, and sanitary requirements, etc., shall be observed by the Contractor.

d. The Contractor shall furnish all labor, materials, equipment, and services (except those furnished by the Government) for the following work: construction a brigade size barracks complex for Wheeler-Sack Army Airfield (WSAAF). The project includes two three story junior enlisted barracks (240 rooms each for a total of 480 rooms) with integrated soldier community facilities, one brigade headquarters, three medium battalion headquarters with classrooms, a dining facility (251-500 PN), thirteen company operating facilities (5 medium, 8 small that are hanger additions), troop aid station, and a multi-purpose ball field. Three hanger COFs will be constructed for the 1/10 battalion at building 2072, three for the 2/10 at building 2060, and two for the 3/17 at building 2074.

e. All work shall be in accordance with the drawings and specifications or instructions attached hereto and made a part thereof, or to be furnished hereafter by the Contracting Officer and subject, in every detail, to his supervision, direction, and instructions.

00800.2 DISCLOSURE OF THE MAGNITUDE OF CONSTRUCTION PROJECTS. The magnitude of the Design/Build construction project is more than $60,000,000 – 80,000,000.

00800.3 COORDINATION PERIOD. In addition to contract clause titled PRECONSTRUCTION CONFERENCE, the Contractor shall reserve a 2 workday period of time no later than one month following the contract preconstruction conference for coordination. The Contractor's project management team responsible for this project shall participate. During the 2-day coordination period the Contractor and the Government will exchange information related to the government regulations and procedures, points of contact, relevant design information and general discussion about the execution and coordination of the project. The Contractor shall dedicate his management team for this 2-day coordination period.

00800.4 LIQUIDATED DAMAGES-CONSTRUCTION.

a. If the Contractor fails to have the water tower erected and operational by 3 June 2005, or any extension, the Contractor shall pay the Government $80,000.00 and $2,145.00 for each day of delay thereafter. If the Contractor fails to have Anaconda Road completed by 3 June 2005, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of $2,145.00 for each day of delay. If the Contractor fails to complete the remainder of the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of $29,985.00 for each day of delay.

b. If the Contractor fails to have the design completed by 5 May 2005, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of $2,145.00 for each day of delay. If the design is delayed, but the project is completed within the time specified in the contract, or any extension, the design liquidated damages will be returned to the Contractor without interest.

b. If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

c. If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

At a time before the project is physically complete but is functionally complete to the satisfaction of the Government, the Government at its sole discretion may agree to accept transfer of the facility or project provided that the remaining work to be done ("punchlist") is completed no later than 30 days from the date of transfer. In this case the contractor shall pay liquidated damages for punchlist items not completed in the daily amount of $475.00 per day commencing after 30 days of project transfer or after date required for project completion (including all extensions), whichever occurs later. The Government will not accept transfer of the barracks or the project if punchlist items exist in the living modules.

00800.5 INSURANCE - WORK ON A GOVERNMENT INSTALLATION

a. The Contractor shall, at it's own expense, provide and maintain during the entire performance of this contract, at least the kinds and minimum amounts of insurance as follows:

(1) General Liability Insurance (comprehensive form of policy)
Bodily Injury Liability - $500,000 per occurrence
Property Damage Liability - $20,000 per accident

(2) Automobile Liability Insurance
Bodily Injury Liability - $200,000 per person and $500,000 per accident
Property Damage Liability - $20,000 per accident

(3) Workmen's Compensation and Employer's Liability Insurance
Compliance with all applicable workmen's compensation and occupational diseases statutes is required. Employer's liability coverage in the minimum amount of $100,000 is required.

b. Before commencing work under this contract, the Contractor shall notify the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective --

(1) For such period as the laws of the State in which this contract is to be performed prescribe; or

(2) Until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

c. The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

00800.6 IMPLEMENTING GUARANTEES. At any time subsequent to the acceptance by the Government of a completed installation under this contract, which installation is required to be covered by a specific guarantee or warranty under the terms of the various sections in the TECHNICAL PROVISIONS, the Installation Commander will be an additional authorized party for the purpose of implementing the provision of such guarantees or warranties in behalf of the Government.

00800.7 RECORD DRAWINGS.

a. General: The Contractor shall maintain as-built drawings during the construction period and shall submit final record drawings at the completion of individual facilities. The Government will provide to the Contractor the CAD (Computer-Aided Drafting) drawing files on electronic disks in microstation 8.0 format. The Contractor is required to make prints from the CAD files and continuously maintain drawings to show current as-built conditions for the duration of the construction. Except for updates as indicated below, the Contractor may maintain as-built drawings by marking up drawings by hand or by CAD methods. Scanned drawings will not be acceptable.

b. Progress As-built Prints: During construction the Contractor is responsible for maintaining one set of up to date paper prints to show as-built construction conditions. These prints shall be kept current and available on the job site at all times. All changes from the contract drawings that are made in the work or additional information, which might be uncovered in the course of construction, shall be accordingly recorded as they occur by means of details and notes. The Contracting Officer's Representative and a responsible representative of the Contractor prior to submission of each monthly pay estimate will jointly inspect the as-built prints for accuracy and completeness. Progress as-builts shall show at a minimum the following information:

(1) The location and description of any utility lines, valves, or other installations of any kind within the construction area. The location includes dimensions to permanent features within +/- 6" of actual dimensions.

(2) The location and dimensions of any changes with the building and structure.

(3) Correct grade or alignment of roads, structures or utilities if any changes were made from the contract plans.

(4) Correct elevations if changes were made in site grading.

(5) Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabricated, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

(6) The topography and grades of all drainage installed or affected as part of the project construction.

(7) All changes, which result from contract modifications.

(8) Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built prints.

(9) All amendments to the contract drawings issued during the solicitation period shall be posted on the as-built drawings.

c. Protection of Records: The Contractor shall be responsible for the protection and safety of prints and CAD records until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at his expense.

d. As-Built Updates: At the 25%, 50%, and 75% completion point in construction of this project as determined by progress payments) the Contractor shall update the CAD files of the project drawings in the appropriate CAD program to show as-built conditions and submit one set of CAD prints to the Contracting Officer for approval. The submission shall only include drawings that have incurred changes. The intent of the submission is to demonstrate construction changes as marked on the progress as-builts, are being made in the CAD files at regular intervals. The Contractor shall make any required corrections before payment will be approved for this item.

e. Preliminary Record Drawing Submittal: At least 30 calendar days before the anticipated date of final acceptance inspection the Contractor shall deliver 2 copies of progress prints showing final as-built conditions to the Contracting Officer for review and approval. These prints shall correctly show all the features of the project as it has been constructed, adding such additional drawings as may be necessary. Drawings shall be printed from the CAD files updated in the appropriate CAD program. Within 10 days, the Government will provide the Contractor one set of prints indicating required corrections to the preliminary submittal. The Contractor shall correct and resubmit within 5 days. Any required subsequent review and resubmission periods shall each be accomplished within 5 days. Upon Government approval of the preliminary submittal, the Contractor shall prepare final record drawings.

f. Record Drawing Submission: In the appropriate CAD program each drawing shall be marked with the words “RECORD DRAWING AS-BUILT” followed by the name of the Contractor in font which will print at least 3/16” high. All revisions to the original contract drawings will be dated in the revision block. All prints must be reproduced from the updated CAD files. A minimum of 5 calendar days before the anticipated date of final acceptance inspection of the project the Contractor shall deliver to the Contracting Officer:

Three (3) CD’s of CAD files of Record Drawings.
One (2) copy of prints of Record Drawings.

Failure to make an acceptable submission of Record Drawings will delay the Final Acceptance Inspection for the project and will be cause for withholding any payment due the Contractor under this contract.

g. Property: All paper prints, reproducible drawings and CAD files will become property of the Government upon final approval. Approval and acceptance of the final record drawings will be accomplished before final payment is made to the Contractor.

h. DRAWINGS AND OTHER DATA TO BECOME PROPERTY OF GOVERNMENT (MAR 1979) : All designs, drawings, specifications, notes and other works developed in the performance of this contract shall become the sole property of the Government and may be used on any other design or construction without additional compensation to the Contractor. The Government shall be considered the "person for whom the work was prepared" for the purpose of authorship in any copyrightable work under 17 U.S.C. 201(b). With respect thereto, the Contractor agrees not to assert or authorize others to assert any rights nor establish any claim under the design patent or copyright laws. The Contractor for a period of three (3) years after completion of the project agrees to furnish all retained works on the request of the Contracting Officer. Unless otherwise provided in this contract, the Contractor shall have the right to retain copies of all works beyond such period.

i. Shop Drawings: Upon completing the work under this contract, the Contractor shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the equipment is completed and accepted.

j. Provide a GPS survey of all roadways, buildings (corners), structures, utilities (direct buried or in conduit), to include laterals and branches from point of origin up to facility tie-ins, storm drains, outlet points, manholes, culverts, sewer lines, domestic water lines, fire lines, gas lines, communication lines, electrical lines, controls, valves, light and power poles, fences, inverts, underground tanks, metering points, roads (centerline, edge of pavement), parking lots (edge of pavement), all control points provided or referenced by the government, shall be identified on as-built drawings and shall be GPS surveyed to a level of submeter accuracy. All of the aforementioned utility lines shall be surveyed at a minimum of two points along every straight run, at every change of direction, at every tie in point, at every change in elevation greater than ¼ meter and at any change in line size.

The GPS survey shall be verified for accuracy by the surveyor and a statement be provided to the government stating the level of accuracy for the data being reported (in meters).

In addition to the accuracy statement, the following information should be provided to the data compiler:

* Coordinate system & Datum used:
* Projection:
* Units.
* Attribute Description (GPS data dictionary; features, attributes and attribute values)
* Source - Receiver type, antenna type, receiver settings, number of positions per point feature, Correction method and any field other relevant field procedures utilized.

GPS survey shall be included as part of the as-built drawings

00800.8 PHYSICAL DATA. Data and information furnished or referred to below is for the Contractor's information. The Government will not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

a. Weather Conditions: Climatological data determined from records of the U.S. Weather Bureau Station, Fort Drum, NY:

Mean Annual Temperature: 46.3 degrees F
Mean Annual Precipitation: 38.5 inches

See also paragraph 0800.11, DEFAULT (FIXED-PRICE CONSTRUCTION) (TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER).

b. Transportation Facilities:

(1) Railroads: Conrail serves the locality of the proposed work. Railhead is located approximately 15 miles from the project site. The Contractor shall make all arrangements at his expense for the use of sidings necessary for the delivery of materials, equipment, supplies, and other facilities required for completion of the work. The Contractor's use of sidings must be arranged so as not to interrupt or delay the operation of the Military reservation.

(2) Highways and Roads: Routes US 11 and NYS Routes 26 & 3 serve the locality of the proposed work. Roads within the military reservation proposed to be used by the Contractor, shall be subject to prior approval of the Post authorities and such roads, if used, shall be maintained throughout construction and shall be restored to as good condition as existed prior to their use. The Contractor may make use of old NYS Routes 29 and 37, but usage by other vehicles may not be interrupted without prior approval from the Contracting Officer and in compliance with paragraph 19(b). The Contractor shall also construct such temporary haul roads and bridges as may be necessary for the conduct of his work. Any such temporary construction shall be restored to its original condition. All costs for the use of existing transportation facilities, for the construction of temporary facilities, and for maintenance, repair, removal and restoration shall be borne by the Contractor.

00800.9 AVAILABILITY AND USE OF UTILITY SERVICES.

a. The Government shall make all reasonable amounts of utilities, except for electric for temporary heat, available to the Contractor from existing outlets and supplies, as specified below.

b. The Contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove all temporary connections, distribution lines, meters and associated paraphernalia.

c. Temporary Heating:

(1) The Contractor shall be responsible to provide heat and maintain building temperature at 55 degrees F, 24 hours a day for areas of work, for the duration of the contract. Electric heat shall require Contracting Officer approval. Open flame heaters are prohibited.

d. The prevailing rates that will be charged to the Contractor for utility usage will be as follows:

Gas:$0.8837/THERM	Electric: $0.88/KWH
Water: $2.9093/1000 GAL	Sewer $3.9479/1000gal

e. The government shall make all reasonable amounts of utilities available to the contractor from existing outlets and supplies. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the contractor at prevailing rates charged to the government or, where the utility is produced by the government, at reasonable rates determined by the Contracting Officer. The contractor shall carefully conserve any utilities furnished without charge.

f. The contractor, at its expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, water line backflow prevention devices and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the government, the contractor shall remove all temporary connections, distribution lines, meters and associated paraphernalia.

g. All costs associated with the above rates are the Contractor's responsibility and shall be included in the Base Bid price.

00800.10 CONSTRUCTION PROJECT SIGNS AND BULLENTIN BOARD.

a. The Contractor shall construct two project signs for each work site; one for project identification and the other to show on-the-job safety performance.

b. Sample sign drawings together with mounting and fabrication details are provided at the end of this section. The signs shall be erected as soon as possible and within 15 calendar days after the date of Notice to Proceed.

c. The two signs are to be displayed side by side and mounted for reading by passing viewers. The exact placement location will be as designated by the Contracting Officer.

d. Panels are to be fabricated using HDO (High Density Overlay) plywood with dimensional lumber uprights and bracing. The sign faces shall be non-reflective vinyl.

e. All legends are to be die-cut or computer cut in the sizes and typefaces specified and applied to the white panel background following the graphic formats shown on the attached sheets. The Communications Red panel on the left side of the construction project sign with the Corps signature (reverse version) shall be screen printed onto the white background.

f. Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 915 by 120 mm in size for displaying the Equal Opportunity Employment poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the above information shall be displayed until work is completed.

g. No separate payment will be made for erecting and maintaining the project signs or bulletin boards, and all costs in connection therewith will be considered the obligation of the Contractor. Upon completion of the project, the Contractor shall remove the signs and bulletin board from the work site.

00800.11 DEFAULT (FIXED-PRICE CONSTRUCTION) (TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER.

a. This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the contract clause titled DEFAULT (FIXED-PRICE CONSTRUCTION). The listing below defines the monthly-anticipated adverse weather for the contract period and is based upon NOAA or similar data for the geographic location of the project. In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

STATION LOCATION: Fort Drum, NY

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS change for fort drum

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(13)	(11)	(10)	(10)	(9)	(6)	(7)	(6)	(7)	(9)	(10)	(15)

b. Upon start of actual construction and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. The above schedule of anticipated adverse weather will constitute the base line for monthly (or portion thereby) weather time evaluations. Actual adverse weather days will be required on a Calendar day basis (include weekends and holidays) and compared to the monthly-anticipated adverse weather in subparagraph "a" above. For purposes of subparagraph "d" the term actual adverse weather days shall include days impacted by actual adverse weather days.

c. The number of actual adverse weather days shall be calculated chronologically from the first to the last day in each month. Once the number of actual adverse weather days anticipated in subparagraph "a" above have been incurred, the Contracting Officer will examine any subsequently occurring adverse weather days to determine whether a Contractor is entitled to a time extension. These subsequently occurring adverse weather days must prevent work for 50 percent or more of the Contractor's workday and delay work critical to the timely completion of the project. The Contracting Officer will convert any delays meeting the above requirements to Calendar days and issue a modification in accordance with the clause titled DEFAULT (FIXED-PRICE CONSTRUCTION).

d. The Contractor's schedule must reflect the above anticipated adverse weather delays on all weather dependent activities.

00800.12 EMPLOYEE AND VEHICLE IDENTIFICATION.

a. The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display such identification as may be approved and directed by the Contracting Officer. All prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employees. When required by the Contracting Officer, the Contractor shall obtain and submit fingerprints of all persons employed or to be employed on the project.

b. The Contractor and subcontractors shall register all company and private vehicles that will be used in the execution of this contract with the Installation Provost Marshall's office prior to start of work by the Contractor/subcontractor. Entry to the installation requires the following prior coordination with the Contracting Officer or designated representative; current vehicle registration, proof of insurance, valid driver's license for the vehicle driver, and procure identification for other personnel. Contractors/Subcontractors and their employees requiring access to the installation will be required to comply with the installation access control policy/procedures. The government will not be responsible for damages due to delay/stoppages caused by failure to comply.

c. All vehicles and personnel are subject to search and seizure of contraband and/or unauthorized government property. Contractor vehicles (Contractor-owned and personal), contractor personnel, and their personal property shall be subject ot searches upon entering of leaving the installation. The search and seizure provisions of AR 190-22 shall apply to contractor personnel entering or leaving Fort Drum or activities/installations in the Fort Drum AR 5-9 area of responsibility which require access by Contractor personnel in performance of this contract.

00800.13 **FIELD OFFICE**

a. The Contractor shall furnish at the job site, prior to the start of work, a 42 feet by 12 feet field office for the use by Government representatives for the duration of the contract. Field office and contents remain the property of the contractor. The exact location will be designated by the Contracting Officer. The building shall be well constructed and properly ventilated and shall contain a closet and door and windows which shall be capable of being locked, four (4) new ergonomically-designed chairs, one (1) plan rack and drawing board, two (4) desks, one (1) two-drawer filing cabinet, and a conference table approximately 5 feet by 6 feet with 6 chairs. The Contractor shall also provide adequate electric lighting, minimum 6 duplex electrical receptacles, drinking water, heat, plumbed functional toilet facilities, air conditioning, janitorial services and maintenance services. In addition the contractor shall make arrangements and pay connection fees and monthly usage for electrical and 2-line telephone service (fax and voice). The field office shall be removed from the project site when and as directed by the Contracting Officer. In addition to the above, the Contractor shall provide the following computer and office equipment, and other items for use by the Government during the contract:

Hardware:

(2) Personal Computers: (LAPTOP)

- Pentium IV processor running at 2.4 GHz or better
- High speed cache memory controller with at least 512 KB L2 PIPELINE BURST CACHE
- At least 556MB SDRAM
- (1) 3.5" 1.44 MB diskette drives with hard drive controller
- 10 GB hard drive with access time of 9 ms
- Sound Card *WI* SPEAKERS
- Enhanced 101 keyboard
- 6 outlet surge protector
- 17" Flat Panel SVGA high resolution COLOR monitor or better with refresh rate 75Hz or better and 8Mb Color Graphics
- 3 Button ergonomic mouse and mouse pad
- Modem V.90 0r V.92 56KB Baud (U.S. Robotics or equal)
- Internal DVD ROM 16X and CD-RW (Read/Write) Drive 24X
- Microsoft Windows 2000 Professional Operating System

- Microsoft Office 2000 Professional Suite
- Lotus Smart Suite and Adobe Acrobat Reader
- Signature card reader: Gradkell Computer Inc.

Part# 050-0300 Description: Argus 300 (card reader and PCI adapter package) for CEFMS: phone# (256)-722-8585 X37 (Mr. Wayne Wright)

- Norton Antivirus Software 2002 and periodic updates.
- Project Scheduling Software to match Contractor's Software as defined in Specification Section 01320
- High Speed Internet Service Equivalent to DSL or Roadrunner

Printer:

- Hewlett Packard Laserjet 4100 Series Printer or equivalent Laserjet Printer.

Copier: Plain-paper, floor module, autofeed, monochrome, minimum 50 copies per minute.

Fax Machine: Monochrome, minimum feed (3) - 8 1/2x11 inch pages per minute. Capable of receiving on plain white bond paper.

Scanner: 600 dpi or better, 24 bit color or better, full page scanner, single pass, optical character resolution, capable of scanning 20 pages per minute.

Printer, Copier, Fax, and Scanner can be one unit.

Telephone: (4) - 2-Line phones compatible with phone service.

Telephone Answering Machine: Standard, compatible with standard telephone line and local service.

First Aid Kit: As a minimum the kit will include antiseptic kit, eyewash solution, bandages, insect sting medication, aspirin and acetaminophen, and coldpack.

Fire Extinguisher: Type as required for a trailer the same size as office.

a. The Contractor, at its option, may furnish a trailer not less than 40 feet long. The trailer shall be approved by the Contracting Officer and shall have the facilities and be serviced as specified above for the field office.

b. No separate payment will be made for providing the above items and all costs in connection therewith will be considered the obligation of the Contractor.

Computer Security Requirements:

The contractor will agree to accept responsibilities and comply with procedures indicated below in connection with the furnishing of Contractor-owned computers for use by Government personnel in accordance with contract requirements.

a. The computers must be dedicated exclusively for Government use. Contractor will not use any computer it supplies which is designated for use by the Government. Contractor will assure that the

Central Processing Unit (CPU) is electronically isolated from the contractor's and not inter-connected via Local Area Network (LAN).

b. Normal access to the computer shall be restricted to Corps of Engineers personnel. Contractor shall set up computers in a secure area and give the keys to the Government. Contractors must immediately notify Government personnel when emergency access to the computer location was exercised by non-Government individuals, and what the circumstances were.

c. If the CPU hard drive fails, the Government will furnish an equivalent hard drive to the owner of the computer, and the old hard-drive will be returned to the Government. Contractor shall not remove any hard drive nor proceed with any repair of the computer unless an authorized Government employee witnesses and approves of the repair.

d. At the time of return of the computer, the Contractor will allow the Government to first remove all information from the hard-drive.

e. Contractor agrees to provide a written certification signed by an authorized officer of the company agreeing to the above policy.

00800.14 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS. In addition to the requirements contained in contract clause titled PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS, and PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS the following will apply to all payments made under this contract:

a. At the time of submission of the project schedule, the Contractor shall submit for approval by the Contracting Officer or his authorized representative a breakdown of the contract work which shall be to the degree of detail required by the Contracting Officer or his representative to effect reasonable progress payments. The Contracting Officer or his representative will review this breakdown within 30 calendar days after receipt and either advise the Contractor that it is approved or disapproved, and if disapproved the reasons for disapproval. Only after the breakdown is approved will any payment invoice be accepted from the Contractor. The Contracting Officer can determine it is in the best interest of the Government to make payment without an approved breakdown, however, in no case will more than 10% of the contract amount be paid unless the breakdown is approved.

b. The Contractor shall submit requests for payment through submission of a proper invoice to the office or person(s) designated in subparagraph (c). For purposes of payment a "proper invoice" is defined as the following:

(1) An estimate of the work completed in accordance with the approved breakdown indicating the percentage of work of each item and the associated costs.

(2) A properly completed ENG Form 93 and 93a (where required).

(3) All contractual submissions indicated elsewhere in this contract to be submitted with payment, such as updated progress schedules, updated submittal registers, etc.

(4) The following certification executed by a responsible official of the organization authorized to bind the firm. A "responsible official" is either a corporate officer, partner, or owner, in the case of a sole proprietorship.

I hereby certify, to the best of my knowledge and belief, that:

(1) The amounts requested are only for performance in accordance with the specifications, terms and conditions of the contract;

(2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract requirements and the requirements of Chapter 39 of Title 31, United States Code; and

(3) This request for progress payments does not include any amounts, which the prime Contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract;

(4) This certification is not to be construed as final acceptance of a subcontractor's performance; and

(5) All required prime and subcontractor payrolls have been submitted.

_____
(Name)

_____
(Title)

_____
(Date)

c. The Government will designate the office or person(s) who shall first receive the invoice submissions and the Contractor shall be so notified at the pre-construction conference. In addition to the designated Project Engineer, the Contractor shall at the same time submit one copy of the detailed breakdown and the ENG Form 93 and 93a to the Area Engineer.

d. The Government representative will return any request for payment that is deemed improper within 7 days of receipt and will specify the defects. If the defect concerns a disagreement as to the amount of work performed and/or the amount of the payment being submitted, the Government and the Contractor's representative will meet to resolve the differences and reach agreement. Upon agreement, the Contractor shall submit a new breakdown and ENG Form 93 and 93a and any other submissions requiring correction. These shall be incorporated with the previous submittal and will then constitute a proper invoice.

e. If agreement cannot be reached, the Government will determine the proper amount per contract clause, PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS and process the payment accordingly. In this event, a "proper invoice" for prompt payment purposes will not have been submitted to the Government.

f. The Government will pay the Contractor in accordance with the following time frames:

(1) Progress Payments. From the date a "proper invoice" is received, in accordance with subparagraphs b and d, the Government will issue a check within 14 calendar days.

(2) Reduction in Retainage Payment. If during the course of the contract, a reduction in retainage payment is required, the Government will issue a check within 14 calendar days after the approval of the release to the Contractor by the Contracting Officer or his authorized representative.

(3) Final Payment. A final payment request will not be considered valid until the Contractor has fulfilled all contract requirements including all administrative items, as-built's, training, payrolls, warranties, etc. and has submitted a release of claims. When the Contractor has fulfilled all contract requirements and a "proper invoice" has been submitted, the Government shall issue a check within 14 days from the date of acceptance of the project by the Contracting Officer.

00800.15 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA.

a. *"Hazardous material,"* includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

b. The Contractor shall submit, a Material Safety Data Sheet, (OUS Department of Labor Form OSHA 174) meeting the requirements of 29 CFR 1910.1200(g) and the latest version of Federal Standard No. 313, for all hazardous material 5 days before delivery of the material, whether or not the Contractor is the manufacturer of these items. This obligation applies to all materials delivered under this contract that will involve exposure to hazardous materials or items containing these materials.

c. Neither the requirements of contract clause titled HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, Contractor, or subcontractor personnel or property.

d. Nothing contained in this contract clause titled HAZARDOUS MATERIAL IDENTIFICATIN AND MATERIAL SAFETY DATA shall relieve the Contractor from complying with applicable Federal, State, and local laws, codes, ordinances, and regulations (including the obtaining of licenses and permits) in connection with hazardous material.

e. The Government's rights in data furnished under this contract with respect to hazardous material are as follows:

(1) To use, duplicate and disclose any data to which this clause is applicable. The purposes of this right are to (i) Apprise personnel of the hazards to which they may be exposed in using, handling, packaging, transporting, or disposing of hazardous materials; (ii) Obtain medical treatment for those affected by the material; and (iii) Have others use, duplicate, and disclose the data for the Government for these purposes.

(2) To use, duplicate, and disclose data furnished under this clause, in accordance with subparagraph (h)(1) of this clause, in precedence over any other clause of this contract providing for rights in data.

(3) The Government is not precluded from using similar or identical data acquired from other sources.

f. The Contractor shall insert this requirement, including this paragraph (f), with appropriate changes in the designation of the parties, in subcontracts at any tier (including purchase designations or purchase orders) under this contract involving hazardous material.

g. **SAFETY AND HEALTH REQUIREMENTS MANUAL** if this contract is for construction or dismantling, demolition, or removal of improvements with any Department of Army agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation. The latest edition of the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1 and it changes are available at http://www.hq.usace.army.mil (at the HQ homepage select Safety and Occupational Health). Contractor shall be responsible for complying with the current edition and all changes posted on the web as of effective date of this solicitation.

h. Before commencing the work, the Contractor shall: (1) Submit a written proposal for implementing the Accident Prevention Plan; and (2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

00800.16 SPECIAL SCHEDULING REQUIREMENTS FOR MECHANICAL AND ELECTRICAL SYSTEMS. In reference to the contract clause entitled "PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS", see SECTION 01452 TESTING FOR MECHANICAL AND ELECTRICAL SYSTEMS for additional scheduling requirements for such systems.

00800.17 PREWORK CONFERENCE.

a. A preconstruction conference will be arranged by the Contracting Officer, or the Contracting Officer's Representative, after award of the contract and before commencement of work. The Contracting Officer’s Representative will notify the Contractor of the time and date set for the meeting. At this conference, the Contractor will be oriented with respect to Government procedures and line of authority, contractual, administrative, and construction matters. Additionally, a schedule of required submittals will be discussed.

b. The Contractor shall bring to this conference the following items in either completed or draft form:

- The Contractor’s order of work
- Accident Prevention Plan
- Quality Control Plan
- Superintendent Appointment Letter
- Subcontractors List

00800.18 CONSTRUCTION COLOR BOARD SUBMITTALS.

Refer to the architectural requirements in section 01010

00800.19 ROAD CLOSURES AND UTILITY OUTAGES.

a. Utility Outages:

(1) The Contractor is advised that the existing utilities service other buildings or areas adjacent to the specific work sites. These buildings will be active and utilized for the entire period of this contract. The Contractor shall maintain all utilities and systems operational at all times except outages approved by the Contracting Officer.

(2) All utility outages shall be scheduled by the Contractor and approved by the Contracting Officer. No outage will be approved which will adversely affect the current operation or mission

accomplishment. Outages shall only be approved to perform tie-ins of new or temporary utilities to existing lines. The Contractor shall request, in writing, the Contracting Officers approval, of any proposed outages at least 14 calendar days prior to the date of the proposed outage. The Contractor shall also be responsible for any repairs or start-up procedures in the affected facilities caused by the outages. The Contractor shall coordinate with the Contracting Officer and representatives of the Installation regarding the work that the Contractor must accomplish in various buildings to re-establish the utilities to proper working conditions. The request for the approval of a utility outage shall include, at minimum, the following: description of the utility; time and duration of the outage; areas and systems affected; proof that all preparatory work is complete; proof that all necessary materials, equipment and manpower are in place; utility lines have been verified; and a contingency plan is in place.

(3) Times frames during which the Contracting Officer may approve utility outages:

Electrical Services:
2200 to 0400 hours, Monday – Friday (daily)

Domestic Water:
2200 to 0400 hours, Monday – Friday

Fuel (Natural) Gas:
2200 to 0400 hours, Monday – Friday (daily)

Sanitary Drainage:
2200 to 0400 hours, Monday – Friday (daily)

Fire Detection/Alarm:
0700 to 1400 hours, Monday – Friday. Maximum duration of two (2) hours, subject to contingency plan.

Fire Protection Systems:
0700 to 1400 hours, Monday – Friday. Maximum duration of two (2) hours, subject to contingency plan.

Telecommunications (telephone, LAN, CATV):
2200 to 0400 hours, Monday – Friday. Maximum duration of four (4) hours.

(4) The Contractor shall have on-site all materials, equipment, manpower, etc. to complete all work during the approved duration of the outage. All utilities and systems shall be fully tested and operational prior to the end of the approved outage. Unscheduled outages shall be repaired immediately. Repairs and corrective actions shall proceed continuously in a diligent manner until all services and utilities are restored to their original condition.

b. Road Closures: Road closures shall not be allowed. Utility installations that affect the roads shall be accomplished in manner to provide through-traffic at all times. In this regard, the Contractor shall provide plates, install utilities in one half of the road at one time; provide temporary access, etc. The Contractor shall submit to the Contracting Officer, a proposed plan indicating how the work is to be performed in road areas and how through-traffic will be maintained. The Contractor shall provide temporary protection, signage, flagmen and traffic controls to maintain free vehicular movement as shown on the plans. Temporary protection, signage and traffic controls shall comply with New York State

Department of transportation requirements. The plan shall be submitted 30 calendar days prior to initiating any work in the affected road access. No work shall take place until the Contracting Officer approves the plan. The Contractor shall notify the Contracting Officer, at a minimum of the one-week in advance, prior to any disruption in parking or traffic flow.

00800.20 ACCESS ROUTES, CONTRACTOR AREAS, DELIVERY AND VISITOR CONTROL.

a. The Contractor shall utilize only entry points as shown on the Location & Existing Condition Plan, C-101. The Contractor will only be allowed to access the installation through Onieda/Ontario Gate. Contractor's personnel and construction equipment will not be permitted in any place other than the project site and the haul route for the borrow and spoil sites, unless specifically authorized by the Contracting Officer. A request for authorization to use alternate limited access shall be made by the Contractor to the Contracting Officer at least 7 calendar days in advance.

b. The Contractor shall utilize the project site areas for his daily staging. Trailers, materials, or equipment shall not be placed or stored outside the project site unless such trailers, materials or equipment are assigned a separate and distant storage area by the Contracting Officer away from the vicinity of the staging area but within military boundaries. At the end of each work day mobile equipment, such as tractors, wheeled lifting equipment, cranes, backhoes and like equipment, shall be parked within the project site. The following shall remain fully accessible: sally ports, hydrants, standpipes and access ways. The Contractor shall be responsible for all temporary connections (power, water telephone, etc.) to the project site. The Contractor shall maintain the area in a clean and neat condition. Parking for Contractor's employees shall be on the project site. The Contractor will return all disturbed areas to their original condition unless specifically authorized by the Contracting Officer.

c. Additional off-site storage areas, if available, may be provided by the Government upon request from the Contractor at no additional cost. The Contractor must maintain all necessary security of his materials and supplies at this off-site location.

d. The Contractor shall be responsible for the control of material deliveries, vendors, suppliers, prospective employees and other authorized personnel entering the project area as relates to this contract. The Contractor shall install signs at entrances to the project directing deliveries and visitors to the proper entry points.

e. The Contractor shall be permitted to utilize the area for material storage and unloading, material hoists, rubbish containers, rubbish chutes (if any), temporary office and personnel dressing facilities, and all other items required for staging. Contractor shall maintain the grounds within his area. Grass and weeds shall be cut at least weekly during the growing season.

f. The Contractor shall provide chemical toilets for his personnel in the project site, and shall be responsible for cleaning and servicing these toilets in accordance with pertinent health regulations and assure a frequency of service as required to prevent odors or other nuisance. Use of toilet facilities by Contractor’s employees within surrounding buildings will not be permitted.

g. The Contractor shall provide weather tight and waterproof storage facilities for all materials stored at the site and required to be incorporated into the work.

h. The Contractor shall remove rubbish containers when full or every 2 weeks which ever comes first.

i. The color of dumpsters, trailers, and storage sheds and portable latrines shall be approved by the Contracting Officer.

j. All materials, trailers, and storage sheds in staging and construction areas shall be elevated and stored a minimum of 3 feet from any structure or fixed object. Trailers shall have doors on both ends.

k. Contractor shall limit employees to his work site.

00800.21 EXISTING PARKING. The existing parking for visitors and Government employees shall not be used by the Contractor. No contractor or subcontractor employee parking is available near the immediate facility and no parking on the shoulders of the roads are allowed.

00800.22 MAINTENANCE OF ACCESS ROADS.

a. The Contractor shall be responsible for the maintenance of access roads at the construction site. Maintenance of access roads shall include snow removal. The Contractor shall remove snow piles and rows when they affect safety, hamper emergency and fire vehicles, or block proper drainage.

b. The Contractor shall provide and allow full access to the project site to all traffic, except as noted, to other contractors and authorized personnel as designated by the Contracting Officer.

c. The Contractor shall not inflict damage upon land properties, roads outside the authorized construction areas by unwarranted entry upon, driving over curbs, passage through, damage to or disposal of, material on such land or property, or overloading of roads. The Contractor may make a separate agreement with any other party, regarding the use of, or right to, land or facilities outside the Installation. If such an agreement is made, it shall be in writing and a copy shall be furnished to the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents free from liability of any nature or kind arising from any trespassing or damage occasioned by Contractor operations.

00800.23 FIRE PROTECTION. The Contractor will provide fire protection in accordance with Section 9 of EM 385-1-1, US Army Corps of Engineers Safety and Health Requirements Manual. The Contractor's means of providing such protection will be included in his safety plan as required by the contract. The plan shall include fire exits and access routes during construction and during partial acceptance of the facilities, if any. Although the Fort Drum Fire department and local departments with whom the installation has mutual aid agreements will respond to emergencies, the capabilities of these departments will be limited by their available equipment and access to the construction sites. The Fort Drum Fire Department does not permit open flame heating devices or tar kettles on roofs.

00800.24 SITE AND BUILDING SECURITY.

a. The Contractor shall be responsible for the security of the areas within the contract limits. When the Government takes possession of certain areas, the Contractor shall be responsible for the areas remaining under Contractor control.

b. The Contractor shall be responsible for furnishing an identification required by Fort Drum to each employee in accordance with paragraph titled IDENTIFICATION OF EMPLOYEES. The Contractor shall provide an updated list of all employees working on the site. This list shall be provided on a monthly basis or when requested by the Contracting Office throughout the duration of this contract.

00800.25 UTILITY VERIFICATION. The RFP drawings depict the general layout of all known utilities. The utility lines are presented for informational purposes only and shall be field verified by the Contractor prior to the start of any utility excavation work. The Contractor shall locate and determine elevations of all existing utilities that will be encountered during work and shall protect all such utilities from any possible damage during the progress of work. The Contractor shall excavate by hand, in the vicinity of existing lines and operations. If damage should occur due to the Contractor's operations, repairs shall be made by qualified personnel at the Contractor's expense.

00800.26 ARTIFACTS, PRESERVATION & PROTECTION OF HISTORICAL, ARCHAEOLOGICAL AND CULTURAL RESOURCES.

a. Any and all items of prehistoric, historic and military relics or memorabilia, which may be discovered in the course of the construction activities, shall remain the property of the Government. Examples of such items include but are not limited to: printed matter or other papers, buttons, buckles, or fragments of uniforms, buried weapons, bayonets, sabers, cannon balls, ammunition, fragments of structures or foundations, in short any item of historical or archaeological value. Federal legislation provides for the protection, preservation and collection of scientific, prehistorical, historical and archaeological data, including relics and specimens, which might otherwise be lost due to alteration of terrain or building features as a result of any federal construction project. Any person who, without permission, injures, destroys, excavates, appropriates or removes any historical or prehistorical artifact, object of antiquity or archaeological resource from public lands of the United States is subject to arrest and penalty of law.

b. Cultural resources on Federal property are protected and managed by the Archaeological Resources Protection Act of 1979 and other applicable laws. The Contractor shall exercise care so as not to disturb or damage artifacts or fossils (should any be uncovered) during the excavation operations. Should the Contractor or any parties operating or associated with the performance of this contract discover evidence of possible scientific, prehistoric, historic or archaeological finds within the work limit lines or adjacent to work area shall immediately cease work at that location and notify the Contracting Officer. The Contractor shall provide the Contracting Officer with all information as to the specific location and nature of the findings. The Contractor shall cooperate fully with the Contracting Officer, except that all notifications by the Contractor shall be to the Contracting Officer and that all directions to the Contractor will be from the Contracting Officer. Where appropriate by reason of discovery, the Contracting Officer may order delays in time of performance or changes in the work or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

00800.27 CONNECTION WITH WORK OF OTHER CONTRACTS. During the period of this contract, other contracts may be in force for the construction of other features of work on or adjacent to the site of work being accomplished under this contract. The Contractor shall arrange his plant and shall schedule and perform the work as to effectively cooperate with all other contractors and Government agencies. It is the Contractor's responsibility to know the extent of the limits of his contract. No direct or extra compensation will be allowed on account the cooperation required.

a. At all points of connection with work of other contracts, the Contractor shall have weekly coordination meetings until all connections have been completed, with the adjoining contractor(s) to insure proper and timely connections.

b. Where the work under this contract is completed before that of the adjoining contractor, the Contractor shall terminate his work in an approved manner ready for future connection by the adjoining contractor. Pipes and conduits shall be closed with suitable caps or plugs that will prevent entry of dirt or debris, but that are readily removable when final connections are made. For underground lines that are

back-filled, approved type markers that extend above the ground surface shall be provided to facilitate future location of the lines by the adjoining contract.

c. Where the work of the adjoining contractor is already in place, the Contractor shall perform all work required to effect the necessary connection, including locations of underground lines, removing of caps, providing necessary adapters or joining pieces, and all related incidental work for necessary for a proper, secure connection.

00800.28 WORKING CONDITIONS, WORKING HOURS, AND NON-WORKING DAYS.

a. Working Hours: Normal working hours shall be Monday - Friday, 0700 to 1700 hours. Differences to these working hours must be approved by the Contracting Officer.

b. Non-Working Days: During the course of this contract the Contractor shall not perform any physical work during the activities listed below. The dates provided are the “on or about” dates of the activities.

(1) All Government Holidays.

c. Working Conditions:

(1) Open trenches or road restrictions will not be permitted without the approval of the Contracting Officer.

(2) Access ways shall be fully usable.

(3) All cost for conformance with the above stated requirements shall be included with the lump sum contract amount and no claim for extra cost shall be considered.

00800.29 CLEANING UP (CONSTRUCTION DISPOSAL, HOUSEKEEPING AND FINAL CLEANUP).

a. All construction debris or other rubbish generated as a result of construction activities shall be disposed of, off the Installation, at the Contractor's expense. Clean soil and rock removed from the construction site will be allowed to be disposed of on Fort Drum as a means of rehabilitation for existing borrow pits. Scrap, debris or surplus construction materials shall not be buried or burned on the site or disposed of in the Installation sanitary disposal containers (dumpsters) but shall be loaded in the Contractor's dumpsters for disposal at a location other than the Fort Drum Installation. The Contractor must obtain all necessary permit/applications required for the disposal of debris for off site locations. The Contractor is responsible for obtaining all necessary permits required for the disposal of all construction debris, including proper disposal of Hazardous Materials.

b. All spillage and mud from the Contractor's trucks shall be removed promptly. All damages to existing curbing, roads, walks, trees, fencing, walls, landscaping and other Government Property resulting from the Contractor's activity, shall be repaired promptly, as directed by the Contracting Officer, and at the Contractor's expense.

c. Project housekeeping shall be done on a daily basis. Areas requiring housekeeping include the Contractor's area, all staging areas provided to the Contractor and around all trailers. At the end of each day, the Contractor shall leave the housekeeping areas broom clean and free of rubbish, litter, and construction debris generated by that day's work. Any dirt or mud which is tracked onto paved or

surfaced roadways, shall be cleaned away immediately and in no case shall the Contractor leave the site at the close of work without verifying that all dirt or mud has been removed from any paved surface beyond the limits of construction.

d. The Contractor shall provide and maintain a dumpster of sufficient size at the project site. The dumpster shall be replaced our emptied at regular intervals to avoid overfilling and spillage and the area around the dumpster shall be kept clean at all times.

e. If, at any time during the progress of the work, the Contracting Officer determines that the Contractor is failing to comply with the requirements of the subparagraphs above, the Contractor will be directed to take such measures, as deemed necessary to constitute corrective action. Such measures may include the requirement to increase the work force assigned to the housekeeping and cleanup operations or to work during evenings or weekends until proper job conditions have been restored.

00800.30 DUST AND NOISE CONTROL.

a. Dust Control: The Contractor shall maintain all excavation, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas and all other work areas within or outside of the project boundaries free from dust which would cause a hazard or nuisance to others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be permitted to control dust. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area damp at all times, and the Contractor shall have sufficient competent equipment on the project site to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever dust nuisance or hazard occurs. No separate or direct payment will be made to the Contractor for dust control and the cost thereof shall be considered incidental to and included in the contract prices. The Contractor will control his operations to prevent any measurable or visible dust form migrating outside of the work area.

b. Noise Control: The Contractor shall schedule extremely noisy activities with the Contracting Officer. The activities shall be planned to minimize the impact on existing facilities and building occupants

00800.31 OPERATION AND MAINTENANCE MANUALS.

a. The Contractor shall provide 3 sets of operation and maintenance manuals to be used for training, operation and maintenance for each piece of operating equipment and material finishes. All material shall be clearly identified, including its location on the project. Sheets shall be 8 1/2" x 11", except pull out sheets which may be neatly folded to 8 1/2" x 11". Manuals shall be properly indexed, bound in plastic covered 3-ring, loose-leaf binders with the project title lettered on the front cover, and shall contain:

(1) Name, address, phone number and trade of all subcontractors.

(2) Complete maintenance instruction; name, address and phone number of installing contractor, manufacturer's local representative, for each piece of operating equipment.

(3) Narrative consisting of instruction for equipment and systems to include:

(a) Description of system and intent.

(b) Start-up Procedures.

(c) Emergency Procedures.

(d) Shut-down Procedures.

(e) Maintenance Instructions.

(f) Wiring Diagrams and trouble shooting guidelines.

(g) System Layout Diagrams

(4) Catalog data on plumbing fixtures, valves, water heaters, heating and cooling equipment, temperature controls, fans, electrical panels, and service entrance equipment, elevators and light fixtures.

(5) Instructions for use in training and operation and maintenance of each item of operating equipment.

(6) Manufacturer's name, type, color designation for ceramic tile, resilient floors, windows, doors, brick, concrete block, paint, roofing and other materials.

b. Submit 3 copies of maintenance manual to the Contracting Officer for the Installation's use prior to request for substantial completion.

c. Posted Operating Instructions: All major items of mechanical equipment shall have posted in a convenient and appropriate location operating instruction consisting of description of system operation, including necessary diagrams keyed to valve and piping identification systems. One set of instruction shall be 36” X 24” for posting on the wall. The instructions shall be laminated on both sides with clear plastic laminate. Two sets of laminated 8 1/2” X 11” instructions shall be provided with O&M manuals.

00800.32 PREPARATION OF DD FORM 1354 "TRANSFER OF ACCEPTANCE OF MILITARY REAL PROPERTY". At the conclusion of this contract, the Contractor shall compile and furnish to the Contracting Officer all costs and quantity data of materials and systems furnished and installed. A list of items for which the costs and quantity data is required and blank DD Form 1354 will be furnished to the Contractor by the Government. The Contractor shall return this information on a completed DD Form 1354 to the Contracting Officer within 10 days from receipt of the list. The following statements shall also be provided at the same time as the completed DD Form 1354:

a. No Asbestos Statement: Upon completion of the work, the Contractor and all of his subcontractors shall provide a written statement stating that "No Asbestos-Containing" material/products were used in the construction.

b. No Polychlorinated Biphenyl (PCB) Statement: Upon completion of the work, the Contractor and all of his subcontractors shall provide a written statement stating that "No Polychlorinated Biphenyl (PCB)" material/products were used in the construction.

c. No Lead Statement: Upon completion of the work, the Contractor and all of his subcontractors shall provide a written statement stating that "No Lead" material/products were used in the construction.

d. If there are exceptions to the above statements, the contractor shall identify every location, the material, and provide an assessment of the hazard(s) to humans.

e. The Contractor shall submit all project closeout documents not previously provided to the Contracting Officer at the time of the Beneficial Occupancy Inspection.

00800.33 COORDINATION OF TRADES.

a. The contract drawings are in part diagrammatic and show the general arrangement of duct, piping and other mechanical and electrical trades. The Contractor must have a competent engineer on the project site to coordinate all fieldwork and shop drawings of the various trades prior to installation and/or submission of field or shop drawings for approval. The Contractor shall allot spaces to the various trades prior to installation of the work. In spaces where all the various installations cannot be accommodated, the Contractor shall notify the Contracting Officer and shall submit alternate solutions as to its solution at no cost to the Government. The decision of the Contracting Officer shall be final.

b. The Contractor shall be responsible for the coordinated drawings of the various trades showing locations and sizes of all sleeves, electric outlets, inserts, piping, shafts, hangers, lights, ducts, catwalks, pads, chases, sprinklers, smoke detectors, soffits, fascias, steel trusses, etc. Composite signed-off coordinated shop drawings shall be developed at 3/8" equals 1'-0 scale showing all mechanical-electrical work in hung ceilings and chases.

00800.34 PROGRESS PHOTOGRAPHS. The Contractor, as directed by the Contracting Officer's representative, shall submit monthly, a minimum of twelve (48) 8" X 10" color digital images showing construction progress and provide an electronic copy on 3.5" diskettes in JPEG image format each month of the photographs submitted. Minimum resolution of the digital images shall be 300 pixels per inch (ppi).

00800.35 PARTNERSHIP IMPLEMENTATION PLAN. To more effectively accomplish this contract, the Government proposes to form a partnership with the Contractor. This partnership would draw on the strengths of each organization in an effort to achieve a quality product within budget and on schedule. This partnership would be bilateral in make-up and participation would be totally voluntary. If mutually agreed to by both parties, a facilitator satisfactory to both parties shall be hired who would be responsible to arrange for an offsite conference location, provide all workshop materials, and compile and distribute a completed partnering agreement to all participants within 30 days of the partnering session. Conference site location shall be coordinated with the Contracting Officer for approval. The Contractor shall plan for the attendance of approximately 15-20 individuals from the Government in addition to the Contractor’s and Subcontractor’s personnel. The cost of the facilitator and conference facility will be paid by the Contractor. All other costs associated with partnership implementation will be borne by the Contractor. It is anticipated that the partnership conference will be for one day each time and will be held on a quarterly basis.

00800.36 DIGGING PERMIT. The Contractor shall be responsible for obtaining a digging permit prior to commencing any excavation. No excavation whether minor or major including trenching, sidewalk replacement, etc. will be permitted without an approved digging permit. Contractor shall carefully avoid contact or damage with any known or identified underground utilities. Work on or near roadways shall be flagged in accordance with the safety requirements in Safety and Health Requirements Manual EM 385-1-1, which forms a part of these specifications. Work located along the alert force route shall not cause blockage, and the Contractor shall maintain unobstructed access for alert force traffic at all times. Contractor shall apply for renewal of work permits as required if the work continues beyond the original permit expiration date.

00800.37 PEST CONTROL.

a. The Contractor shall deposit all food refuge in sealed trash containers to restrict food source for rodents.

b. The Contractor shall replace construction dumpsters at least every two weeks to prevent rodent harborage.

c. All materials, trailers, and storage sheds in staging and construction areas shall be elevated and stored a minimum of 3 feet from any structure or fixed object.

d. The Contractor shall cap all pipes at the end of each day to prevent pest infiltration.

00800.38 COORDINATION MEETINGS.

a. Weekly coordination meetings shall be conducted by the Contracting Officer representative with the Contractor and Fort Drum personnel to review and coordinate the construction schedule. The Contractor shall provide typed minutes of each meeting within 3 days of meeting.

b. The Contractor shall submit at each meeting, for approval by the Contracting Officer a “2-week construction look ahead” construction plan indicating the type and extent of construction to be performed. The plan shall be submitted 14 calendar days prior to actual construction.

00800.39 **Contractor's Project Manager**: (Overall Manager of the Project)

(1) Performs all project management duties of the project.

(2) Serves as the Governments' sole point of contact in all matters relating to work including, but not limited to, contract compliance, progress of work, overall project scheduling, financial matters, and change orders.

(3) Attends all job meetings.

(4) On site a minimum of 30% of the time.

(5) The Overall Project Manager shall have a minimum of ten years of project management experience in design and/or construction on projects of comparable complexity, scope and cost.

Contractor's Quality Control Manager: (Manager of Field, Office Quality Control Personnel and Design Quality Control Personnel)

(1) Performs all quality control management duties required of the Contractor.

(2) Serves as the Governments' primary point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures.

(3) The Contractor shall identify the CQC System Manager as an individual within his organization that is completely responsible for all Quality Issues and shall perform overall management of CQC system and have the authority to act in all CQC matters for the Contractor. This person shall at a minimum perform a monthly site visit and attend all partnering meetings to

discuss, address quality issues during both design and construction and be on site during critical construction activities. This person shall be directly employed by the prime contractor (not a subcontractor) and shall have complete authority in all aspects of Quality Control. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

The Contractors Quality Control Manager shall meet the following requirement:

Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 4 years construction experience and a minimum of 4 years of design experience, at a minimum one of the years experience must have been as a Quality Control or Quality Assurance Representative.

(4) The CQC systems manager may serve as the Design/Construction Liaison, but if he/she takes on this additional duty than they must visit construction site three times a week.
Has no other duties except Quality Control.

(5) Attends all job meetings.

(6) Reports all deficiencies to the Government and the Contractor's Project Manager for correction.

(7) Works directly under, and is responsible to the Project Manager.

(8) An **alternate** for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

Design Quality Control Manager: (Principal in Charge of Design Quality Issues and Coordination of Design Quality Control)

(1) The Contractor shall identify the Design Quality Control Representative as an individual employed by the design firm or by the prime contractor that is completely responsible for all Design Quality Issues and shall perform coordination between the contractor, subcontractors, and the designer and have the authority to act in all design quality control matters for the prime contractor. During design this person shall at a minimum perform a bi-monthly coordination meeting to discuss coordination and quality issues concerning the design of the project. During construction this person shall at a minimum perform a monthly site visit and attend all partnering meetings to discuss and address design quality issues. This person shall be employed by the design firm or by the prime contractor and shall have complete authority in all aspects design coordination and design quality control for the Prime contractor. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

(2) Attends during the design phase a bi-monthly coordination meeting to discuss coordination and quality issues. Hold a current state Professional Engineer's license. Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 6 years experience in design or design coordination.

(3) Has no other duties except Design Quality Control.

(4) Have complete authority in all aspects of design coordination and design quality control for the prime contractor.

(5) An **alternate** for the Design Quality Control Representative will be identified in the plan to serve in the event of the Representative 's absence. The requirements for the alternate will be the same as for the designated Design Quality Control Representative.

(6) Is allowed to serve as the Design/Construction Liason as well.

Construction Quality Control Manager: (Principal in Charge of Construction Quality Issues and Coordination of Construction Quality Control)

(1) The Contractor shall identify the Construction Quality Control Manager as an individual within his organization that is completely responsible for all Construction Quality Issues and shall perform coordination between the contractor, subcontractors, and any Independent Testing Labs and have the authority to act in all construction quality control matters for the prime contractor. During design this person shall at a minimum attend the bi-monthly coordination meeting to discuss coordination and quality issues concerning the design of the project. During construction this person shall be onsite at all times performing Construction Quality Control duties to include, but not limited to, implementation of the three-phase inspection system for all aspects of the construction work specified. This person shall have complete authority in all aspects of Construction Quality control. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

(2) The Construction Quality Control Manager shall meet one of the following requirements:

a) Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 4 years experience in construction.

b) Shall have a minimum of 6 years of construction experience at a minimum level of a project superintendent.

(3) Attends a bi-monthly coordination meeting during the construction phase to discuss coordination and quality issues.

(4) On site at all times during construction performing construction quality control duties.

(5) Has no other duties except construction Quality Control.

(6) Directly employed by the prime contractor.

(7) An **alternate** for the Construction Quality Control Representative will be identified in the plan to serve in the event of the Representative’s absence. The requirements for the alternate will be the same as for the designated Construction Quality Control Representative.

Construction Quality Control Representatives (Three individuals who assist the Construction Quality Control Manager with Construction Quality Issues and Construction Quality Control)

(1) The Contractor shall identify three individuals within his organization that will assist the Construction Quality Control Manager in all associated quality control and coordination issues.

One of the individual will be responsible for site and structural/building systems, one will be responsible for electrical, and the third responsible for mechanical.

(2) Representatives shall have a minimum of 5 years of construction experience within the discipline they will oversee at a minimum of the journeymen level.

(3) Representatives shall attend bi-monthly coordination meeting during the construction phase to discuss coordination and quality issues.

(4) Representatives shall be on site at all times during construction performing construction quality control duties.

(5) Representatives have no other duties except construction Quality Control.

(6) Directly employed by the prime contractor.

(7) The Construction Quality Control Manager may serve as one of the Quality Control Representatives.

Design/Construction Liaison:

(1) Coordinates design activities throughout the life of the project for construction document development and construction activities.

` (2) Must meet one of the following:

BS in engineering with a minimum of 4 years design experience; or

Four (4) years construction experience and a minimum of two (2) years experience in technical design coordination.

(3) Is allowable to perform the function of a Site Safety Officer, provided he/she meets the qualifications.

(4) Supervises the commissioning phase of the contract.

Design Team Leader:

(1) An individual having the leadership role in the production of the product.
(2) For engineering products this individual is the project engineer/architect (PE/A).
(3) For all projects the PE/A must be a registered professional.
(4) This person is responsible for coordination between all disciplines, and ensures excellent integration of trades in both drawings and specifications.

Design Team:

The proposed design team shall, as a minimum, be comprised of the following disciplines: Architect, Civil Engineer, Structural Engineer, Mechanical Engineer, Electrical Engineer, Fire Protection, and Geotechnical Engineer. At least one person in a lead role of each discipline must be registered to

practice in their professional field of engineering in the United States or its possessions (52.236-0025) and have a minimum of five (5) years design experience. Any substitutions in key personnel after award shall require Contracting Officer approval. The Offeror shall submit this information regarding their design team by providing all the information requested on STD forms SF 254 and SF 255 and the information listed below.

1) Full name
2) Years of construction and/or design experience
3) Professional backgrounds
4) Professional and/or contractor's licenses
5) Length of service with your organization
6) Other companies employed by in the past including time frames
7) Project related experience including time frames and brief project descriptions, including any design-build experience

a. All applicable design team members shall assist the Design/Construction liaison in the supervision of the commissioning phase of the contract

Superintendent:(Overall Field Manager Responsible for Construction)

(1) Performs all superintendent duties required of the Contractor, except any duties required under "Superintendence of Subcontractors" below.

(2) Serves as the Governments' on site point of contact in all matters relating to the work including, but not limited to, scheduling of work, utility interruptions, and testing.

(3) Attends all job meetings.

(4) On site at all time during all construction activities.

(5) Serves under, and reports directly to, the Contractor's Project Manager.

(6) The On-Site Construction Superintendent shall have a minimum of 10 years construction experience on projects of comparable complexity, scope and cost.

Contractor's Subcontract Manager:

(1) Performs all subcontract management/superintendent duties required of the Contractor, and any duties required under contract clause titled SUPERINTENDENCE OF SUBCONTRACTORS.

(2) Serves as the Governments' final "Field" point of contact in all matters relating to the subcontracted work including, but not limited to, scheduling of work, utility interruptions, and testing.

(3) Attends all job meetings.

(4) Serves as the alternate in the event the Superintendent is absent.

(5) On site at all times during construction activities of subcontracted work.

(6) Works under, and reports directly to, the Contractor's Project Manager.

ITR Team:

(1) Independent Technical Review (ITR) shall be preformed as follows, all design submissions are reviewed by a qualified team, not affiliated with the development of a project/product, for the purpose of confirming the proper application of clearly established criteria in the RFP, regulations, laws, codes, principles and professional procedures. It includes the verification of assumptions, methods, and level of complexity of the analysis. It also verifies the alternatives evaluated, appropriateness of data used, reasonableness of the results and functionality of the product relative to the customer's requirements.

Independent Technical Review Team (ITRT): An interdisciplinary group formed to perform the ITR.

ITRT Leader - The ITRT Leader is responsible for coordinating all activities associated with the technical review. This coordination includes receipt of review documents from the PE/A, distributing these documents to the ITRT members which may require coordinating the sharing of documents if there are not adequate copies for each member to have their own. The leader must also assure that the reviews are completed on schedule, collect the review comments from the various members and compile all comments into a single package. This package will then be provided to the PE/A. Additional responsibilities include:

• Assist the PE/A (when requested) in the development of the QCP Plan

• Attend the pre-design conference Determine the need for attendance at all major planning/design team meetings.

• Select review team members who will attend the selected planning/design team meetings for in-progress reviews

• Conduct a team meeting early in the QC process to assure an understanding by the ITRT of the role and responsibility of each member

• Assure that ITR comments have been incorporated into the certified final design

• Obtaining signatures of ITRT members for the ITR certification and providing certification to PE/A

ITRT Members - The ITRT Member is responsible for performing an Independent Technical Review of the assigned planning/design component. Whenever the review calls for a level of specialized knowledge, experience, or training not possessed by ITRT members, the ITRT leader and the ITRT members will seek assistance from district functional chiefs in finding appropriate sources of review expertise within or outside the district. In addition are responsible for:

• Signing ITR certification

• Assuring his/her ITR comments have been incorporated into the certified final design

• ITR members must have minimum 10 years experience in their field of review and be a senior engineer in their field

Safety Manager: (Principal in Charge of Enforcing Safety Codes for the Project)

(1) Performs all safety management duties required of the Contractor including duties of the Site Safety Officer (reference Section 01420).

(2) Serves as the Governments' sole point of contact for all matters relating to safety.

(3) Continually enforces and implements the safety requirements of the contract including the Accident Prevention Plan.

(4) On site at all times during building activities, foundations work, structural steel erection, and exterior wall construction. During all other construction activities the Site Safety Officer may fulfill the position requirements of the Safety Manager (reference Section 01420).

(5) Works under and reports to the Contractor's Project Manager.

00800.40 CONTINUITY OF QUALITY PERFORMANCE. The Contractor agrees that in the event of any staffing or corporate changes, or substitution of subcontractors and/or consultants, during the performance of this contract the employees, subcontractors, or consultants engaged in the performance of the contract will continue to have the qualifications, professional background, education, and experience equal to that proposed by the Contractor and accepted by the Government for contract award. Any changes in key management personnel shall be submitted for approval by the Contracting Officer.

00800.41 GOVERNMENT RESIDENT MANAGEMENT SYSTEM AND CONTRACTOR QUALITY CONTROL MODULE. The Government will utilize an in-house Contract Administration program, Resident Management System (RMS). The Contractor shall utilize a Government furnished CQC Programming Module. See Section 01312, Resident Management System for requirements.

00800.42 DISPENSARY AND HOSPITAL FACILITIES. The facilities of the Fort Drum Post clinic are available to use by the Contractor only for the emergency treatment of his personnel injured at the job site. Charges to the Contractor for the use of said facilities will be at prevailing rates for the services provided and billing and payment will be made by separate transaction between the clinic and the Contractor.

00800.43 CONTRACTOR WARRANTY MANAGEMENT.

1. References:

Clause “Warranty of Construction”, (FAR 52.246-0021)
Clause “Inspection of Construction”, (FAR 52.246-12)
Specification Section 00800 Entitled “Special Contract Requirements” paragraph entitled “Record Drawings”
Specification Section 01451 entitled “Contractor Quality Control Design/Build Construction”

2. General: Warranty of Construction. Per ref 1.a all construction shall be warranted against defects for a one-year period beginning at the project acceptance point. In addition, there may equipment, systems or items for which labor and/or materials are warranted beyond the one year point. These are extended warranty items. In order to insure that the Government systematically receives all warranties of construction, equipment and systems to which it is entitled, the contractor shall execute all actions as required by above references and as contained herein. The contractor shall not be permitted to claim improper and/or lack of maintenance as a reason to abdicate its responsibility to correct a warranty or

latent defect items if the contractor is not in contract compliance pursuant to submission of O&M Manuals and /or maintenance instructions as required by references indicated in paragraph 4. or elsewhere in this contract.

3. Post-Completion Inspections: For purposes of management of construction warranties, the Government conducts four and nine month post construction warranty inspections with using agencies. The Contractor is encouraged to attend these inspections in order to better manage any warranty items for which it may be responsible.

4. Tagging of Extended Warranty Items: The Contractor shall install tags to identify items protected by extended warranty. The tags shall be
minimum 3 inches by 5 inches in size, machine-printed in minimum 14-point type, and shall be weatherproof and oil resistant. Tags shall be attached to equipment if accessible or to accessible control panel, etc. As a minimum, tags shall indicate the following information:

"Extended Warranty Item:"
Name of Item
Name of System with which associated, number designation within system, or other identifier
Model Number
Serial Number
Start and end Dates of Warranty
Contract number
Contract Name
Contractor Name
Warranty Point of Contact name, organization and telephone number.
Warranty response time priority code
"WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD."

Contractor shall install additional tags on all equipment and systems where required for reasons of safety, maintenance, and prevention of damage.

5. Posting of Instructions: In addition to any posting of operating procedures as may be required elsewhere in this contract, any equipment or system for which proper operation or maintenance is critical in order to preserve warranties, prevent damage, or for reasons of safety shall have proper operating procedures posted near the equipment or near the operating point. The summarized schedule of Maintenance Instructions shall be inclusive and specific regarding all system components, indicate frequency of maintenance for each maintenance item, and briefly describe each maintenance procedure and cross-reference the volume and page number of the O&M Manual that details the maintenance procedure. Training shall include review of the Summarized Schedule of Maintenance. Instructions shall be protected by 1/16-inch thick plastic sheet. As a minimum such equipment or system shall include:

Electrical Substations
Transformers
Major HVAC System components including chillers, air-handlers, fans, etc.
HVAC Control Panel
Boilers

6. Warranty Plan. Within 10 days of the 80% completion point of this contract (or deliverable phase thereof), the contractor shall submit a warranty plan for Government approval per section "Submittals". The Warranty Plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The plan shall be signed by a principal of the contractor. All documents in the plan shall be assembled in a binder. Upon acceptance it shall be signed by a Government Representative. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. As a minimum the plan shall indicate:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the contractor's, subcontractors or suppliers involved. This shall cover both the one year warranty of construction and extended warranty items or systems.

b. Listing and status of O&M manuals and As-built drawings, and expected delivery dates.

c. Listing and status of all training to be provided to Government personnel, whether specified by contract or required by manufacturers. Indicate dates of training both planned and accomplished.

d. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

e. A spreadsheet-type list for each warranted equipment, item, feature of construction or system, to include roofs, HVAC components, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc., as applicable. For each item, the list shall indicate the following information:

Name of item
Model and serial numbers.
Location where installed
Names of manufacturers or, suppliers and phone numbers.
Names addresses and telephone numbers of sources of spare parts
Identification of Warranted materials and labor, and other terms of warranty.
Cross-reference to warranty certificates as applicable.
Starting point and duration of warranty period.
Summary of maintenance procedures required to continue the warranty in force.
Cross-reference to specific pertinent Operation and Maintenance manuals
Organization, names and phone numbers of persons to call for warranty service
Typical response time and repair time expected for various warranted equipment

f. The contractor's acknowledgement of intention to attend the Four and Nine month post-construction warranty inspections conducted by the Government.

g. Status of tagging of all equipment covered by extended warranties.

h. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons

i. Contractor's understandings with respect to warranty responsibilities for the one year overall warranty of construction, and expected performance on warranty calls during this period.

7. Warranty Meeting. Within 10 days after the approval of the Warranty Plan the contractor will notify the Government representative for the purpose of scheduling a meeting to clarify understandings of responsibilities with respect to warranties to which the Government is entitled. The Government and contractor shall attend the warranty meeting, as well as any subcontractors, or suppliers involved in the warranty process. The Warranty Plan shall be the basis of the meeting's agenda. Contractor will prepare minutes of the meeting indicating major understandings reached, and submit for Government approval within 3 days of the meeting. Minutes will be signed by authorized representatives of the Contractor and Government.

8. Warranty Requirements Compliance. Expected performance of the Contractor on warranty work is indicated herein. If Contractor performance on a warranty call is unsatisfactory, the Contracting Officer may authorize the use of funds remaining in the contract to accomplish the warranty work on an expedited basis including the cost of Government administrative expenses. Repeated poor performance may result in retaining any payment due the Contractor until after the warranty of construction period. The Contractor's Performance Bond shall remain effective through the contract-specified warranty period. Poor warranty performance may also result in a poor contractor performance rating being entered into the Government CCASS system, or downward revision of such rating if already entered.

9. Warranty Performance – Expected Response to Construction Warranty Service Requests and Completion of Repairs: Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed.

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-Air Conditioning Systems
(1) Recreational support.
(2) Air conditioning leak in part of building, if causing damage.
(3) Air conditioning system not cooling properly.

Code 1-Doors
(1) Overhead doors not operational, causing a security, fire, or safety problem.
(2) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.

Code 3-Doors
(1) Overhead doors not operational.
(2) Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical
(1) Power failure (entire area or any building operational after 1600 hours).
(2) Security lights
(3) Smoke detectors

Code 2-Electrical
(1) Power failure (no power to a room or part of building).
(2) Receptacle and lights (in a room or part of building).

Code 3-Electrical
Street lights.

Code 1-Gas
(1) Leaks and breaks.
(2) No gas to family housing unit or cantonment area.

Code 1-Heat
(1). Area power failure affecting heat.
(2). Heater in unit not working.

Code 2-Kitchen Equipment
(1) Dishwasher not operating properly.
(2) All other equipment hampering preparation of a meal.

Code 1-Plumbing
(1) Hot water heater failure.
(2) Leaking water supply pipes.

Code 2-Plumbing
(1) Flush valves not operating properly.
(2) Fixture drain, supply line to commode, or any water pipe leaking.
(3) Commode leaking at base.

Code 3 -Plumbing
Leaky faucets.

Code 3-Interior
(1) Floors damaged.
(2) Paint chipping or peeling.
(3) Casework.

Code 1-Roof Leaks
Temporary repairs will be made where major damage to property is occurring.

Code 2-Roof Leaks
Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)
No water to facility.

Code 2-Water (Hot)
No hot water in portion of building listed.

Code 3-All other work not listed above.

10. Post-Completion Inspections: The Government conducts project inspections for purposes identifying warranted deficiencies at the four and nine month points after project acceptance. The Contractor is required to attend these inspections in order to better manage any warranty items for which it may be responsible.

00800.44 CLAIMS PROCESSING PROCEDURES. The following shall be submitted to the Contracting Officer at the following address: US Army Corps of Engineers, New York District, 26 Federal Plaza, Room 1843, NY, NY 10278-0090:

a. Claims referencing or mentioning the Contracts Disputes Act of 1978.

b. Request for a written decision by the Contracting Officer.

c. Claims certified in accordance with the Contract Disputes Act of 1978.

No other Government representative is authorized to accept such a request. A copy shall also be provided to the authorized Contracting Officer's Representative. The Contractor shall also provide the Contracting Officer with a copy of requests for additional time, money, or interpretation of contract requirements which were provided to the authorized representative of the Contracting Officer that have not been resolved after 90 days.

00800.45 CONTRACT DRAWINGS, MAPS AND SPECIFICATIONS.

a. The Government under this contract, will provide the contractor, without charge, one (1) compact disc with the Microstaion files of the Request for Proposal (RFP) package except publications incorporated into the technical provisions by reference.

b. The contractor shall:

(1) Check all drawings furnished immediately upon receipt;

(2) Complete all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(6) Provide the Government with ten (10) sets of the drawings (5 full size and 5 half size) and ten (10) sets of the specifications.

c. In general:

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The contractor shall follow figures marked on drawings in preference to scale measurements.

d. Omissions from the drawings of specifications or the mis-description of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the contractor from performing such omitted or mis-described details of the work. The contractor shall perform such details as if fully and correctly set forth and described on the drawings and specifications.

00800.46 DESIGN-BUILD CONTRACT – ORDER OF PRECEDENCE:

The contract includes the standard contract clauses and schedules current at the time of contract award. It entails (1) the solicitation in its entirety, including all drawings, cuts, and illustrations, and any amendments, and (2) the successful offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Governments. No documentation shall be omitted which in any way bears upon the terms of that agreement. In the event of conflict or inconsistency between any of the provisions of this contract, precedence shall be given in the following order:

(1) Betterments: Any portions of the accepted proposal, which both conform to and exceed the provisions of the solicitation.
(2) The provisions of the solicitation. (See also Contract Clause: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION.)
(3) All other provisions of the accepted proposal.
(4) Any design products including, but not limited to, plans, specifications, engineering studies and analyses, shop drawings, equipment, installation drawings, etc… These are "deliverables" under the contract and are not part of the contract itself. Design products must conform with all provisions of the contract, in order of precedence herein.

00800.46 SEQUENCE OF DESIGN-CONSTRUCTION

a. After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements as covered under Division 01 General Requirements, and obtain Government review of each submission. No construction may be started, until the Government reviews the Final Design submission and determines it satisfactory for purposes of beginning construction. The ACO or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

b. If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be

made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

c. As part of the proposal the Contractor will submit 90% site specific plans and specifications for the water tower. Within fifteen days of receipt of a Notice to Proceed, the Contractor will begin final design of the water tower plans and specifications. Also within fifteen days of receipt of a Notice to Proceed, the Contractor will begin final design of Anaconda Road. Only 95% and 100% design submissions are required for these packages when submitted separately from the remainder of the design. This work shall meet all review requirements and all other contract requirements. The Contractor will be required to complete the construction of the water tower no later than 3 June 2005 without liquidated damages described above being incurred.

d. At Contractor's option, the design for site work, foundation work (including structural load calculations) and/or utilities may be submitted as a package separate from the remaining facilities. This separate design package can be submitted on a faster schedule to allow for an early start to construction of this work. Only 95% and 100% design submissions are required for this package when submitted separately for this option. This work shall meet all review requirements and all other contract requirements.

e. At the Contractor's option, the design of the hanger COF's may be submitted as a package separate from the water tower, site work, foundation work, utilities, and all remaining facilities. This separate design package can be submitted on a faster schedule to allow for an early start to construction of this work. This work shall meet all review requirements and all other contract requirements. Contractor will be required to make 75%, 95% and 100% submissions unless the Contracting Officer directs otherwise.

f. The design must be completed not later than 5 May 2005, or any extension.

00800.47 EQUAL OPPORTUNITY PREAWARD OF SUBCONTRACT

Any subcontract of $10 million or more must be approved in writing by the Contracting Officer prior to award.

PROJECT IDENTIFICATION SIGN
MILITARY PROJECT

The graphic format for this 4' x 6' sign panel follows the legend guidelines and layout as specified below. The large 4' x 4' section of the panel in the right is to be white with black legend. The 2' x 4' section of the sign on the left with the full corps Signature (reverse version) is to be screen printed Communications Red on the white background. The castle insignia will be furnished by the Government in pressure sensitive vinyl for affixing by the Contractor. See attached sheet for fabrication and mounting guidelines.

Legend Group 1: One- to two-line description of Corps relationship to project
Color: White
Typeface: 1.25" Helvetica Regular
Maximum line length: 19"

Legend Group 2: Division or District Name (optional). Place below 10.5" Reverse Signature (6" Castle)
Color: White
Typeface: 1.25" Helvetica Regular

Legend Group 3: One- to three-line project title legend describes the work being done under this contract.
Color: Black
Typeface: 3" Helvetica Bold
Maximum line length: 42"

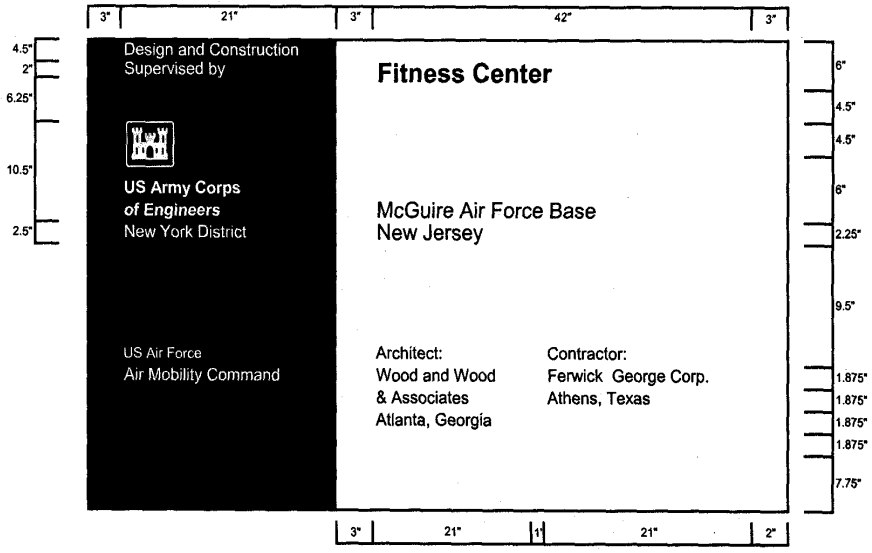
Legend Group 4: One-to two-line identification of project or facility (civil works) or name of sponsoring department (military).
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Cross-align the first of Legend Group 4 with the first line of the Corps Signature (US Army Corps) as shown.

Legend Group 5a-b: One-to-five line identification of prime contractors including: type (architect, general contractor, etc.), corporate or firm name, city, state. Use of Legend Group 5 is optional.
Color: Black
Typeface: 1.25" Helvetica Regular
Maximum line length: 21"

All typography is flush left and rag right upper and lower case with initial capitals only as shown. Letter and word spacing to follow Corps standards as specified in * Appendix D

SAMPLE:



(Dimensions are in inches)

Sign Type	Legend	Panel Size	Post Size	Specification Code	Mounting Height	Color Bkg/Lgd
CID-01	various	4' x 6'	4' x 4'	HDO-3	48"	WH-RD/BK

* Refers to the U.S. Army Corps of Engineers, "Sign Standards Manual", EPS-310-1-6.

SAFETY PERFORMANCE SIGN

The graphic format, color, size and type-faces used on the sign are to be reproduced exactly as specified below. The title with First Aid logo in the top section of the sign, and the performance record captions are standard for all signs of this type. Legend Group 2 and 3 below identify the project and the contractor and are to be placed on the sign as shown. Safety record numbers are mounted on individual metal plates and are screw-mounted to the background to allow for daily revisions to posted safety performance record.

Legend Group1: Standard two-line title "safety is a Job Requirement", with (8" od.) Safety Green First Aid logo. Color: To match PMS 347
Typeface: 3" Helvetica Bold
Color: Black

Legend Group 2: One- to two-line project title legend describes the work being done under this contract and name of host project.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

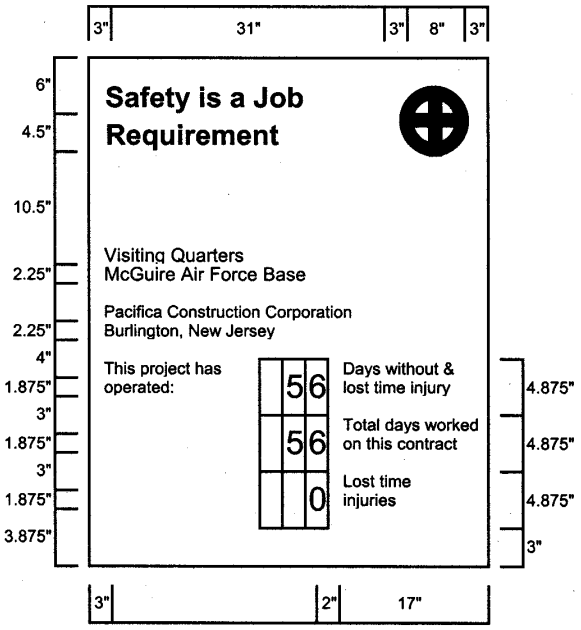
Legend Group 3: One - to two-line identification: name of prime contractor and city, state address.
Color: Black
Typeface: 1.5" Helvetica Regular
Maximum line length: 42"

Legend Group 4: Standard safety record captions as shown.
Color: Black

Typeface: 1.25" Helvetica Regular

Replaceable numbers are to be mounted on white .060: aluminum plates and screw-mounted to background.
Color: Black
Typeface: 3" Helvetica Regular
Plate size: 2.5"x.5"

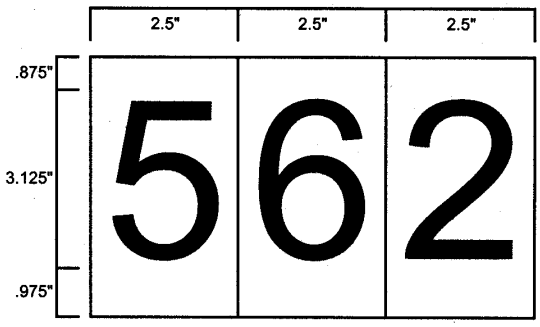
All typography is flush left and rag right, upper and lower case with initial capitals only as shown. Letter- and word-spacing to follow Corps standards as specified in Appendix D. *



Dimensions inches.
See attached sheet for fabrication and mounting guidelines.

* Refer to the U.S. Army Corps of Engineers, "Sign Standards Manual", EPS-310-1-6.

Sign Type	Legend Size	Panel Size	Post Size	Specifications Code	Mounting Height	Color Bkg/Lgd
CID-02	various	4"x4"	4"x4"	HDO-3	48"	WH/BK-GR



Fabrication and Mounting Guidelines

As Construction Project Identification signs and Safety Performance signs are to be fabricated and installed as described below. The signs are to be erected at a location designated by the contracting officer and shall conform to the size, format, and typographic standards shown on the attached sheets.

The sign panels are to be fabricated from .75" High Density Overlay Plywood. Panel preparation to follow HDD specifications provided in Appendix B. **

Sign graphics to be prepared on a white non-reflective vinyl film with positionable adhesive backing.

All graphics except for the Communications Red background with Corps signature on the project sign are to be die-cut or computer-cut non-reflective vinyl, pre-spaced legends prepared in the sizes and typefaces specified and applied to the background panel following the graphic formats shown on the attached sheets.

The 2'x4' Communications Red panel (to match PMS-032) with full Corps signature (reverse version) is to be screen printed on the white background. Identification of the District or Division may be applied under the signature with white cut vinyl letters prepared to Corps standards. Large scale reproduction artwork for the signature is provided on page 4.8 (photographically enlarge from 6.875" to 10.5"). **

Drill and Insert six (6) .375" T-nuts from the front face of the HDD sign panel. Position holes as shown. Flange of T-nut to be flush with sign face.

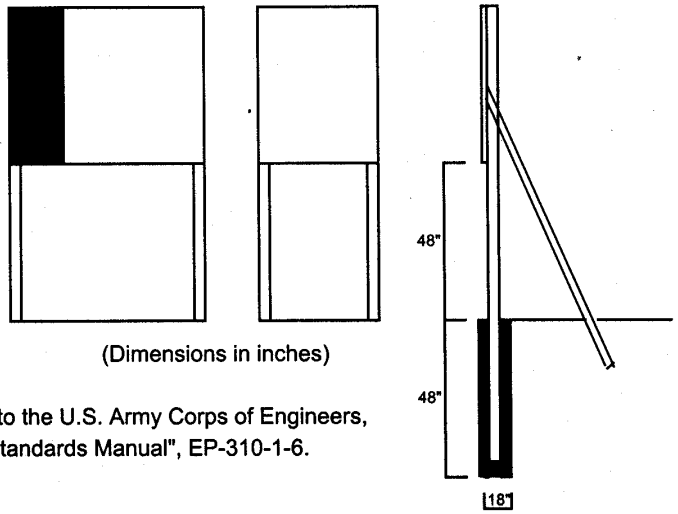
Apply graphic panel to prepared HDD plywood panel following manufacturers' instructions.

Sign uprights to be structural grade 4"x4" treated Douglas Fir or Southern Yellow Pine. No.1 or better. Post to be 12" long. Drill six (6) .375" mounting holes in uprights to align with T-nuts in sign panel. Countersink (.5") back of hole to accept socket head cap screw (4"x.375").

Assemble sign panel and uprights. Imbed assembled sign panel and uprights in 4" hole. Local soil conditions and/or wind loading may require bolting additional 2"x4" struts on inside face of uprights to reinforce installation as shown.

Detailed specifications for HDD plywood panel preparation are provided in Appendix B.**

Shown below the mounting diagram is a panel layout grid with spaces provided for project information. Photocopy this page and use as a worksheet when preparing sign legend orders.



(Dimensions in inches)

** Refers to the U.S. Army Corps of Engineers, "Sign Standards Manual", EP-310-1-6.

Construction Project Sign
Legend Group 1: Corps Relationship

1. _____
2. _____

Legend Group 2: Division/District Name

1. _____
2. _____

Legend Group 3: Project Title

1. _____
2. _____
3. _____

Legend Group 4: Facility Name

1. _____
2. _____

Legend Group 5a: Contractor/A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Legend Group 5b: Contractor /A&E

1. _____
2. _____
3. _____
4. _____
5. _____

Safety Performance Sign
Legend Group 1: Project Title

1. _____
2. _____

Legend Group 2: Contractor/A&E

1. _____
2. _____

- - End of Section - -

SECTION 01000

GENERAL REQUIREMENTS

1.0 SUPERVISION BY THE CONTRACTOR

The following requirements, in addition to those contained in Section 00700 Contract Clauses: SUPERINTENDENCE BY CONTRACTOR, shall be met by the contractor:

1.1 Authority of Contractor Representative

The site representative appointed by the Contractor and approved by the Contracting Officer shall, as a minimum, have the following authority:

1.1.1 To negotiate and execute Supplemental Agreements having a value up to $100,000.

2.0 AGE AND VALUE OF EQUIPMENT

If requested by the Contracting Officer, the Contractor shall provide documentation to establish the age and value of any equipment being utilized to perform work under this contract.

3.0 WORK SCHEDULE

If the Contractor intends to work outside the normal 40 hour Monday through Friday work week, he shall notify the Contracting Officer one full workday (Monday-Friday) in advance.

End of Section

SECTION 01010 – DESIGN REQUIREMENTS

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SECTION 1.0 - DESIGN OBJECTIVES

1.1 **Scope of Work:** Design and construction shall comply with the specifications and requirements contained in this Request for Proposal (RFP). The design and technical criteria contained and cited in this RFP establish minimum standards for design and construction quality. The objective of this solicitation is to obtain a fully functional brigade-sized barracks complex. The complex includes two 240 pn Barracks buildings, five company operations facilities, eight hangar company operation facilities, three battalion headquarters with classrooms, a brigade headquarters, a troop aid station, and a dining facility. This complex shall be constructed at Wheeler Sack Army Airfield (WSAAF), Fort Drum, New York.

1.1.1 Site Area: The sites are described in the civil portion of the RFP and includes approximately 35 hectares.

1.1.2 Site Work: Site work includes all design and construction of site features described in the RFP, including but not limited to, site planning, clearing, grading, erosion control, site drainage, utility systems, pavements, pedestrian and vehicular circulation systems, landscaping, physical security measures, site furnishings, and one million gallon water storage tank and associated piping, valves and connection to existing utilities.

1.1.3 Demolition Considerations and Requirements: Refer to the existing site survey and proposed site layout plan. Demolition shall include vegetation, asphalt pavement adjacent to the hangar buildings for the new COFs and utilities as required to accomplish the work. Materials not owned by the Government and not used in construction shall be disposed off Government property. The contractor shall obtain disposal permits from appropriate agency.

1.2 **Applicable Criteria:** Applicable design and construction criteria references are listed in Section 2.0 of this Section 01010. Criteria shall be taken from the most current references as of the date of issue of the RFP. Referenced codes and standards are acceptable criteria. Administrative, contractual, and procedural features of the contract shall be as described in other sections of the RFP.

1.3 **Design Quality:** The main objective of this solicitation is to obtain a Barracks Complex including parking, walkways, utilities and associated site development within funds available, and to maximize design quality. Design quality is achieved through the optimization of interior and exterior planning, sustainability, selection of building systems for low-cost maintenance and operation, and an overall balance of aesthetics and functionality.

1.4 **Design Freedom:** Requirements stated in this RFP are minimums. A partial design including floor plans, elevations, sections and site plans is included in the RFP and is mandatory but may be modified slightly to accommodate construction and code requirements provided gross building area as shown on drawings is not exceeded and net room area on drawings is not decreased. The design provided is to assure functionality and design image desired by Fort Drum. Any innovative, creative, or cost-saving betterments, which meet or exceed these requirements are encouraged and may be considered as part of the selection. Designs may incorporate factory-fabricated components. Prefabricated barracks modules will not be permitted. Building gross floor area (as calculated in accordance with TI-800-01 and shown on the drawings) shall not exceed that indicated on floor plans. Changes to floor-to-floor height are permissible provided change in height has no adverse effect on use or aesthetics of spaces and minimum ceiling heights are maintained.

1.5 **Optional** Bid Items Option bid items to include the following (See Section 18 of 01010 for further description of each option):

Option A – Complete Construction of Geothermal at Barracks Buildings

Option B – Complete Purchase and Install of Dining Facility Furniture

Option C - Complete Purchase and Install of Dining Facility Equipment

Option D – Decommission Existing Airfield Water Tower

Option E – Complete Construction of Water Treatment Plant

1.5 **Energy and Resources Conserving Features:** Public Law 102-486, Executive Order 12902, and Federal Regulations 10 CFR 435, require federal buildings to be designed and constructed to reduce energy consumption in a life-cycle, cost-effective manner using renewable energy sources when economical. Products designed to conserve energy and resources by controlling the amounts of consumed energy or by operating at increased efficiencies should be considered. Sustainable design criteria shall be followed to achieve a minimum rating of "gold" for the barracks and "bronze" for non-barracks facilities per Sustainable Project Rating Tool (SPiRiT) in ETL 1110-3-491. The Hangar COF Additions are not required to meet SPiRiT. Minimum requirements for this project are identified in the following sections of this Section 01010. Appendix E contains rating sheets for all buildings required to meet SPiRiT. Appendix E shall be used as a guide only. It shall not be viewed as mandatory nor shall it suggest limits to the contractor for investigating alternative methods for achieving ratings.

1.5.1 The Sustainable Project Rating Tool (SPiRiT) shall be used to design and plan the barracks buildings and the non-barracks facilities described hereinafter.

1.5.2 The contractor shall note the following as point credits already considered attainable for this RFP.

1.5.2.1 SPiRiT Code 1.C4. Two points are considered attainable, one point for bicycle racks and one point for providing a bus line.

1.5.2.2 SPiRiT Code 1.C10 – Two points - collaborate with the base as possible and if necessary, community planners to identify and mitigate potential impacts of the project beyond site boundaries and (post) transportation planners to insure efficient "public" transport. Fort Drum does provide "shuttle" service that would currently allow for public transportation between WSAAF and Main Post. Fort Drum has indicated that a larger more permanent, mass transportation system is being pursued to serve WSAAF and Main Post.

1.5.2.3 Facility Delivery Process – SPiRiT Code 6.0 seven points, requires the holistic delivery process for this complex. The intent is that team leaders are to be selected based on their experience in the holistic delivery process. Such team leaders will be required to conduct training in the holistic delivery process to include not only the stakeholders in the facility, but also the construction team, project manager, and the design/engineering team.

1.5.2.4 SPiRiT Code 7.0 Six Points, Current Mission Operation and Maintenance and Soldier and Workforce Productivity and Retention: The intent is to provide a

solution that yields a high quality indoor environment, one that enhances user/occupant, quality of life. The delivered product shall focus on providing a highly functional work environment that promotes user/occupant work productivity. The delivered product must produce a healthy and safe work environment, and enhances quality of life and workforce productivity and retention.

1.5.2.5 SPiRiT Code 8.0 Four Points, Future Missions. Work with the Army to assess the functional life of the facility and its supporting systems to optimize the infrastructure investment. Design the buildings to accommodate as wide a range of future uses as practical. Design the installation of building systems to accommodate foreseeable change with a minimum amount of descriptions, cost, and additional materials. Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form while taking into consideration expansion capabilities and potential future mission requirements, and design the facility for recycling of materials and systems.

1.5.2.6 Use the SPiRiT document to determine available technologies and strategies that will further the goals of facility adaptation, renewal, and future uses.

1.6 **Force Protection & Anti-Terrorism Considerations:** Project site and building design and construction complies with or exceeds DoD Minimum Antiterrorism Standards as outlined in this RFP. Standoff distances shall be as shown on the drawings accompanying this RFP. These distances comply with the Fort Drum 50m standoff requirement and shall adhered to.

SECTION 2.0 - DESIGN SUBMITTAL REQUIREMENTS

2.1 **Standards, Documents and Criteria:** The design requirements listed herein represent the minimum quality and quantity acceptable for the proposals and projects submittals. The latest edition of standards, documents and criteria referenced with this RFP, although not all attached within this RFP document, are modified to the extent indicated within this Section 01010. Each Successful proposer shall be responsible for obtaining the latest edition of any documents not attached as part of this RFP but referenced as criteria for the project. Requirements of this Section 01010 may delete, revise, add to or substitute for criteria contained in the referenced documents and this Section 01010 shall be deemed the controlling authority of any changes to the other referenced documents and criteria.

Reference documents can be obtained from Construction Criteria Base published by the National Institute of Building Sciences or online at http://www.usace.army.mil/publications. Design standards, reference documents and criteria applicable to the design of this project are referenced in the individual subsections of this Section 01010 to which they pertain. The latest edition of the following design standards, reference documents and criteria apply to all portions of the work whether or not they are referenced in the individual subsections of this Section 01010:

2.1.1 TI-800-01 - Technical Instructions - Design Criteria, U.S. Army Corps of Engineers
2.1.2 TI-800-03 - Technical Instructions - Technical Requirements for Design-Build, U.S. Army Corps of Engineers.
2.1.3 NANP-1110-1-1 - Manual of Standard Procedures, U. S. Army Corps of Engineers.
2.1.4 ETL 1110-3-491, Sustainable Design for Military Facilities.
2.1.5 International Building Code (IBC).
2.1.6 NFPA 101 - Life Safety Code.
2.1.7 New York State Energy Code.
2.1.8 UFC 3-600-01 Unified Facilities Criteria – Design: Fire Protection Engineering for Facilities.
2.1.9 UFC 4-721-11.1 Unified Facilities Criteria – Design: Unaccompanied Enlisted Personnel Housing (UEPH) Complexes.
2.1.10 Uniform Federal Accessibility Standards. Federal Std 795 Uniform Federal Accessibility Standards (UFAS), and Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG). Where these criteria conflict, the most stringent requirement shall apply.
2.1.11 UFC 4-010-01 Unified Facilities Criteria - DoD Minimum Antiterrorism Standards for Buildings.
2.1.12 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA):

2.1.12.1	29 CFR	Occupational Safety and Health Standards Part 1910
2.1.12.2	10 CFR 435B	Energy Conservation Performance Standards
2.1.12.3	29 CFR 1926	Safety and Health Regulations for Construction

2.2 **Design Standards:** Equipment, hardware and materials shall be standard manufactured items unless otherwise specified. Replacement parts shall be standard and readily available through commercial means. Discontinued products will not be accepted unless approved by the Contracting Officer.

2.3 **Codes:** The design, materials, equipment and installation shall be in accordance with the requirements of the listed codes and design manuals, with the requirements of this section, and with the listed specifications. The buildings shall be of a noncombustible construction classification.

2.4 **Metric Design:** This project shall be designed in "hard" metric.

2.4.1 Hard Metric: As defined by ASTM: "process of changing the description of an existing measurement to acceptable metric units, but with a change in the size of an existing quantity to obtain standard, convenient, rounded or rationalized metric dimensions"

2.4.2 Mechanical Design: Chapter 35 of the ASHRAE Handbook Fundamentals is a good source for metric conversion for mechanical design.

2.5 **Drawings:** Attached drawings provide minimum requirements for the site and building layout and shall be used in the design of the facility. All of the drawings are available in electronic file form ("Read Only"). Microstation Version 7.1 drawings (.dgn format) will be available to the successful bidder.

2.5.1 Field information:

2.5.1.1 Topographic survey was provided by the government based on an aerial survey. Some areas have been changed due to construction activity on the government survey.

2.5.1.2 The utility information has been compiled from the following three sources:

2.5.1.2.1 Government furnished utility information based on Fort Drum utility maps as provided by Fort Drum Public Works Department

2.5.1.2.2 Aviation Brigade Vehicle Maintenance Facility

2.5.1.2.3 Utility information in front of building 2060, 2072, and 2074 was marked in the field by Fort Drum and surveyed. The limits of the utility survey have been indicated on the drawings.

2.5.1.3 The compiled utility information provided in the drawings is the best information available. It is provided to assist during the design of this project. The Successful proposer is responsible to verify topographical and utility information. The Successful proposer is responsible for obtaining all information during design and requests for information shall be coordinated through the Contracting Officer. Any survey required to provide utility locations, manhole inverts, verification of existing features, etc. shall be the responsibility of the contractor and shall tie into the project datum.

2.5.1.4 Geotechnical Information: Limited soil borings have been conducted as part of the parametric design and the RFP. The sites are relatively flat and open. Part of the site has been used as a borrow pit for other projects. Significant amounts of loose soils are present in the existing borrow pit area which will require complete removal and either recompaction or replacement. Also, existing organic matter shall be removed. The rest of the site is underlain with relatively firm to medium sands.

2.5.1.5 Excavation Permits: The contractor shall obtain approved station excavation permits prior to digging. Request for excavation permits shall be in accordance with Fort Drum Public Works policies.

2.5.1.6 Design Details and Standards: The contractor shall provide a design and construction package that uses the design details given or referenced in this RFP. Additional details shall be created by the Successful proposer as required, but shall conform to the requirements of this RFP and are subject to approval by the Government.

2.5.2 Topographic and Utility Survey: Due to the composition of the survey used for this RFP, contractor to verify all survey information indicated for all of the new building sites in this RFP. Survey maps are to be provided using MicroStation software and shall conform to USACE A/E/C CADD Workspace Standards available online at http://tsc.wes.army.mil. See civil drawings for bench marks.

2.6 **Specifications:** The project specifications shall be prepared using current UFGS guide specifications. If a guide specification does not exist, the Design/Build Successful proposer will prepare a job specific specification. The UFGS shall be edited and adapted by the successful proposer for this project, incorporating UFGS instructions and recommendations in the notes to specifier contained in the guide specifications. The successful proposer is to delete inapplicable portions of the guide specification and revise and/or supplement, as required, the applicable portions to provide a complete project specification. Editing of specifications shall be for bracketed options and project requirements as stated in the RFP only. The Division 01 GENERAL REQUIREMENTS specifications that are provided in this RFP shall be used as provided with no editing by the successful proposer.

Following is a partial list of UFGS specifications required for this project. Other UFGS sections shall be added and submitted by the Design/Build Successful proposer as needed to address all other portions of the work in the accepted proposal.

DIVISION 01 - GENERAL REQUIREMENTS

01356A STORM WATER POLLUTION PREVENTION MEASURES
01500A TEMPORARY FACILITIES
01572A CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01780A AS-BUILT DRAWINGS SUBMITTALS
01781A OPERATIONS AND MAINTENANCE DATA

DIVISION 02 - SITEWORK

02220 DEMOLITION
02231 CLEARING AND GRUBBING
02300 EARTHWORK
02364A TERMITICIDE TREATMENT FOR SUBTERRANEAN TERMITE CONTROL
02510A WATER DISTRIBUTION
02531 SANITARY SEWERS
02553A HEAT DISTRIBUTION SYSTEM IN CONCRETE TRENCHES
02555A PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM
02556A GAS DISTRIBUTION SYSTEM
02560 VALVE PIPING AND EQUIPMENT IN VALVE MANHOLES
2630 STORM-DRAINAGE SYSTEM
02722A AGGREGATE AND/OR GRADED – CRUSHED AGGREGATE BASE COURSE

02741A HOT-MIX ASPHALT (HMA) FOR ROADS
02748A BITUMINOUS TACK AND PRIME COATS
02754A CONCRETE PAVEMENTS FOR SMALL PROJECTS
02763A PAVEMENT MARKINGS
02770A CONCRETE SIDEWALKS AND CURBS AND GUTTERS
02821A FENCING
02870A SITE FURNISHINGS
02921A SEEDING
02930A EXTERIOR PLANTING
02935A EXTERIOR PLANT MATERIAL MAINTENANCE

DIVISION 3 - CONCRETE

03101a FORMWORK FOR CONCRETE
03200a CONCRETE REINFORCEMENT
03300 CAST-IN PLACE STRUCTURAL CONCRETE

DIVISION 4 - MASONRY

04200 MASONRY

DIVISION 5 - METALS

05090a WELDING, STRUCTURAL
05300a STEEL DECKING
05400a COLD-FORMED STEEL FRAMING
05500a MISCELLANEOUS METAL

DIVISION 6 - WOODS & PLASTICS

06100a ROUGH CARPENTRY

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07413a METAL SIDING
07614a STRUCTURAL STANDING SEAM METAL ROOFING (SSSMR) SYSTEM
07530a ELASTOMERIC ROOFING (EPDM)
07600a SHEET METALWORK, GENERAL
07840a FIRESTOPPING
07900a JOINT SEALING

DIVISION 8 - DOORS AND WINDOWS

08110 STEEL DOORS AND FRAMES
08120 ALUMINUM DOORS AND FRAMES
08210 WOOD DOORS
08520a ALUMINUM AND ENVIRONMENTAL CONTROL ALUMINUM WINDOWS
08710 DOOR HARDWARE
08810a GLASS AND GLAZING

DIVISION 9 - FINISHES

09250	GYPSUM WALLBOARD
09310	CERAMIC TILE, QUARRY TILE, AND PAVER TILE
09510	ACOUSTICAL CEILINGS
09650a	RESILIENT FLOORING
09680a	CARPET
09900	PAINTS AND COATINGS
09915	COLOR SCHEDULE

DIVISION 10 - SPECIALTIES

10100a	VISUAL COMMUNICATIONS SPECIALTIES
10180	SHOWER UNIT DOORS
10260a	WALL AND CORNER GUARDS
10430a	EXTERIOR SIGNAGE
10440a	INTERIOR SIGNAGE
10800a	TOILET ACCESSORIES

DIVISION 11 - EQUIPMENT

11400A	FOOD SERVICE EQUIPMENT

DIVISION 12 - FURNISHINGS

12320a	CABINETS AND COUNTERTOPS
12490a	WINDOW TREATMENT

DIVISION 13 - SPECIAL CONSTRUCTION

13080	SEISMIC PROTECTION FOR MISCELLANEOUS EQUIPMENT
13100a	LIGHTNING PROTECTION SYSTEM
13210a	ELEVATED STEEL WATER TANK
13851a	FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE
13930a	WET PIPE SPRINKLER, FIRE PROTECTION
13111a	CATHODIC PROTECTION SYSTEM (STEEL WATER TANKS)
13112a	CATHODIC PROTECTION SYSTEM (IMPRESSED CURRENT)

DIVISION 15 - MECHANICAL

15070a	SEISMIC PROTECTION FOR MECHANICAL EQUIPMENT
15080a	THERMAL INSULATION FOR MECHANICAL SYSTEMS
15181a	CHILLED AND CONDENSER WATER PIPING AND ACCESSORIES
15190a	GAS PIPING SYSTEMS
15400a	PLUMBING, GENERAL PURPOSE
15566a	WARM AIR HEATING SYSTEMS
15569a	WATER AND STEAM HEATING; OIL, GAS OR BOTH; UP TO 20 MBTUH
15620a	LIQUID CHILLERS
15652a	COLD STORAGE REFRIGERATION SYSTEMS

15700a UNITARY HEATING AND COOLING EQUIPMENT
15845a ENERGY RECOVERY SYSTEMS
15895a AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM
15951a DIRECT DIGITAL CONTROL FOR HVAC
15990a TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS
15995a COMMISSIONING OF HVAC SYSTEMS

DIVISION 16 - ELECTRICAL

16070a SEISMIC PROTECTION FOR ELECTRICAL EQUIPMENT
16370a ELECTRICAL DISTRIBUTION SYSTEM, AERIAL
16375a ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND
16415a ELECTRICAL WORK INTERIOR
16528a EXTERIOR LIGHTING INCLUDING SECURITY AND CCTV APPLICATIONS
16710a PREMISES DISTRIBUTION SYSTEM
16711a TELEPHONE SYSTEM, OUTSIDE PLANT
16815a CABLE TELEVISION PREMISES DISTRIBUTION SYSTEM
16990 MASS NOTIFICATION SYSTEM

Additional geotechnical related specifications may be required as determined by the contractor, or as recommended by the Contracting Officer. If additional geotechnical related specifications are required, the contractor shall select and edit the appropriate specification from Unified Facility Guide Specifications (UFGS), subject to approval by the Contracting Officer.

2.7 **Government-Furnished Government-Installed Equipment (GFGI):** All loose furniture, equipment, computers and related hardware, video projectors, VCR's, TV's, drink machines, vending machines, microwaves, barracks module refrigerators, ice machines, clothes washers and dryers are Government Furnished Government Installed (GFGI). The Contractor shall provide utility connections and space for these items. All Dining Facility kitchen , servery, and warewash equipment and seating area furniture shall be Government Furnished Government Installed (GFGI) unless noted otherwise. When wall or ceiling mounted equipment such as TVs, VCRs, monitors, or projectors are required, the Contractor shall provide brackets with appropriate structural support for this equipment. Pay phones shall be provided by separate contractor. Contractor shall coordinate with pay phone provider and provide preparation as needed for attachment and connection of phones and enclosures. All other items to be Contractor Furnished Contractor Installed (CFCI).

SECTION 3.0 - CIVIL AND LANDSCAPE DESIGN

3.1 As part of the building program for the WSAAF Barracks Complex, the contractor shall be responsible for site work design and construction of earth grades from which the building and appurtenances are to be built as well as utility infrastructure to serve the project.

3.1.1 Site Development Plan: The site development plan shows consideration for the site opportunities and constraints, program requirements, and specific site design criteria and guidance provided by Fort Drum.

3.1.2 Buffer Area: Provide appropriate buffer areas to separate and visually isolate the 1/10, 2/10 and 3/17 Aviation Battalion Headquarters buildings, 10th Aviation Brigade Headquarters building, 1/10 and 2/10 Headquarters Company Operations Facilities (COF), Brigade HHC Company Operations Facilities (COF), Dining Facility, 240 Room Unaccompanied Enlisted Personnel Housing (Barracks) Units, Troop Aid Station, 3/17 HHC/A-TRP and a multi-purpose ball field.

3.1.3 Orientation: Orient the 1/10, 2/10 and 3/17 Aviation Battalion Headquarters buildings, 10th Aviation Brigade Headquarters building, 1/10 and 2/10 Headquarters Company Operations Facilities (COF), Brigade HHC Company Operations Facilities (COF), Dining Facility, and 240 Room Unaccompanied Enlisted Personnel Housing (Barracks) Modules as indicated on the site plans. Troop Aid Station, 3/17 HHC/A-TRP, a multi-purpose ball field, and three hanger COFs will be constructed for the 1/10 Battalion at building 2072, four for the 2/10 at building 2060, and two for the 3/17 at building 2074. Orientation was provided by the Fort Drum Public Works Department. Provide a one million gallon elevated water storage tank with associated piping, valves, connections to existing utilities, and tank foundation.

3.1.4 Pavilion: The pavilions will consist of a 10 meters by 5 meters square concrete pad with columns at each corner and a standing metal seam roof covering the area.

3.1.5 Dumpster Pads: Force protection guide lines require that dumpsters be located 25 meters from buildings.

3.1.6 Basketball Court: Within the proposed asphalt paved formation area. Contractor is to provide for a full court basketball area, inclusive of commercial grade steel cantilever posts, rectangular aluminum backboards, triple reinforced solid steel rims and 75 mm wide white striping of the court boundaries, 3 point line, mid court line, and free throw lines.

3.1.7 General Site Design Criteria: Minimum spacing between buildings shall be 15.25 meters. **The buildings should be set back 50 meters from parking lots and roads, due to force protection.** Site design shall be as indicated on drawings.

3.1.7.1 Vehicle Barrier Gates:

3.1.7.1.1 Gate at the north of Barracks as Indicated on Civil Drawings: Contractor to provide vehicle barrier gate meeting current anti-terrorism / force protection requirements. Gate to have a clear opening distance of 4 meters per traffic lane. Gate arms shall lift up vertically. Gate operation will be contractor

provided call box, keypad, remote, card reader, and traffic loop. The call box shall be wired back to the receiving area in the dining facility. The keypad, remote, and card reader will open the gate for vehicles to enter and the traffic loop will be located inside the secure area to allow vehicles to exit. Call box, keypad, remote, and card reader shall be located to allow operation from driver's side of vehicle, and shall be marked and protected from potential damage from snow plowing operations.

3.1.7.1.2 All Other Gates as Indicated on Civil Drawings: Contractor to provide vehicle barrier gate meeting current anti-terrorism / force protection requirements. Gate arms shall lift up vertically. Gate to have a clear opening distance of 4 meters per traffic lane. Gate operation will be by contractor provided keypad, remote, card reader, and traffic loop. The remote and card reader will open the gate for vehicles to enter and the traffic loop will be located inside the secure area to allow vehicles to exit. Keypad, remote, and card reader shall be located to allow operation from driver's side of vehicle, and shall be marked and protected from potential damage from snow plowing operations.

3.1.8 Snow/Ice: Building system is to be designed to minimize ice build up on roof systems. Sliding snow/ice from roof areas is a potential concern. As such, walkways shall be designed to maintain a safe distance from the roof lines to minimize the impact of sliding snow and ice. Parking areas shall be designed with consideration for plowing and managing snow.

3.2 **Requirements:** Site design requirements shall include preparation of site specifications; obtaining all necessary permits; site layout; road and parking lot design; sidewalk design; storm runoff design; natural gas main design and trenching; electrical system design and trenching and applicable concrete pads; communication system design and trenching; final site landscaping as well as establishing site grades, elevations and erosion and sedimentation controls. The contractor shall submit all design calculations, including references and assumptions to the Contracting Officer's Representative (COR) for review.

The site development concept for this project is shown on Site Plan(s) (sheet numbers C-111, C-112, C-113, C-114, C-115, C-116, C-117, C-118, C-119, C-138, C-139 and C-140). Contractor shall conform to the same basic site layout concept as shown on these drawings. The Government's intent in providing the concept site plans is to establish relationships and proportions from which the contactor can finalize design elements.

3.3 **Technical Criteria and Standards:** Design and installation shall conform to the latest editions of the referenced listed below, unless otherwise indicated herein.

3.3.1 U.S. Army Corps of Engineers, New York District, Architect Engineer Instructions (CENYD-AEI).
3.3.2 U.S. Army Corps of Engineers, NY District, Manual of Standard Procedures, NANP-1110-1-1.
3.3.3 TI-800-01 Design Criteria for Unaccompanied Enlisted Personnel Housing.
3.3.4 Fort Drum Installation Design Guidelines.
3.3.5 National Fuel Gas Code, NFPA 54 & Fort Drum Natural Gas Standards.
3.3.6 TM 5-820-4, Drainage Areas for Other Than Airfields.
3.3.7 TM 5-822-5, Chapter 3, Flexible Pavement for Roads, Streets, Walks and Open Storage Areas.

3.3.8 TM 5-813-1, Water Supply, Sources and General Considerations.
3.3.9 TM 5-813-5, Water Supply, Water Distribution.
3.3.10 TM 5-814-1, Sanitary and Industrial Wastewater Collection – Gravity Sewers and Appertenances.
3.3.11 TM 5-803-13 Landscape Design and Planning Criteria
3.3.12 TM 5-803-14, Site Planning and Design
3.3.13 Fort Drum Installation Guide
3.3.14 TR55 Urban Hydrology for Small Watersheds
3.3.15 New York State Stormwater Management Design Manual
3.3.16 New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity.
3.3.17 FHWA Hydraulic Design Series No. 3 and No. 4 (HDS-3 and HDS-4).
3.3.18 FHWA Hydraulic Engineering Circular No. 12 (HEC-12).
3.3.19 FHWA, Manual on Uniform Traffic Control Devices, US Department of Transportation.
3.3.20 NFPA, Installation of Sprinkler Systems, NFPA 13.
3.3.21 NFPA, Private Fire Service Mains and their Appurtenances, NFPA24.
3.3.22 TM 5-822-2, General Provisions and Geometric Design for Roads, Streets, Walks, and Open Storage Areas.
3.3.23 Uniform Federal Accessibility Standards (ADA), Federal Register
3.3.24 EM 1110-3-163 Engineering and Design Water Supply, Water Storage

3.4 **Project Site Surveys:**

3.4.1 See section 2.5. A new topographic and utility survey will be required by the contractor.

3.5 **Site Preparation:**

3.5.1 Site preparation shall include, but not be limited to demolition of pavement, site clearing, grubbing of trees and shrubs, earthwork grading of site to obtain the building pad and site improvement's desired elevations, and other items as indicated.

3.5.2 The contractor is responsible for the removal and disposal of all unsuitable organic material (i.e. tree stumps, roots, limbs, and grubbing debris) off Fort Drum property.

3.5.3 Site Prep; Clearing activities must take place between 1 Aug. and 15 April – Migratory Bird Treaty Act.

3.5.4 The sites are relatively flat and open. Part of the site located on the west side of Bagram Road and across from the VMF project has been used as a borrow pit for other projects. Significant amounts of loose soils are present in the existing borrow pit area which will require complete removal and either recompaction or replacement. The required depth of removal shall be determined by the Contractor's geotechnical design consultant, with full consideration of settlement potential as discussed in Section 4.0 Geotechnical Design. The rest of the site is underlain with relatively firm to medium sands.

3.5.4.1 Minimum recommendations for the borrow pit are as follows: (stricter requirements shall be developed and specified as determined appropriate by the

Contractor's geotechnical and structural design consultants)

3.5.4.1.1 It is recommended that areas on which fill is to be placed be scarified and densified prior to fill placement as a minimum. If the surface soils are sandy and dry, addition of light amounts of water (plus or minus 2 percent of the optimum moisture content) should facilitate compaction. As a minimum, the compacted fill be constructed by spreading acceptable soil in loose layers not more than 200 millimeters thick (150 millimeters thick for pavement sections and building areas). The soils used within the proposed building areas, around structures, in pavement areas, or for replacement in any undercut areas shall be compacted in thin lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D 1557) as a minimum. The upper 300 millimeters of fill beneath foundations, grade slabs and pavements shall also be compacted to 95 percent of the Modified Proctor maximum dry density as a minimum.

3.5.4.1.2 The moisture content of the fill soils should be maintained within plus or minus 2 percent of the optimum moisture content determined from the Modified Proctor density tests. Soils used in compacted fills shall also be free of debris and fibrous organic material. They should have a liquid limit less than 40 and a plasticity index less than 15. Particles larger than 100 mm in diameter shall not be included in the compacted fill.

3.5.5 If unclassified materials (glacial boulders, impenetrable bedrock) are encountered, the contractor is to achieve desired elevation by suitable methods. If blasting is required, blasting impact is to be evaluated. Blasting mats are required on Fort Drum for any blasting. The contractor is to obtain a blasting permit from Fort Drum prior to proceeding. The contractor is responsible to evaluate and determine if any encountered rock is suitable to bear upon and thus altering building foundation system.

3.5.6 Holes and depressions in the ground resulting from demolition operations shall be filled with satisfactory materials, compacted and graded with a proper slope to shed runoff and to drain.

3.5.7 Contractor is required to proof roll existing soil to detect and correct unsuitable soils as recommended by the Contractor's geotechnical consultant, following stripping and leveling operations and prior to placing new fill material.

3.6 **Storm Water Permit for Construction Activities:**

3.6.1 SPDES Storm Water General Permit: As of March 2003, construction that results in disturbance of 0.40 hectares or more of total land area requires the preparation of a Notice of Intent (NOI) to discharge in accordance with the National Pollutant Discharge Elimination System (NPDES) requirements of the Clean Water Act. In New York, which is a NPDES-delegated state, this is accomplished through the administration of the State Pollutant Discharge Elimination System (SPDES) program. The following are requirements for Fort Drum:

3.6.1.1 A completed NOI must be submitted through the COR to Fort Drum Public Works (PW) Environmental Branch for review and approval at least thirty (30) days prior to the proposed commencement of construction activities (e.g. the initial disturbance of soils associated with clearing, grading,

excavation, or other construction activities). The NOI shall include a storm water pollution prevention plan that includes the Stormwater Management and Erosion Control Plan. PW will mail the final NOI to NYS Department of Environmental Conservation (DEC) at least seven (7) working days prior to the commencement of construction activities. The NOI form GP-02-01 can be found on the DEC web site.

3.6.1.2 A completed Stormwater Pollution Prevention Plan in conformance with NYSDEC standards shall be prepared, stamped by a New York State Professional Engineer, submitted for approval to the COR and posted for conformance during the duration of construction at the subject site.

3.6.2 General: No hazardous chemicals (toxins, corrosives, flammables, oil/grease, fuels, disinfection water, hydrostatic water, flushing water, etc.) shall be discharged into the ground surface, storm water drains or sanitary sewer system during construction activities. A Stormwater Management and Erosion Control Plan shall be submitted to the contracting officer and Fort Drum PW environmental branch for review and approval prior to inclusion in the construction documents.

3.6.3 All construction and demolition debris (C&D), with the exception of clean, uncontaminated concrete (not to exceed 1 cubic yard in size), asphalt, brick, masonry, stone, aggregate, soil, brush, and stumpage will be disposed of off post in accordance with federal, state and local law and regulation. Disposal of clean soils on post will be done at an approved, pre-determined site coordinated through Fort Drum Public Works, Master Planning Branch.

3.6.4 All solid wastes generated and disposed of in conjunction with this project (including all C&D debris) will be tracked and recorded by weight. Weights for solid wastes disposed of off post at a permitted facility will be tallied using weight tickets. Clean spoils disposed of on post as part of rehabilitation or mitigations programs, will be considered recycle/reuse materials. Weights for these spoils will be tallied by best estimate (in tons). Totals for solid waste disposal and recycle will be forwarded to the Public Works, Environmental Division ATTN: Mark W. Clarke (mark.clarke@drum.army.mil) at the end of each fiscal quarter or upon project completion, which ever occurs first.

3.6.5 Work sites are to be policed daily to ensure C&D debris and litter are properly containered. Dumpsters and Roll-offs will be covered at the end of each workday to prevent blow-away litter and debris.

3.7 **Site Development**: The contractor is to finalize the site design as shown on sheet numbers C-101 thru C-140 and construct the entry, parking areas, pedestrian walks, utilities, storm drainage pipes and culverts, traffic signage and landscaping.

3.7.1 Parking Areas: The number of parking spaces was provided by Fort Drum Public Works.

3.7.1.1 Unaccompanied enlisted personnel (Barracks) site area will require a total of 950 parking spaces (including handicapped parking) as indicated on the site plans.

3.7.1.2 The 1/10, 2/10 and 3/17 Battalion Headquarters Buildings (BN HQ) will require a total of 439 parking spaces (including handicapped parking) as indicated on the site plans.

3.7.1.3 The 10th Aviation Brigade Headquarters Building (BDE HQ) site will require a total

of 74 parking spaces (including handicapped parking).

3.7.1.4 Parking spaces shall be 90 degree orientation, 2.75 meters wide x 5.5 meters long each. Aisle width shall be for two-way traffic, minimum width of 7.6 meters. Pavement for parking areas shall be asphalt. Pavement thickness shall be in accordance with the contractor's Pavement Design, but not less than indicated.

3.7.1.5 Handicapped access will be provided in the parking lots near the BDE HQ, dining facility, Troop-Aid, (1/10, 2/10 & 3/17 BN HQ), and the Barracks.

3.7.1.6 The contractor will be responsible for providing the proper number of handicapped parking spaces for each parking lot.

3.7.1.7 Transverse slope in the parking areas should be a minimum of 1 ½%.

3.7.2 Roads: Layout shall be as shown on the Site Plan. Pavement for roadways shall be asphalt; thickness shall be in accordance with contractor's Pavement Design, but not less than indicated.

3.7.2.1 The typical road and drive cross section will consist of two (2) 3.8 meter wide paved lanes with a cross slope of 2%. Road shoulders will be 1.8 meters wide, consisting of 1.2 meters paved with 0.6 meters of grass. Shoulder cross slope to be 6%. The maximum desirable longitudinal centerline grade for roads and drives is 5% and minimum longitudinal centerline grade for roads is 0.5%. Positive drainage of storm water will be maintained below the subbase level of the roads, drives and parking lots. Swales will be provided where the pavement is in cut or is not sufficiently above grade to provide adequate drainage. Ditches along the side of roads, drives and parking areas will be grass lined and a minimum of 1.2 meters deep measured from the crown of the road. Cut and fill slopes will be four horizontal to one vertical unless noted otherwise. Where ditches are not possible, an underground drainage system of pipes shall be used to drain the aggregate base course.

3.7.3 Pavement Marking: Pavement marking color, type and width shall be in accordance with the Manual on Uniform Traffic Control Devices. Pavement marking of roadways shall match existing and adjacent roads. Striping for parking spaces shall be 100 mm wide and white in color.

3.7.4 Signage: Regulatory and directional signs shall comply with the Manual on Uniform Traffic Control Devices. Refer to Section 5.13.2 of specification 01010 for building identification signage.

3.7.5 Parking Lot Edge of Pavement: Pavement edges are to be flush with grade with gravel base course extending 150 mm beyond the edge of pavement to act as a shoulder and to help maintain the integrity of the edge of pavement.

3.7.6 Pavement Design: Per Fort Drum Public Works Department requirements, asphalt pavement (roads, access drives, parking areas and formation area) shall consist of the following as a minimum. Actual design will be based on CBR test **but shall not be less than the following**:

3.7.6.1 38 mm Asphalt Concrete Top Course (NYSDOT Item #403.170 Type 7f)

3.7.6.2 63 mm Asphalt Concrete Binder Course (NYSDOT Item #403.170 Type3)

3.7.6.3 304 mm Crushed Stone Base (NYSDOT Type 2) in 152 mm lifts to 95 % density by the modified proctor test.

3.7.6.4 405 mm Total

3.7.6.5 Sand sub-base fill material 650 mm minimum. Subbase to be compacted to 90% density by the modified proctor test.

This pavement design shall be confirmed by the analysis of the soils data for this project site based on the contractor's geotechnical engineer soil report. Any deviations to the pavement composition and thickness shall be presented in a report with supporting calculations to the Contracting Officer for review and approval.

3.7.7 Pavement Grade: Finished pavement shall be graded to assure positive drainage across the paved areas. The minimum acceptable cross slope in parking areas is 1.5% with a maximum grade of 5%.

3.7.8 Concrete Pavement: Per Fort Drum Public Works Department requirements, concrete pavement for vehicular traffic areas **shall consist of the following as a minimum**:

3.7.8.1 250mm of 5000 psi concrete

3.7.8.2 100mm crushed stone base (NYSDOT type 2) compacted to 95% density by the modified proctor test

3.7.8.3 350mm total

3.7.8.4 Sand subbase fill material 650mm minimum. Subbase to be compacted to 90% density by the modified proctor test.

This pavement design shall be confirmed by the analysis of the soils data for this project site based on the contractor's geotechnical engineer soil report. Any deviations to the pavement composition and thickness shall be presented in a report with supporting calculations to the Contracting Officer for review and approval.

3.7.9 Recycled Concrete Material: Recycled concrete materials shall not be used to substitute for the required NYSDOT Type 2 crushed stone base in asphalt paved areas, regardless of such allowance in the UFGS spec.

3.8 **Excavated Materials:** Excavated materials shall be separated to satisfactory and unsatisfactory soil materials. Surplus satisfactory material shall be disposed of at the on-base landfill. contractor to maintain and uniformly grade the on-base clean fill disposal area. Dump piles are to be dozed off smooth and level with no slopes exceeding 20%. Disposal area shall be graded to provide positive drainage and covered with on site soil and seeded. Seed mixture shall be in accordance with Fort Drum standard recommendations for sandy soil. Unsatisfactory material shall be disposed of off of Fort Drum property.

3.9 **Haul Route:** The contractor's route for material to be disposed of off of post will be from Bagram Road and/or Hangar Access Drive south to Munns Corner Road (Co. Route 37), then west through Post Gate onto Great Bend Road (NYS Route 26).

3.9.1 Contractor's route for fill material from borrow pit will be north along dirt road to Bagram Road and then south on Bagram Road to site.

3.9.2 Contractor will be responsible for repairing any damage along the haul routes during construction.

3.10 **Survey Controls:** When set in field they will be indicated on documents.

3.11 **Contractor's Storage Yard:** The contractor's storage yard shall be located within the project site as approved by the Contracting Officer.

3.12 **Grading:** Since the sites are flat, earthwork will consist of fill material required to elevate the building slab elevations to allow for positive surface away from the buildings. Significant amounts of loose soils are present in the existing borrow pit area. This material will require removal and either recompaction or replacement, prior to placing any new compacted structural fill. A large quantity of fill material will be required to fill the existing borrow pit.

Contractor to use extreme caution when evaluating his procedures in compacting fill material in the existing borrow pit to insure that bearing capacity can be obtained to preclude any unacceptable settlement. (See geotechnical section 4.6 for minimum fill compaction requirements).

Conceptual grading of the site has been indicated on the grading plans. The contractor is responsible for design of the final grading plan. Care must be taken to avoid saturating the soils, which support the building foundation system. The open areas and parking areas shall be graded to eliminate ponding and provide positive drainage. Minimum grading in grass formation areas shall be 2% and maximum of 5%. Grade surrounding the building should be set as follows: at foundation, exterior grade is to drop 150 mm below finish floor elevation, then slope away from the building at 6 % grade for a minimum of 3.1 meters horizontal to enhance positive drainage away from the building foundation walls. Minimum slope does not apply to sidewalks. Transverse slope for sidewalks will be 1%.

Borrow materials will be necessary to meet the desired grades, the contractor, upon written authorization from the Contracting Officer, may get sand fill from the Fort Drum borrow pit off Munns Corner Road (Co. Route 37) (See Sheet C-101 for location). The contractor to maintain and uniformly grade the fill pile area. Excavations are to be dozed off smooth and level with no slopes exceeding 20%. Borrow site shall have a maximum depth of 4600 mm and shall be seeded in accordance with the Fort Drum standard recommendations of seeding sandy soils.

3.13 **Storm Runoff and Drainage:**

3.13.1 Storm Runoff: Storm runoff shall be calculated by the Rational Method defined in HDS-4. The site shall be designed to maximize overland runoff routes. Any collection and closed piping system deemed necessary shall be designed for the 10 year storm frequency. Culverts shall be designed for 50-year storm frequency. Runoff coefficients shall be 1.0 for roof areas, 0.9 for paved surfaces, and 0.2 for landscaped/grass areas. Contractor to provide detail calculations for the storm drainage system.

3.13.2 New Storm Drainage System: Culverts shall be provided under driveway access and roadway intersection to maintain continuity of drainage flow in the ditches. On-site drainage shall be by open swales as much as possible. Where closed drainage system is necessary, the storm drain lines shall be sized by computation of backwater surface profiles per HEC-12 and HDS-3 or TMS-820-4, appendix B. The minimum culvert pipe size shall be 375 mm, sloped to provide a minimum velocity of 0.76 m/sec. Calculations for the flows shall utilize a value no greater than 0.013 for Manning's flow. New manholes or inlets shall be provided at all change in pipe direction, grade or elevation, and where pipe lengths exceed 76 m. Internal roof drain connections will be required on the following buildings: Dining Facility, 1/10 HHC, 2/10 HHC, 3/17 HHC,

A-TRP, troop aid, BDE HHC, and all of the COFs attached to the hangar buildings.

3.13.3 Barracks, Troop Aid Station, 3/17 HHC/A-TRP, Dining Facility, Brigade HHC COF, 1/10 and 2/10 HHC COF Site: The existing site is relatively flat and open. The buildings will be located over an existing borrow pit area that will require considerable fill material. The area under the building floor slabs will be filled to provide for positive drainage away from the buildings. The new site grading has been designed so that the majority of the site will drain to the north. New drainage culverts will be installed under Bagram Road under this contract to provide drainage outlet for the site. The majority of surface drainage on the site will be collected in open swales and routed through pipe culverts. (See grading drawings for overall drainage concept).

3.13.4 1/10, 3/17 and 2/10 Aviation Battalion Headquarters Site: The existing site is relatively flat and open. The area under the building floor slabs will be filled to provide for positive drainage away from the buildings. The proposed POV parking areas will be raised to provide for surface drainage flow to the west, so that the water will flow to the existing drainage system. The drainage areas around the buildings will be collected by a series of drainage inlets and routed to the east under the limited access road and discharged into an open ditch that will drain to the south. (See grading drawings for overall drainage concept).

3.13.5 10th Aviation Brigade Headquarters Site: The existing site is relatively flat and open. The area under the building floor slab will be filled to provide for positive drainage away from the buildings. The proposed POV parking area will be raised to provide for surface drainage flow to the southwest. The surface drainage area in front of the building will flow into an inlet piping system that will go under Hangar Access Road and tie into an existing drainage structure. (See grading drawings for overall drainage concept.)

3.13.6 The Three Hanger COFs (Buildings 2074, 2072 and 2060) Sites: The new COFs will be constructed over an area that is presently asphalt pavement. No new surface storm water drainage system is anticipated for these sites other than roof drainage pipes.

3.13.7 Multi-Purpose Ball Field Site: The new multi-purpose ball field backstop will be located parallel to the existing landfill fence. Orientation was provided by Fort Drum Public Works Department. The ballfield will be graded to provide positive drainage for the field. (See grading drawings for overall drainage concept).

3.13.8 Building Roof Drains: The following buildings will have internal building roof drains that will discharge to the site storm drainage system: 1/10 & 2/10 HHC, BDE HHC, 3/17 HHC, A-TRP, Dining Facility, Troop Aid and all of the COFs attached to the hangar buildings.

3.14 **Utilities:** Utility connections shall be provided as required below. Any utility outages, road closures, etc. shall be coordinated with Fort Drum agencies and may be required to be accomplished at off hours/weekends. The location of the service line laterals for water, sanitary sewer, gas, electrical lines, and communications lines shall be coordinated between the building's service points and the location of the mains. Provide marker tape and tracer wire for all underground utilities. Tracer wire test stations and termination to be contained in a cast iron, accessible weatherproof box. Test stations to be located at 150 meter intervals and the

termination of the utility. It shall be the contractor's sole responsibility for cost and repair of any existing utility damaged or disturbed during the course of construction. Tracer wire is to be placed 150mm-300mm above pipe, and dig tape is to be located 450mm below grade. Outages are not acceptable during the heating season and require 30 day advance notice.

3.14.1 Existing Utilities: Existing utilities are shown on the Site Utility Plans. Utility locations were compiled from three sources as indicated in section 2.5.1.2. The contractor shall be responsible for verifying the existence, location, size, depth and condition of the utilities.

3.14.2 Water:

3.14.2.1 Fire Hydrants: Fire hydrants shall be compatible with those presently in use at the Fort Drum, with similar pump and hose connections. Fire hydrant spacing shall be no greater that 150 m apart by paved road. In addition, a hydrant shall be provided so that all parts of the facilities can be reached by hose lines not over 106 m long. All distances shall be calculated along the closest route that the fire apparatus must travel (i.e.; along the curb or access lane). A fire hydrant shall be located within 45 m from any fire department connection provided per Unified Facilities Criteria (UFC 3-600-01). Hydrant laterals shall be 200 mm minimum size, and shall not exceed 15 m in length, and shall have an underground shutoff valve. Valve box, at each lateral, shall be located between 1 m and 3 m of the hydrant, and shall not be located where obstructed by parked vehicles, shrubbery, etc. Guard post barriers shall be provided around all hydrants. Hydrants shall be installed adjacent to paved areas, not closer than 1m and not farther than 2m from the roadway shoulder. Fire hydrant nozzles should be located facing the roads and drive. All hydrants will require a 1.5m long by 10mm diameter fiber glass pole (alternating red and white reflective bands, 4-each) mounted on a spring to the top of the fire hydrant for locating the fire hydrant in the snow. Spring should allow the pole to be bent so that the hydrant can be opened without the pole interfering.

3.14.2.2 Valve and Valve Boxes: Sufficient sectional control valves shall be provided so that no more than two fire hydrants will be out of service in the event of a single break in a water main. The pipes, valves, and all other materials shall meet the requirements for a 1034 kPa working pressure system. Valve boxes shall be provided for each new valve. Cast iron boxes shall be bonded with the ferrous valve and be cathodically protected with a minimum life time of 40 years. Cast iron valve boxes shall have a protective coating applied using a coal tar epoxy. Valve boxes in traffic areas shall be selected to sustain anticipated loads.

3.14.2.3 Post Indicator Valves: Tamper switches must be included on all post indicator valves on the fire lines to building.

3.14.2.4 Burial Depth: Water lines shall have a minimum of 1.68 m of earth cover to maintain the water line below the frost penetration depth.

3.14.2.5 Water Meters: Water meters will be required for the service line for each building. The meter shall read in gallons and shall be pulse type with local and remote read capabilities. The meter is to be located within the mechanical room of the building. Water meters must be tied into the trane tracer system to provide remote read out.

3.14.2.6 Existing Water System Pressures: Fort Drum Public Works Department has indicated that the proposed water distribution system to be installed under the Aviation BDE VMF Project has been designed to provide adequate capacity to handle the additional demand. Contactor to see basis of design for BDE VMF design information. This information shall be used for sizing the domestic water line and designing the fire protection system. Contractor to be advised that the fire reserved elevation in the new elevated water tank has been raised from elevation 246.1 meters (per VMF Project) to elevation 253.346 meters.

3.14.2.7 Water Line Materials: The Watermains are to be concrete lined ductile iron (CLDI) or C900 Polyvinyl Chloride (PVC) and shall be listed for fire protection. Ductile-iron pipe shall conform to AWWA C151, working pressure not less than 1.03 MPa, unless otherwise, unless otherwise shown or specified. Pipe shall be cement-mortar lined in accordance with AWWA C104. Linings shall be standard. When installed underground, pipe shall be encased with 11 mm thick polyethylene in accordance with AWWA C105. Flanges ductile iron pipe with threaded flanges shall be in accordance with AWWA C115.

3.14.2.8 Limit of Work: Site water main construction is to be completed to within 1.5 meters of the building. Site contractor to coordinate with building plumbing contractor for location of service connection to the building.

3.14.2.9 Testing and Chlorination Requirements: To meet NFPA 24 and AWWA C651 as well as local Department of Health Standards. Contractor to provide a written plan and submit to Fort Drum Public Works for approval prior to commencing any flushing, testing, and disinfection work on water lines. 48 hour notice and approval from the COR and the Fort Drum Public Works Environmental Branch must be obtained.

3.14.2.10 Construction Connections: Any connection to the Fort Drum Potable water supply for construction purposes must be protected by an approved backflow device (RPZ) supplied by the contractor and said device is to have a current inspection.

3.14.2.11 Barracks, Dining Facility, Brigade HHC COF, Troop Aid Station, 3/17 HHC/A-TRP, 1/10 and 2/10 HHC COF Site: A new water main will be required along the inside of the proposed service drive in order to establish a loop system. This water main will tie into the 400 mm water line provided under the Aviation BDE VMF project (see utility drawings for tie-in locations). Another proposed water line will come off of the inside loop along the service drive in a north direction between the new facilities and west of the proposed HHC BDE building and tie back into the new water line along the east side of the service drive. This line will provide fire protection and domestic water for the proposed facilities along with the new water line parallel to the service drive. Fire protection for POV parking areas will be provided off of the service drive loop.

3.14.2.12 1/10, 3/17 and 2/10 Aviation Battalion Headquarters Site: Fire protection and domestic water for these buildings will be provided off of a new 400 mm water line provided under the Aviation BDE VMF project located on the east side of the proposed limited access road (see utility drawings for tie-in locations). Fire protection for POV parking areas will be provided off of the existing water line located west and parallel to the POV parking area. Some existing fire hydrants will require relocation due to new POV

parking.

3.14.2.13 10th Aviation Brigade Headquarters Site: Fire protection and domestic water for this facility will be provided off of a new water line to the building. The new water line will tie into the 400 mm water line provided under the Aviation BDE VMF project (see utility drawings for tie-in locations). Fire protection for POV parking will be provided off of the new loop water line.

3.14.2.14 The Three Hangar COFs (Buildings 2074, 2072, and 2060) Sites: Domestic water and fire protection water for the new COF's will tie into the existing water system inside the building.

3.14.2.15 Multi-Purpose Ball Field Site: No water required.

3.14.3 Sanitary Sewer: A sanitary sewer lateral shall be designed to convey sewage produced by the building. The building lateral shall provide the maximum slope attainable while meeting the burial depth criteria for the line. The minimum size diameter for the sanitary sewer lateral shall be 200 mm for the barrack buildings and 150 mm for all other buildings.

3.14.3.1 Manholes: Manholes shall be provided on the sanitary sewer lateral at every change in grade, elevation or pipe direction.

3.14.3.2 Burial Depth: Sanitary sewer lines shall have a minimum depth of 1.68 m of cover or as required to meet the existing sewer inverts.

3.14.3.3 Sanitary Sewer Line Materials: Sewer pipe is to be SDR 35 PVC with Cast Iron Hub and Spigot beneath structures.

3.14.3.4 Sanitary Sewer: The design shall be in accordance with TM5-8141, Sanitary and Industrial Wastewater Collection - Gravity Sewers and Appurtenances.

3.14.3.5 Limit of Work: Site sanitary sewer main construction is to be completed to within 1.5 meters of the building. Site contractor to coordinate with building plumbing contractor for location of service connection to the building.

3.14.3.6 Barracks, Dining Facility, Brigade HHC COF, Troop Aid Station, 3/17 HHC/A-TRP, 1/10 and 2/10 HHC COF Sites: The proposed sanitary sewer distribution system will start north of the Dining Facility and the Brigade HHC COF. The proposed system will gravity flow to the south between the buildings and then to the east to tie into the new sanitary sewer manholes installed under the Aviation BDE VMF project located on the west side of Bagram Road. Fort Drum Public Works Department has indicated that the proposed sanitary sewer system to be installed under the Aviation BDE VMF Project has been designed to provide adequate capacity to handle the additional demand. (See utility drawings for sewer line routing and tie-in locations).

3.14.3.7 1/10, 3/17 and 2/10 Aviation Battalion Headquarters Site: The proposed sanitary sewer distribution system will be located in front of the Buildings. The proposed system will gravity flow to the south and tie into an existing sanitary sewer manhole. Fort Drum Public Works indicated that the existing system is capable of handling the additional flows. (See utility drawings for sewer line routing and tie-in location).

3.14.3.8 10th Aviation Brigade Headquarters Site: The proposed sanitary sewer distribution system will be located in front of the Building. The proposed

system will gravity flow to the southwest crossing under Hangar Access Drive and then turn in a northwest direction parallel to Hangar Access Drive and tie into an existing sanitary sewer manhole. Fort Drum Public Works indicated that the existing system is capable of handling the additional flow. (See utility drawings for sewer line routing and tie-in location).

3.14.3.9 The Three Hangar COFs (Buildings 2074, 2072 and 2060) Site: Sanitary sewer lines will be routed outside the COFs and tie into the existing sanitary sewer system. The proposed routing of the new sanitary sewer lateral is conceptual only. Contractor must determine final routing to avoid existing utilities. Fort Drum Public Works indicated that the existing system is capable of handling the additional flow.

3.14.3.10 Multi-Purpose Ball Field Site: No sanitary sewer is required.

3.14.3.11 Grease Interceptors: All grease interceptors will be located inside the building. Grease interceptors will be designed and located in an area that will provide adequate access for cleaning.

3.14.4 Gas: Interruption of gas service to adjacent facilities, during construction, shall be minimized and restricted to the hours as permitted by the Contracting Officer. The gas service line shall be designed in accordance with the National Fuel Gas Code, NFPA 54 and Fort Drum Natural Gas Standards. Contractor to refer standard gas distribution details from Ft. Drum PW Master Planning. System attributes include anodeless risers, test ports and in-line strainers at each building entrance, tracer wire and test point boxes along the lines, and sensing point details at each main line valve.

3.14.4.1 Valve and Valve Box: A gas valve shall be provided for the service line. The gas valve shall be Poly Ball Valve and shall conform to ASME B16.40. Valves in sizes from 13 mm to 305 mm shall be made of polyethylene and meet or exceed the criteria of ANSI B16.40 and ASTM D-2513. Valve is to include a fused body shell to eliminate all potential leak paths. Shutoff to be Bubble tight with dual elastomeric seats. Install purge points to allow for purging and charging of the gas system according to NFPA 54.

3.14.4.2 Burial Depth: The minimum cover depth for gas mains and service lines shall be 760 mm.

3.14.4.3 Gas Meter and Regulator: A gas meter and regulator shall be provided for the building. The gas meter shall have a permanent bypass line to facilitate removal of the meter without disruption of service and shall have a pulse device for interface with EMCS. The meter and regulator shall be located within the fenced mechanical yard and shall be protected from weather conditions.

3.14.4.4 Gas Line Materials: Materials for gas lines shall be Type II high density polyethylene with the PE 3408 designation SDR11 (100 PSI). Transition from underground to above ground piping shall be by anodeless riser.

3.14.4.5 Gas Line Testing: Gas line to be pressure tested at a minimum 70 psi. Contractor shall provide a written work plan & drawing to FD PW for approval, a minimum 14 days prior to commencing any work. All piping shall be purged using nitrogen only.

3.14.4.6 Gas Line Separation: Gas lines shall have a minimum separation of 3 meters from other site utilities where possible, unless more stringent

requirements exist.

3.14.5 Fire Department Connection: Provide for a 125 mm diameter fire department 'storz' connection at the edge of the parking lot for an external connection to the building sprinkler system. A 150 mm 'dry' main constructed with concrete lined ductile iron (CLDI) or C900 PVC pipe is to run from the building to the 'storz' connection. This 'dry' main is to be brought within 1.5 meters of the building by the site contractor and marked so that the building plumber can connect. This fire department 'dry' main is to be terminated as indicated on the conceptual utility drawings with a check-valve (within a reinforced concrete valve pit), riser and 125 mm 'Storz' connection. At this termination the riser is to be protected with a painted, concrete filled steel bollards. The following buildings will have fire pumper connections on the building instead of pumper connections in outside pits; 1/10 & 2/10 HHC, TRP Aid, BDE HHC, 3/17/A-TRP and VEPH.

3.15 **Electrical and Communications:** For electrical and communications service lines, refer to Section 10.0 of Section 01010.

3.15.1 Site Lighting: For site lighting design and requirements refer Section 10.0 of Section 01010.

3.16 **Site Amenities:**

3.16.1 Dumpster Pads: Provide 250mm thick reinforced concrete dumpster pad as a minimum with 150mm of stone base material. Concrete filled steel bollards shall be installed at the rear of the dumpster pad to keep the dumpster on the pad. The number of dumpster pads required is indicated on the drawings. Concrete pad is to be extended so that front wheels of dumpster truck are on the concrete pad when lifting, shaking and placing dumpster.

3.16.2 Sidewalks: Reinforced concrete sidewalks are to be provided on the site as indicated on the site plans. Sidewalks are to consist of 31,000Kpa concrete with welded wire mesh reinforcing. The minimum thickness of the sidewalks are 150 mm with expansion joints 6 meters on center and sealed control joints 1.5 meters on center. Sidewalks are to have a minimum longitudinal slope of 1% and a maximum slope of 5 %. Transverse slope on sidewalks shall be a minimum of 1.0%. Sidewalks are to broom finished.

3.16.3 Basketball Court: Within the proposed asphalt paved formation area, the contractor is to provide for a full court basketball area, inclusive of commercial grade steel cantilever posts, rectangular aluminum backboards, triple reinforced solid steel rims and 75 mm wide white striping of the court boundaries, mid-court line, 3 point line, and free throw lane. Note the formation area is to be paved in accordance with the pavement section described in section 3.7.6.

3.16.4 Concrete Bollards: Concrete bollards are to be provided on the site as indicated. Bollards are to consist of 200 mm diameter pipe filled with 27,600 Kpa concrete with a foundation 1700 mm below grade and extending to 1220 mm above grade.

Removable bollards where required shall consist of sleeve type removable bollards. All bollards shall be painted brown with a 300 mm yellow band around the top.

3.16.5 Loam & Seed: All disturbed areas shall be covered with stockpiled loam a minimum of 100 mm and shall be seeded in accordance with the Fort Drum standard recommendations of seeding sandy soils, see appendix "K" for seeding specifications.

3.16.5.1 Additional organic soil amendment boost shall be provided for surface soils. Liquified cow manure compost with 10% solids is recommended and shall be applied at a minimum rate of 20 tons/acre wet, which equals approximately 2 tons dry.

3.16.5.2 Prepared surface soil seed bed shall be rolled prior to hydroseeding operations to prevent blowing sand, soil and seed loss as well as, moisture loss and leaching nutrients from the surface due to capillary action of the substrate.

3.16.5.3 The seeding mix has been provided as a guide for aesthetic purposes only. The Contractor shall develop a seeding mix design for review that can withstand wind and blowing sand

3.16.6 Foundation Drip Strip: Contractor to provide a 1.5 meter wide by 75 mm deep drip strip at finished grade around entire building. The drip strip is to include geo-synthetic fabric and colored #2 stone (colored to match the brick) along with black aluminum edging.

3.16.7 Pavilion: The pavilions will consist of a 10m x 5m concrete pad with columns at each corner and a standing metal seam roof covering the area.

3.16.8 Barbeque Grills: Provide two barbeque grills per pavilion. Mount grill in 1200mm X 1200mm X 300mm concrete pad reinforced with #4 bars at 300 mm o.c. each way. Grill shall have two separate cooking grates that are adjustable to 4 levels. Slots for grate adjustment shall be designed to resist theft. All grill handles shall have heavy-duty cool spring handles designed for public use. The grill bars shall be 12.7 mm steel welded on 25.4 mm centers. Each grill shall measure 356 mm X 904 mm giving a total of 6503 sq. cm of cooking surface. Model shall feature a 254 mm X 711 mm X 4.8 mm thick steel that is 914 mm W x 711 mm D x 254 mm H with a large formed ash lip to reinforce the fire box and help prevent hot coals from falling out. The fire box shall be strengthened on the bottom with supporting gussets and mount on a single 102 mm square steel pedestal with 305mm x 305mm x 9.5mm base mounting plate. Theft-deterrent base attachment. Full rotation for draft control. Steel construction. Complete unit shall be finished in non-toxic, heat and rust-resistant black enamel. Unit weight shall be a minimum of 91 kg.

3.16.9 Drinking Fountains with Hose Bib Attachment: Provide one drinking fountain per pavilion. Drinking fountain to be surface mounted, steel pedestal drinking fountain to include: one jug filler, one side mounted vandal resistant ADA accessible receptor bowl with bubbler head and one hose bib with vandal resistant lock and key box. The valve system is to be freeze proof. All valves, valve boxes, and backflow preventers shall be heavy duty type, municipal grade.

3.16 **Elevated Water Storage Tank** (One Million Gallon Capacity) (3,785,412.5 Liter)

3.17.1 General: Contractor shall include all labor, materials and equipment necessary for the design, fabrication, deliver, erection and painting of a one million gallon welded steel elevated water storage tank with fluted column style, height and capacity as shown on the drawings and as specified herein. Cleaning and painting, testing, disinfection, and accessories shall be included. Work shall also include all materials, tools, and labor necessary for the design and construction of the elevated tank foundation including

excavation and backfill, site work, and watermain. **Construction of the new elevated water tank must be completed per the requirement of specification section 00800.**

3.17.2 Tank Style: The tank and supporting structure shall be of the fluted column style and shall be of all welded construction. All openings shall be properly reinforced and the tower shall be adequately anchored to the foundation. All tank plates in contact with water shall have a minimum thickness of 6.35 mm and other parts not in contact with water shall have a minimum thickness of 4.76 mm or greater if required by tank manufacturer.

3.17.3 Standards: The materials, design, fabrication, erection, inspection, and testing of the elevated tank, foundation, and related appurtenances shall conform to the latest edition of the AWWA Standard for Tanks for Water Storage, AWWA D100, New York State Department of Health and/or related Department of the Army Corps of Engineers publications, whichever is more stringent.

3.17.3.1 The following standards should be used as a minimum unless more stringent are referenced:

ACI 318	Building Code Requirements for Reinforced Concrete
ACI 318R	Commentary on Building Code Requirement for Reinforced Concrete
AWWA D100	Standard for Welded Steel Tanks for Water Storage
AWWA D102	Standard for Painting Steel Water Storage Tanks
AWWA C652	Disinfection of Water Storage Facilities
SSPC-PA1	Steel Structures Painting Council Surface Preparation Specification
ETL 1110-9-10	Cathodic Protection System Using Ceramic Anodes
Federal Aviation Administration Advisory Circular AC No: 70/7460 1K Change 1 to Obstruction Marking and Lighting	

3.17.4 Requirements: The tank shall have capacity to hold one million gallons of water.

3.17.4.1 Fort Drum requirements are as follows: The height of the tank shall be 58.204 m with a ground elevation of 205.81 m. The maximum height allowed for items on top of tank (i.e. tank antenna, beacon and handrails shall be elevation 265.843m. Location of tank is indicated on site drawings. The fire reserve level shall be set at elevation 253.346 m. Bottom of tank shall be set at elevation 247.251 m.

3.17.4.2 The location of the new elevated water tank will encroach into the airfield approach zone. Fort Drum Public Works will obtain necessary encroachment permits. Contractor to provide Fort Drum Public Works necessary tank information for permit.

3.17.4.3 Head range shall be 12.1914 meters.

3.17.4.4 The design of conical and doubly curved tubular sections shall be performed in accordance with AWWA D100. No supplementation is required.

3.17.4.5 All inlet/outlet piping above the base elbow(s), and overflow piping shall be in accordance with ASTM A53. All joints connecting these pipe sections shall be welded.

3.17.4.6 Snow load: See section 6.0 of specification section 01010.

3.17.4.7 Wind load: See section 6.0 of specification section 01010.

3.17.4.8 Earthquake design: See section 6.0 of specification section 01010.

3.17.4.9 Ladders shall be provided for access up the interior of the tower and continuing on up to the roof.

3.17.4.10 Provide a 500 mm diameter offset steel riser pipe. The riser pipe shall extend up from the base elbow adjacent to the tower to a point near the tank bottom, then over adjacent to the tank center, then up through the tank bottom adjacent to the drywell. All connections shall be welded.

3.17.4.11 Provide a removable silt stop on the riser pipe inside the tank bottom.

3.17.4.12 Provide a 450 mm diameter steel overflow pipe. The overflow pipe shall be fitted with a weir box. The overflow pipe shall be attached to the drywell, then offset to extend down inside the tower to grade. The overflow pipe shall penetrate the fluted column at grade and discharge onto a concrete splash pad that discharges into a rip-rap ditch. The overflow pipe discharges shall be equipped with a screened end.

3.17.4.13 Ladders shall be equipped with a suitable ladder safety device. The ladder safety device shall comply with OSHA standards.

3.17.4.14 A suitable vent of adequate size shall be provided near the center of the tank roof to permit the passage of air. The vent shall be sized to handle the pressure differential caused by water entering or leaving the tank at a maximum rate. The open area of the overflow shall not be considered as venting area. The vent shall have frost-free insect screens and shall be designed to relieve any pressure or vacuum in the event the screen is clogged. The vent shall be easily dismantled to remove the screens for cleaning.

3.17.4.15 Accessories to be provided:

3.17.4.15.1 Provide an access tube located on the vertical centerline of the tank. The access tube shall have a minimum diameter of 1,220 mm and shall provide access from the top of the fluted column to the tank roof.

3.17.4.15.2 Provide a walkway immediately below the tank extending from the tower to the access tube. The walkway shall be a minimum of 915 mm wide with 1,067 mm high handrails..

3.17.4.15.3 Provide a ladder system attached to the tower which extends from grade to the walkway. This ladder system shall be offset at no more than 6 meter intervals with rest platforms provided. OSHA standards do not require that this ladder system be equipped with a ladder safety device.

3.17.4.15.4 Additional ladders are required from the walkway up to the painters rail access manhole, and from the walkway up to the tank bottom manhole. A ladder is also required on the interior of the access tube for access from the walkway up to the tank roof. These ladders shall be equipped with a suitable ladder safety device in accordance with OSHA standards.

3.17.4.15.5 If a ladder safety device is used, it shall be an OSHA approved cable fall prevention system complete with two (2) harnesses and two (2) sleeves.

3.17.4.15.6 Provide one (1) 760 mm diameter manhole giving access to the exterior painters rail located at the top of the fluted column. The painters rail shall be located approximately 600 mm beneath the junction of the tower and the tank. There shall be a platform inside the tower at this point.

3.17.4.15.7 Provide painters rails permanently installed on the underside of the tank roof as follows:

1. One painters rail near the center of the tank.
2. One painters rail located approximately 450 mm from the tank shell.
3. If the slope distance between these two painters rails exceeds 9.75 meters provide a third rail near midspan

3.17.4.15.8 Provide one (1) 760 mm diameter manhole through the tank bottom. This tank bottom manhole shall be accessible from the upper walkway by means of a straight ladder as described above.

3.17.4.15.9 Two (2) 760 mm diameter hinged rain-proof hatches shall be provided. One hatch shall be located at the top of the access tube complete with chain, hook and inside handle. The other hatch shall be located in the tank roof adjacent to the access tube for entry into the tank and shall have a handle and hasp. The hatch openings shall have a curb 100 mm high and the cover shall have a downward overlap of 50 mm.

3.17.4.15.10 One (1) 600 mm diameter flanged exhaust hatch shall be provided in the tank roof adjacent to the access tube and constructed so that an exhaust fan may be bolted to the hatch for ventilation during painting. The roof vent may be mounted in the exhaust hatch cover plate.

3.17.4.15.11 A minimum of eight (8) vents 250 mm in diameter shall be provided in the tower. Half of the vents shall be installed near the top of the tower and the other half near the base. If the tank is equipped with a condensate ceiling, the lower vents must be located above the condensate ceiling.

3.17.4.15.12 Interior waterproof light sockets with rigid conduit, wiring and switch shall be provided inside the tower and access tube. There shall be one light located at the top of the access tube, one light at the lower end of the access tube above the walkway opening, one light at each of the tower ladder rest platforms, and one light at the base of the fluted column. All wiring shall be in conduit. The conduit and wiring shall terminate with a junction box in the base of the tower. Duplex outlets shall be installed as required by manufacturer.

3.17.4.15.13 Inside the tank structure, at grade level and near the tank riser there shall be an 8’x8’ room constructed. Room shall have an interior finish of gypsum board, drop ceiling, and fluorescent lighting. Room shall be insulated with R-40 insulation and shall have a forced hot air electric heater. Access shall be provided through an insulated lockable hollow metal door. Power outlets shall be provided on all four walls and data outlets shall be provided on the two walls furthest from the location of the door. Twelve strand of fiber shall be run from the room to the MATES facility for connection. Wall construction shall be concrete block or metal stud with metal siding on the exterior wall.

3.17.5. Foundation: The contractor shall be responsible for obtaining site specific geotechnical information for his design of the tank foundation. Contractor to refer to Section 6.0 of

specification section 01010 for seismic, wind and snow load requirements for the tank design. Concrete shall develop minimum strength requirements based on the load calculations. Pile or caisson requirements may be necessary for adequate stabilization.

3.17.6. Painting: All interior and exterior tank painting shall be performed according to manufacturer specifications, New York State Department of Health and Fort Drum Public Works requirements and FAA. Exterior painting shall be orange/white panels.

3.17.6.1. Paint shall be enamel meeting the chromaticity and luminance factors specified in Federal Standards FED-STD 595, Color and follows:

a. Orange, Number 12197 (Aviation Surface Orange)
b. White, Number 17875 (Aviation White)

3.17.6.2. The obstruction marking pattern shall be in accordance with Federal Aviation Administration Advisory Circular # AC 70/7460-1K Change 1.

3.17.6.3. The paint system for the interior of the tank pillar shall be as specified by tank manufacturer for the tank exterior except that the finish coat shall be light gray or as selected by the Contracting Officer.

3.17.7. Disinfection: Disinfection and testing of tank shall be performed according to AWWA C652 standard, New York State Department of Health and/or Fort Drum Public Works requirements.

3.17.7.1. Tank Testing – The flow of water to the tank is to be regulated by the operation of the tank's isolation valve during tank testing to prevent overflow..

3.17.8. Additional: Other items included on the tank include 1000 mm wide by 2100 mm high hollow steel insulation door, 3600 mm high by 4250 mm wide electrically operated vertical slide hollow steel insulated overhead door, exterior lighting above mandoor and overhead door, insulation/heat taping of inlet/outlet pipes, overflow pipe, tank antenna/beacon, and force protection around water storage tower.

3.17.9. Fencing: Chain link fence to have outrigger with 3 strands of barb wire. Materials shall conform to Fed. Spec. RR-F-191.

3.17.9.1. Chain-Link Fabric: Fed. Spec. RR-F-191/1, Type 1, or Type II, with 6-gauge wire woven in a 51 mm mesh.

3.17.9.2. Post, Top Rails, and Braces: Fed. Spec. RR-F-191/3 and zinc-coated.

13.17.9.2.1 Post Braces and Truss Rods: For each gate, corner, pull or end post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment.

23.17.9.2.1 Intermediate Posts: C-section line posts of the same dimension as H-post, 3 mm wall thickness, and fabricated from steel conforming to ASTM A 570, Grade 33 may be furnished in lieu of H- or round posts.

3.17.9.3. Accessories: Fed. Spec. RR-F-191/4.

13.17.9.3.1 Barbed Wire: Zinc coated for use with zinc-coated fabric and aluminum coated for use with aluminum-coated fabric.

23.17.9.3.1 Barbed Wire Support Arms: Single arm type.

33.17.9.3.1 Reinforcing Wire: Minimum tensile strength of 517,107 kPa, zinc-coated for use with zinc-coated fabric and aluminum coated for use with

aluminum-coated fabric. Minimum weight of aluminum coating shall be 11 g of aluminum per square foot of wire.

43.17.9.3.1 Tie Wire: Aluminum alloy of 3.66 mm diameter for attaching fabric to top rail and to intermediate posts. Preformed clips of 6-gage, zinc-coated, steel wire may be used for attaching fabric to intermediate posts.

53.17.9.3.1 Hog Rings: Aluminum wire of 2.79 mm diameter for attaching fabric to top and bottom reinforcing wires.

3.17.9.4. Gates: Fed. Spec. RR-F-191/2; gate shall be the type shown on drawing. Gate fabric shall be as specified for chain-link fabric. Each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence. Gate leaves more than 2.4 m wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate less than 2.4 m wide shall have truss rods or intermediate braces. Gate fabric shall be attached to the gate form by method standard with the manufacturer except that welding will not be permitted.

3.17.10. Cathodic Protection: Cathodic protection is to be provided for the new water storage tank.

3.17.11. Cast Iron Flap Valve Requirement for Overflow Pipe:

3.17.11.1. The valve shall be flange framed with resilient seat.
3.17.11.2. The body and flap shall be cast iron conforming to ASTM A126-B.
3.17.11.3. The hinge arms shall be high tensile bronze conforming to ASTM B584-CA865.
3.17.11.4. The hinge pins shall be silicon bronze conforming to ASTM B98-CA655 or type 304 stainless steel.
3.17.11.5. Each hinge arm shall have two pivot points, an adjustable lower pivot with limited rotation and a threaded upper hinge post to adjust flap valve sensitivity.
3.17.11.6. A lubrication fitting shall be supplied for each pivot.
3.17.11.7. Installation shall be per manufacturers recommendation.

3.17.12. Safety Platform on Top of Tank:

3.17.12.1. Safety platform shall have anti-slip bonded grading and 100 mm toe board.
3.17.12.2. Steel railings shall be galvanized standard weight steel pipe of nominal 38.1 mm size conforming to ASTM A-53.
3.17.12.3. Steel grating shall be designed in accordance with the NAAMM Metal Bar Grating Manual to meet the loading of 2873 Pa. Edges shall be banded with bars 3.175 mm less in height than beaming bars. Frames shall be of welded steel construction finished to match the grating. Floor gratings and frames shall be galvanized after fabrication.

3.17.13. Floor Drainbox: Floor drainbox, frame and grate shall be designed for H-20 loading.

3.17.13.1. Floor drainbox shall have a 300mm DIP drainage pipe that is routed to the overflow ditch outside the tank.

3.17.14. Water Storage Tank Roof Entrance:

3.17.14.1. All entrances to the water storage tank's roof are to have a 150 mm vertical lip above the roof and be fitted with an overlapping cover with lockable hasp.

3.17.15. Marking and Lights: The structure should be marked and/or lighted in accordance with FAA Advisory Circular 70/7460-1 K Change 1, Obstruction Marking and Lighting, paint/red lights – Chapters 3 (Marked), 4, 5 (Red), & 12.

3.17.16. Construction equipment for the tank:

3.17.16.1. Temporary construction equipment such as cranes, derricks, etc. shall not exceed the maximum height (EL 265.843m) of any obstruction on top of the tank. Equipment which has a height greater than elevation 265.843 m requires separate notice to the FAA.

3.17.17. FAA/Fort Drum Forms: The contractor should comply with all FAA regulations and form submittal process to FAA and Fort Drum. The contractor must fill out or provide information to the Contracting Officer as required, to complete any forms required by the FAA / Fort Drum in a timely manner. The Contracting Officer will submit the forms to Joe White for review and he will forward them to FAA for approval.

3.17.18. Altitude Valve: To prevent overflow from elevated tanks, reservoirs, or standpipes, altitude valves will be used, installed in concrete pits having provision for drainage either by gravity or pumping. Drains will not be connected to sanitary sewers. Every precaution will be taken to prevent contamination of the water supply through valves, valve pits, and appurtenances.

3.17.19. Corrosion Allowance: Corrosion allowance shall be per AWWA D100, FAA and Fort Drum Public Works, whichever is more stringent.

3.17.20. Submittals:

3.17.20.1. Bid Sketches: Each Bidder shall submit with his proposal a sketch of the elevated water storage tank showing major dimensions and plate thickness upon which the bid is based. The bidder shall also submit a sketch of the elevated tank foundation showing preliminary dimensions and approximate quantities of concrete and reinforcing steel.

3.17.20.2. Drawings: The contractor shall furnish detailed drawings of the tank and foundation. These drawings shall be sealed by a registered professional engineer licensed in the State of New York.

3.17.20.3. Design Calculations: The contractor shall furnish detailed design calculations for the elevated water storage tank and foundation. Calculations shall be submitted to and approved by the New York COE prior to the start of construction.

SECTION 4.0 - GEOTECHNICAL DESIGN

4.1 **General:** The geotechnical aspects of this project include, but are not limited to, the foundation, soils, soil mechanics design, pavements and related items.

4.2 **Requirements:** Geotechnical design requirements shall include preparation of geotechnical specifications; compaction requirements and procedures for filling the borrow pit area, pavement and sidewalk joint layout, pavement and sidewalk plans, sections and details; and all foundation design, foundation notes as necessary, and drawings required for the project. The contractor shall prepare a Foundation Design Analysis (FDA) including a narrative, data presentation and calculations. The FDA shall be prepared as an individual document to be included as an attachment to the design submissions. Contractor shall submit all design calculations, including references and assumptions, to Contracting Officer's Representative (COR) for review.

4.2.1 See section 6.7 (foundation design) for additional foundation requirements.

4.3 **Government Furnished Items:** The Government will provide the items listed below as part of this RFP. The contractor shall incorporate the Government furnished items into the design of the facility.

4.3.1 Subsurface Investigation Boring Plan and Logs: See Appendix D. (This information is provided for informational purposes only to aid contractor in preparing their bid proposal). Contractor shall perform any additional investigation as they deem necessary to properly complete the required design.

4.4 **References:** The latest edition of the following technical criteria apply to the design, analysis and preparation of the geotechnical portions of this project. Additional criteria not specifically identified below shall also apply, if directly referenced in any of the listed documents.

4.4.1 Architectural and Engineering Instructions Manual, New York District, U.S. Army Corps of Engineers (NYD-AEIM).

4.4.2 AFM 88-6, Chapter 8, Standard Practice for Concrete Pavements.

4.4.3 AFM 88-7, Chapter 1, Pavement Design for Roads, Streets, Walks and Open Storage Areas.

4.4.4 EM 1110-2-1906, Engineering and Design, Laboratory Soils Testing.

4.4.5 EM 1110-2-1907, Engineering and Design, Soil Sampling.

4.4.6 New York State Department of Transportation, Standard Specifications, 1995, latest addenda.

4.4.7 See specification section 01010 section 6.7 foundation design for additional foundation requirements.

4.5 **Additional Geotechnical Explorations:** In the event there are changes in, or additions to the scope of the project (beyond the facility limits, parking, site improvements and demolition) which require further geotechnical investigation, the contractor shall be responsible for any additional

subsurface exploration, laboratory testing and geotechnical design and analysis. The contractor shall submit a proposed drilling, sampling and laboratory testing plan and associated costs to the Contracting Officer for review and approval. No payment will be made for any additional work that is not specifically approved by the CO. Drilling and sampling shall be in accordance with EM 1110-2-1907 "Soil Sampling", dated 31 March 1972. All laboratory testing of samples shall be at a Corps of Engineers approved laboratory testing facility and shall be performed in accordance with EM 1110-2-1906 "Laboratory Soils Testing", dated 30 November 1970. A list of Corps of Engineers approved laboratory testing facilities will be made available upon request. The contractor shall be responsible for all applicable clearances and permits and for the protection of all underground utilities from damage during field investigations. Utility clearances and digging permits are required prior to drilling on-base. On-post clearances and permits shall be coordinated through the Contracting Officer.

The contractor shall prepare a Foundation Design Analysis (FDA) including a narrative, data presentation and calculations. The FDA shall be prepared as an individual document to be included as an attachment to the design submissions. The FDA shall be provided to the Contracting Officer for review and approval. Receipt by the Government of the aforementioned submittals shall not release the Contractor from responsibility for an adequate design. Any geotechnical design and analysis performed in conjunction with additional geotechnical explorations shall be based on the technical criteria and references listed above (as applicable). All findings from such geotechnical explorations, testing, design and analysis shall be reported in the FDA.

4.6 Minimum recommendation for filling and compacting the borrow pit:

4.6.1 It is recommended that areas on which fill is to be placed be scarified and densified prior to fill placement as a minimum. If the surface soils are sandy and dry, addition of light amounts of water (plus or minus 2 percent of the optimum moisture content) should facilitate compaction. As a minimum, the compacted fill be constructed by spreading acceptable soil in loose layers not more than 200 millimeters thick (150 millimeters thick for pavement sections). The soils used within the proposed building areas, around structures, in pavement areas, or for replacement in any undercut areas should be compacted in thin lifts to at least 92 percent of the Modified Proctor maximum dry density (ASTM D 1557). The upper 300 millimeters of fill beneath foundations, grade slabs and pavements should be compacted to 95 percent of the Modified Proctor maximum dry density.

4.6.2 The moisture content of the fill soils should be maintained within plus or minus 2 percent of the optimum moisture content determined from the Modified Proctor density tests. Soils used in compacted fills should also be free of debris and fibrous organic material. They should have a liquid limit less than 40 and a plasticity index less than 15. Particles larger than 100 mm in diameter should not be included in the compacted fill.

4.6.3 Contractor is required to proof roll existing soil to detect and correct unsuitable soils as recommended by the contractor's geotechnical consultant, following stripping and leveling operations and prior to placing new fill material.

4.6.4 The contractor's geotechnical engineer must address the following:

4.6.5 Evaluation of bearing capacity and/or differential settlement potential must be considered for all structures located and/or differential settlement potential must be considered for all structures located over the borrow pit hole. The design must be sufficient to preclude any unacceptable settlement.

SECTION 5.0 - ARCHITECTURAL DESIGN

5.1 **DESIGN GOALS.** Overall architectural goals for the UEPH Complex at WSAAF are to provide a functional, visually appealing campus of facilities that is a source of pride for residents, other facility users, and the installation.

5.1.1 **Exterior Design Objectives.** Design buildings to enhance the visual environment of the installation. Exterior materials, roof forms, and detailing shall be compatible with the immediate local context. Use durable, low-maintenance materials. Configure building massing and use exterior elements such as colonnades, porticos, entry porches, and material detailing to provide human scale.

5.1.2 **Interior Design Objectives.** Arrange spaces in an efficient, functional manner. Provide simple circulation schemes that allow easy wayfinding within buildings. Use durable materials and furnishings that can be easily maintained and replaced. Maximize use of daylighting and operable windows. Use interior surfaces that are easy to clean and light in color; avoid trendy or bright color schemes. Design UEPH interiors with a residential ambience. To the extent possible, design interiors that residents can personalize (for example, arrange living units to allow more than one furniture placement scheme; provide telephone/data jacks on multiple walls to allow optional locations for the desk). Structure interior spaces to allow maximum flexibility for future modifications; companies and battalions often change size or mission, requiring reconfiguration of facilities.

5.1.3 **Material and Product Selection Criteria**. Materials shall meet the requirements of the Section 01010. The Section 01010 includes a range of specificity: some material requirements are specific (no option); other material requirements allow a range of options. The Section 01010 requirements establish a minimum quality level. Higher quality materials will be judged more favorably. The offeror's proposal shall identify the quality level of all major materials to be provided.

5.2 **Applicable Technical Criteria and Standards:** Design and installation shall conform to the latest editions of the referenced listed below, unless otherwise indicated herein.

5.2.1 New York State Energy Code
5.2.2 International Building Code (IBC)
5.2.3 UFC 3-600-01
5.2.4 TI-800-01, 20 July 1998, Design Criteria for Unaccompanied Enlisted Personnel Housing (UEPH), Appendix B
5.2.5 DD1391- latest edition for Barracks Complex WSAAF
5.2.6 ETL 1110-3-491, Sustainable Design for Military Facilities
5.2.7 Federal Standard 795 for All ADA Issues
5.2.8 NFPA 101, Life Safety Code
5.2.9 Uniform Federal Accessibility Standards
5.2.10 Glass Manufacturer Standards
5.2.11 Americans with Disabilities Act Accessibility Guidelines
5.2.12 UL Fire Resistance Directory
5.2.13 NFPA 80, Standard for Fire Doors and Fire Windows
5.2.14 Steel Door Institute, ANSI / SDI-100
5.2.15 American Architectural Manufacturer's Association, AAMA 101-93

5.2.16 Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program, AWI
5.2.17 Handbook for Ceramic Tile Installation, Tile Council of America
5.2.18 ETL 1110-9-12 (FR), Engineering and Design, Standing Seam Roof Systems
5.2.19 Technical Manuals:
5.2.19.1 TM-5-805-6 Caulking and Sealants
5.2.19.2 TM-5-805-8 Builders Hardware
5.2.19.3 TM-5-812-2 Firestopping
5.2.20 AFM 885-3 Paints and Protective Coatings
5.2.21 AFP 88-40 Signage
5.2.22 ASTM E413-87 "Standard Classification for Rating Sound Insulation"
5.2.23 TI-810-91 "Indoor Radon Prevention and Mitigation"
5.2.24 UL/ULC-UL10C Positive Pressure Requirements for Fire Doors
5.2.25 OSHA Safety Standard for Design of Ladders

5.3 **Code Review and Fire Safety:** Refer to Life Safety Plans included in drawings and Code Analysis attached as Appendix B

5.4 **Color Schedules:** Exterior colors shall comply with the current Exterior Colors Matrix (See Appendix A.). Provide color boards to the Contracting Office's Representative and Fort Drum. Color boards must show samples of materials to be incorporated into the project, in the proposed color. Provide two color boards for each interior and exterior color(s)/product(s) for Government review and approval.

5.5 **Accessibility Requirements:** All areas and facilities required to be accessible to physically disabled persons shall conform to the Uniform Federal Accessibility Standards (UFAS) Federal Standard 795, and to the extent greater accessibility is required in the Americans With Disabilities Act Accessibility Guidelines (ADAAG). The following areas shall be accessible:

5.5.1 Areas that may be used by non-military employees or visitors including the Battalion Headquarters, Brigade Headquarters, Troop Aid Station, Dining Facility, and the first floor of the UEPH Commons Areas.
5.5.2 Minimum of one accessible pedestrian route linking handicap accessible parking areas with accessible building entrances.

5.6 **Concrete:** Exposed concrete is not permitted for major exterior architectural elements except as noted for concrete floors. Building foundations and other structural elements of concrete shall be concealed through the use of stepped brick ledges, grading, etc. All minor wall concrete elements shall be sandblasted to produce a unified, matching color, texture and overall appearance. Any exterior finished architectural concrete shall be sealed against water using a clear, non-sheen, impregnating sealer.

5.6.1 A 50 mm concrete topping shall be installed over all precast concrete plank.
5.6.2 All finish floors shall be level with tolerance of 3mm from finish floor elevation in 3050mm. This variation, if it occurs, cannot be abrupt, but must taper so that 3mm variation occurs, over not less than 1200mm.
5.6.3 All interior concrete surfaces shall receive a steel trowel finish. After all bleed water has evaporated from the surface, float to finish floor level, and steel trowel. After concrete has set sufficiently to carry the workmen's weight, burnish with as many trowellings as necessary to leave a dense, level, ringing hard finish free of trowel

marks, drag marks, stipple or orange peel. After curing period recommended by manufacturer, mix and apply a minimum of two coat applications of Concrete Floor Hardener in strict accordance with manufacturer's instructions.

5.6.4 All exterior concrete surfaces shall receive a broom finish. After all bleed water has evaporated from surface, float to finish level and broom finish in direction perpendicular to traffic.

5.7 **Masonry:**

5.7.1 The exterior of the buildings shall be brick. Coursing, color, accents, lintels and other exterior architectural features shall be in compliance with the Exterior Colors Matrix (see Appendix A) and consistent with neighboring buildings. Exterior elevations and details shall, at a minimum, comply with the drawings and details supplied with this RFP. All colors are subject to the approval of Fort Drum. Brick shall not extend below grade. Tool all joints in brick and CMU. Submit brick samples and construct a sample wall for review and approval by the Contracting Office's Representative. Samples must be representative of the product and color range to be incorporated into the project.

5.7.2 All walls within occupied spaces of barracks shall be concrete masonry unit. Refer to Section 6 for further information.

5.7.3 Split face CMU veneer at the exterior wall shall be cast with an integral waterproofing agent.

5.7.4 Outside corners of interior CMU walls shall have bull nose radius corners.

5.7.5 Provide flashings at all openings, transitions, etc., in accordance with the Technical Notes on Brick Construction, as prepared by the Brick Industry Association. This shall include but is not limited to: window heads, sills and jambs; louver heads, sills and jambs; base flashing, door heads, sills and jambs, control joints, lintels and material transitions.

5.7.6 Provide eye and pintle type adjustable hot dipped galvanized wall anchors. Design anchors for seismic reactions when required by structural requirements of this section.

5.7.7 Provide mortar net above base flashings in all wall cavities to catch and permanently suspend mortar droppings in masonry cavity walls above the level of the flashing and weeps, so blockage of weep hole vents can't occur. Mortar net shall be manufactured of high-density polyethylene (HDPE) or nylon strands woven into a 90% open mesh. It must not react with common building products, including PVC, polystyrenes, copper, rubberized asphalt, lead, stainless steel or galvanized metal. It must not absorb or trap moisture, not support mold or fungus, and be inedible by insects. It must not degrade as a result of temperature variations and be designed to last for the life of the building.

5.7.8 Provide control joints on both sides of building corner at a maximum distance of 600mm from the corner. Remaining control joints and expansion joints shall be provided in accordance with the guidelines of the Brick Institute of America.

5.7.9 Precast concrete accents shall include all anchoring devices to anchor units to backup material and lintel angles. Precast accents shall be fabricated to produce a smooth, uniform color and finish. Submit samples to the Contracting Office's Representative and Fort Drum.

5.8 **Miscellaneous Metal:**

5.8.1 Access ladders with cage enclosures shall be provided in the mechanical room of barracks. Ladder shall extend from the third floor mechanical room to the mechanical penthouse. Ladder at the DFAC shall extend from loading dock area to crawl space

floor. These must be of welded steel, designed and fabricated to meet OSHA safety standards.

5.8.2 Brick lintels over windows, louvers, and doors shall be painted loose steel lintels. Steel lintels shall be sandblasted to SP-10 and painted with 2 coats two-part epoxy paint. Each coat shall be 6-8 mils DFT. Color to match window frames. CMU wall lintels shall be bond beams.

5.8.3 Railings shall be fabricated of 40 mm standard weight steel pipe with prefabricated ells welded into all intersections. Railings shall conform to NFPA 101

5.9 **Exterior Design:**

5.9.1 Exterior Soffits and Fascias:

5.9.1.1 Shall be low/no maintenance.

5.9.1.2 Provide continuous ventilation.

5.9.1.3 Shall be screened and sealed to resist insect intrusion.

5.9.1.4 Shall be pre-finished aluminum or steel to match the standing seam metal roof. Select from painted or anodized finishes per the attached color matrix (see Appendix A).

5.9.1.5 Soffits shall be securely attached to prevent uplift.

5.9.1.6 Soffits shall extend 1000 mm past the brick of the exterior wall.

5.9.1.7 Soffits at canopies and building entrances shall be architectural linear metal, pre-finished anodized or painted aluminum or steel to match the roof.

5.9.1.8 Exterior walkways accessing building entrances are required to be covered with canopies to protect pedestrians from snow and ice sliding off the sloped roof. Mechanical room exterior doors and exit only doors not occurring in gable end walls require canopies sized to protect the door and immediate area from sliding snow and ice on roof. Canopies must be secured to building structural elements, with support brackets as required.

5.9.1.9 Utility connections to building (including but not limited to gas meters, electric meters, regulators, etc.) shall be protected from sliding snow and ice by soffits and/or canopies.

5.9.2 Standing Seam Metal Roof: An architectural, UL 90 standing seam roof assembly that conforms to ETL (Engineering Technical Letter) 1110-9-12 shall be provided for the roof area of all buildings except low sloping roof areas as shown on Drawings. Contractor shall provide ventilation in accordance with specifications in 5.11.1 of Section 01010.

5.9.2.1 Standing seams shall be a minimum of 40 mm high. Seams shall be 400 mm to 600 mm O.C. Roofing shall be fabricated from a minimum of 22 gauge G-90 galvanized steel or .040” aluminum.

5.9.2.2 Roof deck assembly shall be FM Class I, or UL listed as Fire Classified.

5.9.2.3 Fastening systems shall be completely concealed.

5.9.2.4 Color shall be factory applied fluoropolymer-polyvinylidene fluoride (PVDF), painted finish (equivalent to Kynar 500) on galvanized steel systems, or anodized for aluminum systems, per Appendix A.

5.9.2.5 Roof system shall be installed over a full underlayment of self-sealing membrane, venting composite insulated roofing panel, and corrugated steel decking on the roof structure. Areas noted as "Warm Duct Space" on plans shall be considered interior space, within the thermal envelope of the building.

a Self-sealing membrane shall be cold applied, self adhering. It shall consist of a high strength polyethylene film coated on one side with a layer of rubberized asphalt adhesive. Membrane shall be UL Class A, minimum 40 mils thick, with an elongation of 250% when tested in accordance with ASTM D412.

b Venting composite insulated roofing panel shall be comprised of 25mm polyisocyanurate insulation board, minimum of 50mm air space (min. 85% free area), 19mm CDX plywood.

c Corrugated steel decking shall be designed in accordance with the roof loading and framing spacing.

5.9.2.6 No mechanical equipment is permitted on top of the metal roof. Penetrations for plumbing vents, etc, are to be kept to a minimum. Whenever possible, gable end walls shall be utilized in lieu of roof penetrations. Any roof penetrations shall be within 1500 mm of the ridge and securely anchored to the structure in at least two locations before penetrating the roof.

5.9.2.7 Roof pitch shall be 4:12. Minimum heel height of roof trusses at the exterior bearing walls shall be 400 mm to ensure adequate airflow from the soffit into the attic space. Heel heights shall be increased to provide a minimum of 150 mm free space above the specified insulation, without the use of foam baffles or compacting the insulation at the perimeter.

5.9.2.8 Provide roof expansion joints to allow movement related to thermal expansion.

5.9.2.9 Fire Retardant treated plywood shall not be a part of the roof assembly.

5.9.2.10 Roof Warranty: Furnish a twenty (20) year weather tightness warranty, with a notarized signature of an authorized representative of the firm. During the extended warranty period, all covered material that fails shall be repaired at no cost, parts or labor, to the Government. Repairs to be made within 24 hours of notice. In addition, the manufacturer shall furnish a twenty (20) year warranty on the paint finish covering chalking, cracking, checking, chipping, blistering, peeling, flaking, and fading. The warranties shall have no dollar limit or prorating. The period of the warranties shall commence upon completion and acceptance of the work involved as determined by the Contracting Officer.

5.9.2.11 Exterior Canopy Support Brackets: Brackets shall be High-density polymer cast around steel pipe. Polymer shall be fire rated Class I material.

5.9.3 Low Sloping Roof:

5.9.3.1 Roof shall have a minimum slope of 6.5mm per 300mm. Walkway pads are required to preclude having to walk directly on the roof membrane for rooftop access and maintenance. A minimum of two inspections by manufacturers representative during roof installation are required.

5.9.3.2 Warranty: Contractor shall provide a weathertightness warranty is required for the low slope roof in addition to the manufacturers warranty. Both the

manufacturers and the weathertightness warranties shall be the same in it's scope, terms, period, and bonding requirement as the Contractor's warranties for the standing seam metal roof but shall apply to the low slope roof material. In addition to those terms it should also cover exposure to anticipated equipment exhaust and anticipated foot traffic.

5.9.3.3 No mechanical equipment shall be placed on the roof without prior approval from the Contracting Officer.

5.9.3.4 Secured access to low-slope roof shall be provided

5.9.3.5 Low slope roof at Dining Facility shall be resistant to kitchen grease, animal fats and exhaust.

5.9.4 Wall Louvers:

5.9.4.1 Weather resistant drainable type, of extruded aluminum, with insect and bird screens.

5.9.4.2 Made to withstand wind loads as described in Section 6.

5.9.4.3 Shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500 and AMCA 511. The ratings shall show a water penetration of less than .06kg/square meter.

5.9.4.4 Louver size shall be coordinated with requirements of Mechanical design. Louvers shall be provided and sized to accommodate removal and replacement of equipment.

5.10 **Interior Design:**

5.10.1 Interior finishes for exits shall be Class A only. Class A materials shall have a flame spread rating less than 25, and smoke developed rating less than 50.

5.10.2 All exposed structural, ductwork, piping, conduit, etc., shall be painted.

5.10.3 Floor finishes shall be as described in the Room-by-Room Requirements, consisting of:

5.10.3.1 Ceramic Porcelain Tile: As a minimum, ceramic tile shall be frost resistant, have a water absorption of 0.004%, and abrasive wear index of 234, a breaking strength of 365kg (800 pounds), and a coefficient of friction of 0.6. Provide slip resistant tile where appropriate. Ceramic tile in toilet rooms and bathrooms shall be installed in a thin set installation in accordance with the TCA handbook. Where framed walls are permitted and scheduled for ceramic wall tile, install tile over cement board over stud framing in accordance with the TCA handbook.

5.10.3.2 Quarry Tile: As a minimum, quarry tile shall have moisture absorption of 0.9%-3.0%, a breaking strength of 163-222 kg, a coefficient of friction of 0.7-0.9. Provide slip resistant tile where appropriate. Where a floor drain exists, quarry tile shall be in a setting bed in conformance with the TCA Handbook for Ceramic Tile Installation.

5.10.3.3 Grout: Epoxy type. Select a complimentary grout color to coordinate with the tile color. Obtain Contracting Officer's approval for grout color.

5.10.3.4 Concrete Sealer: Place sealer on exposed concrete floors, including mechanical room, janitor's closets and electrical rooms. Seal with a transparent, sprayable acrylic-based polymer solution that cures, seals, and dustproofs freshly placed concrete in a single operation. Sealer must comply with ASTM C 309.

5.10.3.5 Vinyl Composition Tile (VCT): 300 mm x 300 mm x 3 mm thick type tile. Federal Specification: FS SS-T-312 Type IV. Seal and wax all vinyl composition tile prior to substantial completion. Use 2 coats sealer and 2 coats wax in accordance with tile manufacturer's instructions.

5.10.3.6 Stair Treads and Landings: Landings shall be finished with VCT. Stairs shall be constructed of concrete filled metal pans, with closed risers. Treads shall include a full-depth type 6063-T5 extruded aluminum casting to accept a replaceable abrasive insert. Abrasive filler shall contain not less than 65% virgin grain aluminum oxide, silicon carbide, or a combination of both, set in an epoxy-resin binder. Abrasive filler strips shall project 1.5 mm above adjacent extruded aluminum frame. Apply clear lacquer to concealed bottoms, sides and edges of aluminum frames secured to concrete. Aluminum frames shall be surface applied, not cast into, the concrete steps. Use stainless steel fasteners. Nosings shall be non-combustible.

5.10.3.7 Entryway Grille System: Provide an interior slab recess to accept a recessed, drainable permanent entryway mat/snowgrate system at all building entrances. Provide a floor drain under mat at building entrances. Aluminum frame system with abrasive insert. Frame set in grout leveling bed within slab depression. Flammability in accordance with ASTM E648, Class I, Critical Radiant Flux, minimum 0.45 watts/m2. Slip resistance in accordance with ASTM D-2047-96, Coefficient of Friction, minimum .060 for accessible routes. Rolling load performance of minimum 500#/wheel.

a Frame of mill finish extruded 6105-T5-aluminum alloy tread rails joined mechanically by extruded 6061-T6 aluminum alloy key lock bars. (Welding or bolting shall not be permitted.) These assemblies receive 6.4 mm thick heavy gauge support cushions 25.4 mm long mounted to each continuous foot at 0.5 m on center. Latex leveling screed by installer to ensure level base.

b Abrasive Insert shall include a flexible abrasive grit tape, bonded to a rigid aluminum tread insert. Tread insert shall be supplied in standard mill finish.

5.10.3.8 Epoxy Floor Paint Systems: 2-coat system comprised of an epoxy primer and heavy-duty non-skid epoxy coating. Epoxy primer shall be a low viscosity, 100 percent solids, high build, and fast cure epoxy primer. The heavy duty non-skid epoxy top coat shall be a catalyzed epoxy, non-skid coating with chemical resistance to acids, alkalis, solvents, fuels, etc.

5.10.4 Wall Finishes:

5.10.4.1 The government desires low / no maintenance finishes to the greatest extent possible. Walls shall be finished with paint, unless noted otherwise in the Room-by-Room Requirements, Section 11.0 through 17.0 of Section 01010.

5.10.4.2 Paint: Paint concrete masonry with a minimum of 2 coats high quality block filler primer and 2-finish coats eggshell latex paint. Paints shall meet or exceed the VOC and chemical composition limits of Green Seal

requirements. Paint exterior walls with a vapor retarding, low perm paint between the block filler and finish latex paint.

5.10.4.3 Wall Base: 100 mm high rubber meeting FS SS-W-40, Type 1 rubber; top set coved, 3 mm thick, with premolded end stops and external corners. Use ceramic or quarry tile in areas with tiled floors.

5.10.5 Ceiling Finishes:

5.10.5.1 Suspended Acoustic Ceiling Tile (SACT): SACT shall be 600 mm x 600 mm x 20 mm thick regular ceiling tile. In wet/humid areas SACT shall vinyl faced tile to provide moisture resistance, washability, and resistance to mold and mildew growth. Wet humid areas include kitchen, serving lines, toilet rooms, food storage areas, pot and pan wash areas, field feeding and preparation areas, and locker rooms.

5.10.5.2 Gypsum Board: All gypsum ceilings shall have a smooth texture. Where gypsum board is used for ceilings and walls in bathrooms, toilet rooms, kitchens, servery, warewash and other wet spaces, gypsum board shall be minimum 15 mm thick, moisture resistant type. Finish all gypsum board surfaces to Level 5 finish, as defined by GA-214-90, Levels of Gypsum Board Finish. Paint gypsum board ceiling surfaces with one coat primer and 2 coats latex paint.

5.10.5.3 Ceiling Heights: Minimum ceiling height is 2450 mm unless noted otherwise in Sections 11 through 17 of 01010. Higher ceilings are appropriate in larger spaces.

5.10.5.4 Painted Exposed Concrete Plank: Seal joints with flexible, paintable sealant. Paint with a minimum of 2 coats high quality block filler primer and 2 finish coats eggshell latex paint. Paints shall meet or exceed the VOC and chemical composition limits of Green Seal requirements. At Barracks paint second and third floor ceilings (concrete planks) with a vapor retarding, low perm paint between the block filler and finish latex paint.

5.10.6 Corner Guards and Wall Guards:

5.10.6.1 All exposed corners of gypsum board partitions shall be protected with surface mounted guards consisting of continuous aluminum retainer with snap-on vinyl/acrylic corner guard cover.

5.10.6.2 All exposed corners of glazed structural unit and concrete masonry unit partitions and columns subject to damage from portable food service equipment will be provided with stainless steel guards with 304 finish.

5.10.6.3 All corner guards shall extend from finished floor to a height of 2400mm above finished floor.

5.10.6.4 Provide vinyl/acrylic or stainless steel wall guards on all walls in areas with portable food service equipment, serving lines, dining room areas and all other areas specified in Sections 11 through 17 of the Section 01010. Vinyl/Acrylic wall guards shall be surface mounted assembly consisting of a continuous extruded aluminum retainer with snap-on cover and integral shock absorbing cushions where indicated. Wall guards shall be mounted at height appropriate to prevent damage from equipment, seating, etc.

5.10.7 Casework:

5.10.7.1 Service Areas in Living Units and Coffee/Break Areas. Provide manufactured unitized kitchen; or provide architectural cabinets complying with AWI Quality Standards, Section 400, Custom Grade cabinets with high-pressure decorative laminate finish, meeting NEMA LD3 standards. Horizontal laminate: nominal 1.25 mm thick; vertical laminate: nominal 0.7 mm thick. Door and drawer edges shall be heavy-duty 3mm extruded polyvinyl chloride with self-locking serrated tongue. Countertop shall be post-formed high-pressure decorative laminate with waterfall front edge and integral coved backsplash, or solid surfacing material with integral matching backsplash. Where end of countertop abuts wall, provide end splash of material and thickness to match backsplash.

5.10.7.2 Bathroom Vanity in Living Units. Provide architectural cabinets complying with AWI Quality Standards, Section 400, Custom Grade cabinets with high-pressure decorative laminate finish, meeting NEMA LD3 standards. Horizontal laminate nominal 1.25 mm thick; vertical laminate nominal 0.7 mm thick. Door and drawer edges shall be heavy-duty 3 mm extruded polyvinyl chloride with self-locking serrated tongue. Vanity countertop shall be solid surfacing material of 13 mm minimum thickness, or cast-filled acrylic with integral lavatory bowl, with integral matching backsplash. Where end of countertop abuts wall, provide end splash of material and thickness to match backsplash.

5.10.7.3 CQ Station, Reception Desk and Duty Officer. Provide architectural casework complying with AWI Quality Standards, Section 400, Custom Grade cabinets with high-pressure decorative laminate finish meeting NEMA LD3 standards. Horizontal laminate: nominal 1.25 mm thick; vertical laminate: nominal 0.7 mm thick. Door and drawer edges shall be heavy-duty 3mm extruded polyvinyl chloride with self-locking serrated tongue. Work surfaces and counter shall be high-pressure decorative laminate, or solid surfacing material. Desks shall be built in, with scheduled power, phone, data, and cable TV jacks. Desk shall consist of a 300 mm deep transaction top at 1100 mm above finished floor (AFF) and a 600 mm deep work surface at 750 mm AFF. Provide 2 heavy-duty steel file cabinets below the work surface for storage and countertop support. Provide additional work surface support brackets as required

5.10.7.4 Vanity at Public Toilets. Provide architectural casework complying with AWI Section 400, Custom Grade cabinets with high-pressure decorative laminate finish meeting NEMA LD3 standards. Horizontal laminate nominal 1.25 mm thick; vertical laminate: nominal 0.7 mm thick. Provide enclosed wall-hung vanity cabinet with countertop, or wall-hung countertop with apron. Exposed piping at accessible lavatories shall be insulated in conformance with ADA/UFAS. Countertop shall be post-formed high-pressure decorative laminate with waterfall front edge and integral coved backsplash, or solid surfacing material, with integral matching backsplash. Where end of countertop abuts wall, provide end splash of material and thickness to match backsplash.

5.10.7.5 Other casework. Provide architectural casework complying with AWI Section 400, Custom Grade cabinets with high-pressure decorative laminate finish meeting NEMA LD3 standards. Horizontal laminate: nominal 1.25

mm thick; vertical laminate: nominal 0.7 mm thick. Door and drawer edges shall be heavy-duty 3 mm extruded polyvinyl chloride with self-locking serrated tongue. Work surfaces and counter shall be high-pressure decorative laminate, or solid surfacing material. Where end of countertop abuts wall, provide back splash and end splash.

5.10.8 TA-50 Lockers:

5.10.8.1 Lockers shall be single tier woven wire mesh. Doors shall be framed with hot rolled angle and pre-hung at factory. Top, bottom, sides, and back panels shall be framed on all four sides with hot rolled angles. All frames, dividers, and angle stiffeners shall be punched with slotted holes for anchoring and assembly. Woven wire mesh shall be securely welded to all frames. Lockers shall be factory finished.

5.10.9 Wood:

5.10.9.1 The use of wood shall be limited to cabinetry or millwork plastic laminate mounting panels and unexposed fire retardant treated nailers, roof curb blocking shims, or backing for flashing. Wood paneling wall finishes or exterior wood treatments are not permitted.

5.11 **Insulation:**

5.11.1 Cold Roof Design: The attic space shall be adequately ventilated and insulated so as to thermally isolate the roof surface from the heated interior space. Contractor shall provide ventilation in attics of all buildings in accordance with guidelines in Appendix H of Section 01010 so as to avoid problematic icings at their eaves. No heating units or ductwork are permitted in the cold attic space. Any ductwork required to run above the ceiling of the upper floor of any structure shall do so within the thermal envelope. Attic trusses or equivalent framing shall be incorporated as required to maintain at least a 150-mm roof-ventilation airway from the eaves through the cold attic spaces and out through the ridge vent.

5.11.2 Thermal Insulation: (R values are shown in metric (Sq. Meters x Celsius Temp/Watts). Corresponding English Value (Sq. Feet x Fahrenheit Temp/BTUH) may be determined by multiplying by 5.68). Where applicable Thermal values shall comply with LTTR (Long Term Thermal Values).

5.11.2.1 Insulation shall be UL listed as having a flame spread rating less than 75, and a smoke developed rating less than 150, except as allowed by the UFC 3-600-01.

5.11.2.2 Minimum 50 mm rigid insulation shall be provided at all foundation walls of heated spaces. Extend from top of footing to underside of slab and 600 mm under slab perimeter.

5.11.2.3 Minimum R3.52 insulation shall be provided at all exterior walls. Required insulation values shall be achieved through a continuous foil faced polyisocyanurate rigid insulation board in the cavity between the brick and back-up wall.

5.11.2.4 At cold attic locations a minimum R8.45 insulation shall be provided between the heated space and the ventilated attic. At the Barracks, required insulation values shall be achieved through minimum of 100 mm extruded polystyrene rigid insulation board placed directly on top of the concrete plank separating the third floor from the attic covered by unfaced fiberglass batt insulation at the bottom chord of the roof truss or framing.

5.11.2.5 At low sloping roof locations a minimum R7.04 shall be provided.

5.11.2.6 No loose or granular fill insulation is permitted.

5.11.2.7 No insulation shall be placed directly on acoustical ceiling tiles.

5.11.3 Acoustical Insulation:

5.11.3.1 Ceiling tiles shall have an NRC of .60 or better.

5.11.3.2 See Sections 11 through 17 of 01010, Room by Room Requirements, for STC ratings required between spaces.

5.11.3.3 Extend sound attenuated construction to underside of structure.

5.11.4 Vapor Barriers:

5.11.4.1 A vapor barrier shall be provided on the warm side of all surfaces separating heated from non-heated spaces. Vapor barriers may be closed cell foam, poly sheets or vapor retardant paint. Seal all cuts, breaks, joints and holes in the vapor barrier with a compatible low perm vapor retarding tape or sealant.

5.11.4.2 Vapor retarding paint shall be applied in two coats, each 4 mils wet film thickness, to achieve a 1 perm vapor barrier rating.

5.11.4.3 At warm duct space, provide a 6 mil poly vapor barrier on the warm side of the walls and ceiling.

5.12 **Doors and Hardware:**

5.12.1 Exterior Doors:

5.12.1.1 Main Entrance Doors. Utilize Fiber Reinforced Plastic (FRP) doors at exterior locations subject to weather exposure, including the stair exit doors, mudroom, building entrances, interior vestibule doors, and Mechanical room doors. Install FRP doors in aluminum frames. Exterior doors shall be flush, insulated, smooth skin, 44 mm thick

a Doors: Door panels shall be constructed of 150mm mainframe tube with insulating core. Doors shall be of thermally broken. Door panels shall not rely on the core for primary strength. Wide stiles shall consist of 150mm tube with 4.7 mm wall thickness and 6mm hinge sidewall thickness. Sub frames composed of smaller tube sections bolted together to meet the minimum 150 mm requirement are not acceptable. Edge trim shall be completely repairable. Joints between main framing members shall be bolted with 9.5 mm tie rods and welded. Polystyrene core shall be CFC and HCFC free. Doors shall include heavy steel reinforcing for door hardware, and include standard 10-year warranty with 25-year coverage against structural

failure of the main frame of the door and delaminating of the face sheets from the core. The doors at the stair exits and mudroom shall include 125 mm x 500 mm vision lites. Mechanical room doors shall be provided without vision lites. FRP doors in aluminum frames shall be provided at the two entry vestibule locations intended for occupant access to the building. Both sets of doors within each vestibule shall be identical, with wide stiles, wide intermediate rail, fully glazed top half, total ¾ of the door glazed. Door stiles and framing constructed of extruded aluminum 6063- T6.

b Aluminum Frames for FRP Doors: Extra heavy duty Series, wall thickness of 4.7 mm frame depth of 150 mm, face dimension of 38 mm angle clip joint construction. Frames shall be of thermally broken.

c Door Glazing: Typical glazing shall consist of 25 mm insulated, bronze tinted, glazing panels (1 pane of 6.35 mm thick laminated glass and 1 pane of 6.35 mm thick tempered glass separated by a 13 mm spacer). The inboard lite shall be of laminated safety glass and the outboard lite shall be tempered safety glass. Laminated glass shall consist of two nominal 3 mm glass panes bonded together with a minimum of a 0.75 mm thick polyvinyl-butyral (PVB) clear fragment retention film.

d Doors shall be a minimum of 2100 mm high. All fasteners shall be of aluminum, stainless steel, or zinc plated steel, and concealed by the framing system. Door and trim moldings shall be extruded of 6063-T5 aluminum alloy and temper. (ASTM B221 alloy GS 10A-T5). Overall U-factor of doors=0.09 or better. Heavy-duty doors and hardware are required.

5.12.1.2 Exterior Non-entrance Doors. Exterior doors and frames opening to spaces other than corridors or lobbies shall be hollow metal; comply with ANSI A250.8/SDI 100. Doors and Frames shall be thermally broken. Doors shall be Level 3, physical performance Level A, Model 2; insulated; top edge closed flush. Frames shall be Level 3, 14 gauge, with continuously welded corners and seamless face joints. Doors and frames shall be constructed of hot dipped zinc coated steel sheet, complying with ASTM A653, Commercial Steel, Type B, minimum A40 coating weight; factory primed. Anchors and accessories shall be zinc coated. Frames in masonry shall have bituminous back-coating, plaster guards, and shall be grouted solid. Fire-rated openings shall comply with NFPA 80, and the requirements of the labeling authority. Hollow metal doors and frames shall be painted.

a All non-glazed and non-fire rated exterior door assemblies, excluding storefront assemblies, shall have a polyurethane core foamed in place or laminated to each outer panel, with a minimum compressive strength of 1.4 kg/cm^2 and a minimum density of 28.8 kg/cm^2.

b Doors shall be a minimum of 2100 mm high. All fasteners shall be of aluminum, stainless steel, or zinc plated steel, and concealed by the framing system. Door and trim moldings shall be extruded of 6063-T5 aluminum alloy and temper. (ASTM B221 alloy GS 10A-T5).

Overall U-factor of doors=0.09 or better. Heavy duty doors and hardware are required.

c Doors shall have painted, concrete filled steel bollards located on the hinge side of the door. The bollard shall be placed to prevent the door from opening in excess of 135 degrees from the closed position.

5.12.2 Interior Doors:

5.12.2.1 Interior doors at UEPH and administrative spaces shall be solid core wood doors in welded hollow metal frames. Interior doors at unoccupied areas (Mechanical, Electrical, Supply, Storage and COF storage and work areas) shall be minimum 16-gauge flush hollow metal doors in minimum 16-gauge hollow metal frames. Doors shall be 2100 mm in height.

5.12.2.2 Hollow metal doors and frames shall be painted in accordance with the interior color scheme. Grout all hollow metal frames solid.

5.12.2.3 Vision Lites: Stairwell doors and the doors to communal spaces shall have 100mm X 625mm vision panels. Glazing in fire rated doors shall be 5mm clear wire safety glass or other clear glazing material UL listed and approved. Non-rated doors shall be glazed with 5mm clear laminated safety glass.

5.12.2.4 Wood doors shall be of 5-ply construction, 44 mm thick, with a bonded structural composite lumber core, stiles, rails, and crossband. Veneers shall be suitable for transparent finish, complying with the Hardwood Plywood and Veneer Association's DFV-1, Voluntary Standard for Sliced Decorative Wood Face Veneer. Veneers shall be matched to avoid barberpoling. Determine species, slice and matching. Selections must be in accordance with the Interiors Color Matrix and receive the approval of the Contracting Officer. Matching edges and hardware blocking shall be provided. Doors shall be factory finished to industry standard TR-6. Installation shall be in accordance with Door and Hardware Institute standards.

5.12.2.5 Factory Finishing Requirements

a Prefinish all wood doors at factory.

b Prefinish all wood doors to AWI/WDMA Premium Finishing Systems per AWI Section 1500 and WDMA Section G-17.

c Finish doors using three coats of water-clear, 100 percent solids, Modified Acrylic Urethane, cured immediately with ultra-violet light.

d Prefinish system to meet or exceed the performance characteristics of AWI - "TR6" or equivalent WDMA System.

e Factory seal all doors on all 6 sides using Manufacturer's Standard meeting these specifications.

5.12.3 Operable Partitions: Provide operable wall to divide classroom down the middle. Operable wall and partition above extending to underside of roof deck shall provide minimum STC 50. Provide pocket walls for recessed storage.

5.12.4 Hardware: Door hardware and security requirements must be coordinated with the functional requirements and the electrical security/ fire alarm system requirements of this RFP. Provide all hardware to meet the NFPA 101 Life Safety Code, International Building Code and UFC 3-600-01.

5.12.4.1 Hardware Finish: Standard finish for all Base hardware is Dull Chrome Builders Hardware Manufacturer's Association A156.18.

a	Steel Base Metal	BHMA 639
b	Brass Base Metal	BHMA 626
c	Stainless Steel Base Metal	BHMA 630

5.12.4.2 Coordinate keying requirements with Fort Drum and the Contracting Office.

5.12.4.3 Door Hinges: Entrance vestibule and stair exit doors shall have tamper proof continuous geared hinges. Interior hinges shall comply with ANSI A156.1 Series A8111; doors shall have a minimum of 1½ pair of Heavy Duty Butt Hinges. Exterior hinges shall comply with ANSI A156.1 Series A5111; doors shall have a minimum of 1½ pair of Heavy Duty Butt Hinges. All out swing doors with keyed locksets shall have NRP non-removable pins. This includes all interior and exterior door hinges. Minimum Size shall be 100mm x 100mm.

5.12.4.4 Security Mechanical Locks: Shall comply with ANSI A156.13 Series 1000 Security Grade 1 Dead Bolt Lock F18.

5.12.4.5 Locksets and Latchsets: Shall comply with ANSI A156.13 Series 1000 Security Grade 1, and meet Accessibility Code A117.1, NFPA 101 Fire Safety, NFPA 80 Life Safety and ULC-UL10C Positive Pressure. Mortise locksets to have escutcheon trim with lever handles that are ADA compliant. The locks shall be supplied with Best Mortise Cylinders to continue the Base Master Key System. The existing Fort Drum system is equal to Schlage Heavy Duty Commercial Lever Type with removable, 7 pin, Type L keyway, interchangeable core locks to be compatible with existing Fort Drum "Best" manufactured locks. Building entrance doors shall be keyed alike.

5.12.4.6 Panic Devices: Shall comply with ANSI A156.3 Type 1, Type 2, Grade 1, Accessibility Code A117.1, NFPA 101 Fire Safety, NFPA 80 Life Safety and ULC-ULC10C Positive Pressure. Panics to have lever trim handles that are ADA compliant. The panics shall be supplied with Best Cylinders to continue the Base Master Key System. Provide Fort Drum standard panic hardware with cylinder lock at all building entrances. Provide as required by codes.

5.12.4.7 Door Closers: Shall comply with ANSI A156.4, Grade 1, Accessibility Code A117.1, NFPA 101 Fire Safety, NFPA 80 Life Safety and ULC-ULC10C Positive Pressure. Closers to be multi-sized with metal cover, hex Nut & Bolts, separate adjusting valves. Provide for all exterior doors, all entry doors to living units, all doors opening to corridors and as required by codes. At exterior doors to lobbies, corridors, mechanical rooms, janitors closets, and COF supply areas provide overhead holders or closers with hold-open capability. Provide for all entry doors to living units, all doors opening to corridors and as required by codes.

5.12.4.8 Kick Plate: Shall comply with ANSI A156.6 J102. Kick Plates shall be 4BE x .050 Wood screws for wood doors. Machine screws for Hollow Metal Doors. Provide at all doors with closers.

5.12.4.9 Auxiliary Hardware. ANSI/BHMA A156.16. Provide wall or floor stops for all doors that do not have overhead holder/stops. Provide other hardware as necessary for a complete installation.

5.12.4.10 Thresholds, Weather Stripping, Astragals, Sweeps: Shall comply with ANSI A156.21- 1994. Provide at all exterior doors.

5.12.4.11 Electric Wall Magnetic Hold Open: Shall comply with ANSI 156.15 Mag Door Holders to be supplied with proper spacers to meet the conditions at each door.

5.12.5 Exterior Windows:

5.12.5.1 Windows shall be aluminum, impact resistant, heavy duty commercial grade. Frames shall be of thermally broken aluminum, and shall have a minimum performance rating of AW65 per AAMA 101. Window frames, mullions, and hardware must be designed to resist a static load of 7 kilopascals applied to the surface of the glazing. Frame and mullion deformations shall not exceed 1/160 of the unsupported member lengths. The glazing shall have a minimum bite of 25 mm for both structural glazed and non-structurally glazed window systems. Design frame connections to surrounding walls to resist a combined ultimate loading consisting of a tension force of 35 kN/m and a shear force of 13 kN/m. Design supporting elements and their connections based on their ultimate capacities. Window anchorage to the adjacent walls must be in accordance with the manufacturer's instructions to fully convey the window's maximum design loads to the wall. Locks on windows shall include sweep locks, auto head locks, and auto sill locks. Window manufacturer shall certify windows are in compliance with AAMA publication 902, "Voluntary Specification for Sash Balance", and design the operating system based on total sash weight and minimum operating force requirements. Windows at Barracks shall be double hung and windows at all other buildings shall be single hung. All sleeping rooms in the barracks shall have operable windows complying with egress requirements of applicable codes. Operable windows shall have locks; provide fiberglass or aluminum insect screens removable from the inside.

5.12.5.2 Finish shall be bronze anodized per Fort Drum Architectural Compatibility standards. The overall R value shall be minimum R2.25.

5.12.5.3 Glazing for all exterior windows shall be insulated, bronze tinted, glazing panels. The inboard lite shall be of Low E coated, laminated safety glass and the outboard lite shall be tempered safety glass. Laminated glass shall consist of two nominal 3 mm glass panes bonded together with a minimum of a 0.75 mm thick polyvinyl-butyral (PVB) clear fragment retention film.

5.12.5.4 All exterior windows shall have horizontal mini-blinds. The blinds shall have .008 gauge, one inch wide horizontal aluminum slats, supported by braided ladders. All hardware shall be enclosed in a metal head. All operating hardware shall be machine clinched to head to assure perfect alignment. It shall be possible to tilt the slats to any horizontal angle by turning a transparent wand. Bottom of wands to extend within 100 mm above window sill. Slat supports shall be braided of polyester yarn, the vertical component of which shall be not less than 1.1 mm diameter, nor greater than 1.7 mm diameter for maximum strength and flexibility with

minimum stretch. Braided ladders shall support slats parallel and straight to assure proper tilt control and adequate overlap of slats. Distance between ladders shall not exceed 560 mm and maximum 150 mm to ends. Lift cord shall be of adequate diameter, braided of high strength synthetic fibers to provide minimum stretch and maximum strength and flexibility. All blinds shall have satin gloss finish, color to be selected by Fort Drum from standard colors.

5.12.5.5 Interior sills of exterior windows shall receive solid surfacing material stools, nominal 25 mm thick.

5.12.6 Interior Windows:

5.12.6.1 Interior windows shall be hollow metal frames. Glazing of interior windows shall be minimum 5 mm tempered glass. Meet fire resistance requirements consistent with wall construction.

5.13 **Specialties:**

5.13.1 Signage: Provide exterior building numbers in accordance with Fort Drum Installation Design Guide on two sides of each building. The numbers shall be Helvetica font and sized accordingly to be visible from the road, coordinate size with the contracting officer. Provide signage throughout the facility (interior, exterior, and site, as appropriate). All signage shall be in accordance with the ADA. The building shall have one primary roadside, two faced, stand alone, light sign. This sign shall be provided and installed by Fort Drum. Provide electrical services to the sign. Refer to site plan for location.

5.13.2 Building Identification:

5.13.2.1 Room Identification: All interior and exterior doors shall have room identification signs. Two signs shall be provided at each location- one mounted at eye level and one mounted near the floor.

5.13.2.2 All exits shall be clearly marked.

5.13.2.3 All toilet facilities and fire extinguishers shall be marked with international symbols.

5.13.2.4 Restrictive areas shall be so labeled. Coordinate with Fort Drum personnel.

5.13.2.5 Signage shall be vandal resistant.

5.13.3 Mailboxes: The mail distribution room shall have minimum of 1 mailbox for each living/sleeping room, 9 parcel lockers and 1 mail collection box.

5.13.3.1 Mailboxes shall have rear access loading. Units shall be high security vault type, recessed into the wall, and constructed entirely of aluminum. Standard units shall be based on "A" size doors (130 mmH x 164 mmW). Each compartment shall measure 394 mm deep. Mailboxes shall incorporate the following salient features:

a Heavy-duty, non-corrosive combination lock.

b Interlocking device on hinge side of door to prevent insertion of prying tool

c Latch side of door to have vertical barrier to prevent access
d Horizontal and vertical rows of boxes fabricated and assembled in a single rigid unit and attached to a metal mounting frame
e Compartments constructed of .6 mm thick high-strength sheet aluminum alloy with vertical stiffeners
f Doors minimum 3 mm thick, high-strength extruded aluminum reinforced vertically along both sides and center with integral ribs
g Tenant doors identified with engraved, 16 mm high numerals
h Pressure-sensitive labels for loading identification
i Compartment sizes: (Size A) 150 mmW x 125 mmH x 394 mmD.
j Separate snap-on trim for rear-loading units.

5.13.3.2 Parcel Lockers: Shall incorporate the following salient features:

a 1800 mm high lockers, available in 4 or 5 door units standard
b 360 mm wide x 450 mm deep
c Postal arrow lock for master lock, and dust proof cam lock for customer lock
d Rear loading, in-wall, no base
e US 28 anodized colors standard

5.13.3.3 Mail Collection Box: Shall incorporate the following salient features:

a Rear access- equipped with lift-off rear cover
b 4 mm thick extruded aluminum front door
c Extruded aluminum frame
d Steel compartment
e Letter slot 19 mm high x 254 mm wide
f Engraved letters 25 mm high
g Anodized aluminum finish

5.13.4 Toilet Accessories:

5.13.4.1 Towel Shelf With Towel Bar: Surface mounted towel shelf with integral towel bar, all welded construction with type 304 stainless steel, satin finish. Minimum towel bar length is 600 mm. Flanges and support arms shall be 0.8 mm and equipped with concealed, 1.6 mm mounting brackets that are secured to concealed 1.6 mm wall plates with locking setscrews. Shelf and towel bar shall be 8 mm square tubing.

5.13.4.2 Towel Bar: Towel bar, all welded construction with type 304 stainless steel, satin finish. Minimum towel bar length is 600 mm. Support posts and flanges shall be one-piece, chrome-plated, cast heavy brass with satin finish. Towel bar shall not rotate within support posts. Properly install towel bar such that it shall withstand more than 114 kg of force.

5.13.4.3 Soap Dishes: Recessed heavy duty stainless steel soap dishes constructed of 18-8 type 304 stainless steel with a satin finish. Soap dish and flange shall be drawn and beveled, one-piece seamless construction.

5.13.4.4 Toilet Paper Dispenser: Double roll stainless steel toilet paper holder, constructed of type 304 stainless steel with satin finish. Unit shall accommodate two standard-core toilet paper rolls up to 140 mm diameter

(1800 sheets). Flanges shall be equipped with concealed 1.6 mm mounting brackets that are secured to concealed 1.6 mm wall plates with stainless steel locking setscrews. Spindles shall be equipped with a heavy duty internal spring.

5.13.4.5 Robe Hooks: Surface mounted double robe hooks constructed of heavy duty cast zamak with satin finish. Unit shall be secured to a concealed wall plate with a setscrew. Locate in shower/ watercloset room.

5.13.4.6 Medicine Cabinets: Recessed stainless steel medicine cabinets. Cabinet shall be type 304 stainless steel with all-welded construction. Exposed surfaces shall have satin finish. Mirror shall be #1 quality, 6 mm thick, select float glass guaranteed against silver spoilage for 15 years, and mounted in a door. Door shall be secured to cabinet with full-length stainless steel piano-hinge, retained by means of a magnetic catch, and equipped with a stainless steel cable door-swing limiter. Cabinet shall have four adjustable stainless steel shelves. An integral toothbrush holder shall accommodate 2 toothbrushes, and be located on the back of the door. Unit shall be invertible for choice of right or left-hand door swing.

5.13.4.7 Retractable Clothesline: Surface mounted retractable clothesline constructed of type 304 stainless steel with satin finish. Unit shall have a button retainer and 2440 mm nylon cord that retracts on a spring-actuated reel.

5.13.4.8 Shower Curtain Hooks: Provide twelve snap open hooks. Each hook shall be 1.6 mm diameter, type 304 stainless steel. Hooks shall be usable with 32 mm diameter shower curtain rods.

5.13.4.9 Shower Curtain: Opaque, matte, 100% vinyl, 1780 mm wide x 1830 mm high shower curtain. Nickel plated brass grommets along the top, 150 mm on center. Bottom and sides hemmed.

5.13.4.10 Shower Rod: Extra heavy duty, minimum 32 mm outside diameter, type 304, 1.6 mm gauge stainless steel with satin finish. Flanges shall be type 304, 1.6 mm gauge stainless steel with satin finish, one-piece die-formed.

5.13.4.11 Full length Mirrors: Wall mounted mirror in the passage space accessing the sleeping rooms from the serving area. Mirror shall be #1 quality, 6 mm thick, select float glass guaranteed against silver spoilage for 15 years, and mounted in a stainless steel frame with satin finish. Mirror shall be a minimum of 300mm wide and 1700mm high.

5.13.4.12 Combination Paper Towel Dispenser/Waste Receptacle: Recessed paper towel dispenser and waste receptacle shall be type 304 stainless steel with all-welded construction; exposed surfaces shall have a satin finish. Door shall be 1.6 mm gauge; have 13 mm 90 degree return edges; be secured to the cabinet with a concealed full length stainless steel piano hinge; and equipped with a stainless steel cable door-swing limiter and two tumbler locks keyed like other washroom accessories. Paper towel dispenser shall be equipped with a six-position adapter, adjustable to dispense 600 C-fold, 800 multi-fold, or 1100 single-fold paper towels. Waster receptacle shall be furnished with a removable, leak-proof, rigid molded plastic waste-container with a minimum capacity of 45 liters.

5.13.4.13 Electric Hand Dryer: Surface mount, reflective infrared sensor operation, brushed stainless steel cover, 7300 linear feet per minute flow rate, corrosion-resistant plating on internal parts, stainless steel tamper-resistant

air intake grills. Dynamically balanced blower wheels for vibration-free running. 10 year limited parts warranty, 5 year sensor warranty.

5.13.4.14 Grab Bars: ADA compliant, type 304 stainless steel grab bars, 1.6 mm wall thickness and 40 mm outside diameter. Clearance between the grab bar and the wall shall be 40 mm. Concealed mounting flanges shall be 3 mm thick stainless steel plate, 80 mm diameter, and equipped with two screw holes for attachment to wall. Flange covers shall be 0.8 mm, 85 mm diameter x 13 mm deep, and shall snap over the mounting flange to conceal the mounting screws. Ends of grab bar shall pass through concealed mounting flanges and be heliarc welded to form one structural unit. Satin finish with peened gripping surface.

5.13.5 Fire Extinguishers and Cabinets: Provide fire extinguishers as required by code. All extinguishers shall be contained in a recessed fire extinguisher cabinet. Fire extinguisher cabinets shall require breaking a tempered safety glass panel within a keyed, steel cam locking metal door frame to access the extinguisher. Lock and cabinet shall be tamper resistant. Cabinet door and frame shall be constructed of stainless steel. Provide multi-purpose dry chemical extinguishers of the 2-A, 10-B, C rating at locations as required by code. In mechanical / electrical / communication / laundry rooms provide extinguishers mounted on bracket adjacent to exits from the rooms.

5.13.6 Expansion Joints: Provide expansion joints where required by Code. Expansion joints shall be provided in all surfaces of the joint, including floor expansion joint cover assemblies, wall/ceiling expansion joint cover assemblies, exterior expansion joint seals, roof expansion joint assemblies, and fire barrier systems. Floor expansion joints shall be flush with adjacent flooring, and recessed to receive VCT. Standard floor covers shall be designed to withstand a minimum load of 226.8 kilograms. without damage or permanent deformation. Provide expansion joint cover assemblies identical to those of assemblies whose fire resistance and cycling capability has been determined per UL 2079 by Underwriter Laboratories, Inc. Fire rating not less than the rating of adjacent construction. Obtain all interior expansion joint cover assemblies from a single manufacturer

5.14 Physical Security Requirements:

5.14.1 Anti Terrorism/Force Protection. Comply with the minimum construction standards of the Department of Defense Antiterrorism/Force Protection Construction Standards. UEPH buildings are classified as troop billeting structures; Dining Facility, Battalion HQs and Brigade HQs are classified as primary gathering structures; COFs and Troop Aid Stations are classified as Inhabited Structures.

5.14.2 Secured Documents Vaults/Crypto Vaults. Provide 6-sided (walls, ceiling and floor) modular vault attached to building floor system. Vault shall conform to Class M (15 minute working time) requirements of UL 608 Standards for Modular Vault Panels. Vault shall be interfaced with building HVAC, fire protection, and electrical systems. Provide Class 5 vault door and frame complying with Federal Specification QPL-AA-D-600-7and supplied with combination locks meeting FF-L-2890. Provide metal ramp type threshold. Provide wire mesh, day gate with lock operated from outside by key, and from inside by handle. Comply with egress requirements of applicable codes.

5.14.2.1 Penetrations. Penetrations shall be minimized. All openings or penetrations in Vault floor, walls or ceiling greater than 61,900 sqaure mm shall be protected with welded steel rod-and-bar grid weighing 39.5 Kilograms/Meter , consisting of25mm by 5mm vertical bearing bars at 25mm on center, and 8mm diameter horizontal rods at 50mm on center; or equivalent protection.

5.14.3 Floor Anchors for GFGI Security Safes. Provide 10mm diameter stainless steel bar bent into U-shape 25mm inside radius with 50mm long 90-degree returns at ends of vertical legs. Overall height shall be 125mm; embed 75mm of vertical legs (open end) in concrete floor slab; 50mm of U-shaped end will protrude above slab to provide anchorage for GFGI security safe.

5.15 **Arms Vaults at Company Operations Facilities** Arms rooms shall be constructed to meet minimum requirements set for Category II arms per MIL-HDBK-1013/1A and AR190-11, Appendix G-1.

5.15.1 Door and Frame. Class 5 vault door and frame complying with Federal Specification QPL-AA-D-600-7. Locks shall be Underwriters Laboratory listed Group 1 or 1R combination lock. Provide metal ramp type threshold. Provide wire mesh, dutch door style daygate with shelf for issuing arms and ammo. Daygate shall have lock operated from outside by key, and from inside by handle. Comply with egress requirements of applicable codes.

5.15.2 Penetrations. Penetrations shall be minimized. All openings or penetrations in Vault floor, walls or ceiling greater than .062 m^2 shall be protected with welded steel rod-and-bar grid weighing 39.6 kg/m2, consisting of 25.4 mm x 4.8 mm vertical bearing bars at 25 mm on center, and 8 mm diameter horizontal rods at 50 mm on center; or equivalent protection.

5.15.3 Arms Rack Anchor Rings. Provide 10 mm diameter stainless steel bar bent into U-shape (25 mm inside radius) with 50mm long 90 degree returns at ends of horizontal legs. Overall length shall be 127 mm; embed 76 mm of horizontal legs (open end) in concrete 51 mm of U-shaped end will protrude from wall to provide anchorage for GFGI arms racks. Orient the projecting U-shape vertically, so that centerline of the U is 1225mm above the floor slab. Provide anchor rings at 900mm on center along all walls inside the Arms Vault.

5.16 **Crawl Space at Dining Facility (DFAC):**

5.16.1 Provide a crawl space in all areas, except dining/seating areas, in order to readily access the utilities.

5.16.2 Provide access door/hatch and ladder to crawl space from loading dock area.

5.16.3 Height. The crawl space area is not included in the overall building gross area totals. To comply with TI 800-01 and not include the crawl space in overall building area calculations, the maximum height of the crawl space, measured from finished floor to bottom of structure, shall be 1900mm.

5.16.4 Ventilation. The crawl space shall be ventilated to comply with International Building Code.

5.16.5 Grease Trap shall be located in the crawl space near the loading dock and the crawl space access door/hatch.

5.16.6 Floor of Crawl space shall be constructed of concrete slab.

5.17 **Food Service:**

5.17.1 Foodservice design requirements shall include preparation of concept plans, equipment schedules. Proposer is responsible to submit all final design plans, dimensioned rough-in plans, final utility load information and exact equipment selected, including references and assumptions, to the Contracting Officer's Representative (COR) for review.

5.17.2 The latest editions of the following technical criteria apply to the design, analysis and preparation of the foodservice portions of this project. Additional criteria not specifically identified below shall also apply, if directly referenced in any of the listed documents.

5.17.2.1 Architectural and Engineering Instructions Manual, New York District, U.S. Army Corps of Engineers (NYD-AEIM).

5.17.2.2 Standard Definitive Design for Enlist Personnel Dining Facility (251-500 Person Capacity)

5.17.2.3 NSF Standards: Comply with applicable National Sanitation Foundation standards and criteria and provide NSF "Seal of Approval" on each manufactured item and on major items of custom-fabricated work.

5.17.2.4 UL / ETL / CSA Standards: For electrical components and assemblies, provide either UL / ETL / CSA listed products or, where no listing service is available, provide a complete index of the components used as selected from the UL / ETL / CSA "Recognized Component Index." For fire extinguishing systems to comply with UL 300.

5.17.2.5 ANSI Standards: Comply with applicable ANSI standards for electric-powered and gas-burning equipment; for piping to compressed-gas cylinders; and for plumbing fittings, including vacuum breakers and air gaps, to prevent siphonage in water piping.

5.17.2.6 AGA / CGA: All gas-fired equipment shall be AGA / CGA approved, equipped to operate on the type gas available at the job site, and shall contain 100% automatic safety shut-off devices.

5.17.2.7 NFPA Standards: Comply with NFPA Bulletin 96 for exhaust systems; with NFPA Bulletins 13, 17, 17A and 96 for fire extinguishing systems; and with NFPA 54, National Fuel Gas Code and NFPA 70, National Electrical Code.

5.17.2.8 UFC 4-722-01.

5.17.2.9 ASME Code: Comply with ASME boiler code requirements for steam-generating and steam-heated equipment; provide ASME inspection, stamps, and certification of registration with National Board.

5.17.2.10 SMACNA Guidelines: Provide seismic restraints for food service equipment to comply with the Sheet Metal and Air Conditioning Contractors National Association's (SMACNA) "Kitchen Equipment Fabrication Guidelines", appendix 1, "Guidelines for Seismic Restraints of Kitchen Equipment", unless otherwise indicated.

5.17.2.11 ASHRAE: Provide mechanical refrigeration systems complying with the American Society of Heating, Refrigerating and Air Conditioning Engineers' ASHRAE 15, "Safety Code for Mechanical Refrigeration".

5.17.2.12 Americans with Disabilities Act (ADA)

SECTION 6.0 - STRUCTURAL DESIGN

6.1 Description: The structural criteria established herein shall be used for structural loading, design and installation of all structural systems and foundations, including manufacturing, erection, supervision, testing and quality assurance of the completed installation of this project. All structural calculations shall be checked and initialed by a professional engineer registered in the State of New York. The structural work consists of design and construction of, but not necessarily limited to, the following items:

6.1.1 Building foundations and slabs-on-grade
6.1.2 Load bearing and non-load bearing masonry walls
6.1.3 Structural precast hollow core plank
6.1.4 Structural steel framing
6.1.5 Concrete slabs on metal deck
6.1.6 All elevated floors shall be comprised of concrete slab construction, slab may be cast on metal deck, pre-cast, or cast on removable forms
6.1.7 Horizontal and truss framing members, including roof framing members
6.1.8 Connection details of structural members
6.1.9 Non-load bearing, steel stud walls, soffit or fascia framing
6.1.10 Special conditions, such as expansion, construction and contraction joints
6.1.11 Attachment provisions for architectural, mechanical and electrical elements
6.1.12 Interior and exterior equipment pads
6.1.13 Structual Systems which are not acceptable:
6.1.13.1 Structural framing systems with wood construction is not allowed for any building construction.
6.1.13.2 Cold formed steel stud framing systems, interior & exterior walls, are not allowed for Barracks construction.

6.2 **Metrication:** The metric units used are the International System of Units (SI) adopted by the U.S. Government. New construction and products which are manufactured to metric dimensions or have an industry recognized metric designation are given in hard metric SI values. In other cases both metric SI value units and English inch-pound (I-P) measurement are indicated by an SI value followed by the I-P value in parentheses. The SI value is a mathematical approximation of the I-P value and the I-P value shall govern over the metric measurement. All dimensions on the plans, details and sections shall be in SI format --millimeters.

6.2.1 Dimensions:

6.2.1.1 Plan and Vertical Dimensions: Use hard metric units of measurement. All dimensions on the plan, details, and sections shall be in SI format – millimeters.
6.2.1.2 Design Dimensions: Use hard metric units of measurements, SI format – millimeters.

6.2.2 Masonry:

6.2.2.1 Masonry Sizes as They Relate to Overall Plan Dimension: Use the industry standard for block sized, e.g. 8” – 200 mm, 16” – 400 mm, and etc.

6.2.3 Structural Steel: Due to the unavailability of metric structural steel shapes in the geographic region of this project, structural steel designations in the SI system format shall be used for the structural contract documents of this project.

6.2.3.1 Wide Flanges, Channels, Angles and Etc.: Use the English to Metric equivalent size as found in the metric AISC manuals (e.g. W310 x 24 for W12 x 16, W410 x 46 for W16 x 31, etc.).

6.2.3.2 Joists, Joist Girders and Etc.: Use the same size designation in Metric as in the English version (e.g. 12K4, 16K1 and etc.).

6.2.4 Concrete Reinforcement: Due to the unavailability of metric reinforcing bars in the geographic region of this project, concrete reinforcing designations in the SI system format shall be used for the structural contract documents of this project (e.g. #10, #13, #16 for #3, #4, #5 etc.).

6.2.4.1 For reinforcing lengths, use hard metric, millimeters.

6.2.4.2 Hard Metric Bar Size: Do not use hard metric because hard metric bars are not currently available in the geographical region of this project.

6.2.5 Light Gage Metal and Wire: Use the same gage designation in Metric as in the English version (e.g. 16 gage, 22 gage and etc.).

6.2.6 Plates: Any material.

6.2.6.1 Thickness: Use hard metric, millimeters.

6.2.6.2 Foot Print Size: Use hard metric, millimeters.

6.2.7 Bolts

6.2.7.1 Diameter: : Use hard metric, millimeters.

6.2.7.2 Length: Use hard metric, millimeters.

6.2.8 Studs: Use industry standard, SI system format.

6.3 **Reference:** Design methods and allowable stresses or load factors for the various structural steel materials shall be in accordance with current engineering and technical manual, codes and specifications (AISC, ACI and etc.), engineering regulations and engineering technical letters. Recommendations made in the codes, specifications and industry standards in this paragraph are requirements of this RFP, unless specified otherwise in these RFP documents.

6.3.1 Technical Manuals and Instructions, latest editions:

6.3.1.1 UFC 3-310-01: Load Assumptions for Buildings

6.3.1.2 TI 809-02: Structural Design Criteria for Buildings

6.3.1.3 TI 809-4: Seismic Design for Buildings

6.3.1.4 TI 809-07: Design of Cold Formed Load Bearing Steel Systems and Masonry Veneer/Steel Stud Walls

6.3.1.5 TM 5-809-3: Masonry Design for Buildings

6.3.1.6 UFC 4-010-01: DoD Minimum Anti-terrorism Standards for Buildings

6.3.2 Codes and Specifications:

6.3.2.1 AISC – Load and Resistance Factor Design Specification for Structural Steel Buildings by the American Institute of Steel Construction (AISC, Third Edition)

6.3.2.2 AISC – Load and Resistance Factor Design Specification, Volume II – Connections by the American Institute of Steel Construction (AISC, Third Edition)

6.3.2.3 Building Code Requirements for Structural Concrete by the American Concrete Institute (ACI 318-02)

6.3.2.4 SEI/ASCE 7-02 – Minimum Design Loads for Building and Other Structures by the American Society of Civil Engineers

6.3.2.5 Cold-Formed Steel Design Manual by the American Iron and Steel Institute (AISI, 1990)

6.3.2.6 Structural Welding Code-Steel by the American Welding Society (AWSD1.1-1998)

6.4 **Design Loads:**

6.4.1 General: Design loads shall be included in the structural notes on the Proposers drawings.

6.4.2 Dead Loads: The structural system shall be designed and constructed to safely support all dead loads, permanent or temporary, including but not limited to self weight, partitions, insulation, ceilings, floor covering, and all equipment that is fixed in position. All loads and load case combinations shall be in accordance with SEI/ASCE 7-02. Load factors for designs shall be based on the applicable material design standard (e.g., Ref. ACI-318 for concrete, and AISC for structural steel and etc.).

6.4.3 Live Loads:

6.4.3.1 Roofs shall be designed to support live loads in accordance with SEI/ASCE 7-02. Minimum Roof Live Load = 1.0 kPa. Reduction of roof live loads will not be permitted.

6.4.3.2 Structural floors shall be designed to support the following minimum live loads with due consideration for the loads due to equipment, cabinets, etc., as noted in the room-by-room description of Section 01010, "Architectural" of these RFP documents.

a. Mechanical Room - 5.982 kPa or actual weight of equipment, whichever is greater.
b. Elevated Floors (UEPH Floor) - 2.9 kPa, unless noted otherwise.
c. Corridors (above first floor)- 3.8 kPa.
d. Stairwells - 5.0 kPa.
e. Roofs - 1.0 kPa.
f. All other areas - in accordance with SEI/ASCE 7-02.

Notes: Floor loads may be reduced as permitted by the SEI/ASCE 7-02.

6.4.3.3 Horizontal Loads: The structural system shall be designed in accordance with SEI/ASCE 7-02 and DoD Minimum Anti-terrorism Standards for Buildings, (UFC 4-010-01).

6.4.4 Environmental Loads:

6.4.4.1 The structural system (i.e. roof, walls, floors, foundations, etc.) shall be designed to support and resist the following environmental loads in accordance with SEI/ASCE 7-02:

a. Snow Load including Drifting Snow, Sliding Snow and Rain on Snow: Ground snow load = 3.350 kPa. Snow loads, full or unbalanced, shall govern where such loading will result in larger members at connections.
b. Wind Load including Cladding and Components: Basic Wind Speed = 45 M/sec.
g. Earthquake Load (also in accordance with TI 809-4):

i. Seismic Use Group: I
ii. Site Classification: D
iii. Seismic Acceleration: $S_1 = 2.4$
$S_s = 1.54$

6.5 **General Design Criteria:**

6.5.1 The Proposers drawings shall contain structural notes which shall contain a list of the design loading criteria, a list of the strengths of the engineering materials used, the design soil values, and any other data that would be pertinent to remodeling and/or future additions. Reference COE Standard Drawing for required minimum standard structural notes and typical details. The minimum requirements for the respective notes are described in detail throughout this RFP section.

6.5.2 Walls mostly below grade that are supported laterally by diaphragms at or near the top and bottom, shall be designed using loadings based on at-rest soil pressures.

6.5.3 Diaphragms shall have continuous chord members on all edges and shall have direct positive connection for transferring load to all members of the main lateral force resisting system.

6.5.4 Gypsum wallboard shall not be used as a lateral resisting element of the lateral support system.

6.6 **Design Criteria:**

6.6.1 Serviceability:

6.6.1.1 Foundation Settlement Strength: An adequate level of protection against structural failure due to uniform and/or differential foundation settlement of general shear shall be provided.

6.6.1.2 Vertical Deflection of Suspended Horizontal Framing Members: Building serviceability shall not be impaired by vertical deflections. Vertical deflections shall be limited to the following criteria:

a. L/360 at roofs – live loads.
b. L/600 for masonry walls and lintels.
c. L/360 at floor live loads and L/240 at floor total loads.

6.6.1.3 Horizontal Deflection (Drift): Horizontal drift shall not exceed the limits set forth in AFM 88-3, Chapter 13 when the structure is subjected to the required seismic or wind loads. Horizontal drift shall not exceed 0.0025 times the story height when the structure is subjected to wind loads.

6.6.1.4 Ultimate Strength of Structural Elements: Provide an adequate level of protection against structural failure under extreme loading conditions for normal factors of safety.

6.6.2 Construction Tolerance: Allowable variations from level, or specific slopes, shall be as follows:

6.6.2.1 For overall length, for surface of 3,050 mm or less, plus or minus 3 mm

6.6.2.2 Up to 6,100 mm plus or minus 6 mm

6.6.2.3 Up to 12,190 mm plus or minus 10 mm

6.6.2.4 Determining flatness and levelness of the floor slab surfaces on grade and on deck shall be measured by the straightedge system in accordance with ACI 117/117R (1990).

6.6.3 Durability – Time Reliability:

6.6.3.1 Structural components shall be protected from condensed moisture that could impair their structural adequacy through deterioration.

6.6.3.2 Special attention shall be given to protection for corrosion or oxidation of metals, decay of wood and wood base materials, spalling of concrete, leaching of mortar, and deterioration of adhesives. Prevention of these hazards shall be especially important.

6.6.3.3 The materials used in structural elements, components and assemblies shall be resistant to or protected from damage by exposure to normal climatic conditions.

6.6.4 Concrete Design:

6.6.4.1 Testing: Testing of concrete work shall be done at the Successful proposer's expense by an approved independent testing laboratory and be of the frequency as stated in the guide specifications.

6.6.4.2 Forms: Materials for forms shall be plywood, metal, metal-framed, aluminum, reinforced fiberglass, or plywood-faced, to provide continuous, straight, smooth, exposed surfaces.

6.6.4.3 Reinforcing Materials: Reinforcing bars shall meet the minimum requirements of ASTM A 615, minimum Grade 60, deformed. Ties and stirrups can be ASTM A 615, minimum Grade 40 deformed.

6.6.4.4 Concrete Materials:

a. Cement: ASTM C 150, Type I-II Portland Cement low alkali (0.6% or less)
b. Fine Aggregate: ASTM C 33
c. Coarse Aggregate: ASTM C 33
d. Air-Entraining Admixture: ASTM C 260
e. Flowing Concrete Admixture: ASTM C 1017, Type 1 or 2
f. Calcium Chloride will not be permitted
g. Fly Ash: ASTM C 618, Class "F"; fly ash content shall not be less than 20 percent nor more than 25 percent of cement content per cubic yard of concrete.

6.6.4.5 Capillary Water Barrier: Provide 100mm capillary water barrier under all interior floor slabs.

6.6.4.6 Curing: Concrete curing shall be as specified in the furnished guide specifications.

6.6.4.7 Ready-Mix Concrete: ASTM C 94; 31.026 MPa minimum compressive strength at 28 days.

6.7 **Foundation Design:**

6.7.1 General: Foundation notes shall be included in the structural drawings.

6.7.2 Minimum Footing Depth: The minimum exterior footing depth from base of footing to outside finish grade shall be 1,676 mm. Interior footing shall bear at minimum depths 460 mm below finished floor unless the completed subgrade will be exposed to freezing weather. Interior footings shall be placed to provide a minimum of 100 mm clearance between the top of footing and bottom of floor slab, or deeper as necessary to meet seismic requirements.

6.7.3 Type of Foundation: The minimum foundation system shall be cast-in-place concrete continuous footings and foundation walls, with floor slabs-on-grade. Use of concrete block for foundation walls is not permitted. Finish on foundation walls shall be Class C. Foundations bearing directly on bedrock shall be doweled or socketed into the bedrock as required to resist lateral design pressures.

6.7.4 Design Loads: The allowable bearing pressure and pertinent soil properties shall be as given in the final Foundation Design Analysis. Allowable foundation bearing pressures shall be given as "net" values. For bid purposes, the proposed buildings shall be supported on spread and strip footings with an allowable bearing pressure of 143.6 kPa).

6.7.5 Slabs-on-Grade: Floor slabs-on-grade shall be a minimum of 125 mm thick. A 100 mm thick minimum capillary water barrier and 6 mil minium vapor barrier shall be placed under all building interior slabs-on-grade. Slabs shall receive a troweled finish.

6.7.6 Slab-on-Grade Control Joints: Slab-on-grade control joints shall be located at a spacing no greater than 6,100 mm on center each direction. The joints can be either contraction joints (weakened plane joints) or construction joints.

6.7.7 Interior and Exterior Mechanical/Electrical Equipment Foundation Pads: Interior and exterior mechanical and electrical equipment pads are required and shall be shown on the contract drawings. Equipment foundation pads shall be designed to adequately support the equipment loads. Interior pads shall be a minimum 100 mm thick; exterior pads shall be a minimum 150 mm thick.

6.7.8 Radon Prevention: In accordance with TI-810-91, provide passive radon prevention measures as required for a facility of Priority 2, negligible radon levels. These required measures shall include a 6 mil polyethylene sheet and a capillary water barrier under the floor slab, sealant in all joints in the floor slab and around all pipe and conduit penetrations. Lap plastic sheeting a minimum of 300 mm, and seal with adhesives or pressure sensitive tape. Select and install joint sealants in accordance with TM-5-805-6.

6.8 **Superstructure System:**

6.8.1 Barracks Building, (Multi Story L-shaped sturucture with 2-wings and a Commons, center core, Area) : The overall structural system for the barracks wings shall be a structural prestressed precast hollow core concrete plank with 50 mm concrete topping supported on load bearing interior and exterior masonry walls. The system shall provide vertical and lateral load carrying capacity and shall provide durability, maintainability and cost effectiveness. The barracks structural system must be designed with sufficient continuity, redundancy or energy dissipating capacity to avoid progressive collapse and structural precast plank load reversals or uplift as defined in Section B-2.1 of UFC 4-010-01 (July 2002). Note: The installation prefers the use of load-bearing masonry for the barracks construction for durability; however, the use of steel or concrete beam and column systems will be permitted. The use of load bearing exterior prestressed precast concrete panel wall systems will be permitted. Cold-formed steel stud and gypsum board construction will not be allowed for exterior or interior wall construction.

6.8.1.1 Structural Prestressed Precast Hollow Core Plank on Load-Bearing Masonry Walls:

a. General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.
b. Precast Plank shall be designed in accordance with PCI MNL-120 “PCI Design Handbook – Precast and Prestressed Concrete”. Provide 50 mm minimum concrete topping over all plank.
c. The framing system shall be able to carry lateral loads imposed on the system by wind forces, seismic forces, and blast impact forces.
d. Roof framing shall be designed using structural steel and joists members and/or light gauge metal framing trusses, galvanized roof deck with standing seam roof.
e. Exterior wall system shall be reinforced 200 mm (min) CMU back-up with face brick veneer cavity wall. CMU back-up shall be moderately reinforced (minimum 0.15% reinforcing ratio).

Expansion joints shall be provided between the commons area and the two wings

6.8.2 Brigade Headquarters: The single story building structural system shall be a combination of structural steel frame (columns and beams) and load bearing masonry walls, open web steel joists, or cold formed metal roof truss framing. Where appropriate, exterior and interior walls may be used as load bearing walls. The use of load bearing exterior prestressed precast concrete panel wall systems will be permitted.

6.8.2.1 General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.

6.8.2.2 The framing system shall be able to carry lateral loads imposed on the system by wind and seismic forces.

6.8.2.3 Exterior wall system shall be reinforced 200 mm CMU back-up with face brick veneer cavity wall or brick veneer cavity wall with steel metal stud back-up.

6.8.2.4 Roof framing shall be designed using structural steel members, open web steel joists or cold formed steel roof trusses, galvanized roof deck with standing seam roof.

6.8.3 Battalion Headquarters: The single story building structural system shall be a combination of structural steel frame (columns and beams) and/or load bearing masonry walls, open web steel joists, or cold formed metal roof truss framing. Where appropriate, exterior and interior walls may be used as load bearing walls. The use of load bearing exterior prestressed precast concrete panel wall systems will be permitted.

6.8.3.1 General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.

6.8.3.2 The framing system shall be able to carry lateral loads imposed on the system by wind and seismic forces.

6.8.3.3 Exterior wall system shall be reinforced CMU back-up with face brick veneer cavity wall or brick veneer cavity wall with steel metal stud back-up.

6.8.3.4 Roof framing shall be designed using structural steel members, open web steel joists or cold formed steel roof trusses, galvanized roof deck with standing seam roof.

6.8.4 Dining Facility: The single story building structural system shall be a combination of interior and exterior structural steel frame (columns and beams), and/or load bearing masonry walls, open web steel joists, or cold formed metal roof truss framing. Where appropriate, exterior and interior walls may be used as load bearing walls. The use of load bearing exterior prestressed precast concrete panel wall systems will be permitted.

6.8.4.1 General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.

6.8.4.2 The framing system shall be able to carry lateral loads imposed on the system by wind and seismic forces.

6.8.4.3 Exterior wall system shall be reinforced CMU back-up with face brick veneer cavity wall or brick veneer cavity wall with steel metal stud back-up.

6.8.4.4 Roof framing shall be designed using structural steel members, open web steel joists or cold formed steel roof trusses, galvanized roof deck with standing seam roof.

6.8.5 Troop Aid Station: The single story building structural system shall be a combination of structural steel frame (columns and beams) and/or load bearing masonry walls, open web steel joists, or cold formed metal roof truss framing. Where appropriate, exterior and interior walls may be used as load bearing walls. The use of load bearing exterior prestressed precast concrete panel wall systems will be permitted.

6.8.5.1 General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.

6.8.5.2 The framing system shall be able to carry lateral loads imposed on the system by wind and seismic forces.

6.8.5.3 Exterior wall system shall be reinforced CMU back-up with face brick veneer cavity wall or brick veneer cavity wall with steel metal stud back-up.

6.8.5.4 Roof framing shall be designed using structural steel members, open web steel joists or cold formed steel roof trusses, galvanized roof deck with standing seam roof.

6.8.6 Company Operations Facilities (1/10th & 2/10th HHC; 3/17th & A-TRP; HHC BDE): The single story building structural systems shall be a combination of structural steel frame (columns and beams) and/or load bearing masonry walls, open web steel joists, or cold formed metal roof truss framing. Where appropriate, exterior and interior walls may be used as load bearing walls. The use of load bearing exterior prestressed precast concrete panel wall systems will be permitted.

6.8.6.1 General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.

6.8.6.2 The framing system shall be able to carry lateral loads imposed on the system by wind and seismic forces.

6.8.6.3 Exterior wall system shall be reinforced CMU back-up with face brick veneer cavity wall or brick veneer cavity wall with steel metal stud back-up.

6.8.6.4 Roof framing shall be designed using structural steel members, open web steel joists or cold formed steel roof trusses, galvanized roof deck with standing seam roof.

6.8.7 Hanger Additions Company Operations Facilities (Additions Buildings 2060, 2072 & 2074): The exixting two-story structures are two-story steel braced frames with steel wide-flange columns and beams. The existing elevated floor slab system is composite steel beams and composite steel joists and beams. The new two-story structure building structure will require a double column separation expansion joint. The new framing system will be steel floor and roof framing with steel columns; beams and joists or cold formed metal roof truss framing.

6.8.7.1 General: The structural system shall be designed for both the vertical and horizontal loads required by the building code and SEI/ASCE 7-02.

6.8.7.2 The framing system shall be able to carry lateral loads imposed on the system by wind and seismic forces.

6.8.7.3 Exterior wall system shall be insulated metal panel similar to the existing construction.

6.8.7.4 Floor framing shall be designed using structural steel members, and composite floor slab system.

6.8.7.5 Roof framing shall be designed using structural steel members and galvanized roof deck.

6.8.7.2 Expansion joints, (Double row of column), shall be used between existing and new structural framing systems.

6.9 **Walls and Partitions:**

6.9.1 Lateral Loads: Exterior walls shall be designed to withstand lateral loads due to wind and/or seismic while spanning vertically from floor to roof or horizontally between columns, pilasters or intersecting walls. The wall component design wind load shall be determined from the worst possible combination of exterior and interior pressures (either inward or outward) and other provisions of SEI/ASCE 7-02. Seismic loads for structural and architectural components shall conform to TI 809-4. All buildings interior partitions shall be designed to withstand minimum lateral pressures as specified in SEI/ASCE 7-02 and can span either vertically or horizontally. If spanned vertically, partitions must be supported at the top of the wall by the roof or floor structural components.

6.9.2 Load Bearing and Non-Load Bearing Masonry Walls:

6.9.2.1 Masonry walls and partitions shall be designed in accordance with TM 5-809-3, as applicable.

6.9.2.2 Specify and design for Type “S” mortar. The mortar shall contain the manufacturer’s recommended amount of liquid polymeric integral water repellant mortar admixture for water repellency and assure proper bond strength. Masonry mortar shall not be used.

6.9.2.3 For design of the masonry unit prism strength use F’m = 10.342 Mpa (1,500 psi).

6.9.2.4 Masonry units shall have a minimum 28 day compressive strength of 13 Mpa (1,900 psi) on net area.

6.9.2.5 All exterior above grade masonry units shall be integral water repellant type. Integral water repellant shall be a liquid polymeric admixture. Masonry units which will be exposed to weathering shall be tested for efflorescence. Efflorescence sampling and testing shall conform to the applicable provisions of ASTM C 67.

6.9.2.6 Minimum Reinforcement: All masonry walls shall be reinforced as specified in TI 809-2 & UFC 4-010-01 and as required to meet the most severe loading imposed by seismic forces and/or wind forces. Vertical and horizontal reinforcement requirements for masonry walls shall be clearly indicated on the structural drawings. CMU back-up at exterior walls, at Barracks, shall be moderately reinforced (0.15%).

6.9.2.7 Masonry single wythe interior partitions and walls shall be of thicknesses shown on the drawings and shall be reinforced.

6.9.2.8 Wall control joint locations and spacing and other crack control measures shall be in accordance with TM 5-809-3 & TI 809-2, as applicable, but not to exceed a spacing of 12,200 mm on center and at least 600 mm from the edge of any wall opening.

6.9.2.9 Masonry walls shall be kept clear of steel columns and steel beams at a minimum of 20 mm.

6.9.2.10 Masonry notes and standard details shall be placed on the contract drawings.

SECTION 7.0 - FIRE PROTECTION AND SECURITY DESIGN

7.1 **Code Review and Applicable Codes/Regulations:**

7.1.1 Commercial Codes and Design Manuals: Design and installation shall conform to the latest editions of the referenced listed below, unless otherwise indicated herein.

7.1.1.1 NFPA (National Fire Protection Association) 10 - Portable Fire Extinguishers, latest edition
7.1.1.2 NFPA (National Fire Protection Association) 13 - Standard for the Installation of Sprinkler Systems, latest edition
7.1.1.3 NFPA (National Fire Protection Association) 13R - Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, latest edition
7.1.1.4 NFPA (National Fire Protection Association) 14 - Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems, latest edition
7.1.1.5 NFPA (National Fire Protection Association) 70 - National Electrical Code, latest edition
7.1.1.6 NFPA (National Fire Protection Association) 72 - National Fire Alarm Code, latest edition
7.1.1.7 NFPA (National Fire Protection Association) 90A - Installation of Air-Conditioning and Ventilating Systems, latest edition
7.1.1.8 NFPA (National Fire Protection Association) 90B - Installation of Warm Air Heating and Air-Conditioning Systems, latest edition
7.1.1.9 NFPA (National Fire Protection Association) 101 - Life Safety Code, latest edition
7.1.1.10 NFPA (National Fire Protection Association) 291 - Recommended Practice for Fire Flow Testing and Marking of Hydrants, latest edition
7.1.1.11 International Building Code
7.1.1.12 28 CFR Part 36 - ADA Standards for Accessible Design
7.1.1.13 NFPA (National Fire Protection Association) 54 - Gas Code, latest edition

7.1.2 Military Regulations and Design Manuals: Design and installation shall conform to the latest editions of the references listed below, unless otherwise indicated herein.

7.1.2.1 UFC - 3-600-01
7.1.2.2 TI 800-01, 1998 - Design Criteria
7.1.2.3 TI 800-03, 1998 - Technical Requirements for Design Build
7.1.2.4 TI 801-01, 1998 - Barracks Upgrade Program
7.1.2.5 TI 802-01 - Technical Instructions for Code 3 Design with Parametric Estimating, latest edition
7.1.2.6 TI 809-04 - Technical Instructions for the Seismic Design for Buildings, latest edition
7.1.2.7 NANP-1110-1-1, 1990 - Manual of Standard Procedures for Planning and Design
7.1.2.8 ETL 1110-3-491, 2001 - Sustainable Design for Military Facilities
7.1.2.9 UFC 4-721-11.1, 2001 - Unaccompanied Enlisted Personnel Housing (UEPH) Complexes, Volume I: Project Management Manual

7.1.2.10 UFC 4-7210-11.1, 2001 - Unaccompanied Enlisted Personnel Housing (UEPH) Complexes, Volume II: Model Request for Proposals

7.2 **Design Standards and Analysis:**

7.2.1 General: All materials, equipment, fixtures and appurtenances shall be labeled by Underwriters Laboratories, Inc. or a similar organization acceptable to the government.

7.2.2 Sprinkler System: All buildings shall be fully sprinklered with a wet-pipe sprinkler system. The attic space is not required (due to presence of two hour fire rated ceiling) to be and shall not be sprinklered and shall not be required to have draft stops. The sprinkler system shall be hydraulically designed and installed in accordance with NFPA 13, NFPA 13R, and the other codes referenced above. All sprinkler system piping and components shall be mounted to meet all necessary seismic restraint requirements. Refer to Section 6.0 for seismic classifications. All sprinkler piping shall be black steel schedule 40. The sprinkler system shall consist of the following:

7.2.2.1 The present site is fed from a 3,785,411 liter (1,000,000 gallon) tank. Water supply pressure and flow information was recently taken on the proposed site and yielded a static pressure of 351 kPa (51 psi) and a residual pressure of 310 kPa (45 psi) flowing 8358 Lpm (2208 gpm), respectively. Three hydrant butts were flowed to attain this information. There shall be no fire pump installed in this complex. The successful proposer shall hydraulically design the system to the appropriate density requirements as stated in letters a-c in 7.2.2.4 below without the need for a fire pump.

7.2.2.2 A minimum of a 203-mm (8 inch) fire service shall be brought into the building and the domestic water service shall be branched off of and be supplied by it. Piping shall extend 1.5 meters (5 feet) outside of building to civil portion of work. The fire service shall terminate in the first floor mechanical room where it shall be protected by a vertical type double check detector assembly (to save space) designed specifically to be used for fire protection purposes. Both valves on the check valve shall be monitored by tamper switches, which shall in turn be monitored by the building fire alarm system. After the double check valve assembly there shall be provided a 152-mm (6 inch) main wet-alarm check valve assembly, complete with trim and supervisory devices in accordance with NFPA 13.Any valve drainage requirements shall be exhausted directly to the exterior of the building.

7.2.2.3 Sprinkler system densities shall be as follows:

a. Light Hazard: [3.8 Lpm/m^2 (.10 gpm/ft^2) over 139 m^2 (1500 ft^2), with a 379 Lpm (100 gpm) hose stream demand, for a duration of 30 minutes]: This shall include all living modules (sprinklers in living modules shall be designed per NFPA 13R), corridors, common areas, means of egress, multipurpose spaces, mail distribution room, storage rooms (only general storage), janitor closets, mud rooms and communications rooms.

b. Ordinary Hazard Group 1: [6.11 Lpm/m^2 (.16 gpm/ft^2) over 139 m^2 (1500 ft^2), with a 946 Lpm (250 gpm) hose stream demand, for a duration of 60-90 minutes]: This shall include all laundry rooms.

c. Ordinary Hazard Group 2: [8.15 Lpm/m^2 (.20 gpm/ft^2) over 139m^2 (1500 ft^2), with a 946 Lpm (250 gpm) hose stream demand for a duration of 60-90 minutes]: This shall include all mechanical and electrical rooms.

7.2.2.4 All sprinkler heads shall be of the quick response type. Sprinkler heads located in any Ordinary Hazard Group 1 or 2 space shall be of the intermediate temperature rating.

7.2.2.5 All areas of the building (except attic spaces) shall be fully sprinklered. This includes closets and other ancillary spaces.

7.2.2.6 All sprinkler system flow and tamper switches shall be fully supervised by the building fire alarm control panel.

7.2.2.7 Each wing of each floor of the building shall be considered an individual sprinkler zone. These zones shall be controlled by either OS&Y (Outside Stem and Yoke) or butterfly type valves and shall be monitored by tamper switches, which shall in turn be monitored by the building fire alarm system. Also, on the flow side of the zone valve, a flow switch shall be installed and monitored by the building fire alarm system.

7.2.2.8 There shall be no exposed sprinkler or piping in the building except in mechanical spaces and stairwells. There shall be no sprinkler piping located in the attic space.

7.2.2.9 A Class I wet standpipe system shall be located in both end stairwells and the center stairwell of the building and connected to the wet-pipe sprinkler system. There shall be no hoses provided with the standpipe system as it is for fire department use only. All standpipe connections shall be of the male 63.5 mm (2-1/2-inch) NST (National Standard Thread) type. The residual pressures required for standpipe systems as dictated in the codes above are not required to be met for this building because fire department apparatus is expected to boost pressures in the standpipe system.

7.2.2.10 A 127 mm (5-inch) Storz type fire department connection shall be provided on the site in accordance with Section 3.14.5 of this Section 01010.

SECTION 8.0 - MECHANICAL - HVAC DESIGN

8.1 **Code Review & Applicable Regulations:**

8.1.1 Codes and Design Manuals: Design and installation shall conform to the latest editions of the referenced listed below, unless otherwise indicated herein.

8.1.1.1 COE (Army Corps of Engineers), Fort Drum Energy Design Guide
8.1.1.2 COE (Army Corps of Engineers), Fort Drum EMCS Systems
8.1.1.3 COE (Army Corps of Engineers) Cost Engineering Instructions and Regulations
8.1.1.4 Executive Order 13123 - Sustainable Principles
8.1.1.5 SPiRiT - Sustainable Project Rating Tool
8.1.1.6 TI 800-01, Design Criteria
8.1.1.7 TI 800-03, Technical Instructions Technical Requirements for Design-Build
8.1.1.8 TI 809-04, Seismic Design for Buildings
8.1.1.9 UFC (Unified Facilities Criteria) 3-400-01 Design: Energy Conservation
8.1.1.10 UFC (Unified Facilities Criteria) 3-400-0 Engineering Weather Data
8.1.1.11 UFC (Unified Facilities Criteria) 3-410-01FA Design: Heating, Ventilating, and Air Conditioning
8.1.1.12 UFC (Unified Facilities Criteria) 3-410-02A Design: Heating, Ventilating, and Air Conditioning (HVAC) Control Systems
8.1.1.13 UFC (Unified Facilities Criteria) 3-450-01 Design: Noise and Vibration Control
8.1.1.14 UFC (Unified Facilities Criteria) 3-600-01 – Design: Fire Protection Engineering for Facilities
8.1.1.15 UFC (United Facilities Criteria) 3-430-05FA Design: Gas Distribution.
8.1.1.16 ETL 1110-3-483, Clothes Dryer Exhaust Venting
8.1.1.17 ASHRAE (American Society of Heating Refrigeration and Air Conditioning Engineers) Handbook (4 vols., latest edition)
8.1.1.18 ASHRAE (American Society of Heating Refrigeration and Air Conditioning Engineers) Standard 62 (latest edition)
8.1.1.19 ASHRAE (American Society of Heating Refrigeration and Air Conditioning Engineers) Standard 90.1 (latest edition)
8.1.1.20 NFPA (National Fire Protection Association) Standard 54 – National Fuel Gas Code
8.1.1.21 NFPA (National Fire Protection Association) Standard 90A – Installation of Air Conditioning and Ventilation Systems, Latest Edition
8.1.1.22 NFPA (National Fire Protection Association) Standard 90B – Installation of Warm Air Heating and Air Conditioning Systems
8.1.1.23 NFPA (National Fire Protection Association) Standard 96 – Ventilation Control and Fire Protection of Commercial Cooking Operations
8.1.1.24 NFPA (National Fire Protection Association) Standard 211 – Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances
8.1.1.25 IBC (International Building Code) 2003

8.2 **General:**

8.2.1 Materials and Equipment: All materials and equipment shall be new and shall be the standard catalogued product of manufacturers regularly engaged in production of such materials and equipment, and shall be the manufacturers' latest standard design. Refer to paragraph 8.6 for control requirements.

8.2.1.1 Equipment shall comply with the requirements of Underwriters Laboratories, Inc. (UL), Canadian Gas Association (CGA), American Gas Association (AGA), Air Conditioning and Refrigeration Institute (ARI), American Society for Testing and Materials (ASTM), National Electric Manufacturers Association (NEMA), American National Standards Institute (ANSI), National Fire Protection Association (NFPA) or other national trade associations as applicable.

8.2.1.2 Equipment layout shall be in accordance with the manufacturer's recommended clearances and code clearances. Ensure that filters, controls, control valves, and coils are easily accessible for servicing and cleaning. Isolation valves shall be provided for each terminal unit, zone, branch, long runs, etc. as necessary for proper isolation and maintenance. Coils shall be fully removable without requiring demolition of any building components or removal of other pieces of equipment. Piping configuration at all coils shall include unions to facilitate easy coil removal. Provide adequate clearances around all pieces of equipment for periodic maintenance, inspection and cleaning. Service of one piece of equipment shall not require disturbance of adjacent equipment.

8.2.2 Guide Specifications. The mechanical system design and submittal process shall conform to the latest edition of the Corps of Engineers Unified Facilities Guide Specifications. These specifications can be downloaded from http://www.ccb.org/ufgs/ufgs.htm.

8.2.3 All HVAC system supports, foundations, braces, hangers and vibration isolators shall be designed to meet requirements of T1 809-04, Seismic Design for Buildings, except that life safety systems and equipment shall be designed to withstand horizontal forces of 1.0 g, minimum. Refer to Section 6.0 for further requirements.

8.2.3.1 Vibration and Noise Isolation: All piping, ductwork, air handling units, unit heaters and other equipment shall be properly isolated to prevent vibration, and subsequent noise shall be limited to 10% transmission of the lowest equipment RPM. All piping within fifty feet of rotating equipment shall be vibration isolated with combination steel spring and neoprene hangers or floor mounts with suitable seismic restraints. All rotating equipment shall be vibration isolated with combination steel spring and neoprene hangers or floor mounts with suitable seismic restraints. Isolator deflections shall comply with recommendations in the ASHRAE Applications Handbook except that life safety systems and equipment shall be designed to withstand forces of 1.0g, minimum.

8.2.4 Contractor shall provide isolation to meet the RC (N) Mark II ratings listed in "Acoustic Requirements," below.

8.2.5 When piping and support materials are dissimilar metals, an isolation system shall be used to prevent corrosion from electrolysis.

8.3 **HVAC Calculations:**

8.3.1 Heating/Cooling Load Calculations: Heat gain and loss calculations shall be, as a minimum, in accordance with the current edition of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbook of Fundamentals. Computer generated loads must be submitted with complete input and output summaries during the design process. Load calculation software must be ASHRAE based. The cooling equipment shall be selected based on satisfying both the total and latent calculated loads. Heating shall also be provided to utility rooms, and other uninhabited areas as needed to prevent pipes from freezing. Verify ventilation rates of each space with the referenced publications in this mechanical design section. Conduct air balance calculations for the space in the complex to verify intended design total supply air, outdoor air, return air, and exhaust air. The space (airflow) pressure relationships shall be maintained. Total airflow calculations are required to verify that the building pressure is adequately positive to the outdoors. The design shall reflect heating and cooling capacities based on the design conditions stated in this document.

8.3.1.1 Load calculations shall be made on room-by-room basis, using an acceptable software program such as Trane's Trace 700, Carrier's HAP 4.10b or DOE's BLAST software. The software program shall perform 8760 hourly calculations. Complete input and output summaries shall be submitted during the design process.

8.3.1.2 Heat of lights and other internal heat gains shall not be considered as credits that supplement the capacity of the heating system.

8.3.1.3 Cooling equipment shall be selected to satisfy both the total heat, and the latent heat loads as determined by the HVAC Load Calculations.

8.3.1.4 Refer to Room By Room Requirements for room occupants and other room specific information.

8.3.2 Ventilation calculations: Calculations shall be provided in accordance with the latest edition of ASHRAE 62 for all systems providing building ventilation.

8.3.3 Air Balance Calculations: Calculations and schematic diagrams shall be submitted that clearly demonstrate that each building is designed to be under positive pressure.

8.3.4 Air Diffusion Performance Index: Provide calculations/selections in accordance with 2001 ASHRAE Fundamentals Handbook, Chapter 32, demonstrating that the selection of air distribution devices meet or exceed an Air Diffusion Performance Index (ADPI) rating of 80.

8.3.5 Duct calculations: Calculations shall be provided for sizing all duct systems, including static pressure drop calculations for all fans. Ductwork calculations shall be in accordance with the latest edition of the ASHRAE Fundamentals Handbook. Ductwork layout drawings shall also be provided to indicate all fittings and devices to substantiate

calculations. Duct sizing calculations for VAV systems shall be calculated using the static regain method.

8.3.6 Piping calculations: Piping calculations shall be in accordance with the latest edition of the ASHRAE Fundamentals Handbook. Pressure drop calculations for all piping systems shall be provided and shall demonstrate the critical path. In addition to the pressure drop calculations, expansion tank, pipe expansion loop and chilled water volume calculations must also be provided. Drawings must be submitted that illustrate the specific water flow rates through all of the pipe branches and be provided with provision to balance flow rates by means of balancing valves (circuit setter) in the return segment of the piping branch.

8.3.7 Energy Conservation Calculations: A minimum requirement of the sustainable project certification is to show compliance with the latest version of ASHRAE 90.1. The compliance documentation shall be submitted by the successful proposer after contract award. The designer may choose between the Energy Cost Budget Method and the Prescriptive and Performance Requirement Method of compliance. Energy conservation compliance documentation shall be in accordance with UFC 3-400-01. All proposers must submit in their proposals a statement that they will provide a facility that complies with ASHRAE 90.1 and the Fort Drum Energy Design Guide.

8.3.7.1 The design shall comply with the Fort Drum Energy Design Guide and ASHRAE Standard 90.1, if its requirements are more demanding than the Fort Drum Guide.

8.3.7.2 Calculations of the annual energy utilization shall be performed using an acceptable software program such as Trane's Trace 700, Carrier's HAP, DOE-2 or DOE's BLAST software.

8.3.8 Life Cycle Cost Analysis (LCCA). Submit all backup data related to LCCA (cost estimates, replacement costs, etc.). Lump sum cost estimates is not acceptable. Clearly document sources of information and any assumptions made. Also, submit complete input and output for economic program and the Energy analysis program used. Acceptable energy analysis programs are Trane TRACE 700, Carrier HAP, BLAST, and DOE-2. The economic program shall be the Life Cycle Cost in Design (LCCID) program, the Building Life Cycle Cost (BLCC) program or one approved by HQUSACE, CEMP-E to be the equivalent thereof. The LCCID program is available from Building Systems Laboratories at (217) 333-3977. The BLCC program is available from the FEMP web site at www.eren.doe.gov.femp.

8.4 HVAC Design Parameters: The design shall be based on the following parameters and as further defined in the, "Room-By-Room Requirements".

8.4.1 Project Location: Fort Drum, New York; Latitude: 44° 02' N; Longitude: 75° 46' W; Elevation: 200 meters above sea level.

8.4.2 Outdoor Conditions:
8.4.2.1 Heating Season: -29 deg. C Dry Bulb
8.4.2.2 Cooling Season: 28.5 deg. C Dry Bulb. / 23 deg. C Wet Bulb
8.4.2.3 Air Cooled Condenser Design Condition: 32.2 deg. C Dry Bulb

8.4.2.4 Prevailing Wind: From Northwest, at 5 knots, in the winter.

8.4.3 Indoor Conditions:

8.4.3.1 Indoor Design Conditions for Barracks Living/Sleeping Modules and Adjoining Spaces, Multi-Purpose Rooms, Lobby Area(s) and Mail Distribution Room: Summer: 23.9°C DB, with unoccupied setup at 29.5°C DB; Winter: 20°C DB, with unoccupied setback at 12.8°C. Indoor relative humidity shall not exceed 50% RH.

8.4.3.2 Indoor Design Conditions for Mud Room and Laundry Rooms: 20°C DB with 12.8°C unoccupied setback year round.

8.4.3.3 Indoor Design Conditions for the Dinning Facility's Kitchen and Dishwash Rooms: Summer: 28°C DB, Winter: 15.5°C DB. Indoor relative humidity shall not exceed 50% RH.

8.4.3.4 Typical Occupied Spaces: 23.9 degrees C, 50 percent RH. Winter: 20 degrees C.

8.4.3.5 Barracks Corridors: Winter: 20 degrees C.

8.4.3.6 Vestibules: Winter: 10 degrees C.

8.4.3.7 Mechanical Rooms: Summer: Mechanically ventilate to 35 deg. C maximum (Ventilation rate shall not be lower than 20 air changes per hour). Winter: 12.8 deg. C for freeze protection only. (Mechanical room heating calculations shall take into account infiltration from louvers located in the room.)

8.4.3.8 Electrical Rooms: Summer: Mechanically ventilate to 35 deg. C maximum (Ventilation rate shall not be lower than 20 air changes per hour). Winter: 12.8 deg. C for freeze protection only. (Electrical room heat loads shall take into account the heat loads of the electrical equipment in the room. i.e.: transformers.)

8.4.3.9 Telecommunications Rooms: These rooms shall have a stand alone HVAC system to condition the space 24hr/day – 7days/week. Maintain temperature between 17.8 and 22.2 deg C DB. Relative humidity shall be maintained between 30% and 55% RH.

8.4.3.10 Indoor Design Conditions for Attic: Natural ventilation of attic spaces shall include ridge, gable and soffit areas.

8.4.3.11 Indoor Design Conditions for Storage Areas: 23.9 degrees C, 50 percent RH. Winter: 20 degrees C.

8.4.4 Minimum Thermal Characteristics: The buildings' R-values shall comply with section 5 of this document and the latest version of ASHRAE 90.1.

8.4.5 Internal Cooling Design Criteria: Refer to Section 11.0 - Room By Room Requirements for room occupants and other room specific information.

8.4.5.1 Equipment: Actual normal heat rejection of installed equipment.

8.4.5.2 Lights: Room lighting loads shall be actual lighting loads for each space.

8.4.6 Ventilation Systems Design:

8.4.6.1 Ventilation for building occupants shall be provided in accordance with the latest edition of ASHRAE Standard 62. Outside air quantities will be sufficient to meet ventilation requirements and maintain a positive pressure at all times relative to the outdoors in the living/sleeping rooms, interior corridors, offices, conference rooms, lobby and similar occupied areas.

8.4.6.2 Fan coil unit configurations that directly utilize untreated/untempered outside air shall not be used on this project. A separate outside air system that pre-treats outside air shall be used where fan coil units are provided. The dew point of the discharge

air from this unit shall not exceed the dew point for the indoor design temperature.

8.4.6.3 Where the outside air requirements are a significant part of the cooling load, especially where a separate outside air unit is required, the use of desiccant cooling, enthalpy wheels and similar devices for conditioning the outside air and transferring latent and sensible heat to the exhaust air shall be considered.

8.4.6.4 Exhaust systems shall be provided for all bathrooms, janitor's closets, mechanical rooms, electrical rooms, and other spaces as required. Exhaust system shall be designed in accordance with the latest version of ASHRAE 62. All exhaust fans shall be equipped with motorized dampers.

8.4.6.5 The outside air intakes shall be located at least 3 meters above finish grade. Louvers used for mechanical or electrical room ventilation may be lower. Outside air intakes shall be located away from fumes including vehicle exhaust, generator exhaust, toilet exhaust, etc. The location of all air intakes must comply with UFC 4-010-01.

8.4.6.6 Each building's ventilation system shall have emergency switches that shut down the ventilation system. These switches should be located in easily accessible areas. The location of these switches shall be approved and coordinated with the Contracting Officer.

8.4.6.7 Boiler Room ventilation shall be as required by NFPA-54 and NFPA-211. Individual combustion air louvers shall be provided for each boiler. These louvers shall be equipped with motorized dampers interlocked with its associated boilers. Dampers shall close when the boiler is not firing. Combustion air louvers can not be installed below 1.2 m above finish grade.

8.4.7 Dryer Vents. Dryer vents shall be installed as described in ETL 1110-3-483, Clothes Dryer Exhaust Venting. This document can be downloaded from http://www.usace.army.mil/inet/usace-docs/eng-tech-ltrs/etl-all.html. A manifold exhaust arrangement shall not be used. All dryers shall be individually vented to the outside. Make up air shall be provided to the back of the dryers from outdoors.

8.5 **Selected Design Concepts**:

8.5.1 Barracks Buildings:

8.5.1.1 Cooling System Design: Each Barracks building shall be served with its own air cooled chiller(s). Chilled water pumps and accessories shall be located in the Mechanical Room located on the first floor of the Barracks Building.

8.5.1.2 Heating System Design: Each barracks building shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. Hot water pumps and accessories shall be located in the Mechanical Room located on the first floor of the Barracks Building.

8.5.1.3 Air System Design and Zoning:

8.5.1.3.1 HVAC for Living/Sleeping Modules: Cooling for each Living/Sleeping Module shall be provided by a dedicated horizontal fan coil units. Heating for each room shall be provided by a dedicated finned tube radiant heater. Each sleeping room shall be provided with its own radiant heater and fan coil unit. Ventilation air shall be ducted directly into each of the sleeping rooms.

8.5.1.3.1.1 Fan coils for barracks rooms shall be mounted exposed in sleeping room. These units shall be 2-pipe horizontal cabinet type with discharge grille, hinged bottom access door, tamper proof screw fasteners and safety chain. Each unit shall be provided with factory-installed piping package complete with control valve, circuit setter, unions, ball valves and strainer. All piping and valves shall be installed inside the fan coil cabinet. No piping or piping accessories shall be exposed in the sleeping room.

8.5.1.3.1.2 The entire perimeter of the Barrack building shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a hot water control valve. Finned tube heaters and fan coil units shall both be controlled by a single wall mounted thermostat located in each of the Living/Sleeping rooms.

8.5.1.3.2 HVAC System for Knuckle (Lobby) Areas: Ventilation air (tempered makeup air) for Multi-Purpose spaces, Lobbies, Laundries and Mail Distribution space shall be provided by an air handling unit. The following spaces in the "Knuckle" Area will be air conditioned via 2-pipe room fan coil units and heated by hot water (glycol) terminal units: Multi-Purpose Room (Ground Floor), Multi-Purpose Room (Second Floor), Mail Distribution Room Ground Floor), Lobby (Ground Floor), and Lobby (Second Floor).

8.5.1.3.3 Corridors: No mechanical cooling required. Heating for the corridor shall be provided by hot water convectors. Ventilation air for the corridors shall be supplied to each.

8.5.1.4 Ventilation System Design:

8.5.1.4.1 Ventilation air to Living/Sleeping spaces and/or spaces requiring exhaust make-up shall be provided by dedicated 100% outside air handling units located in the attic mechanical room. Ductwork shall be routed from these units to each space. The air handling units shall be provided with 30% efficient pleated prefilters and 85% efficient cartridge final filters, chilled water (glycol) cooling coils, and hot water (glycol) heating coils. Each air handling unit shall contain modulating cooling and heating control. The cooling coils for these units shall be sized to cool the outside air to 12.8 deg. C in order to dehumidify the ventilation air. The heating coils for these units shall be sized to heat the outside air to 20 deg. C.

8.5.1.4.2 Ventilation air supply temperature shall be determined by a reset schedule. Temperature shall be 12.8 deg. C when the outside air temperature is equal to the summer design outside air temperature and 20 deg. C when the outside air temperature is equal to the winter design outside air temperature.

8.5.1.4.3 The outside air quantity for each module shall be sufficient enough to offset the space exhaust requirements and to slightly pressurize the space.

8.5.1.4.4 Bathroom Exhaust Systems: A central exhaust system utilizing in-line exhaust fans located in the attic mechanical space shall be used to exhaust

each bathroom. Each central exhaust fan shall exhaust a maximum of 15 bathrooms. Bathroom exhaust shall be in accordance with the latest version of ASHRAE 62.

8.5.1.4.5 Kitchen Exhaust Systems: Each kitchen space shall utilize a hood exhaust / fan complete with exhaust riser routed to vertical duct chases. Exhaust risers shall connect into horizontal exhaust duct mains located on each side of each wing. The exhaust duct mains shall be routed via the warm duct spaces to one of two central kitchen exhaust fans located in the fourth floor Mechanical Room. These central kitchen exhaust fans shall be equipped with variable frequency drives and pressure transducers which will enable them to modulate their flow rate as individual kitchen hood fans operated. To ensure that the central kitchen exhaust fans can meet the minimum flow conditions, a bypass loop may be utilized.

8.5.2 Battalion Headquarters

8.5.2.1 Cooling System Design: The Battalion Headquarters Building shall be served by one air cooled chiller. Chilled water pumps and accessories shall be located in the BHQ Mechanical Room.

8.5.2.2 Heating System Design: The Battalion Headquarters Building shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. Hot water pumps and accessories shall be located in the Mechanical Room located in the BHQ Mechanical Room.

8.5.2.3 Air System Design: The Battalion Headquarters Building shall be served by a chilled water/hot water VAV system with reheat. VAV boxes shall be fan powered type with hot water reheat coils. DDC system shall provide as a minimum monitoring and control of zone temperature, timed override and local set point. This system shall be zoned by functional requirements, operation schedules, environmental control conditions, and load characteristics. As a minimum individual zones are required for each executive or command office and for each classroom or conference room. Zones shall not exceed 74 square meters and must not cover multiple building exposures.

8.5.2.4 Perimeter Heat Design: The entire perimeter of the Battalion Headquarters Building shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.2.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's VAV air handling unit. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.3 Brigade Headquarters

8.5.3.1 Cooling System Design: The Brigade Headquarters Building shall be served by one air cooled chiller. Chilled water pumps and accessories shall be located in the building's mechanical room.

8.5.3.2 Heating System Design: The Brigade Headquarters Building shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. Hot water pumps and accessories shall be located in the building's mechanical room.

8.5.3.3 Air System Design: The Brigade Headquarters Building shall be served by a chilled water/hot water VAV system. VAV boxes shall be fan powered type with hot water reheat coils. DDC system shall provide at minimum monitoring and control of zone temperature, timed override and local set point. This system shall be zoned by functional requirements, operation schedules, environmental control conditions, and load characteristics. As a minimum individual zones are required for each executive or command office and for each classroom or conference room. Zones shall not exceed 74 square meters and must not cover multiple building exposures.

8.5.3.4 Perimeter Heat Design: The entire perimeter of the Brigade Headquarters Building shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.3.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's VAV air handling unit. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.4 <u>1/10, 2/10, 3/17 & A-TRP HHC COF</u>

8.5.4.1 Cooling System Design: Each COF Building shall be served by one air cooled chiller. Chilled water pumps and accessories shall be located in the building's mechanical room.

8.5.4.2 Heating System Design: Each of the COF Buildings shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. Hot water pumps and accessories shall be located in the Mechanical Room located in the building's mechanical room.

8.5.4.3 Air System Design: Each of these COF buildings are composed of two identical COF facilities under a common roof. Both of the COF facilites shall be served by a minimum of two, constant volume, chilled water/hot water air handling units. These systems shall be zoned by functional requirements, operation schedules, environmental control conditions, and load characteristics.

8.5.4.4 Perimeter Heat Design: The entire perimeter of the COF Building shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.4.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's air handling units. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.5 HHC BDE COF

8.5.5.1 Cooling System Design: Each COF Building shall be served by one air cooled chiller. Chilled water pumps and accessories shall be located in the building's mechanical room.

8.5.5.2 Heating System Design: Each of the COF Buildings shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. Hot water pumps and accessories shall be located in the Mechanical Room located in the building's mechanical room.

8.5.5.3 Air System Design: The COF building shall be served by a single zone, constant volume, chilled water/hot water air handling unit.

8.5.5.4 Perimeter Heat Design: The entire perimeter of the COF Building shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.5.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's air handling units. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.6 Dining Facility

8.5.6.1 Cooling System Design: The Dinning Facility shall be served by a minimum of one air cooled chiller. Chilled water pumps and accessories shall be located in the building's mechanical room.

8.5.6.2 Heating System Design: The Dinning Facility shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. Hot water pumps and accessories shall be located in the building's mechanical room.

8.5.6.3 Air System Design: The Dinning facility shall be served by three constant volume single zone air handling units. Air handler units shall contain hot water and chilled water coils. The kitchen area, serving area, and dinning area shall each be served by their own air handling units.

8.5.6.4 Perimeter Heat Design: The entire perimeter of the Dining facility shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.6.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's air handling units. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.6.5.1 A separate kitchen hood exhaust fan system shall be provided for each kitchen hood and dishwashing hood. Hoods shall in accordance with UFGS 11400A- Food Service Equipment.

8.5.6.5.2 Makeup air shall be provided to each kitchen hood. (The temperature of the makeup air must be coordinated with the hood manufacturer.)

8.5.6.5.3 Kitchen area and dishwashing area shall be maintained under negative pressure in relation to the dinning and serving areas.

8.5.6.5.4 Dining facility ventilation design shall ensure that the building as a whole is always under positive pressure. System must be able to adapt to exhaust airflow changes as exhaust fans are turned on and off. The design build team's proposal shall address how the design parameters listed above are going to be accomplished.

8.5.7 Hangar Company Operations Facility

8.5.7.1 Cooling System Design: No cooling is required.

8.5.7.2 Heating System Design: The existing boilers shall be used to provide hot water for the building addition. New hot water pipes shall be connected to the existing hot water system. Isolation valves shall be provided at the tie in point.

8.5.7.3 Air System Design: The Hanger COF shall be served by a two speed ventilation unit. Ventilation unit shall have a hot water coil to temper outside air in the heating season. Summer ventilation shall be provided at a rate of 15 l/sec/sq.m. Winter ventilation shall be in accordance with paragraph 8.4.6. Ventilation units shall not be located outside.

8.5.7.4 Perimeter Heat Design: The entire perimeter of the Hanger COF shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled by a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.7.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's ventilation unit. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.8 Troop Aid Station

8.5.8.1 Cooling System Design: The Troop Aid Station shall be served by multiple split system air conditioners. This system shall be zoned by functional requirements, operation schedules, environmental control conditions, and load characteristics.

8.5.8.2 Heating System Design: The Troop Aid Station shall be served by one cast iron boiler. Hot water pumps and accessories shall be located in the building's mechanical room.

8.5.8.3 Air System Design: The Troop Aid Station shall be served by a minimum of four DX air handlers with a hot water heating coils. This building shall be zoned by functional requirements, operation schedules, environmental control conditions, and load characteristics.

8.5.8.4 Perimeter Heat Design: The entire perimeter of the Troop Aid Station shall be heated using finned tube radiant heaters. Each finned tube heater shall be controlled a control valve. Radiant heaters shall be controlled using a wall-mounted thermostats located in each of the perimeter rooms.

8.5.8.5 Ventilation System Design: Outside air shall be delivered to each room of the building year round using the building's air handling unit. Ventilation System shall be in accordance with paragraph 8.4.6.

8.5.9 HVAC System for Communications Room: All communications Rooms shall utilize an independent DX air conditioner designed to meet the room design conditions stated in paragraph 8.4.3.8. These units shall be provided with micro-processor controls and any other options necessary to meet the design conditions such as low ambient temperature controls, humidifiers, or hot-gas bypass reheat for humidity control. Units may be either self-contained or split system type. Designer must take into consideration winter design condition and ensure that units will be capable of maintaining the room design conditions year round

8.6 **HVAC Controls**:

8.6.1 HVAC control system design shall be in accordance with UFC 3-410-02A Design: HVAC Control Systems.

8.6.2 The Contractor shall provide a Direct Digital Control (DDC) System for all buildings in this contract. The DDC system shall include localize controls and local control capability and be provided with a dedicated local building control panel in each building, each building panel shall be connected to Fort Drum's existing centralized/global base-wide Energy Management and Control System (EMCS) which is located in Fort Drum's Heat Shop. The existing EMCS at Fort Drum is currently a Trane Tracer Summit System (BACnet protocol). The EMCS shall interface and provide complete and absolute seamless interoperability with the existing base-wide-system. The system shall include software with all the necessary means for scheduling, local and remote control and adjustment, load shedding, event management, monitoring, trending, logging, maintenance notification, and alarms. The Contractor shall install the software in one of the existing PC workstations at Fort Drum, as designated by the Contracting Officer's Representative. The DDC system shall communicate via LAN.

8.6.3 Direct Digital Controls: Control drawings shall include schematics, ladder diagrams and sequences of operation for all HVAC equipment. The DDC system shall include all application software, devices and materials needed to implement the specified control strategies required. The program nomenclature shall follow the standards in use at Fort Drum. Application software shall be provided for each system as recorded on the EMCS points list. The new system interface shall not alter the existing base central software operations. The system shall be capable of monitoring and override from the central EMCS computer, and shall be designed to be completely stand-alone in the event of communications failure. All wiring shall be labeled and terminated. All control devices shall be new and unused.

8.6.4 The Contractor shall fully program the HVAC/EMCS control panel, including graphics and control schemes in the EMCS central computer. The graphics screens shall include a building floor plan indicating control locations and detail screens of individual equipment controls as required in the point's list. The control schemes and graphics shall be approved by submittal. The program shall execute standalone control functions in the building control panel with or without communication with the EMCS central computer.

The building control panel shall accept override controls, set-point adjustments, and program central network monitoring and control functions. All alarms generated by the building panel shall automatically be logged with the EMCS Central Computer. A text-based sequence of operation screen shall be linked to the graphics screens for the building and shall explain control procedures. The I/O summary (points list) shall be submitted to Contracting Officer's Representative for approval.

8.6.5 All DDC control and power wiring shall be routed in accordance with section 10 of this RFP.

8.6.6 DDC zone temperature sensors shall be equipped with a temperature calibrated local setpoint adjustment slidepot which will give the occupant a limited ability to change the zone's setpoint. Sensors shall also be equipped with a local override button. Do not provide override button on sensors installed in the Dining Facility or Barrack Buildings.

8.6.7 The location of all zone temperature sensors shall be approved and coordinated with the Contracting Officer.

8.6.8 DDC system shall monitor water, electric and gas meters.

8.7 **Heating Boilers**: Cast iron type gas-fired boilers shall provide heating for the buildings. Pulse type combustion boilers are not acceptable.

8.7.1 The jacket panels shall be steel construction and coated with a baked-on enamel finish. All waterways shall be of cast-iron construction. Boiler heat exchanger shall carry a minimum 5 year warranty.

8.7.2 Manufacturer's packaged operation controls shall be provided to handle all aspects of capacity modulation and safeguarding. Controls shall be provided to allow for staggered and lead-lag operation and shall interface with the building DDC system and allow changes to be made to boiler control set points from the DDC system. Control Panel shall be located for easy access and have a protective cover, which can be removed with no tools. Solid-state controls shall be used to monitor and control all operating and safety functions. Standard operating controls and equipment shall include ignition, operating aquastat, manual re-set hi-limit, automatic main and redundant gas valve, master switch with pilot light, inlet/outlet temperature gauges, ASME safety relief valve and flow switch. Complete factory certified operating and start-up instructions shall be furnished with unit.

8.7.3 Boilers shall be UL listed.

8.7.4 Each boiler shall utilize a separate boiler secondary pumping system to maintain constant hot water circulation rate through the boiler whenever the boiler is enabled. Circulation rate shall be in accordance with manufacturer's recommendations.

8.7.5 Minimum boiler efficiency shall 81% AFUE.

8.7.6 The burner gas train shall be AGA and FM approved. Provide all required boiler safety devices. The boilers shall be equipped with ASME rated pressure relief valves. Boiler combustion safety controls shall utilize LED readout.

8.7.7 The selected boilers shall have the smallest footprint possible and shall be mounted on anchored, reinforced concrete housekeeping pad. All code-mandated and manufacturer's specified maintenance clearances shall be provided in the mechanical room containing the boilers.

8.7.8 The boiler room shall be provided with natural gas and carbon monoxide gas leakage monitoring devices. These devices shall be connected to the fire alarm control panel, and shall affect automatic shutdown of gas to the building, upon detection of natural gas leakage or carbon monoxide.

8.7.9 Boiler Selection Parameters: The Design Build Contractor shall take all necessary precautions to assure the boiler's satisfactory performance when heating propylene glycol. He shall substantiate his selection by submittals, for review, of all data and parameters recommended by the manufacturers of the boiler and the glycol solution, as well as all the related calculations and a signed certificate of his compliance with the requirements. All of these data shall be specifically relevant to the make and type of the proposed boilers and materials used for their construction, and the physical characteristics appropriate for the proposed propylene glycol heat transfer fluid. As a minimum, the following shall be addressed, clarified and fully documented:

8.7.9.1 Boiler's construction and materials shall be suitable for the heating of propylene glycol.

8.7.9.2 Boiler's output capacity shall be based on the use of propylene glycol solution.

8.7.9.3 Chemical treatment of make-up water shall be compatible with the glycol and inhibitor system provided by the glycol's manufacturer.

8.7.9.4 Glycol manufacturer's data shall define the maximum permissible bulk temperature of the fluid and the maximum permissible temperature of the fluid's surface film that is exposed to the heat of the boiler's fire.

8.7.9.5 Boiler manufacturer's data shall include parameters and recommendations for protecting the fluid-and-inhibitor system against accelerated degradation due to the heat in the interior of the boiler. At least the following shall be defined:

a. Recommended flow velocity of the fluid through the boiler, to minimize the adherence of the glycol's boundary film on the inside of the boiler.
b. Recommendation regarding the use of forced and continuous circulation of the fluid through the boiler, regardless of what is happening in the system while it is in operation.
c. Recommended over-pressure shall be maintained on the boiler's gage.
d. Provide glycol manufacturer's recommendations of periodic monitoring and analysis of the fluid's condition.

8.8 Heating System:

8.8.1 The hot water heating systems shall include cast iron type hot water boilers and circulation pumps. Heating system shall utilize a primary/secondary pumping arrangement. If the motors for the distribution pumps exceed 7.0 kW then the distribution loop shall be designed for variable flow and the pumps shall be controlled by variable frequency drives.

8.8.2 There shall be not less than two hot water distribution pumps for each building, one of which shall be operating and the other on automatic standby. Each pumps shall be selected for the full hot water flow rate. Pumps shall be base mounted and selected for non-overloading operation at all conditions. The controls shall activate the lead/lag pumps daily and to equalize their running hours.

8.8.3 Piping and Accessories. Hot water distribution piping shall be piped in a reverse return configuration. Heating water piping shall be Type L copper or ASTM A53 SCH 40 black steel. Ball valves shall be utilized for sizes up to 3", larger piping shall be equipped with gate valves. Piping supports shall be in accordance with MSS SP-59 and MSS SP-69. System shall include an air separator, expansion tank, chemical bypass feeder, and makeup water connections. Equip circulation pumps with strainers, check valve, calibrated balancing valve, flexible couplings and isolation valves to permit pump maintenance. The pump body drain and all air vents shall be piped to nearest floor drain. Provide pressure gages arranged such that pump differential pressure may be witnessed. Entire pump assembly on base mounted pumps shall be mounted on a structural steel frame equipped with housed spring vibration isolators. Provide manual balancing or automatic water flow control valves at each coil and balancing valve in each loop of piping branch.

8.8.4 Horizontal runs of piping outside of the Mechanical Room shall be placed within interstitial spaces located above the suspended ceilings. Riser piping shall not be run within interior partitions or exterior walls. Contractor shall provide suitable enclosures for all vertical risers.

8.8.5 All HVAC hot water piping shall be insulated with mineral fiber insulation. Valves and fittings shall be insulated with insulation of the same material and thickness as insulation on adjacent pipe and shall have a molded PVC jacket. Insulation thickness shall be as indicated in UFGS 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Piping passing through hangers shall be supported on insulation shields. Installation shall be with full length units of insulation and using a single cut piece to complete a run. Cut pieces or scraps abutting each other shall not be used. Where insulated pipes pass through fire walls, fire partitions, above grade floors, and fire rated chase walls, the penetration shall be sealed with fire stopping materials.

8.8.6 Insulate all hot water system equipment such as pumps, air separators, storage tanks, and expansion tanks. Equipment shall be insulated with rigid mineral fiber, or flexible mineral fiber insulation. Insulation shall be formed or fabricated to fit the equipment. Removable insulation sections shall be provided to cover parts or equipment which must be opened periodically for maintenance including vessel covers, fasteners, flanges, and accessories. Secure with insulation with stainless steel bands.

8.8.7 Automatic controls shall provide linear reset of glycol temperature, depending on the outdoor air temperature:

OA Temp.	Glycol Temp.
(-)15°C	93°C
18°C	66°C

8.9 Air-Cooled Water Chiller:

8.9.1 Packaged air-cooled water (glycol antifreeze solution) chillers shall provide the central source of the cooling media for the buildings. The water chiller shall be located outdoors.

8.9.2 Chillers shall be selected for using a propylene glycol solution. Chiller submittals shall clearly show the de-rated capacity of the chillers for the concentration of propylene glycol solution that is to be used in the system.

8.9.3 Packaged air cooled liquid chillers. Units shall be assembled, leak-tested, charged (refrigerant and oil), and adjusted at the factory. Chiller shall be provided with factory installed insulation on surfaces subject to sweating including the liquid cooler, suction line piping, economizer, and cooling lines. Chiller shall include all customary auxiliaries deemed necessary by the manufacturer for safe, controlled, automatic operation of the equipment. Chiller shall be provided with a single point wiring connection for incoming power supply. Factory installed insulation shall be provided on all suction piping from the evaporator to the compressor and on the liquid cooler shell. Where motors are the gas-cooled type, factory installed insulation shall be provided on the cold-gas inlet connection to the motor per manufacturer's standard practice. Compressors shall be scroll, reciprocating, rotary screw or centrifugal type. Scroll and reciprocating chillers shall be constructed and rated in accordance with ARI 590. Rotary screw chillers shall be constructed and rated in accordance with ARI 550 or ARI 590 as applicable. Centrifugal chillers shall be constructed and rated in accordance with ARI 550. Chiller shall conform to ASHRAE 15. Refrigerants shall be one of the fluorocarbon gases. Refrigerants shall have number designations and safety classifications in accordance with ASHRAE 34. Refrigerants shall meet the requirements of ARI 700 as a minimum. Refrigerants shall have an Ozone Depletion Potential (ODP) of less than or equal to 0.05. Chiller shall be provided with a complete factory mounted and prewired microprocessor based control system. Controls package shall contain as a minimum a digital display or acceptable gauges, an on-auto-off switch, motor starters, power wiring, control wiring, and disconnect switches. Controls package shall provide operating controls, monitoring capabilities, programmable setpoints, safety controls, and EMCS interfaces. Chiller’s minimum efficiency shall be in accordance with the latest version of ASHRAE 90.1.

8.9.4 Provide concrete mounting pad on grade sized as required to allow for service and NEC clearances in accordance with the manufacturer's written installation instructions and recommendations for maintenance, access and unobstructed condenser air intake flow.

8.9.5 The chilled water (glycol solution) piping system shall be field-coupled to an air-cooled chiller unit by means of factory-fabricated & insulated underground, FFIU, piping routed between the ground floor mechanical room and the water chiller located outdoors.

8.9.6 Chiller Warranty. The Contractor shall provide a 5 year parts only (excludes refrigerant) manufacturer's warranty on the chiller compressor(s). This warranty shall be directly

from the chiller manufacturer to the Government and shall be in addition to the standard one-year warranty of construction. The manufacturer's warranty shall provide for the repair or replacement of the chiller compressor(s) that become inoperative as a result of defects in material or workmanship within 5 years after the date of final acceptance. When the manufacturer determines that a compressor requires replacement, the manufacturer shall furnish new compressor(s) at no additional cost to the Government. Upon notification that a chiller compressor has failed under the terms of the warranty, the manufacturer shall respond in no more than 24 hours. Response shall mean having a manufacturer-qualified technician onsite to evaluate the extent of the needed repairs. The warranty period shall begin on the same date as final acceptance and shall continue for the full product warranty period.

8.10 <u>Cooling System:</u>

8.10.1 The chilled water system shall have an air cooled chiller(s) and all required accessories. The chiller components exterior to the building shall be protected from freezing through the use of a propylene glycol solution in the chilled water system. Manufacturer's standard packaged controls shall be provided to handle all aspects of compressor staging and safeguarding, including phase loss.

8.10.2 There shall be not less than two chilled water pumps for each building, one of which shall be operating and the other on automatic standby. Each pump shall be selected for the full chilled water flow rate. Pumps shall be base mounted and selected for non-overloading operation at all conditions. The controls shall activate the lead/lag pumps daily and to equalize their running hours.

8.10.3 If the motors for the distribution pumps exceed 7.0 kW then a primary/secondary pumping arrangement shall be used, the distribution loop shall be designed for variable flow and the pumps shall be controlled by variable frequency drives.

8.10.4 Chilled Water Piping. Chilled water distribution piping shall be piped in a reverse return configuration. Chilled water piping system shall include an air separator, expansion tank, chemical bypass feeder, makeup water connections, temperature and pressure ports, temperature and pressure gages, flow switch, and all other required appurtenances. Pumps shall be equipped with strainers, check valve, balance valve, flexible couplings and isolation valves to permit pump maintenance. Provide pressure gages arranged such that pump differential pressure may be witnessed. If the volume of chilled water in the system is less than seven gallons per ton of chiller capacity a storage tank shall be provide. The storage tank shall be sized to ensure that chilled water system volume is greater than the minimum water volume ratio (seven gallons per ton of chiller capacity).

8.10.4.1 Horizontal runs of piping outside of the Mechanical Room shall be placed within interstitial spaces located above the suspended ceilings. Riser piping shall not be run within interior partitions or exterior walls. Contractor shall provide suitable enclosures for all vertical risers.

8.10.5 The above ground chilled water piping shall be in accordance with 15181A Chilled and Condenser Water Piping and Accessories.

8.10.6 Underground chilled water piping shall be in accordance with UFGS 02555A

Prefabricated Underground Heating/Cooling Distribution System.

8.10.7 All aboveground chilled water piping shall be insulated with cellular glass or flexible elastomeric cellular insulation. Jacketing for outdoor applications shall be .016 inch aluminum. Insulation on valves, elbows and fittings shall be protected using PVC covers. Insulation thickness shall be as indicated in UFGS 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS. Piping passing through hangers shall be supported on insulation shields. Installation shall be with full length units of insulation and using a single cut piece to complete a run. Cut pieces or scraps abutting each other shall not be used. Where insulated pipes pass through fire walls, fire partitions, above grade floors, and fire rated chase walls, the penetration shall be sealed with fire stopping materials. All below ground chilled water insulation shall be insulated in accordance with UFGS 02555A PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM.

8.10.8 Insulate all chilled water system equipment such as pumps, air separators, storage tanks, and expansion tanks. Equipment shall be insulated with cellular glass or flexible elastomeric cellular insulation. Insulation shall be formed or fabricated to fit the equipment. Removable insulation sections shall be provided to cover parts or equipment which must be opened periodically for maintenance including vessel covers, fasteners, flanges, and accessories.

8.11 **Freeze Protection**:

8.11.1 All chilled water and hot water piping shall be protected from freezing by use of a propylene glycol mixture. Contractor shall provide chemical treatment, glycol fill station and all required hydronic controls and accessories for all hydronic systems. Glycol concentration shall be sufficient to protect the system against freezing in temperatures down to (-)29°C.

8.11.2 The heating and cooling system’s propylene glycol solution shall be provided with corrosion inhibitors supplied by the glycol manufacturer.

8.11.3 Provide an automatic, chemical water treatment system. Glycol make-up tank volume shall be a minimum of 189 liters. The treatment shall be compatible with the chemicals used by the glycol manufacturer. It shall bring the water quality to a level complying with the boiler manufacturer's specifications and the glycol manufacturer's recommendations. The use of products containing hexavalent chromium (Cr) is prohibited.

8.11.4 Provide test kits and a test coupon assembly with balancing valve, shut-off valve, and plugged tees for sampling connections, 25 mm diameter. Provide a drum-mounted, manually operated bung pump for the transfer of glycol into the storage and makeup/fill tank. The glycol make-up system shall automatically operate on reduction of system pressure. Provide a makeup water line with a hose bib and a back-flow preventer for filling glycol tank. No direct connection between the fill tank and the domestic water shall be made. Tank will be filled indirectly using a portable flexible hose.

8.11.5 Fluid level in the glycol tank shall be monitored by the DDC system and shall send an alarm (latching type) to the Heat Shop when the fluid level is low.

8.12 Air Handling Units:

8.12.1 Air handling units shall be double wall draw-through configuration, provided with a forward curved, belt driven, centrifugal supply fan; internal vibration isolators; chilled

water (glycol solution) cooling coil, access section; hot water (glycol solution) heating coil; 30% pre-filter and 85% cartridge; filters; and mixing box complete with automatic air dampers; double wall galvanized steel casing; galvanized steel frame; condensate drain pan; high efficiency motor with adjustable sheaves; and electronic, direct digital type automatic temperature controls to facilitate operation in the "occupied"/"unoccupied" modes of operation. The air handling units shall be provided with a discharge duct smoke detector, to be wired to the fire alarm control panel under the Electrical Division of the specifications. Contractor shall provide a sound-attenuating plenum downstream of the supply fan section to allow for top supply, air duct take-offs.

8.12.2 Air handling units shall be floor-mounted on minimum of 100 mm thick reinforced concrete pad or suspend units on 16 mm diameter galvanized threaded rods and supplemental galvanized trapeze angle support steel members with spring type, seismically restrained suspension vibration isolators and diagonal sway bracing. Access space for service and maintenance shall be provided in accordance with code and manufacturer's recommendations. If AHU's are suspended, the Contractor shall provide service platforms with access; these shall comply with OSHA requirements. Provide horizontal or vertical coil pull space for all coils.

8.12.3 Design build team shall include in their proposal provisions in their design for ease of maintenance. Proposals shall address how maintenance will be achieved, i.e. coil pull, motor and fan change outs.

8.12.4 Heating and cooling coil piping connections shall be provided with isolation valves, automatic control valves, calibrated balancing valves, strainers, temperature and pressure test plugs. Condensate drain piping of Type M copper shall be coordinated with the sanitary sewer drainage piping design. The condensate drainpipe shall be provided with a P-trap of height adequate to offset the unit draw-through fan total pressure in inches-water-gauge, plus one-inch water-gauge pressure. Air handling unit locations shall be coordinated with all disciplines. Outside air shall be taken into each air handling unit in accordance with the outside air system design parameters. Make-up air shall be taken through louvers in the exterior wall, pitched at bottom back toward louver, properly ducted to the units, and shall be coordinated with the locations of relief and exhaust louvers to prevent "short circuiting" of intake and exhaust air. Intake openings shall be located at least 3 meters away (horizontally) from the relief/exhaust outlets, and at least 0.6 meters below them.

8.12.5 When on the heating cycle, the air-handling unit shall supply tempered air at a constant temperature, determined by an adjustable setpoint. The heat loss through the building's exterior envelope shall be offset by the building's hydronic terminal radiation heating system.

8.12.6 Freeze protection shall be accomplished by monitoring the air handling units discharge air temperature. When the discharge air temperature falls 5 deg C below the leaving air temperature set point the DDC system shall send a signal to stop fan, close the outside air damper, and send an alarm to the control system.

8.12.7 <u>Energy Recovery Equipment: If the design build team chooses to include energy recovery devices in their design, the devices must comply with the requirements listed below.</u>

8.12.7.1 Plate heat exchangers. Unit shall be a factory fabricated and tested assembly for stationary air-to-air energy recovery by transfer of sensible heat from exhaust air to supply air stream. Heat transfer surface shall be constructed of aluminum. Enclosure shall be fabricated from galvanized steel and shall include maintenance access provisions.

8.12.7.2 Rotary heat exchangers. Unit shall be a factory fabricated and tested assembly for air-to-air energy recovery by transfer to sensible heat from exhaust air to supply air stream. Device performance shall be according to ASHRAE 84. Exchange media shall be chemically inert, moisture-resistant, fire-retardant, laminated, nonmetallic material which complies with NFPA 90A. Exhaust and supply streams shall be isolated by seals which are static, field adjustable, and replaceable. Chain drive mechanisms shall be fitted with ratcheting torque limiter or slip-clutch protective device. Enclosure shall be fabricated from galvanized steel and shall include maintenance access provisions.

8.12.7.3 Heat recovery coils. Coil assembly shall be factory fabricated and tested air-to-liquid-to-air energy recovery system for transfer of sensible heat from exhaust air to supply air stream. System shall deliver an energy transfer of sensible heat from exhaust air to supply air stream. System shall deliver energy transfer effectiveness without cross-contamination with maximum energy recovery at minimum life cycle cost. Components shall be computer optimized for capacity, effectiveness, number of coil fins per mm, number of coil rows, flow rate and frost control.

8.12.7.4 Heat pipe. Device shall be factory fabricated, assembled and tested, counterflow arrangement, air-to-air heat exchanger for transfer to sensible heat between exhaust and supply streams. Device shall deliver energy transfer effectiveness without cross-contamination. Heat exchanger tube core shall be seamless aluminum or copper tube with extended surfaces, utilizing wrought aluminum Alloy 3003 or Alloy 5052, temper to suit. Tubes shall be fitted with internal capillary wick, filled with an ASHRAE 15, Group 1 refrigerant working fluid, selected for system design temperature range, and hermetically sealed. Heat exchanger frame shall be constructed of not less than 16 gauge galvanized steel and fitted with intermediate tube supports, and flange connections. Tube end-covers and a partition of galvanized steel to separate exhaust and supply air streams without cross-contamination and in required area ratio shall be provided. A drain pan constructed of welded type 300 series stainless steel shall be provided. Heat recovery regulation shall be provided by system face and bypass dampers and related control system as indicated interfacing with manufacturer's standard tilt-control mechanism for summer/winter operation, regulating the supply air temperature and frost prevention on weather face of exhaust side at temperature indicated. Coil shall be fitted with pleated flexible connectors.

8.13 **Ductwork and Accessories**: These shall comply with UFGS 15895 Air Supply, Distribution, Ventilation, And Exhaust System and guidelines provided in applicable paragraphs of this Section.

8.13.1 Ductwork shall be constructed of sheet metal to SMACNA HVAC Duct Construction Standards, latest edition. Fiberglass duct work will not be allowed. Each supply duct branch shall be fitted with a manual balancing damper. Return air shall be ducted to unit

from each space. Ceiling return air plenums shall not be used. All ductwork shall be tested in accordance with SMACNA. Access must be provided to all devices or areas that may require periodic inspection, including but not limited to balancing devices, motor operated dampers, flow measuring stations, smoke/fire dampers, etc. Ductwork shall be sealed in accordance with ASHRAE 90-1-1999. All exposed ductwork shall be round double wall spiral seam type with internal insulation and matching fittings.

8.13.2 Flexible Duct. Flexible duct shall be limited to runouts and, shall be adequately supported to prevent kinks. The length of flexible duct shall not exceed 1.5 meters. Design build team shall insure that this requirement is reflected in the written specifications. Flexible duckwork shall be preinsulated, factory fabricated, and conform with NFPA 90 and UL 181.

8.13.3 Contractor shall coordinate duct locations with all other disciplines.

8.13.4 All ductwork, duct openings and plenums shall be designed to a maximum RC Mark II value of 35(N) per ASHRAE Applications Volume (latest edition).

8.13.5 Ductwork Insulation: All ductwork shall be insulated in accordance with the latest version of ASHRAE Standard 90.1.

8.13.6 Ductwork shall be lined 3 meters from the AHU's and fans or to the second 90º elbow, whichever is longest. Lined ductwork shall be 25 mm thick, 24 Kg/m^3 acoustic fiberglass liner with vinyl or neoprene coating. Where internally lined duct meets unlined ductwork, all exposed edges and transverse joints shall be field-encapsulated with manufacturer's edge coating and shall be neatly butted without gaps. Liner installation shall comply with "NAIMA Duct Liner Installation Guidelines."

8.13.7 Ventilation and Exhaust Openings: Outdoor Air intakes shall be placed at least 3 m above floor/grade level, in soffits or roof overhangs. Exhaust and relief outlets shall be located in the gabled walls of the Loft, at not less than 3 m above ground. Louvers shall be removable with self draining plenums sized for the effective louver area.

8.13.7.1 Exhaust and relief vents shall not be located near outdoor intakes, to prevent short-circuiting of exhaust/relief and outside air intake.

8.13.8 Acoustic Requirements: An acoustic analysis shall be performed for each air handling unit, air inlet and air outlet, and in accordance with the RC Mark II method outlined in the latest edition of ASHRAE Applications Handbook. The following Room Criteria ratings shall be required:

Maximum Permissible RC(N) Mark II Values of Background Noise Due to the HVAC System	
ROOM	RC(N)
Living/Sleeping	35
Office Spaces	35
Occupied Spaces	35
Corridors	40
Multi-Purpose	40
Toilets	40
Vestibules	45

8.13.9 Volume Dampers: Manual-balancing dampers shall be furnished with accessible operating mechanisms. Where operators occur in finished portions of the building, operators shall be chromium plated with all exposed edges rounded. Two rods are required on splitters over 203 mm. Manual volume control dampers shall be operated by locking-type quadrant operators. Dampers and splitters shall be 2 gauges heavier than the duct in which installed. Unless otherwise indicated, multi-leaf dampers shall be opposed blade type with maximum blade width of 305 mm. Access doors or panels shall be provided for all concealed damper operators and locking set-screw and bushing. Unless otherwise indicated, the locking-type quadrant operators for dampers, when installed on ducts to be thermally insulated, shall be provided with stand-off mounting brackets, bases, or adapters to provide clearance between the duct surface and the operator not less than the thickness of the insulation. Stand-off mounting items shall be integral with the operator or standard accessory of the damper manufacturer. Volume dampers shall be provided on all runouts to supply outlets and return/exhaust inlets, regardless of any dampers that are furnished integral with air inlets and outlets. Contractor shall also provide balancing dampers in all duct branches in outdoor air intake ducts and exhaust ducts, as needed for system balancing.

8.13.10 Air Filters: Two-stage air filtration shall be provided for the air-handling units. Pre-filters shall be 25 to 30% efficient, and final filters shall be 85% efficient, as defined by ASHRAE 52.1. All filters shall be UL Class 2.

8.13.10.1 Each filter stage shall be monitored by the DDC system and shall send an alarm (latching type) to the Heat Shop when filters are required to be changed. Filter pressure drop that indicates filters need to be changed shall be determined by the filter manufacturer.

8.13.11 Fire and Fire/Smoke Dampers: Fire dampers shall be fire rated according to the areas being protected. Fire dampers shall conform to the requirements of NFPA 90A, UL 555, and UBC. Fire dampers shall be installed in accordance with NFPA 90A. Fire dampers shall be automatic operating type and shall have a dynamic rating suitable for the maximum air velocity and pressure differential to which they will be subjected. Fire and Fire/Smoke dampers shall be approved for the specific application, and shall be installed according to their listing. Fire dampers shall be Type "B", with curtain blades outside of the air stream in their unreleased, retracted position. Penetrations of “rated ceilings” shall be protected as required by NFPA and UL. Fire/Smoke Dampers shall comply with UL 555 and UL 555S, respectively.

8.13.12 Diffusers, Grilles and Registers: Air distribution devices shall be factory-fabricated of steel, corrosion-resistant steel, or aluminum and shall distribute the specified quantity of air evenly over space intended without causing noticeable drafts, air movement faster than 0.25 m/s in occupied zone, or dead spots anywhere in the conditioned area. Selection and placement of diffusers should be based on meeting the Air Diffusion Performance Index listed in paragraph 8.3.3. Inlets and outlets shall be sound rated and certified according to ASHRAE Standards. Diffusers and registers shall be color coordinated with the Architectural Design.

8.14 **Factory-Fabricated & Insulated Underground (FFIU) Piping:**

8.14.1 Factory-fabricated, insulated and jacketed underground piping designed for the distribution of chilled water/glycol solution.

8.14.2 Carrier Pipe: A-53 Grade B ERW in Schedule 40.

8.14.3 Insulation: Polyurethane foam with the following minimum characteristics: K Factor = 0.13, Density = 2 pcf, Closed Cell Content = 90-95% in conformance with MIL-1-24172 and ASTM C-591 completely filling the annular space between carrier pipe and jacketing.

8.14.4 Jacketing Material: High impact, seamless Polyvinylchloride (PVC) Class 12454-B compound conforming to ASTM 1784, Type 1, and Grade 1. (No FRP jacketing will be allowed.) Minimum jacket thickness shall be as listed below:

8.14.4.1 Nominal pipe size: 152 mm
8.14.4.2 Minimum insulation thickness: 44 mm
8.14.4.3 Jacket size: 203 mm
8.14.4.4 Jacket thickness: 80 mills minimum

8.14.5 All fittings shall conform to pipe type and shall be insulated and jacketed with materials supplied by the system supplier and as per manufacturers' standard procedures. Fittings shall be fitted with a watertight mastic end seal at jacket and pipe surfaces.

8.14.6 Each length of pre-insulated pipe shall be joined by welding. After welding and testing, all joints shall be insulated and sealed as per manufacturer's standard procedures. All field cuts shall be sealed with a field applied end seal.

8.14.7 Anchors shall be 12.7mm thick plate steel attached to internal pipe and sealed to pipe jacketing as per system supplier's recommendations.

8.14.8 Installation, backfill and testing shall be in strict accordance with manufacturer's instructions. Inspection and certification by manufacturer's representative are required.

8.14.9 Manufacturer of FFIU shall submit copy of certificate to the effect that installation of FFIU conforms to manufacturer's requirements.

8.15 **Commissioning**: The final design will include all the supporting data listed in paragraphs k and l of Chapter 9, of publication TI-800-03.

SECTION 9.0 - MECHANICAL - PLUMBING DESIGN

9.1 **Requirements, Criteria Sources and References:** Design and installation shall conform to the latest edition of the references listed below, unless otherwise indicated herein.

9.1.1 Commercial Codes and Design Manuals: Design and installation shall conform to the latest editions of the referenced listed below, unless otherwise indicated herein.

9.1.1.1 International Standard Plumbing Code (IPC)
9.1.1.2 NANP 1110-1-1, US Army Corps of Engineers, New York District (NAN), Manual of Standard Procedures for Planning and Design
9.1.1.3 TI 800-01, Design Criteria
9.1.1.4 TI 800-03, Technical Instructions Technical Requirements for Design Build
9.1.1.5 TI 809-04, Seismic Design for Building (Refer to Section 6.0)
9.1.1.6 EM 385-1-1, US Army COE Safety and Health Requirements Manual
9.1.1.7 ER 414-1-10, Contractor Submittal Procedures
9.1.1.8 ER 415-345-42, Construction Costs, Cost Estimating and Reserves for Contingencies
9.1.1.9 ER 1110-1-263, Chemical Data Quality Management for HTW Remedial Activities
9.1.1.10 ER 1110-345-122, Interior Design
9.1.1.11 ER 1110-345-700, "Design Analysis"
9.1.1.12 ER 1110-345-710, "Drawings, Military Construction"
9.1.1.13 ER 1110-345-720, "Specifications, Military Construction"
9.1.1.14 TM 5-785-1, "Engineering Weather Data"
9.1.1.15 TM 5-810-5, Plumbing
9.1.1.16 UFC 3-420-01FA, Design: Plumbing Control Systems
9.1.1.17 Unified Facilities Guide Specifications for use with SPECSINTACT Version 3.1.270 or later software
9.1.1.18 Current Version of Tri-Service A/E/C CADD Standards, Special Data Standards, and A/E Deliverable Standards
9.1.1.19 New Army Barracks Construction Criteria, dated July 11, 2002
9.1.1.20 ETL 1110-3-489, Domestic Water Heaters for Barracks
9.1.1.21 American Society of Testing Materials (ASTM)
9.1.1.22 Underwriters Laboratories (UL)
9.1.1.23 National Fire Protection Association (NFPA)
9.1.1.24 National Institute of Occupational Safety and Health (NIOSH) Standards
9.1.1.25 Occupational Safety and Health Administration (OSHA) Standards
9.1.1.26 ETL 1110-3-491, Sustainable Design for Military Facilities
9.1.1.27 Sustainable Project Rating Tool (SPiRiT)
9.1.1.28 American National Standards Institute (ANSI)
9.1.1.29 American Society of Mechanical Engineers (ASME)
9.1.1.30 American Society of Sanitary Engineering (ASSE)
9.1.1.31 FCCHR-01 Manual of Cross Connection Control
9.1.1.32 Plumbing and Drainage Institute (PDI)
9.1.1.33 American Gas Association (AGA)
9.1.1.34 ARI 1010 and Lead Contamination Control Act for Water Coolers

9.1.1.35 American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)

9.1.1.36 American Water Works Association (AWWA)

9.2 **Functional and Technical Requirements:**

9.2.1 Plumbing system shall be designed and installed in accordance with the latest edition of the International Standard Plumbing Code (IPC). Inspection and testing of the plumbing system shall be performed as prescribed in the IPC. Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacturer of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily at least two years prior to bid opening.

9.2.2 Design Calculations:

9.2.2.1 Domestic hot water heater design for barracks buildings shall be based on Army Technical Letter ETL 1110-3-489, Domestic Water Heaters for Barracks. All other water heaters shall be sized based on the methods described in the ASHRAE Applications Handbook, for a 50ºC rise.

9.2.2.2 Piping design shall be based on the IPC for domestic water, sanitary waste and vent piping. All water piping shall be sized to limit water velocity in the pipe to 2440 mm/sec, unless a lower velocity is recommended by the plumbing fixture manufacturer. An isometric diagram of the water system and sanitary sewer system shall be included in the design submittal.

9.2.3 Domestic Water Heater System:

9.2.3.1 Hot water will be stored at 60°C and delivered to the plumbing fixtures at 60°C (kitchen fixtures), 49°C (laundry equipment) and43°C (all other plumbing fixtures) through the use of a thermostatic mixing valve.

9.2.3.2 A minimum of (2) two modular condensing boilers shall be provided. Burners utilizing pulse combustion principles will not be accepted. Controls shall be provided to allow for staggered and lead-lag operation and shall be integrated with the building DDC system. Control Panel shall be located for easy access and have a protective cover, which can be removed with no tools. Solid-state controls shall be used to monitor and control all operating and safety functions. Standard operating controls and equipment shall include ignition, operating aquastat, manual re-set hi-limit, automatic main and redundant gas valve, master switch with pilot light, inlet/outlet temperature gauges, ASME safety relief valve and flow switch. Boilers shall be equipped for 120 V, single phase, 60 Hertz. Complete factory certified operating and start-up instructions shall be furnished with unit.

9.2.3.3 The jacket panels shall be steel construction and coated with a baked-on enamel finish. All waterways shall be of copper/brass construction. The heat exchanger shall employ a drain to remove corrosive condensate. Boiler heat exchanger shall carry a minimum 5 year warranty.

9.2.3.4 Each boiler shall utilize a separate pump to maintain constant circulation through the boiler whenever boiler is enabled. Circulation rate shall be in accordance with manufacturer's recommendations.

9.2.3.5 Unit shall meet or exceed ASHRAE 90.1b-1992.

9.2.3.6 Each boiler shall have a minimum combustion efficiency rating of 88% and designed for operation up to 414kPa pressure. Burners, fuel/air combustion passage and exhaust manifolds shall be of stainless steel, copper-nickel and/or of corrosion-resistant construction. The burner gas train shall be AGA and FM approved. Provide all required boiler safety devices, forced or induced draft natural gas burners and suitable only for direct venting applications. The boilers shall be equipped with ASME rated pressure relief valves. Boiler combustion safety controls shall utilize LED readout.

9.2.3.7 The selected boilers shall have the smallest footprint possible and shall be mounted and anchored on a 100 mm thick reinforced concrete housekeeping pad with a 100 mm clear space from the boiler to the edge of the pad. All code-mandated and manufacturer's specified maintenance clearances shall be provided in the mechanical room containing the boilers.

9.2.3.8 Domestic water heating storage tanks shall have round, glass-lined tanks, and shall be installed with an integral insulating wrap with a minimum R value of 5. Access shall be provided in the wrap for service and maintenance openings. Storage tanks that are not equipped with integral heat traps and having vertical pipe risers shall be installed with heat traps directly on both the inlet and outlet. Circulating systems need not have heat traps installed. A pressure/temperature relief valve and drain shall be provided for the storage tanks. Storage tanks shall be mounted on and anchored on 100 mm thick to reinforced concrete housekeeping pads with a 100 mm clear space from the tank to the edge of the pad.

9.2.3.9 The boiler room shall be provided with natural gas and carbon monoxide gas leakage monitoring devices. These devices shall be connected to the fire alarm control panel, and shall effect automatic shutdown of gas to the building, upon detection of natural gas leakage or carbon monoxide.

9.2.3.10 Direct venting shall be horizontal type, furnished and installed in strict accordance with manufacturer's installation instructions. Masonry chimneys shall not be used.

9.2.3.11 Circulating pumps for domestic hot water shall be electrically driven single stage centrifugal type. Pumps will be of bronze construction.

9.2.3.12 Provide pressurized expansion tanks for all water heaters.

9.2.4 Fixtures: Fixtures shall be water conservation type in accordance with the IPC. Fixtures shall be provided complete with fittings, and chromium or nickel-plated brass (polished bright or satin surface) trim.

9.2.4.1 Vitreous china plumbing fixtures shall conform to ANSI A112.19.2, Vitreous China Plumbing Fixtures. Stainless steel fixtures shall be in accordance with ANSI A112.19.3, Stainless Steel Plumbing Fixtures (residential design). Plastic fixtures shall conform to ANSI Z124. Enameled cast iron plumbing fixtures shall comply with ANSI A112.19.1, and enameled steel fixtures shall comply with ANSI A112.19.4.

9.2.4.2 Exposed traps shall be chromium-plated, adjustable-bent tube, 20-gauge brass. Concealed traps may be plastic (ABS).

9.2.4.3 Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories, bathtubs and kitchen sinks, or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Water flow shall be no more than .158 L/s from any faucet.

9.2.4.4 Shower and bath combination shall be controlled by a diverter valve. Shower and bath combinations shall be provided with waste fitting pop-up, concealed with all parts removable and renewable through the overflow and outlet openings in the tub. Showers and shower and bath combinations shall be equipped with a combination pressure balanced valve and flow control device to limit the flow to 0.158 L/s at pressures between 137.9 to 413.7 kPa.

9.2.4.5 Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except bathtubs and showers. Shutoff valves shall be provided for each bathroom group.

9.2.5 Water closets shall have vitreous china elongated bowl, direct fed siphon jet action, fully glazed 51 mm ballpass trapway, 40 mm top spud, 2 bolt caps and shall be floor mounted. Water consumption shall be no more than 6 L per complete flushing cycle. All waterclosets shall have toilet seats with covers except in the Public Restrooms where open front seats without covers are required. Flush valves shall be exposed at all locations.

9.2.6 Lavatories shall be wall mounted, vitreous china, a minimum of 508 by 457 mm in size in the Public Restrooms. Bathroom lavatories shall be integral with counter top. Lavatories shall have pop-up drains.

9.2.7 Bathtub/Shower combination shall be one piece gel coated with ceiling top, glass fiber reinforced polyester construction, minimum 1524 mm L x 762 mm W x 2136 mm H in size. Minimum surface thickness shall be 16 mils. Resin to filler content in reinforcement layers shall be greater than 70 percent. Factory cast pre-leveled bottoms for floor support and slide-in installation. Insulate and include stiffeners below bathtub.

9.2.8 Shower stalls shall be of ceramic tile, floor to ceiling, over membrane waterproofing on a cementitious substrate; or gel-coated, glass-fiber reinforced polyester. Shower receptors shall be slip resistant cast stone or gel-coated, glass-fiber-reinforced polyester. Shower stall wainscots shall be ceramic tile or gel-coated, glass-fiber-reinforced polyester. Soft PVC liners shall be installed for shower pans ceramic tile showers.

9.2.9 Kitchen sinks shall be Type 302 stainless steel, 20 gauge minimum, seamless drain and sound deadened. Sinks shall be single bowl, minimum 560 mm L x 495 mm W x 184 mm deep in size, self mounting without mounting rings, complete with cup strainer and plug.

9.2.10 Mop sinks shall be floor mounted, precast terrazzo or stainless steel construction, minimum 610 mm x 610 mm x 305 mm high in size with stainless steel caps on all curbs. Mop sink faucet shall be wall mounted chrome plated with vacuum breaker, integral stops, adjustable wall brace, pail hook, 20 mm hose thread on spout, 762 mm long flexible, heavy duty rubber hose and hose bracket.

9.2.11 Electric water coolers shall be wall mounted, stainless steel, lead free with front and side pushbars and have a capacity of 30 liters/hour. Water coolers shall conform to the requirements of ARI 1010 and the Lead Contamination Control Act of 1998. Each floor will have an electric water cooler and the ground floor unit shall be high-low type.

9.2.12 Mud Room utility sinks shall be floor mounted, enameled cast iron, minimum 610 mm x 510 mm x 305 mm deep in size with stainless steel rim guard. Sink shall have an enameled cast iron 77 mm P-trap with strainer. Sink faucet shall be rough plated with vacuum breaker.

9.2.13 Emergency eyewash shall be a wall mounted unit consisting of chrome plated brass sprayhead assembly with twin eye/face wash heads with pop-off covers, chrome plated brass 1/2" stay open ball valve manually operated by stainless steel push flag handle, integral stream control, dome strainer and drain fitting, heavy-gauge wall bracket, stainless steel bowl, and wall mounted identification sign. Eyewash shall be fitted with a tailpiece and p-trap with extension to wall. Floor drain will be provided at every emergency eyewash station. Eyewash stations shall be provided with tepid potable water in accordance with ANSI Z358.1-1998. Eyewash stations shall be spaced apart in accordance with ANSI Z358.1-1998.

9.3 **Piping Systems:**

9.3.1 Sanitary Sewer Piping System shall be service weight cast iron with hub and spigot, neoprene gasketed joints below slab and schedule 40 PVC plastic or copper DWV pipe and fittings above floor. Multi-storied buildings shall use service weight cast iron with hub and spigot, neoprene gasketed joints or hubless cast iron above ground. Plastic piping will not be used in multi-story buildings. Piping shall be extended 1.5 meters outside of building to civil portion of work. The sanitary sewer system will be vented in accordance with the IPC. Plumbing vents through roof should be located as close to ridge as possible and have extra supports due to winter conditions. Indirect waste and condensate piping system shall be Type "M" copper, insulated and must discharge through an air gap. Building drain shall be 100 mm minimum.

9.3.2 Domestic Water Piping System shall be Type "K" copper below slab and Type "L" copper above floor in accordance with ANSI B16.22 and ANSI B16.26 for copper fitting requirements. Piping shall be extended 1.5 meters outside of building to civil portion of work. All water piping above floor shall be insulated. Building water service shall be sized in accordance with the IPC. The entire water distribution shall be disinfected in accordance with AWWA Standards.

9.3.3 Provide domestic water service to the mechanical room from 5’-0” outside the building. Water service into the building will be sized for both domestic water and fire sprinkler systems. The water supply will be split immediate upon entering the building into the fire sprinkler service (capped for connection by the fire protection contractor) and the domestic water service riser. The domestic water service riser inside the mechanical room shall include main RPZ backflow preventer, and water meter with remote readout capability. Water meter shall connect to the DDC system.

9.3.4 Natural Gas Piping system will be designed and installed in conformance with manufacturer’s recommendations and applicable sections of ASME B31.8 and AGA-

01. The installation of interior natural gas distribution systems shall be in conformance with the provisions of NFPA 54 and AGA-01. The use of semi-rigid tubing and flexible connectors for gas equipment and appliances is prohibited, except that the final connections to the kitchen ranges shall be made using flexible connectors conforming to ANSI Z21.45, Flexible Connectors of Other Than All Metal Construction for Gas Appliances, not less than 1000mm long. Provide accessible gas shutoff valve and coupling for each gas equipment item. Comply with IBC or model code seismic requirements. Exposed horizontal piping shall not be installed farther than 150mm from the nearest parallel wall in laundry areas or areas where clothes hanging could be attempted. Steel pipe shall conform to ASTM A 53, Grade A or B, Type E or S, Schedule 40. Furnace butt-welded or screwed pipe may be used in sizes 40mm and smaller. Fittings 40mm and smaller shall conform to ASME B16.11. Pipe flanges and flanged fittings larger than 40mm, including bolts, nuts, and bolt patterns shall be in accordance with ASME B16.5, Class 150. Butt-weld fittings shall be in accordance with ASME B16.9. Weld neck flanges shall be used.

9.3.5 Provide a gas distribution system, connected to existing systems and designed in accordance with local codes, utility company requirements, or Ft. Drum DPW regulations, whichever is more stringent. Gas distribution systems shall comply with the requirements of ASME B31.8. When connecting to existing steel piping system, provision shall be made to ensure that the integrity of the cathodic protection is not compromised. Shutoff valves shall be provided on the exterior of each building. A gas meter and regulator shall be provided for each building structure. Existing lines that are to be abandoned shall be either removed or physically disconnected from all gas sources and purged. Abandoning existing gas piping shall be done in accordance with ANSI B31.8, Gas Transmission and Distribution Piping Systems. Installation of gas piping will be in accordance with ANSI B31.8 and 49 CFR 192. Polyethylene pipe shall conform to ASTM D2513, Standard Specification for Thermoplastic Gas Pressure Piping Systems, with fittings complying with either ASTM D2513 or ASTM D2683, Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing. All underground gas piping shall be polyethylene. Polyethylene valves shall match existing base standards. Connections to metal pipe shall comply with ANSI B16.5, Pipe Flanges and Flanged Fittings, or manufacturer's recommended standards. Lines shall not be placed under any buildings. Lines shall be placed with a minimum of 600mm of earth cover. Protective casings shall be provided to protect lines from superimposed street or heavy traffic loads. Interruptions of gas service for piping installation shall be approved by the Contracting Officer and Ft. Drum agencies. Gas meter will be located in the chiller yard. Protection shall be provided for the exposed gas meter and piping from snow and ice falling from the roof of the building. Gas meter must be capable to operate in temperature range of -40 to + 140 degrees F. Gas meter shall connect to the DDC system.

9.3.6 Piping shall be concealed except in Mechanical and Electrical Rooms.

9.3.7 Provide fire rated wall and floor penetrations where passing through fire rated construction.

9.3.8 Piping identification shall be in accordance with ASME A13.1.

9.3.9 Piping insulation type shall be fiberglass, closed cell foam, or phenolic foam and comply with ASTM E84, NFPA 255 and UL 723 Standards. Domestic cold water piping shall be insulated with a minimum of 13 mm insulation with vapor jacket. Domestic hot water runouts shall have 13 mm insulation with all service jacket. Hot water branches and mains 26 mm pipe size and below shall have 20 mm insulation with all service jacket. Hot water branches and mains greater than 26 mm pipe size shall have 26 mm insulation with all service jacket. Indirect and condensate waste piping shall be insulated with minimum of 13 mm insulation with vapor jacket.

9.3.10 No piping should be located in exterior walls, unheated attics or other areas subject to freezing**.** Contractor is to take all necessary measures in the design/construction to prevent pipes from freezing and rupturing.

9.3.11 All piping shall be seismically restrained.

9.4 **Miscellaneous Items:**

9.4.1 Cleanouts shall be provided at each change in direction of sanitary sewer lines, at the intervals specified in the IPC, and at the building service entrance. All cleanouts shall be permanently accessible. Provide access panels or cover plates in exposed areas. Ground cleanouts shall be installed in a 300mm by 300mm concrete pad, flush with grade.

9.4.2 Exterior wall hydrants shall be non-freeze, exposed, anti-siphon self draining type, with integral backflow preventer, bronze casing, polished bronze, wall plate, 20 mm hose thread spout and removable key. Provide additional shutoff valve in building. One hydrant shall be provided outside the Mechanical Room and at a maximum spacing interval of 45 meters around the exterior wall of the building. Wall hydrants shall have a minimum stem length of 2 feet. Supply piping should not be located in an exterior wall.

9.4.3 Interior hose bibbs shall be bronze or brass with replaceable hexagonal disc, 20 mm hose thread spout and vacuum breaker in conformance with ANSI/ASSE 1011. Hose bibbs shall be installed in each Mechanical Room. Combination hot and cold water hose bibbs shall be installed in the Mud Room (one at each boot cleaning station).

9.4.4 Washing machine hose boxes shall be recessed with single faceplate and shall be constructed of plastic or sheet steel. Steel boxes shall have a corrosion-resistant epoxy enamel finish. Washer connections shall include a 50 mm drain, 20 mm hose thread supplies, valve and stop body for hot and cold water with shut off valves. Boxes shall be mounted a minimum of 865 mm above the finish floor. Each washer shall have a hose box.

9.4.5 A positive-displacement type water meter assembly in compliance with AWWA C700 and a reduced pressure type backflow preventer in compliance with New York State Department of Health Standards shall be installed at the domestic water service entrance in the ground floor Mechanical Room of each building. Indirect waste from the backflow preventer device shall discharge through exterior wall and spill over grade.

9.4.6 Provide a hose bibb for the cold water makeup for any HVAC equipment. Hose bibb shall be protected by a backflow preventer device in compliance with New York State Department of Health Standards. NOTE: No direct water connection shall be made to the glycol system.

9.4.7 Water hammer arrestors shall be installed in accordance with ANSI A112.26.1 and PDI WH-201.

9.4.8 A capped cold water valved outlet and floor drain shall be provided in the vicinity of the ice machine located in the vending areas.

9.4.9 Provide 350mm x 350mm access panels for the shut-off valves at the tub/shower unit and the water closet in each bathroom.

9.4.10 Floor drains shall be installed in Mechanical Rooms, Laundry, gang toilet rooms, janitor rooms, for equipment requiring drainage and in the vicinity of ice machines. Floor drains shall be cast iron body and grate. Floor drains in gang toilet rooms shall ha a polished brass grate. All floor drain traps shall be automatically primed by single trap primers or where appropriate distribution unit type trap primers.

9.4.11 Mud Room boot washing area drains shall be all welded steel combination separator drains, minimum 765 mm x 1135 mm x 815 mm deep with 102 mm outlet with outlet vent connection, 50 mm internal rear vent connection, visible double wall outside trap seal, three (3) easily removable stainless steel grates with slotted inlet grate openings, grates suitable for pedestrian traffic, three (3) removable sediment and mud pans, separator screen, filter screen and epoxy coated. Drains shall connect to the storm water system. Provide freezproof hose bibbs at the mud room. The number of hose bibbs shall be as follows: 16 for large company, 10 for medium company and 6 for small company.

9.4.12 All waste piping containing grease shall be routed through a grease interceptor. Grease interceptor shall be of reinforced concrete, precast concrete construction or equivalent capacity commercially available steel grease interceptor with removable three-section, 9.5 mm checker-plate cover, and shall be installed outside the building. Steel grease interceptor shall be installed in a concrete pit and shall be epoxy-coated to resist corrosion as recommended by the manufacturer. Interceptors shall be tested and rated in accordance with PDI G 101. Concrete shall have 21 MPa minimum compressive strength at 28 days. Coordinate the location of grease interceptor with the Architect.

9.4.13 Provide concrete housekeeping pads under domestic water boilers.

9.4.14 Gas testing and purging shall be done in accordance with NFPA 54 and the Fort Drum DPW regulations. The written work plan for testing and purging of all gas piping shall be coordinated with and submitted for approval to the Fort Drum Public Works Department**.** Purging shall be interpreted as meaning full displacement of air with inert gas prior to opening any gas valve. Only nitrogen shall be used for purging. Refer to Appendix G.

9.4.15 Pipe insulation type shall be fiberglass, closed cell foam, or phenolic foam. Domestic service hot water piping minimum pipe insulation shall be in accordance with the requirements of the latest edition of ASHRAE/IESNA 90.1. Domestic service cold water piping shall be insulated with a minimum of 15mm insulation with vapor jacket. Roof drain piping. Provide 25mm thickness insulation on all horizontal piping.

9.4.16 All piping in crawl spaces shall be protected from freezing.

SECTION 10.0 - ELECTRICAL DESIGN

10.1 Applicable Codes, Regulations, Standards and Criteria:

10.1.1 Commercial Code and Standards: Design and installation shall conform to the latest editions of the references listed below, unless otherwise indicated herein.

10.1.1.1 IEEE C2, National Electrical Safety Code
10.1.1.2 ANSI C57.12.26 Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three Phase Distribution Transformers for use with Separable Insulated High-Voltage Connectors, High-Voltage, 34500GrdY/19920 Volts and Below; 2500 kVA and Smaller
10.1.1.3 ANSI C57.12.27 Conformance Requirements for Liquid-Filled Distribution Transformers Used in Pad-Mounted Installations, Including Unit Substations
10.1.1.4 ANSI C57.12.28 Switchgear and Transformers - Pad-Mounted Equipment - Enclosure Integrity
10.1.1.5 ANSI C84.1, Electric Power Systems and Equipment - Voltage Ratings
10.1.1.6 ANSI A117.1, Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People
10.1.1.7 EIA/TIA 568-B Commercial Building Telecommunications Cabling Standard, Parts 1 and 2
10.1.1.8 EIA/TIA 568-B.2-1 Transmission Performance Specifications for 4-Pair 100 Ohm Category 6 Cabling
10.1.1.9 EIA/TIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces
10.1.1.10 EIA/TIA 606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
10.1.1.11 EIA/TIA 607 Commercial Building Grounding/Bonding Requirements
10.1.1.12 IEEE C62.41 Surge Voltage in Low Voltage AC Power Circuits
10.1.1.13 IEEE Std 241 Electrical Power Systems in Commercial Buildings (The Gray Book.)
10.1.1.14 IEEE Std. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (The Buff book.)
10.1.1.15 IEEE Std. 48 Standard Test Procedures and Requirements for Alternating-Current Cable Terminations 2.5 kV through 765 kV
10.1.1.16 IEEE Std. 592 Exposed Semiconducting Shields on Premolded High Voltage Cable Joints and Separable Insulated Connectors
10.1.1.17 IEEE Std 404 Cable Joints for Use with Extruded Dielectric Cable Rated 5000V Through 138000 V and Cable Joints for Use with Laminated Dielectric Cable Rated 2500 V Through 500000 V
10.1.1.18 IES, Lighting Handbook
10.1.1.19 NFPA 70, National Electrical Code
10.1.1.20 NFPA 72, National Fire Alarm Code
10.1.1.21 NFPA 101, Code for Safety to Life from Fire in Buildings and Structures

10.1.2 Military Regulations and Criteria: The RFP and design shall conform to the latest editions of the references listed below, unless otherwise indicated herein.

10.1.2.1 NANP-1110-1-1, US Army Corps of Engineers New York District, Manual of Standard Procedures for Planning and Design
10.1.2.2 UFC 3-600-01, Fire Protection Engineering for Facilities.
10.1.2.3 TI 800-01 Technical Instructions Design Criteria Appendix B - Unaccompanied Personnel Housing & Appendix C – Dining Facilities
10.1.2.4 TI 809-4, Seismic Design for Buildings
10.1.2.5 TM 5-811-1, 1995 – Electrical Power Supply and Distribution
10.1.2.6 Unified Facilities Criteria (UFC 4-721-11.1) for Unaccompanied Enlisted Personnel Housing (UEPH) Complexes
10.1.2.7 Unified Facilities Criteria (UFC 520-01), Interior Electrical Systems
10.1.2.8 Installation Information Infrastructure Architecture (I3A) Implementation Guide

10.2 **General:**

10.2.1 All work shall comply with the latest edition of the National Electrical Code (NEC) and National Electrical Safety Code (NESC).

10.2.2 All materials, equipment, fixtures and appurtenances shall be listed or labeled by Underwriters Laboratories, Inc., or a similar organization acceptable to the Government.

10.2.3 All electrical work, including conduits and boxes, shall be concealed in finished spaces. Outlet boxes and wiring devices shall be flush-mounted in finished spaces. For this purpose, finished spaces include the entire building except for mechanical rooms, electrical rooms, electrical closets in the hallways, communications rooms, and janitor closets.

10.2.4 Provide power to all contractor furnished, contractor installed; government furnished, contractor installed; and government furnished, government installed equipment.

10.2.5 All equipment locations shall be coordinated prior to any rough-ins.

10.2.6 The Contractor shall provide all disconnect switches, motor starters, control equipment and control wiring for all equipment provided under this contract.

10.2.7 Any electrical work potentially affecting existing electrical or communication systems shall be coordinated through the Contracting Officer. Contact Contracting Officer in writing at least 14 days prior to any planned power or communications outages.

10.2.8 Excavation permits shall be obtained from the Fort Drum Public Works.

10.2.9 The installation must comply with the seismic requirements of TI 809-4. See section 6.0, Structural Design for further criteria.

10.2.10 Provide pull wires in all spare conduits. Cap spare conduits that do not terminate in equipment.

10.2.11 Firestop all penetrations in fire-rated elements (walls, decks, etc.).

10.2.12 Label all equipment and circuits. Label each end of spare conduits and cables with the location of the opposite end.

10.2.13 All information technology system work shall comply with the Installation Information Infrastructure Architecture (I3A) Implementation Guide.

10.2.14 All work shall comply with the latest edition of the Fort Drum Energy Guide.

10.2.15 Label all electrical equipment including panelboards, disconnect switches, motor starters, contactors, etc. Install wire markers for each conductor at panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

10.2.16 Demand factors may be applied to the kitchen equipment loads as permintted by the National Electrical Code. The demand factors shown in the National Electrical Code for dwelling units do not apply to the barracks buildings.

10.2.17 Raceways crossing structural expansion joints or seismic joints thall be provided with suitable expansion fittings or other suitable mean to compensate for the building expansion and contraction and to provide continuity of grounding.

10.2.18 In all conference rooms, provide a dedicated 20 amp, 120 volt circuit and duplex receptacle above ceiling in the center of the room to provide power to a future projector. In addition, extend 1 – 53 mm (2”) empty conduit from point adjacent to receptacle to a double gang sized junction box mounted at 460 mm (18”) above finished floor on a wall as designated by Contracting Officer. Raceway to be used for computer connection to projector. Provide a pullstring in the empty conduit.

10.3 **Exterior Electrical System:** The electrical primary distribution system at Ft. Drum is rated 13.2/7.62 kV, solidly grounded Y with multi-grounded neutral. The Contractor shall provide an underground electrical service to all new buildings. The existing buildings to be renovated have underground service. Where existing services require re-work all work shall be underground.

10.3.1 Primary Service: Splice the conductors in the existing 13.2 kV line in a designated existing manhole as shown on the site plan. A new feeder will serve the new Barracks/Dining Facility area from this tap. All splices shall be made with T-Bodies rated for the use on medium voltage conductors.

10.3.1.1 Provide a 15 kV class, 3-phase low-profile pad-mount fused sectionalizing enclosure (fuse terminal) next to the manhole where the connection will be made. Provide fuse terminals throughout the underground distribution as shown on the electrical site plans to achieve tap-offs to pad-mounted transformers and for conductor pulling purposes. Provide fuse terminals no less than 90 meters apart for ease of conductor pulling. Provide 4 sets of terminals in each fuse terminal: 2 – sets for the main line (source side), 1 – set for the (load side), and 1 – set for a spare tap (load side). Size each set for the new loads in this project, plus 50% spare. Provide fuses on the load side terminal, sized for the new loads. Fuses in terminal shall be ELX type. Provide 12 additional spare cartridges.

10.3.1.2 Provide an underground non-reinforced concrete encased duct bank with three (1 active and 2 spare) 129 mm (5") non-metallic PVC conduits from the fuse terminal to each new pad mounted transformer. Provide warning tape with a suitable legend above the duct bank. Where ductbanks are run beneath roadways, provide additional reinforcement.

10.3.1.3 Provide spare conduits from the tap section of the fuse terminal unit to the existing manhole and from the spare tap section of the fuse terminal to a point approximately 1.5 m (5 feet) from the fuse terminal. Provide spare conduit at all other fuse terminals from the spare tap section in the same manner.

10.3.1.4 Minimum cover for the primary power duct bank shall be 762 mm (30") below finished grade.

10.3.1.5 Medium-voltage cable joints shall comply with IEEE Std 404 and IEEE Std 592. Medium-voltage cable terminations shall comply with IEEE Std 48. Joints shall be the standard products of a manufacturer and shall be of the factory preformed type. Joints shall have ratings not less than the ratings of the cables on which they are installed. Splice kits shall be of the premolded splice and connector type. Joints used in manholes, handholes, vaults and pull boxes shall be certified by the manufacturer for waterproof, submersible applications. Tape type splices are **not** acceptable. Medium-voltage cable joints shall be made by qualified cable splicers only. Underground splicing kits shall be 15 kV class heat-shrink or type RTE splices and terminations shall be 15kV class, separable insulated connectors, type BOL-T connectors, or approved equal.

10.3.2 Primary Conductors: All line side primary conductors shall be sized (3) 500 MCM, (1) 4/0 (N) between fuse terminals. All phase conductors on the load side of fuse terminals shall be sized for the load of all new buildings plus 50%. All phase conductors (primary cables) shall be single copper conductor 15kV, 133% insulated, type MV90, with a semi-conducting shield, and EPR insulation sized by per NEC for the loads, but shall be a minimum of #2**.** Provide #2 bare copper ground wire with the phase conductors. Ground conductor shall be type USE/XHHW.

10.3.3 Transformers: A dedicated pad-mounted transformer shall be provided for each new building. The building transformer shall be 3-phase, 13.2 kV, delta primary, grounded wye secondary, oil filled, air cooled, and enclosed per ANSI C57.12.28, loop-feed type.

10.3.3.1 The primary cabinet shall be dead front with load-break elbow terminations, load-break oil-immersed switch and draw-out, dry-well mounted current-limiting fuses, with primary surge arrestors.

10.3.3.2 The primary feeder shall be connected to one set of bushings, and the surge arresters shall be connected to the second set of bushings.

10.3.3.3 The transformer secondary compartment shall be live front with NEMA pattern spade terminations. The neutral connections shall be solidly grounded.

10.3.3.4 Transformers shall be furnished with standard accessories per ANSI C57.12.26 and at least 4 taps (2 – 2.5% above and below nominal voltage).

10.3.3.5 Transformer dielectric cooling fluid shall be mineral oil.

10.3.3.6 Provide secondary containment for transformer oil.

10.3.3.7 The transformer shall provide service to a main distribution panelboard located in the electrical room.

10.3.3.8 Provide approximately 25% spare capacity (kVA) above the estimated peak demand load.

10.3.4 Equipment Pads: Equipment pads shall be reinforced concrete, with a minimum thickness of 150 mm (6”). The pads shall have conduit windows which shall be grouted before installation of equipment. The pads shall extend 300 mm (12”) beyond the equipment silhouette or footprint and shall provide both physical support for the equipment and serve a housekeeping function. Pads shall be laid on 203 mm (8”) of gravel fill.

10.4 **Grounding:** The Contractor shall provide grounding systems that meet or exceed the requirements of the National Electrical Code (NEC). The maximum resistance to ground shall be 25 ohms. All underground bonding connections shall be made with exothermic welds.

10.4.1 Fuse Terminal Ground: The ground system at the fuse terminal shall consist of a minimum of four 19 mm x 3.1 m (3/4” x 10’) copper clad steel ground rods.

10.4.1.1 The ground rods shall be bonded together with # 4/0 bare copper wire.
10.4.1.2 Provide a minimum of 2 connections from the primary grounding system to the fuse terminal.
10.4.1.3 Bond the fuse terminal grounding system to the grounding system in the manhole, if any.

10.4.2 Service Transformer Ground: The grounding at each new transformer shall consist of a minimum of four 19 mm x 3.1 m (3/4” x 10’) copper clad steel ground rods.

10.4.2.1 The ground rods shall be bonded together with # 4/0 bare copper wire.
10.4.2.2 Provide a minimum of 2 connections from the primary grounding system to the transformer.

10.4.3 Building Service Ground: The grounding electrodes at the building service shall consist of a minimum of two 19 mm x 3.1 m (3/4” x 10’) copper clad steel ground rods plus concrete encased electrodes in the building foundation bonded as required by the NEC.

10.4.3.1 In addition, building steel, metal water pipes, and other components shall be bonded to the ground system as required by the NEC.
10.4.3.2 The system shall have no ground loops.
10.4.3.3 Grounding electrode conductors shall be copper and sized per the National Electrical Code.

10.4.4 Fence Grounding: Connect each fence terminal post, corner post, and gate post to ground cable and 3 meter ground rod.

10.4.5 Telecommunications Grounding: Grounding for the telecommunications systems shall be designed and installed in accordance with EIA/TIA 607 standards. A telecommunications main grounding busbar shall be provided in the main communications room of each building and telecommunications grounding busbars shall be provided in all intermediate telecommunications rooms. Connects to all busbars shall be made by an irreversible compression connection.

10.5 **Interior Electrical System:** The Contractor shall provide a complete interior electrical system. Overcurrent protective devices shall be coordinated such that only the device closest to a fault

trips or opens. All feeders and branch circuits shall have a dedicated neutral conductor and insulated equipment grounding conductor and shall be installed in conduit, except as noted below.

10.5.1 Voltage Drop: Voltage drop shall be limited to 1% on the service conductors and 5% from the building's main distribution panel to all loads. Voltage drop calculations shall be based on estimated demand loads plus 25% future load growth.

10.5.2 Service Entrance: The building shall be fed from the transformer via type USE secondary conductors in an underground non-reinforced concrete encased duct bank with PVC conduits from sized as required by the National Electrical Code (NEC). Provide warning tape with a suitable legend above the duct bank.

10.5.2.1 Provide at least 1 spare conduit, which shall be the same size as the conduits with wires, from the transformer to the electric room.

10.5.2.2 Minimum cover for the service duct bank shall be as shown on the site plans.

10.5.2.3 Conductor sizes shall be calculated as required by the NEC plus 25% extra capacity to allow for future growth.

10.5.2.4 The service entrance conductors shall not be larger than 500 MCM. If the ampacity of the total load exceeds the ampacity of 500 MCM wire, then parallel runs of conductors shall be used. Parallel runs shall be installed as required by the National Electrical Code.

10.5.2.5 The Contractor shall provide current transformers and a meter capable of providing volts, amps, kWH, peak demand, and harmonic data. The meter shall also provide an output that can be read by the Building Management System. See Section 8.0 of Section 01010 for information about the Building Management System. The contractor shall connect the meter to the Building Management System.

10.5.2.6 The main disconnect shall be a circuit breaker. All other downstream feeder and branch circuit overcurrent protection in panelboards shall also be provided by circuit breakers.

10.5.2.7 Provide transient voltage surge suppression (TVSS) at the service entrance.

10.5.3 Feeders: Feeders shall be sized to supply the full demand load of the panel or load they serve, plus a minimum 25% spare capacity. Feeder overcurrent protection shall meet NEC requirements.

10.5.4 Stepdown Transformers: Where 480 volt systems are chosen for any building, provide dry-type transformers in electrical rooms to achieve 208/120 volt service where required by the NEC. Transformers shall be sized and installed per NEC requirements.

10.5.4.1 Transformers shall be furnished with standard accessories and at least 4 taps (2 – 2.5% above and below nominal voltage).

10.5.4.2 Transformers shall be Energy Star rated.

10.5.4.3 Ground transformers as required by the NEC.

10.5.4.4 All kitchen equipment shall be fed from 208 volt system.

10.5.5 Panelboards: Panelboards shall be sized for a minimum of 125% of the demand load they serve.

10.5.5.1 Panelboards shall be fully rated for the available fault current.

10.5.5.2 Except for the main service distribution panelboard and the main 120/208 volt panelboards connected to the 480 – 120/208 volt stepdown transformers, panelboards shall be furnished with main lugs only. All panelboards shall have copper busses.

10.5.5.3 Full sized bolt-on branch breakers, insulated neutral busses and equipment grounding busses shall be provided.

10.5.5.4 Panelboards shall be recessed in finished areas and surface mounted in unfinished areas, with flush fronts and hinged doors. All panelboards shall be concealed behind doors or located in mechanical or electrical rooms. See paragraph 10.2.3 for the definition of finished spaces.

10.5.5.5 Panelboards shall be located near the loads they serve. See the drawings for panelboards located in corridors. The Contractor shall determine the locations of other panelboards as required to serve building loads.

10.5.5.6 Approximately 20% of single pole spaces shall be provided for spares (8 in a 42 space panel and 6 in a 30 space panel).

10.5.5.7 Circuit breakers protecting receptacle branch circuits in sleeping rooms and the sleeping room closets shall be arc-fault interrupter type.

10.5.5.8 Provide separate panelboards for HVAC loads. This requirement does not apply to HVAC equipment; such as bathroom exhaust fans and fan coil units, in the sleeping units.

10.5.6 Conductors: All conductors shall be copper, aluminum is not allowed, and not smaller than #12 AWG.

10.5.6.1 All conductors shall be stranded. Provide spade lugs or suitable adapters to connect conductors to wiring devices.

10.5.6.2 All conductors shall be installed in electrical metallic tubing (EMT) where permitted by the NEC. The use of PVC conduit for grounding electrode conductors is permitted.

10.5.6.3 Wire type THHN/THWN shall be used, except for site lighting branch circuits. Type RHW or XHHW insulation shall be used for site lighting circuits.

10.5.7 Branch Circuits, Receptacles and Outlets: All general receptacle and lighting circuits shall be 20 ampere circuits and fed by 20 ampere circuit breakers. All wall plates shall be ivory, unbreakable nylon in finished spaces. Metal face-plates are permitted in unfinished spaces. See paragraph 10.2.3 for the definition of finished spaces.

10.5.7.1 All branch circuits required by the National Electrical Code shall be provided.

10.5.7.2 Receptacles on opposite sides of common walls shall be horizontally offset. The horizontal offset shall be a minimum of 600 mm (24 inches) in fire-rated partitions.

10.5.7.3 Receptacles shall be limited to 5 duplex type per circuit.

10.5.7.4 Lighting and receptacles shall be on separate branch circuits.

10.5.7.5 General purpose receptacles shall be provided per the NEC and as specified in this specification section.

10.5.7.6 Convenience receptacles shall be NEMA 5-20R ivory, and located as specified in this subsection.

10.5.7.7 Ground fault interrupting (GFI) receptacles and arc fault interrupting circuit breakers shall be provided as required by the NEC and this subsection.

10.5.7.8 Circuit breakers for permanently connected appliances, such as the range hood and cooktop, shall be capable of being locked on the open position.

10.5.7.9 Provide two 13 mm (1/2") spare conduits from the panelboard serving each sleeping module to the module. Spares shall terminate in separate contractor-provided outlet boxes above the suspended ceiling in the serving area a minimum of 300 mm (12") from any wall. Label the boxes as spare 120/208 volt power boxes along with panelboard number where conduit terminates.

10.5.7.10 Provide a circuit as required for all exterior building signs. See civil sheets for sign locations.

10.5.7.11 All branch circuits and feeders shall be equipped with an insulated green equipment grounding conductor.

10.5.7.12 Each branch circuit serving computer and data processing loads shall be equipped with a dedicated neutral conductor.

10.5.7.13 Provide power and lighting branch circuits to each pavilion from the electrical system in the nearest barracks building. Provide 2 general purpose receptacles at each pavilion.

10.5.7.14 Provide power center (transformer, panelboards, starters, lightning protection, heat tape system for all water pipes, controls, etc.) to support power requirements of the elevated water tower. Refer to the civil drawings for location of water tower and nearest existing aerial power lines to serve a new pad-mounted transformer. The water tower shall be monitored and controlled as follows:

10.5.7.14.1 Monitor tank with two (redundant) sensors: Output is 4-20 ma.

10.5.7.14.2 Provide a bi-directional flow sensor on the tank riser – non-invasive or mag meter type. Output is 4-20 ma.

10.5.7.14.3 Provide RTU radio transmitter, 900 MHz spread spectrum radio.

10.5.7.14.4 Provide telemetry antenna mounted at top of tank, next to lights.

10.5.7.14.5 Provide heated enclosure inside tank enclosure for RTU and level transmitters with proper access for maintenance.

10.5.7.14.6 Coordinate all work with Paul Fish, Ft. Drum telemetry operator 315-772-3322.

10.5.7.15 In barracks sleep rooms, provide general purpose quadruplex receptacles on each wall. Provide a duplex receptacle in the portion of the wall between the room entry and closet doors. There shall be a minimum of 5 receptacles in each sleeping room. All sleeping rooms shall have one dedicated circuit for receptacles within the room. No point on any wall shall be more than 1.8 m (6 feet) horizontally from a receptacle. Arrangement as shown on floor plan (drawing A-1).

10.5.7.16 In barracks living module service areas, provide general purpose receptacles on each wall: one in the passageway to the sleeping rooms and one in each wall in the serving area in addition to the receptacles for appliances and above the counter. These 3 receptacles shall be on a

dedicated circuit. Provide 2 GFI receptacles above the counter as shown on the architectural drawings. Each of these receptacles shall be on a dedicated circuits (i.e., 2 circuits are required). Provide GFCI receptacles on a dedicated circuit for the refrigerator and over the counter microwave oven (one circuit). Provide power to the oven/range.

10.5.7.17 At barracks Entry Vestibules, provide a general purpose receptacle on each wall. No point on any wall shall be more than 6 meters from a receptacle. Provide 2 duples receptacles at the CQ desk in both lobbies. Coordinate locations with furniture provider.

10.5.8 Harmonic Loads: All step-down transformers serving harmonic loads (which comprise 25% or more of the total load) shall be K-rated. All panelboards serving harmonic loads shall be provided with 200% rated neutral busses and 200% rated neutral feeders. Panelboards which serve computer and data processing loads shall be dedicated to these loads and other loads such as HVAC, lighting, and other building loads shall be served by separate panels. Each panelboard serving harmonic loads shall be protected by a TVSS system.

10.5.9 It has been determined that the switchboards in the (3) existing Company Operations Facility buildings have sufficient capacity to serve the new electrical loads in the addition. However, the switchboards do not have spare spaces to add circuit breakers to feed new distribution panels in the additions. New switchboard distribution sections will be required to accommodate the new loads. All existing feeders shall also be reconnected to new section.

10.5.10 Refer to as-built drawings provided for the existing COF buildings. Significant relocation of existing electrical gear, raceways, and associated equipment is required to allow access to new doorways, pass-through windows, etc. in the hangar bays. Coordinate the proposed location of all relocated items with the Contracting Officer prior to disconnection.

10.5.11 In the DFAC building, provide all electrical connections to kitchen equipment per NFPA 70, NFPA 96 and kitchen rough-in drawings. Where panelboards are located in kitchen area to serve kitchen equipment, panelboard covers shall be stainless steel type. All equipment located beneath hoods with fire suppression system shall be connected to shunt-trip activated circuit breakers.

10.6 **Lighting:** Lighting shall be provided per Illuminating Engineering Society (IES) standards, and as specified in this specification section. All luminaires shall be heavy commercial (specification) grade.

10.6.1 Exterior Lighting: Luminaires shall be high pressure sodium, cutoff type and include shields to minimize light trespass.

10.6.1.1 All exterior luminaires, including those under the canopies, shall be fused.

10.6.1.2 Lighting shall be provided for all access roads, sidewalks, and the parking areas.

10.6.1.3 Provide high pressure sodium luminaires. Average maintained illuminance shall be 10 lux (1 footcandle) on sidewalks, and 5 lux (0.5 footcandle) on

the access road and in parking. All areas shall be lit with a site lighting ratio of 6:1 (min:max).

10.6.1.4 Poles for parking areas and roads shall be metal 9.2 m (30') high and shall be installed on one meter (3') high concrete pedestals. Poles for sidewalks shall be metal and approximately 4.6 m (15') high. Pole assemblies shall be rated for 177 kph.

10.6.1.5 All metal poles shall be grounded to a ground rod at the pole and bonded to the equipment grounding conductor.

10.6.1.6 Poles and pole-mounted shoebox type luminaires shall match existing.

10.6.1.7 Provide photocell control via a mechanically-held magnetic lighting contactor with a hand-off-auto switch located in the electric room. One photocell and one contactor may be used to control all exterior luminaires, including site lighting, exterior canopies, and wall packs.

10.6.1.8 Provide fluorescent, tamper proof type fixtures at each pavilion to achieve a level of 50 lux.

10.6.1.9 Provide area lighting to cover the entire fenced area beneath the elevated water tower. Provide two flashing beacons and red obstruction lights on and around water tower as required by AC 70/740-1K (in Appendix F). Each light location shall have a redundant fixture adjacent. The lighting level within the fenced area shall be 30 lux minimum. Provide lighting inside water tower with levels of 400 lux average on all levels.

10.6.2 Interior Lighting: Provide luminaires for all rooms and interior areas, including the sleeping areas as follows:

10.6.2.1 Lighting control shall be from wall-mounted switches in each room. All switches shall be ivory.

10.6.2.2 Provide energy efficient lighting consisting of luminaires with T-5, T-8, or compact fluorescent lamps and electronic ballasts throughout the building.

10.6.2.3 Provide occupancy sensors in offices, restrooms, and corridors. Occupancy sensors shall be dual technology type (infrared and ultrasonic or microphonic).

10.6.2.4 Open-type fluorescent luminaires shall be equipped with wire guards.

10.6.2.5 Where compact fluorescent lamps are used, lamps shall be hard-wired type and not self-ballasted, screw-in type.

10.6.2.6 U-bent type lamps shall not be used.

10.6.2.7 Light levels in each space shall be as directed by TI800-01, including all appendices. Where certain spaces are not covered by TI800-01 or this RFP, standard IES levels shall be used.

10.6.2.8 Lighting for individual areas and spaces shall be as follows:

Barracks Module Serving Area: Ceiling-mounted recessed luminaires with compact fluorescent lamps for general illumination and a switch at the door.

A recessed fluorescent luminaire, supplemented by a fluorescent task light above the counter between the sink and cooktop, and separate switches for the ceiling-mounted luminaire and task light.

A recessed fluorescent luminaire(s) for the lavatory, and a separate switch near the lavatory.

Sleep Rooms: Area lighting to be surface mounted fixtures with fluorescent lamps. The fixtures shall be controlled by multiple switches to allow multi-level lighting. The ambient light level (with all lamps on) at desk height shall average 300 lux min. Provide a fluorescent luminaire in closet to achieve 100 lux and a switch at door.

Other Spaces:

Stairways: Provide unswitched pendant or ceiling-mounted architectural fluorescent luminaire(s),. Industrial type luminaires are not acceptable. Provide emergency lights as required by the Life Safety Code.

Multipurpose Rooms: 400 lux (Note 1)

Restrooms: 200 lux (Note 2)

Notes: 1. Where multi-purpose rooms have provisions for televisions, that space shall have dimmable lighting. In addition, provide dimmable lighting in the Soiled Room and in the Therapy Room in the Troop Aid Station.

2. For bathrooms in living units provide a wall mounted fluorescent fixture over the lavatory and a ceiling mounted shower light (UL listed for wet applications) over the tub or shower.

10.6.3 Egress and Emergency Lighting: Emergency egress and exit lighting shall be provided as required by NFPA 101.

10.6.3.1 Provide low profile emergency lighting units with PVC housings and self-diagnostics.

10.6.3.2 Exit lights shall be LED type with emergency battery packs, self-diagnostics, and PVC housings.

10.6.4 Security Lighting: Security lighting shall be provided at service entrances and at utility rooms (i.e. mechanical, electrical, communications, etc.). Wall mounted security light fixtures shall be shrouded to minimize glare. Fixtures shall use compact fluorescent lamps with glare control.

Security or wall mounted light fixtures at main entrances and other high visibility areas shall be selected for aesthetics and compatibility with the buildings architecture.

10.7 **Communications Utilities:** Communications utilities include telephone, data, and cable TV.

10.7.1 Exterior Cable System: The Contractor shall provide new ductbank systems for exterior communications cabling to serve all new buildings. The new ductbanks shall be connected to an existing manhole near each site. See the electrical site layout plans in

the drawing set for suggested manhole and ductbank layouts and the connection point to the nearest communications manholes. Provide 6 – 129 mm PVC conduits between all manholes in a non-reinforced concrete encased duct bank system as shown on the drawings. Provide 4 – 129 mm conduits to all buildings (including the existing hangar buildings) from the nearest respective manhole. The conduits are for telephone, data (fiber optic cable), future cable TV (CATV), and one spare. Provide 4 - 32 mm innerducts in the data conduit.

10.7.1.1 Minimum cover for the service duct bank shall be 762 mm (30”) below finished grade.

10.7.1.2 Provide warning tape with a suitable legend above the duct bank.

10.7.1.3 Communications system installations shall not occupy the same trench as electrical power cables. These trenches shall be at least 300 mm (12 inches) apart.

10.7.1.4 Provide a new 144 strand single-mode fiber optic cable from the network hub in Building 2065. This cable shall distribute fiber service to each new building in this project. Twelve strands shall also be reserved for each barracks building, but shall remain unterminated on each end. Provide splices in communications manholes for fanning out of cables to each building. Provide a 2.133 meter tall, 482 mm wide open TIA/EIA rack and 2 144 port fiber patch panels in hub room located in Building 2065. Patch panels shall be equipped with slack storage shelf and splice trays for all strands. Extend and terminate fiber cable into top panel and terminate all strands (except for those reserved for barracks buildings). Label all strands and patch panel ports showing building served.

10.7.1.5 Provide a 12 strand single-mode fiber optic cable to the main communications room of each new building to the nearest manhole shown on the plans and splice into the backbone fiber stated above. All terminations on each end of the cable shall be performed by the Design Build Contractor.

10.7.1.6 Provide multi-pair underground telephone cable to first floor communications room of each new building to the nearest manhole as shown on the plans. The pair count shall be determined by 2 times the number of phone stations in the building plus 25% spare. All splices, terminations, and cutovers on each end of cables shall be performed by Design Build Contractor.

10.7.1.7 Provide a spare 129 mm conduit from each communications manhole to a point approximately 1.5 m from the manhole.

10.7.1.8 Exterior CATV cables will be provided by others.

10.7.1.9 At the three existing hangars where the COF additions will be constructed, the communications manhole serving the respective building is located directly in conflict with the addition. The existing cables shall be disconnected from the building and pulled back to the next, unaffected manhole prior to reconstruction of a new ductbank into the main communications room. The Contractor shall remove the manhole serving each building and provide a new manhole outside of the construction limits. A new 4 way x 129 mm ductbank shall also be run into the main communications room, in the same vicinity of the existing conduits entering the room. The existing system cables shall be pulled back into the rooms and re-terminated in same fashion as existing. Coordinate all

service outages and terminations with Ft. Drum's Contracting Officer and IT personnel prior to all work.

10.7.1.10 All new optical fiber cables installed in this job shall be tested with an OTDR tester.

10.7.2 Telephone/Data Systems: Provide complete telephone and data cable systems for each new building.

10.7.2.1 The Contractor shall provide equipment racks, cabinets, fiber and copper patch panels, grounding equipment, service entrance equipment (including protectors and cross-connects), "110" punch down blocks, and all conductors and outlets throughout the building. All horizontal copper cabing shall be rated for the present level of Category 6 cabling as approved by EIA/TIA standards. The Contractor shall make all required connections for both telephone and data (both copper and fiber) systems. The entire horizonatal distribution cabling system link for the data and telephone systems shall be part of the manufacturer's warranted cabling solution, including patch cords. The design documents shall include data rack layouts and elevations showing each type of patch panel and equipment space required.

10.7.2.2 The telephone and fiber optic service entrances shall be located in the first floor communications room in each new building.

10.7.2.3 The Contractor shall make all final connections of the building telephone system at the main telephone cross connect and, in multi-story buildings, between floors Communications Rooms. Backbone cables for voice between floors shall be multiple 25 pair bundle cables. Backbone cables shall be sized as follows: 2 pairs for each telephone on floor plus 25%.

10.7.2.4 Provide a minimum of three empty 103 mm (4") conduits between the first and second floor communications rooms for CATV, telephone and data systems.

10.7.2.5 The Contractor shall make all final connections for both the fiber optic and copper data system cables, including patch cords, and between the first and second floor Communications Rooms. The Contractor shall furnish to the Government 5% spare patch cords for both copper and fiber cables.

10.7.2.6 Provide 4 pair, EIA/TIA 568B, category 6, unshielded twisted pair (UTP), #24 AWG, solid copper, plenum rated cables for both telephone and data systems. Telephone and data cables shall have different colors. Coordinate colors with the Contracting Officer.

10.7.2.7 All information outlets (telephone/data) shall have two jacks (dual 8-position connectors) with voice on top and data on bottom. Voice jacks shall have ivory color and data jacks shall have blue color.

10.7.2.8 All horizontal cables from data and telephone jacks shall be terminated on rack mounted patch panels with 110 style IDC connectors. Two 3 meter long patch cords shall be provided with each horizontal link. All components shall be Category 6 rated.

10.7.2.9 All patch panels for the data/telephone system in each building shall be mounted in 480 mm wide TIA/EIA floor mounted open racks. All patch panels shall be sized for 25% spare capacity and shall be sized to accommodate User provided network electronics. Coordinate rack layouts with Ft. Drum DOIM personnel.

10.7.2.10 Connect all single 8-position type wall and pay telephone outlets from the telephone terminal backboard with one 4-pair cat 6, UTP cable.

10.7.2.11 Flush outlets shall be provided in finished rooms. Surface mount outlets shall be provided in unfinished areas.

10.7.2.12 Wiring shall be homerun (star) style.

10.7.2.13 Provide solid bottom cable trays for telephone, data, and cable TV cables. Cables in cable trays shall be separated by system and into bundles of no more than 50 cables per bundle. Bundles shall be made using Velcro tie wraps. Tie wraps shall be used every 2 meters. Provide sufficient space in cable trays for future CATV cabling. This space shall be separated from other cable sections with a physical barrier.

10.7.2.14 Provide 25 mm EMT from the cable tray in the corridors to the data/telephone jacks in all rooms. Provide insulating bushings at the ends of all conduits at cable tray locations.

10.7.2.15 Where optical fiber cabling is installed in cable trays, cable shall be run in innerduct.

10.7.2.16 In the barracks building, provide two 21 mm spare conduits from the cable tray closest to each sleeping module to the module. Spares shall terminate in separate contractor-provided outlet boxes above the suspended ceiling in the serving area a minimum of 300 mm (12”) from any wall and 300 mm (12”) from the spare power outlet boxes. Label the boxes as spare communications boxes.

10.7.2.17 Provide cable in cable tray for main horizontal cable runs. Conduit shall be provided in areas subject to physical damage. All telephone and data homeruns shall be concealed in finished spaces. See paragraph 10.2.3 for the definition of finished spaces.

10.7.2.18 The Contractor shall terminate all outlets to patch panels and telephone punchdown blocks.

10.7.2.19 Horizontal distribution cable terminations on the patch panels shall be terminated in an orderly, efficient, sequential arrangement, as per I3A requirements, following the outlet locations in the room.

10.7.2.20 Provide a dedicated telephone line for the Building Management System modem. Connect the modem to the telephone cable system.

10.7.2.21 Provide at a minimum, two information outlets (voice/data) in each office or similar space. Where multiple occupants are specified a certain space, provide an information outlet for each occupant plus one additional spare outlet. Locate the outlets throughout the space to allow flexibility in the space with respect to furniture changes.

10.7.2.22 In barracks buildings, provide two outlets for telephone connection in each sleep room only. Locate the outlets on opposite sides of the room for maximum furniture layout flexibility.

10.7.2.23 In barracks buildings, provide one combination data/telephone outlet at each CQ desk. Coordinate locations with furniture installer.

10.7.2.24 In the existing hangar buildings, only one room provides data service to the entire building. All new horizontal data cabling shall originate in this room to serve all new data jacks in the COF additions. Provide one new backboard in room and new data patch panels and wire management panels to support new data jacks. Due to the limited space in these rooms, new patch panels, etc. will need to be backboard mounted. Provide three TIA/EIA equipment shelves suitable for mounting of network electronics

on backboard. Provide raceways (conduit or cable trays) from the COF additions to the network room to support cabling. See hangar as-built drawings for location of these rooms.

10.7.2.25 In the existing hangar buildings, the horizontal telephone cabling serving new phone jacks in the COF additions shall originate in the main electrical/communications rooms. There are adequate spares present on the existing punchdown blocks in this room. Coordinate exact termination space for all telephone connections with Ft. Drum's IT manager.

10.7.2.26 Specific Requirements: In addition to the above requirements, provide information outlets as follows:

10.7.2.26.1 In the Dining Facility, provide outlets at each Cashier's station, C-Store, Manager's Office, Office, Dry Storage. Provide phone connection only at the Receiving area.

10.7.2.26.2 Brigade and Battalion Headquarters: Provide 4 outlets in each Communications Room. In the EOC office, provide at least 4 additional telephone jacks. In the storage rooms, provide power and information outlets as required for an office space.

10.7.2.26.3 In 1/10, 2/10, 3/17 & A-Trp COF: Provide outlet in Com Storage.

10.7.2.27 Secure Communications (SIPRNET): Each Battalion Headquarters and the Brigade Headquarters building shall be provided with 5 SIPRNET outlets each. Each outlet shall consist of 2 data jacks with Category 6 cables as described above. The outlet shall be surface mounted and shall be installed within a lockable enclosure, similar to that shown in Appendix I. The outlets are to be located in the following spaces: Brigade Headquarters: Commanding Officer, Executive Officer, S-2, S-3, EOC; Battalion Headquarters: Commanding Officer, XO, S-2, S-3, S-4. Coordinate the location of remaining outlets with Contracting Officer. Provide a rack mounted 24 port, Category 6 rated patch panel in the Vault for distribution to the outlets. The conduit serving each outlet shall be rigid galvanized steel and shall be welded at all couplings. It shall be installed exposed for the entire length, except where run through walls. Each conduit shall be homerun from the outlet device box to the Vault. The SIPRNET patch panel and outlets shall be located at least 1 meter away from normal LAN connections and shall be mounted into a dedicated TIA/EIA rack. All conduits serving the SIPRNET connections shall be run no less than 1 meter away from other normal LAN cables and/or cable trays.

10.7.3 Cable TV & Projection Systems: CATV service is required for the Dining Facility, Brigade Headquarters, each Battalion Headquarters, Troop Aid Station, and each hangar building. Only conduit infrastructure for a CATV system shall be provided at the barracks buildings. The CATV service provider will provide the cable from the manhole to each building in the conduit provided by the Construction Contractor to the point of demarcation in the first floor Communications Room. The Contractor shall provide all necessary CATV components in the building including, but not limited to, amplifiers, splitters, directional couplers, outlet boxes, jacks, faceplates, and cables

from the point of demarcation in the first floor Communications Room to each individual CATV outlet in the building. There shall be individual home runs from each outlet to the CATV backboard in the Communications Rooms. Coordinate all CATV jack locations with Contracting Officer. In areas where projection systems are required, provide conduit and empty device box infrastructure to allow future connection between a PC or laptop computer and a ceiling mounted projector. Ensure that conduits installed are adequately sized to accommodate the projector cables and terminator size used. Coordinate locations and requirements with Contracting Officer.

10.7.3.1 For the barracks buildings, provide two device boxes in each sleep room and at other locations requiring televisions. Extend a 25 mm conduit from each box to the nearest cable tray and provide a pullstring in each segement of conduit for pulling of future coaxial cables. Boxes in sleep rooms shall be located on opposite sides of the room for maximum furniture layout flexibility. Provide space in cable tray system for future cabling to extend from each device box and home-run to the 1st floor communications room. Provide sufficient space on wall in 1st floor communications room to accommodate future CATV distribution equipment. Provide sleeves in floor between each communications room for extension of future horizontal coaxial cables between floors.

10.7.3.2 In the Dining Facility, provide 4 CATV drops in the seating area, distributed evenly throughout the space to allow view of televisions from all areas.

10.7.3.3 In the Brigade Headquarters, provide CATV drops in Classrooms 1 & 2, the Duty Officer's Office, the Conference Room, the Commanding Officer's Office, and in the Command Section Area. Provide infrastructure for projector systems and power for motorized screens in each classroom, in the EOC space, and in the Conference room. In addition, provide conduit infrastructure in Classrooms for future speaker system. Speaker locations will be on wall where projector screens reside. Extend conduits to a central point for connection to headend system.

10.7.3.4 In each Battalion Headquarters, provide CATV drops in the Duty Officer's Office, the Commanding Officer's Office, and in the Command Section Area. Provide infrastructure for projector systems and power for motorized screens in each classroom. In addition, provide conduit infrastructure for future speaker system. Speaker locations will be on wall where projector screens reside. Extend conduits to a central point for connection to headend system.

10.7.3.5 In each COF building, provide infrastructure for projector systems and power for motorized screens in each Conference Room.

10.7.3.6 In the Troop Aid Station, provide CATV drops in the Therapy Area, and in the Locker Rooms (ceiling mounted). Provide infrastructure for projector systems and power for motorized screens in the Therapy Area.

10.7.3.7 In each Hangar Building, provide CATV drops in each Commander's Office.

10.7.4 Public Address Systems:

10.7.4.1 The existing hangar buildings currently have PA systems with speakers located throught the facility. The Contractor shall provide new speakers throughout the COF additions and connect to the existing system. Separate zones are not required in each space. System cabling shall be compatible with the existing system and installation shall result in a completely operational system throughout the entire facility.

10.7.4.2 Provide a complete PA system in the Dining Facility. The PA system shall consist of ceiling and/or wall speakers and a microphone in the Facility Manager's office. A sound system shall also be connected to the PA system. The sound system shall consist of CD player, cassette player, and AM/FM tuner.

10.8 Fire Alarm and Detection Systems: Each building shall receive a completely addressable fire detection/alarm system installed in accordance with the codes referenced above. The system shall have a sufficient number of addressable points to accommodate all necessary devices and shall have the capacity for future expansion. Initiating device circuits shall be wired Class A, Style 6 back to the fire alarm control panel and notification device circuits shall be wired Class A, Style Z back to the fire alarm control panel. All fire alarm raceway and components shall be mounted to meet all necessary seismic restraint requirements. Refer to Section 6.0 for seismic classifications. The fire alarm system shall consist of the following:

10.8.1 Fire alarm control panel mounted in building main communications room with an auxiliary annunciator panel capable of all control functions mounted in the building main entrance vestibule. Provide a smoke detector adjacent to the control panel as required in NFPA 72.

10.8.2 Automatic smoke detection shall be provided in each sleeping room. The smoke detectors shall be system detectors with sounder type bases. Upon initiation of a sleeping room smoke detector, only the sounder bases of the three smoke detectors within the affected living module shall activate and a supervisory signal shall be transmitted to the fire alarm control panel. Upon initiation of a general fire alarm initiation device (manual pull station or sprinkler flow switch) all audio/visual appliances and all smoke detector sounder bases throughout the building shall activate.

10.8.3 Detection is not required in the rest of the buildings as indicated in NFPA 101. Smoke detection shall not be installed in the rest of the building as the building shall be equipped with a fully supervised automatic sprinkler system.

10.8.4 The fire alarm system shall monitor all sprinkler system flow and tamper switches and post indicator valves for alarm and trouble conditions.

10.8.5 Manual fire alarm pull stations shall be installed at all means of egress from a floor and the building in immediate proximity to the means of egress. Pull stations shall also be installed at other doors that open to grade. Fire alarm pull stations shall be of aluminum construction. Manual pull stations shall be the addressable type or shall be monitored by an addressable monitor module

installed in the pull station back box. All fire alarm pull stations shall be provided with a polycarbonate plastic protection cover with a local alarm (powered by fire alarm control panel) which shall sound at the cover when it is lifted.

10.8.6 The fire alarm system shall be capable of providing all accessory functions as required by code (i.e. fan shutdown, smoke damper closure, fire damper closure).

10.8.7 Duct smoke detectors shall be installed per NFPA 90A. All fans 472 l/s or greater shall be shutdown automatically upon a general fire alarm activation and not restart until the fire alarm system is manually reset.

10.8.8 Fire alarm audible, visual and audio/visual appliances shall be installed per NFPA 72. Living modules do not require visual notification appliances and shall not be installed.

10.8.9 The fire alarm systems shall be provided with and connected to a Monaco BT2-8 fire alarm transceiver, which shall transmit signals to the existing base wide Monaco D700 fire alarm monitoring system. The fire alarm transceiver shall be provided with all necessary equipment to interface with the existing base monitoring system and shall have batteries that are sized for 72 hours of supervisory operation and an additional 30 minutes operation under alarm. The transceiver antenna shall be mounted on the exterior of the building and on a wall-mounted bracket.

10.8.10 All laundry, mechanical rooms, and the DFAC kitchen shall be provided with both combustible gas detectors (calibrated to alarm at 25% of the LEL of methane) and carbon monoxide gas detectors (calibrated to alarm at 35 ppm). These detectors shall be connected to a dedicated gas monitoring system. The system shall be monitored for alarm and trouble conditions by the building fire alarm system and shall transmit as separate zones to the fire alarm transceiver. When a detector activates it shall sound a horn/strobe with an amber lens. Signage provided with the horn/strobe shall state what the hazard is and to evacuate the area immediately to fresh air. Activation of any gas detector shall initiate a building general fire alarm, however shall not sound the fire alarm audio/visual appliances or smoke detector bases in the building. Activation of any gas detector shall shut off gas to the building automatically which shall only be reset manually

10.8.11 There shall be no exposed fire alarm raceway in the building, except in mechanical spaces.

10.8.12 Pseudo fire alarm zones shall be programmed to send signals to the Monaco fire alarm transceiver to transmit zone information to the base wide fire alarm monitoring center. Provide all necessary programming and addressable modules to accomplish general zoning of the fire alarm system.

10.8.13 In barracks buildings, magnetic door hold open devices shall be installed to hold open the doors leading from the floor entry lobbies to the corridors leading to the wings on each floor. Coordinate with door hardware so that there are no conflicts with door hardware hitting walls.

10.8.14 In the existing hangar buildings, provide all new devices required and connect to the existing fire alarm system serving facility. All new devices shall be compatible with existing system and system shall be re-programmed for new device addresses. After construction of addition is complete, the entire fire alarm system shall be retested according to NFPA 72 criteria.

10.9 Security:

10.9.1 Each weapons and crypto vault and weapons storage area in this project shall be monitored via an Intrusion Detection System (IDS). Each IDS shall be procured and installed in accordance with AR 190-11 & Ar 380-5 and all components shall be compatible with Ft. Drum's existing Advantor IDS head-end system. As a minimum, the IDS shall include a control panel (inside vault), dedicated power circuit, dedicated phone line, proximity card reader (on control panel), LCD keypad (on control panel), dual-technology motion sensor, microphone sensor (on control panel), duress button (adjacent to control panel), balance magnetic switch on vault door, digital CCTV camera (located inside the vault with view of door, control panel, and surrounding area), strobe light and siren outside respective building at entrance nearest vault room, and 8-hour battery backup. In addition, provide an unswitched lighting fixture directly above the vault entrance. Fixture shall also be equipped with an emergency battery. The system shall be configured to be monitored in Building 10715. Provide all necessary components to monitoring station to accept signals from from new systems in this project. Transmission lines for the alarm circuit shall have line supervision to detect tampering or malfunction and shall meet specific requirements such as minimum wire guage, and type of cable as recommended by manufacturer. The hardware communications link shall be enclosed in rigid steel conduit between the IDS connection and the telephone distribution connection. Coordinate all design issues and device locations with Ft. Drum Physical Security Office prior to installation: (315) 772-9924.

10.9.2 All 5 gates built in this project require power and control connections. Each assembly shall be provided with access control devices that utilize keys and swipe cards to allow access. Provide with these devices one card printer and 100 blank magnetic stripe cards, and 100 keys. Coordinate all codes and key types required with the Contracting Officer. In addition, the gate to the north of the Dining Facility on the Barracks/Dining Facility Complex access road shall be provided with 2 way intercom system and a CCTV camera. The intercom system headend and CCTV monitor shall be housed in the Receiving Area at the Dining Facility. There shall also be a remote control manual switch in the Receiving Area for operation of the same gate. Coordinate the locations of all devices specified with the Contracting Officer prior to roughing in of equipment and conduits. Power connections shall also be provided for the traffic loop on the exit lane of each gate to allow outbound traffic to pass. Provide all devices and associated wiring to provide a complete and operational system.

10.10 Mass Notification Systems: Provide a mass notification system in each building (including new & existing portions of hangar buildings) as required by UFC 4-010-1. Each system shall be furnished and installed in accordance with UFC 4-021-1. Each system shall have a dedicated control panel and capability to connect a future Monaco transceiver that can accept all messages, including live voice messages, from the central control station at Ft. Drum. All notification devices shall be combined with fire alarm notification devices where the device has two strobes (white for fire alarm and amber for mass notification) and a common voice speaker. The system shall be programmed such that when the mass notification system is in alarm, the fire alarm notification signals are temporarily overridden until the mass notification system has been reset. All supervisory signals shall still be transmitted to the fire station during any event.

10.11 Lightning Protection System: Provide a lightning protection system for each building. Systems shall be installed in compliance with NFPA 780 and shall be installed and certified to receive a UL Master Label.

10.12 Design and Calculations Review**:** The Contractor shall submit the following design and calculations:

10.12.1 Load calculations and load factors, including allowance for future loads as specified above. Provide both connected and demand load calculations.
10.12.2 Lighting calculations for each type of room, building entrances and all lighted exterior areas.
10.12.3 Short circuit calculations for each facility.
10.12.4 Voltage drop calculations for each facility.

SECTION 11.0 – BARRACKS ROOM BY ROOM REQUIREMENTS

11.1 Living/ Sleeping Modules

11.1.1 Space Function: Quarters for enlisted personnel. Provide two spaces(living/sleeping rooms) per module. Minimum net area per living/Sleeping Room shall be 13 m^2.

11.1.2 Architectural Issues: Secure private quarters, with perimeter walls of the sleeping room and adjacent closet space extending to the underside of the precast concrete plank above.

11.1.2.1 Walls: Paint on CMU, extending from floor to underside of precast concrete plank. STC 55
11.1.2.2 Floor: Vinyl composition tile (VCT).
11.1.2.3 Ceiling: 3 m high, paint underside of precast concrete plank. Use vapor retarding paint at underside of concrete of precast concrete plank.
11.1.2.4 Doors: Provide 900mm wide entry door swinging into room.
11.1.2.5 Windows: Size to meet egress/rescue window requirements.
11.1.2.6 Other: Living/sleeping room shall have at least one exterior operable window with insect screen. Window shall meet egress requirements of NFPA 101 and International Building Code. Door between service area and living/sleeping room shall have entry function (F82) lockset (living/sleeping room is secure side). Door between public corridor and living/sleeping room shall have mortise dormitory function (F13) lockset.

11.1.3 Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire detection systems.

11.1.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed sidewall type. Provide the appropriate number of spaced heads as dictated by room size.
11.1.3.2 Fire Detection: Provide one analog/addressable system smoke detector with a sounder base per sleeping room. Mount detector to wall according to NFPA 72 and manufacturer recommendations. Detectors shall operate as indicated in Section 10.

11.2 Closet

11.2.1 Space Function: Secure private storage for one enlisted personnel. Provide two spaces per module. Minimum net area per Closet is 3 m^2.

11.2.2 Architectural Issues: Secure private storage, with perimeter walls of the closet extending to the underside of the precast concrete plank above.

11.2.2.1 Walls: Paint on CMU. Walls shall extend from floor to underside of structure.
11.2.2.2 Floors: VCT.

11.2.2.3 Ceiling: Minimum 2.4 m high gypsum board ceiling suspended below the precast concrete plank. Use vapor retarding paint on underside of concrete plank.

11.2.2.4 Doors: Provide minimum 800mm wide door between living/sleeping room and closet. Door shall have padlock hasp for locking closet door.

11.2.2.5 Accessories: Provide minimum of 2 linear meters of 400 mm deep plastic coated wire shelf with continuous heavy duty rod along one short and long wall. Robe hook on back of door.

11.2.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

11.2.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size..

11.3 Serving Area

11.3.1 Space Function: Kitchenette space for two enlisted personnel. Provide one space per module.

11.3.2 Architectural Issues:

11.3.2.1 Walls: Paint on CMU. Walls shall extend from floor to underside of structure.

11.3.2.2 Floors: VCT.

11.3.2.3 Ceiling: Min. 2.4 m high, painted gypsum board. Use vapor retarding paint on underside of concrete plank.

11.3.2.4 Doors: . Door between public corridor and service area (entry door into module) shall have mortise dormitory function (F13) lockset. Provide 900mm wide entry door swinging into room

11.3.2.6 Accessories: Min. 1500 linear mm of 600mm deep plastic laminate base cabinets with side and backsplashes at walls, with single compartment, stainless steel kitchen sink with food strainer/stopper, minimum inside dimensions 400mm x 400mm x 175mm deep with chrome-plated, single handle, washerless mixing faucet. Provide 1500 linear mm of 300mm deep wall cabinets. Wall cabinets shall be minimum 600mm high, provide 600mm clear between countertop and bottom of wall cabinets at sink. Base cabinets shall have minimum of two 300mm wide drawers. Provide a microwave shelf to hold a Whirlpool GM8155XJ microwave (GFGI). Microwave shelf area shall include a GFCI outlet. Provide space for a 0.27 cubic meter WC Wood R05HAA refrigerator (GFGI) with a GFCI outlet. Provide a two burner cooktop (equal to Kenyon B49511 Alpine 120 volt and range hood. Cooktop shall be 2 burner smooth top ceramic glass cooktop, 165 mm (1200 watt) and 200 mm (1200 watt) burners). Range hood shall be minimum 600 mm wide, 115 volt, 2.0 amps, two (2) speed system with filter and light included. Direct connection required.

11.3.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

11.3.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

11.3.3.2 Fire Detection: None

11.4 Bathroom

11.4.1 Space Function: Toilet and bath facilities for two enlisted personnel. Provide one space per module.

11.4.2 Architectural Issues: Handicapped accessibility not required.

11.4.2.1 Walls: Paint on CMU. Ceramic tile base shall be standard 4" high sanitary cove base. Walls shall extend from floor to underside of structure.

11.4.2.2 Floors: Ceramic tile. Install base prior to flooring.

11.4.2.3 Ceilings: 2.4 m high, painted gypsum board.

11.4.2.4 Doors: . Provide 700mm wide door between bathroom and service area or hall. Door shall have privacy function (F76) lockset.

11.4.2.7 Equipment: Lavatory shall be minimum 475mm x 475mm self-rimming vitreous china. Provide chrome-plated washerless faucet with pop-up drain. Countertop shall be minimum 900mm wide acrylic solid surfacing material with integrally molded, 100mm high coved backsplash. Provide 100mm high side splash at side walls. Provide plastic laminate surfaced vanity base cabinet with hinged door(s) and minimum two 225mm wide drawers. Provide floor mounted flush valve water closet and one-piece combination shower/ tub unit. Provide one Towel Shelf with Towel Bar, Provide one Towel Bar, Provide two Soap Dishes, Provide one Toilet Paper Dispenser, Provide two Robe Hooks, Provide two Medicine Cabinets, Provide one Retractable Clothesline, Provide one Shower Curtain and twelve shower curtains hooks, Provide one shower rod, and Provide one full length mirror. Refer to chapter 5 for Toilet Accessories.

11.4.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

11.4.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Barracks bathrooms have been designed to be less than 5.1 square meters therefore sprinkler head in this room may be omitted.

11.5 Entry Vestibule

11.5.1 Space Function: Building entrance. Provide two spaces on ground floor.

11.5.2 Architectural Issues:

11.5.2.1 Walls: Brick or paint on CMU. Walls shall extend from floor to underside of structure.

11.5.2.2 Floors: Quarry tile with recessed walk-off mat.

11.5.2.3 Ceilings: Painted gypsum board.

11.5.2.4 Doors: Pair of doors 900 mm wide FRP, ¾ glass, with Aluminum frames. Each opening to receive Heavy Duty Hardware, Two Continuous Hinge, Rim Vertical Rod Classroom Panic Device, with lever handles, Best cylinder, keyed distinct from all others in the building, Door Closer, Over Head Stop/Holder, Stainless Steel Kick Plate, One Threshold with Pem-Kote finish x sleeve bolt fasteners, One Set Weather Stripping, Astragal, Two Sweeps.

11.5.2.5 Windows: Insulated glazing panels of laminated glass.

11.5.2.6 Accessories: Walk-off mat.

11.5.3 Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

11.5.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent Freeze proof type. Provide the appropriate number of spaced heads as dictated by room size.

11.5.3.2 Fire Alarm Control: A fire alarm annunciator panel shall be recessed wall mounted in the south entry vestibule.

11.5.4 Mechanical – Plumbing Issues: Provide floor drain below recessed mat.

11.6 Entry Lobby

11.6.1 Space Function: Building lobby and CQ desk. Provide one space per floor.

11.6.2 Architectural Issues:

11.6.2.1 Walls: Paint on CMU.

11.6.2.2 Floors: VCT.

11.6.2.3 Ceilings: 2.4 m high SACT.

11.6.2.4 Doors: Pair of doors 900 mm wide FRP, ¾ glass, with Aluminum frames. Each opening to receive Heavy Duty Hardware, Two Continuous Hinge, Rim Vertical Rod Classroom Panic Device, with lever handles, Best cylinder, keyed distinct from all others in the building, Door Closer, Over Head Stop/Holder, Stainless Steel Kick Plate, One Threshold with Pem-Kote finish x sleeve bolt fasteners, One Set Weather Stripping, Astragal, Two Sweeps.

11.6.2.5 Windows: As shown on exterior elevations.

11.6.2.6 Accessories: CQ desk of plastic laminate. Center desk on both building corridors. Chair by government. Fire extinguisher and fire extinguisher cabinet. Provide six upholstered modular waiting-area seating units with two modular end table units. Provide wall mounted television bracket. Provide wall mounted electric water cooler.

11.6.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

11.6.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

11.6.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

11.7 Building Corridors

11.7.1 Space Function: Building circulation. Provide two spaces per floor.

11.7.2 Architectural Issues: Fire rating as required for bearing walls.

11.7.2.1 Minimum Size: 1.850 m wide.
11.7.2.2 Walls: Paint on CMU.
11.7.2.3 Floors: VCT.
11.7.2.4 Ceilings: 2.4 m high SACT.
11.7.2.5 Doors: Pair of 850 mm wide painted flush hollow metal doors and frames. 125 mm x 500 mm vision panels. C label fire doors. Each opening to receive Heavy Duty Hardware, Two Continuous Hinge, Push Plate, Pull Plate, Door Closer, Wall Magnetic Hold Open, Stainless Steel Kick Plate.
11.7.2.6 Windows: None.
11.7.2.7 Accessories: Fire extinguisher and fire extinguisher cabinets.

11.7.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers, fire alarm notification appliances, manual fire alarm pull stations, and magnetic door holders.

11.7.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by area size.
11.7.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72.
11.7.3.3 Fire Manual Release: Manual fire alarm pull stations shall be located directly adjacent to all exits from a floor. Manual fire alarm pull stations shall be equipped with protective covers as indicated in Section 10.
11.7.3.4 Magnetic Door Holders: The double doors leading from each floor's entry lobby to the wing corridors shall be equipped with magnetic door holders to keep the doors propped open under normal operating conditions.

11.8 Vending Area

11.8.1 Space Function: Vending machines. Provide one space.

11.8.2 Architectural Issues:

11.8.2.1 Minimum Size: Size to accommodate min. 5 machines.
11.8.2.2 Walls: Paint on CMU.
11.8.2.3 Floors: VCT.
11.8.2.4 Ceilings: 2.4 m high SACT.

11.8.2.5 Doors: None.
11.8.2.6 Windows: None.
11.8.2.7 Furniture: Vending machines supplied and installed by the government. Successful proposer to provide electrical and plumbing services as specified.

11.8.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.8.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by area size.

11.8.4 Mechanical – Plumbing Issues: Provide floor drain and cold water valved outlet in vicinity of Ice Machine.

11.9 Central Stair

11.9.1 Space Function: Vertical circulation. Provide one space per floor.

11.9.2 Architectural Issues: No enclosure. Provide smoke draft stops extending from ceiling to code required minimum distance below ceiling to prevent smoke transfer.

11.9.2.1 Minimum Size: provide as required to allow circulation from lobby to all upper floors, and to comply with all applicable code egress requirements.
11.9.2.2 Walls: Paint on CMU.
11.9.2.3 Floors: VCT at landings, abrasive tread inserts at stairs.
11.9.2.4 Ceilings: Painted exposed structure.
11.9.2.5 Doors: None.
11.9.2.6 Windows: Exterior windows as shown on elevations.
11.9.2.7 Accessories: None.
11.9.2.8 Railings: Painted steel pipe rails in conformance with NFPA 101.

11.9.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.9.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be upright. Provide the appropriate number of spaced heads as dictated by area size. Provide wire protective guards for all sprinkler heads in the stairwell.
11.9.3.2 Class I Standpipe: Class I standpipe system connections shall be provided on each floor on the stairwell. Standpipe system to be connected to building fire suppression sprinkler system as indicated in Section 7.

11.10 Building Stairs

11.10.1 Space Function: Emergency egress and vertical circulation. Provide two spaces per floor.

11.10.2 Architectural Issues:

11.10.2.1 Minimum Size: provide as required to allow circulation from lobby to all upper floors, and to comply with all applicable code egress requirements.
11.10.2.2 Walls: Paint on CMU.
11.10.2.3 Floors: VCT at landings, abrasive tread inserts on stairs.
11.10.2.4 Ceilings: Painted exposed structure.
11.10.2.5 Interior Doors: Door width of 900 mm painted hollow metal doors and frames U/L Fire Rated. 125 mm x 500 mm vision panels. Each door to receive Heavy Duty Hardware, One Continuous Hinge, Rim Panic Passage Function, Door Closer, Stainless Steel Kick Plate.
11.10.2.6 Exterior Doors: Exterior door 900 mm wide insulated FRP doors x Aluminum Frame. Each opening to receive Heavy Duty Hardware, One Continuous Hinges, Rim Panic Exit Only Function, Door Closer, Over Head Stop/Holder, Threshold x Pem-Kote x Sleeve Anchors, Set Weather Stripping, Sweep.
11.10.2.7 Windows: Laminated glass vision panel in door.
11.10.2.8 Railings: Painted steel pipe rails in conformance with NFPA 101.

11.10.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers and Class I standpipe connections on each floor.

11.10.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be upright. Provide the appropriate number of spaced heads as dictated by area size. Provide wire protective guards on all sprinkler heads within this room.
11.10.3.2 Class I Standpipe: Class I standpipe system connections shall be provided on each floor on the interior of the stairwells. Standpipe system to be connected to building fire suppression sprinkler system as indicated in Section 7.

11.11 Phone Booth Alcove

11.11.1 Space Function: Public phone access. Provide one space per floor, 2 phones per space.

11.11.2 Architectural Issues: Handicapped accessible phone booths at ground floor only.

11.11.2.1 Walls: Paint on CMU.
11.11.2.2 Floors: VCT.
11.11.2.3 Ceilings: 2.4 m high SACT.

11.11.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.11.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by area size.

11.12 Mud Room

11.12.1 Space Function: Boot wash and equipment cleaning room. Provide one room at ground floor only.

11.12.2 Architectural Issues: Must be adjacent to the ground floor laundry, with direct access from the entry vestibule.

11.12.2.1 Walls: Paint on CMU. Walls shall extend from floor to underside of structure and shall have minimum STC of 45.
11.12.2.2 Floors: Non-skid epoxy floor system. Slope floor to grates.
11.12.2.3 Ceilings: Min. 2.4 m high gypsum board.
11.12.2.4 Doors: Door width of 900 mm painted FRP door and Hollow Metal frames U/L Fire Rated. 125 mm x 500 mm vision panels. Each door to receive Heavy Duty Hardware, One Continuous Hinge, Mortise Lockset Passage Function, Door Closer, Wall Stop, Stainless Steel Kick Plate.
11.12.2.5 Windows: As shown on elevations.
11.12.2.7 Equipment: Provide three combination separator drains, set flush to adjacent concrete flooring. Wall mounted hose bib with mixing valve for warm water wash of equipment and footgear. Min. of three floor-mounted utility sinks.

11.12.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.12.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
11.12.3.2 Fire Detection: Provide notification devices per NFPA 72.

11.12.4 Mechanical – HVAC Issues:

11.12.4.1 Special Exhaust or Ventilation Requirements: Space shall be ventilated using an inline exhaust fan. Ventilation rate shall be a minimum of (10) air changes per hour. Exhaust fan shall be controlled by wall mounted timer.

11.12.4.4 Temperature Requirements:

	Occupied	Unoccupied
Heating:	20°C (68°F)	12.8°C (55°F)
Cooling:	N/A	N/A

11.13 Laundry

11.13.1 Space Function: Laundry facilities for use by Barracks personnel. Provide one per floor. Space shall accommodate a minimum of one clothes washer per 12 residents, and 1.5 clothes dryers per washer (round fractional numbers to the next highest whole number). Washer and Dryers are GFGI.

11.13.2 Architectural Issues: Locate laundry rooms on exterior walls so dryers can be exhausted directly to exterior. Locate dryer exhaust wall caps away from operable windows.

11.13.2.1 Walls: Paint on CMU. Partitions around laundry rooms shall have minimum STC of 45, and shall extend to underside of floor above.

11.13.2.2 Floors: Quarry Tile.
11.13.2.3 Ceilings: 2.4 m high SACT.
11.13.2.4 Doors: Door width of 900 mm Solid Core Wood door and Hollow Metal frames U/L Fire Rated. 125 mm x 500 mm vision panels. Each door to receive Heavy Duty Hardware, One Continuous Hinge, Mortise Lockset Passage Function, Door Closer, Wall Stop, Stainless Steel Kick Plate.
11.13.2.5 Windows: Exterior windows as shown on elevations.
11.13.2.6 Furniture: Washers and dryers supplied and installed by the government. A 1200mmx600mm table per every 4 washers.
11.13.2.7 Accessories: Provide built in plastic laminate tops for use as folding tables.
11.13.2.8 Other: Provide one floor drain for every four washers; locate outside of traffic area. Provide direct straight-run venting of dryer exhaust

11.13.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

11.13.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
11.13.3.2 Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each laundry room as indicated in Section 10.
11.13.3.3 Fire Protection: Provide notification devises per NFPA 72.

11.13.4 Mechanical – HVAC Issues:

11.13.4.5 Provide dryer vent system designed in accordance with TM 5-810-1 and TM 5-815-3.
11.13.4.6 Provide gas piping for dryers.

11.13.5 Mechanical – Plumbing Issues: Provide washer boxes including sanitary, vent and water connections. Provide floor drain.

11.14 Toilet Room

11.14.1 Space Function: Public unisex toilet facilities. Provide one space per floor.

11.14.2 Architectural Issues: Ground floor toilet room only required to be handicapped accessible.
11.14.2.1 Walls: Ceramic tile wainscot to min. 1.5 m high, with painted CMU walls above. Partitions shall have minimum STC of 45 and shall extend from floor to underside of structure above.
11.14.2.2 Floors: Ceramic tile floor and sanitary cove base. Install base prior to flooring.
11.14.2.3 Ceilings: 2.4 m high SACT or painted gypsum board.
11.14.2.4 Doors: Door width of 900 mm Solid Core Wood door and Hollow Metal frames grouted solid. Each door to receive Heavy Duty Hardware, Three

Hinges, One Mortise Lockset Privacy Function Entry (F76), Door Closer, Wall Stop, Stainless Steel Kick Plate.

11.14.2.5 Accessories: Provide one combination paper towel dispenser/waste receptacle, one soap dish, one toilet paper dispenser, one electric hand dryer, and grabs bars. Refer to chapter 5 for Toilet Accessories.

11.14.2.6 Equipment: Floor mounted flush valve water closet and wall hung lavatory.

11.14.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

11.14.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

11.14.3.2 Fire Notification: A fire alarm visual notification appliance shall be located in this space per NFPA 72 and Federal Accessibility Standards.

11.14.4 Mechanical – HVAC Issues:

11.14.4.1 Special Exhaust or Ventilation Requirements: No return air from this room. Exhaust shall comply with ASHRAE 62.

11.15 Janitor's Closet

11.15.1 Space Function: Provide one space per floor.

11.15.2 Architectural Issues:

11.15.2.1 Walls: Paint on CMU.

11.15.2.2 Floors: Sealed concrete.

11.15.2.3 Ceilings: Painted concrete plank.

11.15.2.4 Doors: Door width of 900 mm hollow metal flush door and Hollow Metal frame grouted solid. Each door to receive Heavy Duty Hardware, Three Hinges, One Mortise Lockset Storeroom Function, Best cylinder, keyed distinct from all others in the building Door Closer, Wall Stop, Stainless Steel Kick Plate. Undercut.

11.15.2.5 Equipment: Floor mounted service sink.

11.15.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.15.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be upright. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads within this room.

11.15.4 Mechanical – HVAC Issues: This area requires only exhaust.

11.15.4.2 Special Exhaust or Ventilation Requirements: Compliance with ASHRAE 62. Exhaust inlet at ceiling.

11.16 Multi-Purpose Room

11.16.1 Space Function: Exercise and recreation room. Provide a minimum of 1 space per floor.

11.16.2 Architectural Issues:

11.16.2.1 Walls: Paint on CMU. Partitions shall have minimum STC of 45 and shall extend from floor to underside of structure above.
11.16.2.2 Floors: VCT.
11.16.2.3 Ceilings: 2.4 m high SACT.
11.16.2.4 Doors: Door width of 900 mm Half Glass Solid Core Wood door and Hollow Metal frames grouted solid. Each door to receive Heavy Duty Hardware, Three Hinges, One Mortise Lockset Passage Function, Door Closer, Wall Stop, Stainless Steel Kick Plate.
11.16.2.5 Windows: Exterior windows as shown on elevations. Interior windows of hollow metal frames, tempered glass vision panels.

11.16.3 Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm notification appliances.

11.16.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
11.16.3.2 Fire alarm notification appliances shall be located in this space per NFPA 72.

11.17 Mail Distribution

11.17.1 Space Function: Secure area for sorting incoming mail and distributing to rear loading mailboxes and parcel lockers.

11.17.2 Architectural Issues: Provide a minimum of 1800 mm (6') clear between the back of the mailboxes and any obstructions.

11.17.2.1 Walls: Paint on CMU. Partitions shall have minimum STC of 45 and shall extend from floor to underside of structure above.
11.17.2.2 Floors: VCT.
11.17.2.3 Ceilings: 2.4 m high SACT.
11.17.2.4 Doors: Door width of 900 mm Hollow Metal flush door and Hollow Metal frames grouted solid. Each door to receive Heavy Duty Hardware, Three Hinges, One Mortise Lockset Storeroom Function, Best cylinder, keyed distinct from all others in the building, Door Closer, Wall Stop, and Stainless Steel Kick Plate. Doors shall have weather stripping installed on all four edges.
11.17.2.5 Windows: Exterior windows as shown on elevations. Aluminum storefront, laminated glazing.
11.17.2.6 Furnishings/Fixtures/Equipment: Provide a plastic laminate faced sorting counter 750 mm deep x minimum 2400 mm long x 900 mm high Provide

United States Postal Service approved mailbox for each living/sleeping space of the facility. Mailboxes not required to meet USPS mounting heights. Provide minimum of nine parcel lockers, and one outgoing mail collection box.

11.17.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.17.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

11.17.4 Mechanical – HVAC Issues:

11.17.4.1 Special Exhaust or Ventilation Requirements: Exhaust shall comply with ASHRAE 62.
11.17.4.2 HVAC system for this space must comply with the mailroom ventilation section of UFC 4-010-01.

11.18 Mailbox Access Area

11.18.1 Space Function: Mail pickup area for barracks residents.

11.18.2 Architectural Issues:

11.18.2.1 Minimum Size: As required to access the mailboxes, parcel lockers and mail collection box.
11.18.2.2 Walls: Paint on CMU.
11.18.2.3 Floors: VCT.
11.18.2.4 Ceilings: 2.4 m SACT.
11.18.2.5 Doors: None.
11.18.2.6 Windows: None.
11.18.2.7 Furnishings/Fixtures/Equipment: Writing desk, minimum 300 mm wide, 300 mm deep, wall mounted at 1100 mm high. 240 mailboxes (one for each living/sleeping space of the facility), 9 parcel lockers and 1 mail collection box.

11.18.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.18.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by area size.

11.19 Communications Room

11.19.1 Space Function: Room to house network and phone equipment. Provide one space per floor. Room area shall be minimum of 1.1% of the building area served, however, minimum dimensions for each communication room shall be 2100 mm x 3000 mm

11.19.2 Architectural Issues:

11.19.2.1 Walls: Painted fire retardant plywood on paint on CMU walls.
11.19.2.2 Floors: Anti static VCT.
11.19.2.3 Ceilings: 3 m high, paint underside of precast concrete plank. Use vapor retarding paint at underside of precast concrete planks.
11.19.2.4 Doors: Door width of 900 mm Solid Core Wood door and Hollow Metal frames grouted solid. Each door to receive Heavy Duty Hardware, Three Hinges, One Mortise Lockset Storeroom Function, Best cylinder, keyed distinct from all others in the building, Door Closer, Wall Stop, Stainless Steel Kick Plate.

11.19.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

11.19.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13R. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads within this room.

11.20 Electric Room

11.20.1 Space Function: Room to house electric service and distribution panels. Provide one space per floor.

11.20.2 Architectural Issues:

11.20.2.1 Walls: Paint on CMU. Partitions shall have minimum STC of 45 and shall extend from floor to underside of structure above.
11.20.2.2 Floors: Sealed concrete.
11.20.2.3 Ceilings: Painted precast concrete plank.
11.20.2.4 First Floor Interior Doors: Pair of doors width of 900 mm Hollow metal doors and frames grouted solid. Each opening to receive Heavy Duty Hardware, Three Hinges, One Mortise Lockset Storeroom Function, Best cylinder, keyed distinct from all others in the building, One Door Closer, Wall Stop, Flush Bolts, Stainless Steel Kick Plate.
11.20.2.5 Second Floor Interior Door: Door width 900 mm solid core flush wood door. Painted hollow metal frame U/L Fire Rated, grouted solid. Entry door to receive Heavy Duty Hardware, Three Hinges, One Mortise Storeroom function Lockset, with lever handles, Best cylinder, keyed distinct from all others in the building, Door Closer, Wall Stop, Stainless Steel Kick Plate.

11.20.3 Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

11.20.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the upright type. Provide wire protective guards on all sprinkler heads within this room. Provide the appropriate number of spaced heads as dictated by room size.

11.20.3.2 Fire Alarm Control: Provide smoke detector and pull station at entry.

11.21 Mechanical Room

11.21.1 Space Function: Room to house mechanical systems. Provide one space per floor.

11.21.2 Architectural Issues:

11.21.2.1 Walls: Paint on CMU, grouted solid walls extending to underside of concrete plank above. Partitions shall have minimum STC of 45.

11.21.2.2 Floors: Sealed concrete.

11.21.2.3 Ceilings: Painted concrete plank.

11.21.2.4 Ground Floor Exterior Doors: Pair of doors width of 900 mm FRP door and Aluminum frames grouted solid. Each opening to receive Heavy Duty Hardware, Two Continuous Hinges, One Mortise Lockset Storeroom Function, Best cylinder, keyed distinct from all others in the building, Two Door Closer, Over Head Stop/Holder, Wall Stop, Flush Bolts, Stainless Steel Kick Plate, One Threshold x Pem-Kote x Sleeve Anchors, One Set Weather Stripping, Security Astragal, Two Sweeps.

11.21.2.5 Second Floor Interior Door: Door width 900 mm solid core flush wood door. Painted hollow metal frame U/L Fire Rated, grouted solid. Entry door to receive Heavy Duty Hardware, Three Hinges, One Mortise Storeroom function Lockset, with lever handles, Best cylinder, keyed distinct from all others in the building, Door Closer, Wall Stop, Stainless Steel Kick Plate.

11.21.2.6 Furnishings/Fixtures/Equipment: Steel access ladder with cage. Fire extinguisher and fire extinguisher cabinet.

11.21.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers, the building fire suppression sprinkler main water service/riser, mechanical unit control relays, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

11.21.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads within this room.

11.21.3.2 Fire Suppression Sprinklers Service: The sprinkler system main water service/riser shall enter and be located in the first floor mechanical room. A 200 mm double check detector back flow prevention valve assembly shall be connected to the fire service that enters the building. The main sprinkler riser shall be connected to the flow side of the back flow prevention valve. A 150 mm wet-pipe alarm check valve assembly and trim sprinkler service riser shall be provided per NFPA 13R and as indicated in Section 7.

11.21.3.3 Control Relays: Any mechanical unit designated to be shutdown on a general fire alarm activation as indicated in Section 7, shall have its respective shutdown control module/relay mounted within .9 m (3 ft) of the unit it is controlling. Relays shall be mounted in junction boxes and labeled as to their function.

11.21.3.4 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72.

11.21.3.5 Fire Manual Release: A manual fire alarm pull station shall be located directly adjacent to the exit from the room leading to the exterior of the building. Manual fire alarm pull station shall be equipped with protective covers as indicated in Section 7.

11.21.3.6 Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each mechanical room as indicated in Section 10.

11.21.4 Mechanical – HVAC Issues: This area requires ventilation, exhaust and winter heating. Emergency shutdown requirements with fire protection and coordination with electrical design.

11.21.4.2 Special Exhaust or Ventilation Requirements: Exhaust and ventilation shall comply with ASHRAE 62, NPPA 90A, NPPA 211, NPPA 54 and as required to maintain temperature below 35°C.

11.21.4.5 Special Requirements: Emergency shutdown as required by codes. Successful proposer shall coordinate with other trades.

11.21.4.6 Provide natural gas system for HVAC and domestic water heating equipment.

11.21.5 Mechanical – Plumbing Issues:

11.21.5.1 Provide domestic water service including meter and backflow preventer.

11.21.5.2 Provide domestic hot water heating system for servicing all plumbing fixtures.

11.21.5.3 Provide floor drains.

11.21.5.4 Provide hose bibs.

11.21.5.5 Provide cold water makeup with backflow preventer for HVAC equipment.

11.21.5.6 Provide condensate and indirect waste piping from equipment to spill over floor drains.

11.22 Exterior Canopy- Inside of "L" (North)

11.22.1 Space Function: Provides weather protection at building entrance.

11.22.2 Architectural Issues:

11.22.2.1 Minimum Size: Provide canopy of length as required to protect against sliding snow from roof above. Utilize the sliding snow calculator available from the Army Corps of Engineers to verify canopy length. Provide 1000mm high brick walls along entire canopy length and on both sides of walkway under canopy.

11.22.2.2 Floors: Concrete sidewalk

11.22.2.3 Ceilings: Linear metal.

11.22.3 Fire Protection Issues: None.

11.22.4 Mechanical – HVAC Issues: None.

11.22.5 Mechanical – Plumbing Issues: None.

11.23 Exterior Canopy- Outside of "L" (South)

11.23.1 Space Function: Provides weather protection at building entrance.

11.23.2 Architectural Issues:

11.23.2.1 Minimum Size: Provide canopy of length as required to protect against sliding snow from roof above. Utilize the sliding snow calculator available from the Army Corps of Engineers to verify canopy length. Provide 1000mm high brick walls along entire canopy length and on both sides of walkway under canopy.
11.23.2.2 Floors: Concrete sidewalk
11.23.2.3 Ceilings: Linear metal.

11.23.3 Fire Protection Issues: None.

11.23.4 Mechanical – HVAC Issues: None.

11.23.5 Mechanical – Plumbing Issues: None.

11.24 Fourth Floor Mechanical Room

11.24.1 Space Function: Mechanical.

11.24.2 Architectural Issues:

11.24.2.1 Walls: Exposed CMU.
11.24.2.2 Floors: Sealed concrete.
11.24.2.3 Ceilings: 2.1 m high maximum, exposed concrete plank.
11.24.2.4 Doors:
a. Exterior pair of 900 mm wide insulated FRP doors x Aluminum Frame. Each opening to receive Heavy Duty Hardware, Two Continuous Hinges, Four Slide Bolts, One Set Weather Stripping, Astragal Two Sweeps. Supply a removable safety rail conforming to OSHA standards.
b. Interior access doors 900 mm wide 2 hour fire rated painted Hollow Metal door and frames grouted solid, to access attic duct space, U/L Fire Rated. Each door to receive Heavy Duty Hardware, Two Hinges, One Mortise Lockset Passage Function, Door Closer.
11.24.2.5 Equipment: Intake and exhaust louvers, integrated into window systems- see exterior elevations.

11.24.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers, mechanical unit control relays, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

11.24.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13R. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads within this room.

11.24.3.2 Control Relays: Any mechanical unit designated to be shutdown on a general fire alarm activation as indicated in Section 7, shall have its respective shutdown control module/relay mounted within .9 m (3 ft) of the unit it is controlling. Relays shall be mounted in junction boxes and labeled as to their function.

11.24.3.3 Fire Notification: Fire alarm notification appliances shall be located in thee spaces per NFPA 72.

11.24.3.4 Fire Manual Release: A manual fire alarm pull station shall be located directly adjacent to the exit from the room leading to the corridor below (near top of ladder). Manual fire alarm pull station shall be equipped with protective covers as indicated in Section 7.

11.24.3.5 Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each mechanical room as indicated in Section 10.

11.24.4 Mechanical – HVAC Issues: This area requires ventilation, exhaust and winter heating. Emergency shutdown requirements with fire protection and coordination with electrical design.

11.24.4.1 Special Exhaust or Ventilation Requirements: Exhaust and ventilation shall comply with ASHRAE 62, NFPA 90A, NFPA 211, NFPA 54 and as required to maintain temperature below 35°.

11.24.4.5 Special Requirements: Emergency shutdown as required by codes. Successful proposer shall coordinate with other trades.

11.24.5 Mechanical – Plumbing Issues: None

11.25 Electric Closet

11.25.1 Space Function: Closet to conceal electrical panels.

11.25.2 Architectural Issues: Corridor wall is one hour fire rated.

11.25.2.1 Walls: Paint on CMU, extending from floor to underside of precast concrete plank.

11.25.2.2 Floor: Sealed concrete.

11.25.2.3 Ceiling: Paint underside of second floor concrete plank with vapor retarding paint.

11.25.2.4 Doors: Door width 800 mm solid core flush wood door. Painted hollow metal frame, grouted solid, U/L Fire Rated. Each door to receive Heavy Duty Hardware, Two Hinges, One Mortise Dead Lock Storeroom Function, Best cylinder, keyed distinct from all others in the building, Door Closer.

11.25.3 Fire Protection Issues: None.

11.25.4 Mechanical – HVAC Issues: None.

11.25.5 Mechanical – Plumbing Issues: None.

11.26 Warm Duct Space

11.26.1 Space Function: Mechanical space for ductwork, within the thermal envelope.

11.26.2 Architectural Issues: Corridor wall is one hour fire rated.

11.26.2.1 Walls: Metal stud wall framing with 5/8" gypsum board, R20 wall insulation, 6 mil. poly vapor barrier on warm side.
11.26.2.2 Floor: ¾" fire retardant plywood floor if roof trusses are utilized.
11.26.2.3 Ceiling: R40 ceiling insulation, 5/8" gypsum board, 6 mil. poly vapor barrier on warm side.
11.26.2.4 Doors: Insulated hollow metal access doors to cold attic space. One door each side.

11.26.3 Fire Protection Issues: None.

11.26.4 Mechanical – HVAC Issues: Provide minimum heat in this space (i.e. finned tube radiation with self-contained control valve; expanded metal grille).

11.26.4.1 Zone Thermostat Type: None.
11.26.4.2 Special Humidity Requirements: None.
11.26.4.3 Special exhaust or Ventilation Requirements: None.
11.26.4.4 Temperature Requirements:

	Normal	Setback
Heating:	7.5°C (45°F)	7.5°C (45°F)
Cooling:	None	None

11.26.5 Mechanical – Plumbing Issues: None.

SECTION 12.0 – BATTALION HEADQUARTERS ROOM-BY-ROOM REQUIREMENTS

12.1. Commanding Officer

12.1.1. Space Function: Private office for battalion commanding officer. Provide one, minimum $19.5m^2$

12.1.2. Architectural Issues: Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

12.1.2.1. Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.1.2.2. Base: resilient Cove Base
12.1.2.3. Floor: Carpet.
12.1.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.1.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
12.1.2.6. Furnishings: Provide and design room to accommodate one desk, one credenza, one bookcase, two legal-size four-drawer file cabinets, one conference table, six side chairs, and one desk chair

12.1.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.1.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.2. Executive Office

12.2.1. Space Function: Private office for battalion executive officer. Provide one, minimum $14m^2$

12.2.2. Architectural Issues: Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

12.2.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.2.2.2. Base: Resilient Cove Base
12.2.2.3. Floor: Carpet.
12.2.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.2.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
12.2.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair

12.2.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.2.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.3. Command Sergeant Major

12.3.1. Space Function: Private office for battalion command sergeant major. Provide one, minimum 17m^2

12.3.2. Architectural Issues: Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

12.3.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.3.2.2. Base: Resilient Cove Base
12.3.2.3. Floor: Carpet.
12.3.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.3.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.
12.3.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.3.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.3.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.4. Reception Area

12.4.1. Space Function: Receptionist workstation and waiting area for visitors to the CO, XO, CSM offices. Provide one, minimum 22m^2

12.4.2. Architectural Issues:To accommodate reception desk and waiting area. Occupants: 1, and space for four visitors.

12.4.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.4.2.2. Base: Resilient Cove Base
12.4.2.3. Floor: Carpet.
12.4.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.4.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.
12.4.2.6. Furnishings: Provide and design area to accommodate one reception desk, four side chairs and one magazine table.

12.4.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.4.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.4.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.5. Command Section Toilet

12.5.1. Space Function: Single-occupant toilet and lavatory, for use by command staff and visitors.

12.5.2. Architectural Issues: Provide one private toilet room. Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from reception area.

12.5.2.1. Walls: Painted Gypsum Wallboard or Painted CMU. Partitions shall extend to underside of structure above.

12.5.2.2. Base: porcelain tile, or ceramic tile

12.5.2.3. Floor: porcelain tile, or ceramic tile

12.5.2.4. Ceiling: minimum 2500 mm high, Painted gypsum wallboard or painted Portland Cement Plaster

12.5.2.5. Accessories: Provide one floor mounted toilet, one wall-hung lavatory, mirror with shelf above lavatory, Paper towel dispenser/waste receptacle, soap dispenser, toilet tissue dispenser, and wall mounted grab bars at toilet

12.5.2.6. Other: Door shall have privacy function (F76) lockset. Arrange space so that door does not open directly into reception area. Partitions shall have minimum STC rating of 49.

12.5.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

12.5.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.5.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.6. Coffee Area

12.6.1. Space Function: Sink and space for coffee maker and supplies; for use by command section staff and visitors. Provide one.

12.6.2. Architectural Issues: Area shall have countertop with kitchen sink; comply with handicap accessibility requirements. .

12.6.2.1. Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.6.2.2. Base: porcelain tile or ceramic tile
12.6.2.3. Floor: porcelain tile or ceramic tile
12.6.2.4. Ceiling: Suspended acoustical panel ceiling
12.6.2.5. Other Provide minimum 1200 mm wide x 600 mm deep plastic laminate countertop, with stainless steel kitchen sink. Provide minimum 1200 mm of wall cabinets; mounted to provide 600 mm clearance above countertop. Provide dedicated electrical receptacle for coffee maker (coffee maker not in contract).

12.6.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.6.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size
12.6.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.7. S-1 Officer

12.7.1. Space Function: Private office for S-1 officer. Provide one, 8.8m^2 minimum.

12.7.2. Architectural Issues: Room shall be accessed through the S-1 Clerical/Central Files area. Occupants: 1, and occasional visitors.

12.7.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.7.2.2. Base: Resilient Cove Base
12.7.2.3. Floor: Carpet.
12.7.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.7.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
12.7.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.7.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.7.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed sidewall type. Provide the appropriate number of spaced heads as dictated by room size.

12.8. S-1 PAC Clerical/Central Files

12.8.1. Space Function: Private quarters for one enlisted personnel. Provide one, minimum 92m^2.

12.8.2. Architectural Issues: Secure private quarters, with perimeter walls of the sleeping room and adjacent closet space extending to the underside of the precast concrete plank above.

12.8.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.8.2.2. Base: Resilient Cove Base
12.8.2.3. Floor: Carpet.
12.8.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.8.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm.
12.8.2.6. Furnishings: Provide and design room to accommodate seven type systems furniture workstations.

12.8.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

12.8.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.
12.8.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.9. S-2 Officer

12.9.1. Space Function: Private office for S-2 officer. Provide one, minimum $10m^2$.

12.9.2. Architectural Issues:Room shall be accessed through the S-2 Clerical/Central Files area. Occupants: 1, and occasional visitors.

12.9.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.9.2.2. Base: Resilient Cove Base
12.9.2.3. Floor: Carpet.
12.9.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.9.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
12.9.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.9.3. Fire Protection Issues: This area shall receive fire suppression sprinklers

12.9.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

12.10. Office

12.10.1. Space Function: Private office for use by personnel. Provide 5, minimum 8.8m^2 each.

12.10.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

12.10.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.10.2.2. Base: Resilient Cove Base
12.10.2.3. Floor: Carpet.
12.10.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.10.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
12.10.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.10.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

12.10.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size
12.10.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.11. S-2 Clerical/Central Files

12.11.1. Space Function: Open office area for S-2 admin staff; access to other S-2 spaces. Provide one, minimum 43m^2.

12.11.2. Architectural Issues: S-2 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-2 private offices, and the Secured Documents Vault. Occupants: 8 staff, and occasional visitors.

12.11.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.11.2.2. Base: Resilient Cove Base
12.11.2.3. Floor: Carpet.
12.11.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.11.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2650mm
12.11.2.6. Furnishings: Provide and design room to accommodate five type systems furniture workstations.

12.11.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.11.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.11.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.12. Crypto Vault

12.12.1. Space Function: Storage of documents classified 'secret' and below. Workspace for one clerk. Provide one room; 8 m^2 minimum.

12.12.2. Architectural Issues: Vault shall be certified for open storage of secret material. Class M Modular construction is acceptable. Provide Class 5 vault door with day gate. To allow future flexibility in reconfiguring offices areas, locate vault on the perimeter of the administrative areas. Occupants: 1.

12.12.2.1. Walls: painted or pre-finished modular vault panels.
12.12.2.2. Base: Resilient Cove Base
12.12.2.3. Floor: Carpet or vinyl composition tile
12.12.2.4. Ceiling: painted or pre-finished modular vault panels
12.12.2.5. Furnishings: Provide and design room to accommodate one desk with return, and one desk chair.

12.12.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

12.12.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

12.12.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.12.4. Mechanical Issues: This space is a conditioned occupied room

12.13. S-3 Officer

12.13.1. Space Function: Private office for S-3 officer. Provide one, minimum 8.8m^2.

12.13.2. Architectural Issues: Room shall be accessed through the S-3 Clerical/Central Files area. Occupants: 1, and occasional visitors.

12.13.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.13.2.2. Base: Resilient Cove Base
12.13.2.3. Floor: Carpet.

12.13.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.13.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
12.13.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.13.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.13.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.14. COMMO Office

12.14.1. Space Function: Private office for use by COMMO personnel. Provide 1 at 20m^2 minimum.

12.14.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

12.14.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.14.2.2. Base: Resilient Cove Base
12.14.2.3. Floor: Carpet.
12.14.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.14.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
12.14.2.6. Furnishings: Provide and design room to accommodate two desks, one bookcase, two legal-size four-drawer file cabinets, and two desk chair.

12.14.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.14.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.15. S-3 Clerical/Central Files

12.15.1. Space Function: Open office area for S-3 admin staff; access to other S-3 spaces. Provide one, minimum 124m^2.

12.15.2. Architectural Issues: S-3 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-3 private offices, and the Secured Documents Vault. Occupants: 8 staff , and occasional visitors.

12.15.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.15.2.2. Base: Resilient Cove Base
12.15.2.3. Floor: Carpet.
12.15.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.15.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2650mm.
12.15.2.6. Furnishings: Provide and design room to accommodate minimum eight type systems furniture workstations.

12.15.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.15.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.
12.15.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.16. Conference Room

12.16.1. Space Function: Conference room for battalion leadership, staff, and visitors. Functions will include staff meetings, hearings, disciplinary sessions, and training. Provide one, 49m^2 minimum.

12.16.2. Architectural Issues: Room shall be located to allow direct access from the main corridor/lobby and the Command Section/S-1 Section. Occupants: up to 26 persons.

12.16.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.16.2.2. Base: Resilient Cove Base
12.16.2.3. Floor: Carpet.
12.16.2.4. Ceiling: Suspended acoustical panel ceiling. Minimum ceiling height 2642 mm
12.16.2.5. Other: Provide 900 mm wide doors into room; doors shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55. Exterior window is desirable.
12.16.2.6. Furnishings: Provide and design room to accommodate one conference table and 10 chairs. Provide one marker board (minimum 2400 mm wide x 1200 mm high). Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 4 recessed ceiling mounted speakers. Provide one 2400mm recessed ceiling mounted motorized projection screen.

12.16.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.16.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.16.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.17. S-4 Officer

12.17.1. Space Function: Private office for S-4 officer. Provide one, minimum 8.8m^2.

12.17.2. Architectural Issues: Room shall be accessed through the S-4 Clerical/Central Files area. Occupants: 1, and occasional visitors.

12.17.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

12.17.2.2. Base: Resilient Cove Base

12.17.2.3. Floor: Carpet.

12.17.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

12.17.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.

12.17.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.17.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.17.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.18. Retention Office

12.18.1. Space Function: Private office for use by Retention personnel. Provide 1, minimum 9m^2.

12.18.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

12.18.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

12.18.2.2. Base: Resilient Cove Base

12.18.2.3. Floor: Carpet.

12.18.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

12.18.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.

12.18.2.6. Furnishings: Provide and design area to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

12.18.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.18.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.19. S-4 Clerical/Central Files

12.19.1. Space Function: Open office area for S-4 admin staff; access to other S-4 spaces. Provide one, minimum 83m^2.

12.19.2. Architectural Issues: S-4 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-4 private offices, and the Secured Documents Vault. Occupants: 8 staff , and occasional visitors.

12.19.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.19.2.2. Base: Resilient Cove Base
12.19.2.3. Floor: Carpet.
12.19.2.4. Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling.
12.19.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
12.19.2.6. Furnishings: Provide and design room to accommodate eight systems furniture workstations.

12.19.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.19.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed type. Provide the appropriate number of spaced heads as dictated by room size.
12.19.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.20. S-4 Storage and Supplies

12.20.1. Space Function: Supply Storage. Provide one, minimum 6m^2.

12.20.2. Architectural Issues: Room shall be under control of, and accessed from, S-4/Clerical/Central Files area. Room shall be located on exterior wall, with exterior doors leading to paved sidewalk

12.20.2.1. Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
12.20.2.2. Base: Resilient Cove Base
12.20.2.3. Floor: Sealed concrete.

12.20.2.4. Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

12.20.2.5. Other: Provide 900 mm wide door into room from S-4/Clerical/Central Files; provide pair of 900 mm wide outswinging hollow metal exterior doors. Doors shall have storeroom function (F86) locksets.

12.20.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.20.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

12.20.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.21. Storage

12.21.1. Space Function: Supply Storage. Provide two, minimum 8.8m^2.

12.21.2. Architectural Issues: Room shall be accessed from the corridor.

12.21.2.1. Walls: Painted 200mm CMU. Partitions shall extend to underside of structure above.

12.21.2.2. Base: Resilient Cove Base

12.21.2.3. Floor: Sealed concrete.

12.21.2.4. Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

12.21.2.5. Other: Door shall have storeroom function (F86) lockset.

12.21.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.21.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

12.21.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.22. Duty Officer

12.22.1. Space Function: Duty Officer will provide physical security of the building, and visual control of the entrances and lobby, as well as functioning as an information source for visitors. Provide 1, minimum 16m^2.

12.22.2. Architectural Issues: Room shall be accessed from the main lobby. Occupants: 1.

12.22.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
12.22.2.2. Base: Resilient Cove Base
12.22.2.3. Floor: Carpet.
12.22.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.22.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset and glass vision panel. Provide duty officer counter (built-in casework) minimum 1800 mm long separating the Duty Officer room from the lobby/corridor. The counter on the corridor side shall be minimum 1500 mm wide x 1000 mm high x 300 mm deep. Counter on the office side shall be a minimum of 750mm deep and 750mm high.

12.22.3. Fire Protection Issues: This area shall receive fire suppression sprinklers

12.22.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.23. Chaplain's Assistant

12.23.1. Space Function: Private office for Chaplain's Assistant and waiting area for visitors to Chaplain's office. Provide 1, minimum 14m^2.

12.23.2. Architectural Issues: Room shall be accessed from the lobby or main corridor. Occupants: 1, and visitors.

12.23.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.23.2.2. Base: Resilient Cove Base
12.23.2.3. Floor: Carpet.
12.23.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.23.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.
12.23.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, four side chairs, and one desk chair.

12.23.3. Fire Protection Issues: This area shall receive fire suppression sprinklers

12.23.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed sidewall type. Provide the appropriate number of spaced heads as dictated by room size

12.24. Chaplain

12.24.1. Space Function: Private office for Chaplain and visitors. Provide 1, minimum 16m^2.

12.24.2. Architectural Issues: Room shall be accessed from the Chaplain's Assistant office. Occupants: 1, and visitors.

12.24.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.24.2.2. Base: Resilient Cove Base
12.24.2.3. Floor: Carpet.
12.24.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.24.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 55.
12.24.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, one desk chair

12.24.3. Fire Protection Issues: This area shall receive fire suppression sprinklers

12.24.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.25. Classroom

12.25.1. Space Function: Soldier training and other meetings. Provide two (2) classrooms, minimum 85m^2 each.

12.25.2. Architectural Issues: Each classroom shall be located to allow direct access from the main corridor/lobby, and direct egress out of the building. In a two-story building, classrooms will be located on the first floor. Occupants: up to 60 persons in each room.

12.25.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.25.2.2. Base: Resilient Cove Base
12.25.2.3. Floor: vinyl composite tile.
12.25.2.4. Ceiling: Minimum ceiling height shall be 2600mm at perimeter and 3000mm in main portion of room, suspended acoustical panel ceiling.
12.25.2.5. Other: Provide 900 mm wide door into room; door shall have classroom function (F84) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Provide and design room to accommodate the following furnishings: minimum of 12 Training tables with 2 stacking chairs per table per classroom. Walls separating classrooms shall be operable

panel partitions with minimum STC rating of 47. Provide data jacks around room near training tables. Provide one data jack per seat. Provide one additional telephone jack near instructor's position. Provide one CATV jack on wall where television bracket is installed. Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 4 recessed ceiling mounted speakers.

12.25.2.6. Provide and design room to accommodate the following furnishings: Provide one marker board (minimum 3650 mm wide x 1200 mm high) and one 2400mm recessed ceiling mounted motorized projection screen.

12.25.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.25.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

12.25.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.26. Learning Resource Center

12.26.1. Space Function: Provide one, minimum 18m^2. Soldier training and other meetings

12.26.2. Architectural Issues: Provide direct access from the main corridor/lobby. Occupants: up to 10 persons .

12.26.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

12.26.2.2. Base: Resilient Cove Base

12.26.2.3. Floor: vinyl composite tile.

12.26.2.4. Ceiling: Minimum ceiling height shall be 2600mm at perimeter and 3000mm in main portion of room, suspended acoustical panel ceiling.

12.26.2.5. Other: Provide 900 mm wide door into room; door shall have classroom function (F84) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.

12.26.2.6. Furnishings: Provide and design room to accommodate the following furnishings: one (1) 750mm by 1500mm worktables, four (4) stacking chairs and two (2) bookcases (3 shelf). Partitions shall have minimum STC rating of 49. Provide one marker board minimum 2400mm wide by 1200mm high and one 2400mm wide wall mounted pull-down projection screen.

12.26.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.26.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant

type. Provide the appropriate number of spaced heads as dictated by room size

12.26.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

12.27. Lobby and Corridors

12.27.1. Space Function: Entry to the facility; egress and circulation through the building.

12.27.2. Architectural Issues: Provide as required to allow access to building spaces. Unless otherwise required, minimum width of main corridors providing access to classroom area shall not be less than 2400 mm, minimum width of other main corridors shall not be less than 1800 mm. Corridor width shall comply with applicable egress codes.

12.27.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
12.27.2.2. Base: Resilient Cove Base
12.27.2.3. Floor: vinyl composition tile.
12.27.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
12.27.2.5. Other: Handicap Accessible. Provide wall mounted electric water cooler. Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide recessed space for three vending machines per building (machines are not in contract). Provide interior signage to identify major spaces. Provide two trophy cases (minimum size: 2400 mm wide x 1500 high x 400 mm deep) per battalion; provide one recessed building directory near each main entrance. Provide one 1200 mm high x 1800 mm wide wall mounted bulletin board.

12.27.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.27.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
12.27.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.28. Entry Vestibule

12.28.1. Space Function: Primary entry point into the facility; weather protection for interior spaces.

12.28.2. Architectural Issues: Provide at each exterior entrance to lobby/main corridor area.

12.28.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
12.28.2.2. Base: Resilient Cove Base
12.28.2.3. Floor: vinyl composition tile.
12.28.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

12.28.2.5. Other: Handicap Accessible. Provide FRP entrance doors on exterior and corridor sides of vestibule. Additional aluminum storefront area (sidelights, transoms) is desirable. Provide minimum 1000 mm deep exterior covered area (entry porch) full width of storefront. Provide location for company identification signage on exterior wall above or adjacent to entrance.

12.28.3. Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

12.28.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

12.28.3.2. Fire Alarm Control: A fire alarm annunciator panel shall be recessed wall mounted in the south entry vestibule

12.29. Mens Toilet Rooms

12.29.1. Space Function: Restrooms for male occupants. Provide one.

12.29.2. Architectural Issues: Sized to accommodate the number of plumbing fixtures required for each battalion served. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

12.29.2.1. Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have minimum STC rating of 55.

12.29.2.2. Base: porcelain tile, or ceramic tile

12.29.2.3. Floor: porcelain tile, or ceramic tile.

12.29.2.4. Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

12.29.2.5. Other: Handicap Accessible. Provide 3 lavatories, 3 floor mounted toilets, and 3 wall-hung urinals for each battalion. Lavatories shall be wall-hung. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door. Provide two ceramic tile shower stalls with rod and shower curtain. Shower shall have ceramic soap holder. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, located outside of circulation path.

12.29.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.29.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

12.29.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.30. Women's Toilet Rooms

12.30.1. Space Function: Restrooms for female occupants. Provide one.

12.30.2. Architectural Issues: Sized to accommodate the number of plumbing fixtures required for each battalion served. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

12.30.2.1. Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have minimum STC rating of 55.

12.30.2.2. Base: porcelain tile, or ceramic tile

12.30.2.3. Floor: porcelain tile, or ceramic tile.

12.30.2.4. Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

12.30.2.5. Other: Handicap Accessible. Provide 3 lavatories, 3 floor mounted toilets. Lavatories shall be wall-hung. Provide toilet partitions at each toilet. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one sanitary napkin disposal at each toilet; and one robe hook on each toilet partition door. Provide two ceramic tile shower stalls with rod and shower curtain. Shower shall have ceramic soap holder. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, located outside of circulation path.

12.30.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.30.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

12.30.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

12.31. Janitor Closet

12.31.1. Space Function: Sink and storage of cleaning supplies, soap and paper products. Provide one, minimum 4.5m^2.

12.31.2. Architectural Issues: Provide at each group of toilets of the building. Room shall be accessed from the corridor.

12.31.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
12.31.2.2. Base: ceramic tile or resilient cove base.
12.31.2.3. Floor: ceramic tile or sealed concrete.
12.31.2.4. Ceiling: Painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.
12.31.2.5. Other: Door shall have classroom function (F84) lockset

12.31.3. Fire Protection Issues: This area shall receive fire suppression sprinklers

12.31.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size

12.32. Mechanical Rooms

12.32.1. Space Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment

12.32.2. Architectural Issues: Provide dedicated areas for mechanical equipment. Each battalion shall have independent operation and control of HVAC system for its own spaces, but mechanical equipment may serve more than one battalion, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

12.32.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above. Partitions shall have minimum STC of 45.
12.32.2.2. Base: resilient cove base.
12.32.2.3. Floor: sealed concrete.
12.32.2.4. Ceiling: none required
12.32.2.5. Other: Doors shall have storeroom function (F86) locksets

12.32.3. Fire Protection Issues These areas shall receive fire suppression sprinklers, the building fire suppression sprinkler main water service/riser, mechanical unit control relays, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

12.32.3.1. Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.
12.32.3.2. Fire Suppression Sprinklers Service: The sprinkler system main water service/riser shall enter and be located in the first floor mechanical room. A 200 mm (8”) double check detector back flow prevention valve assembly shall be connected to the fire service that enters the building. The main sprinkler riser shall be connected to the flow side of the back flow prevention valve. A 150 mm (6 inch) wet-pipe alarm check valve assembly

and trim sprinkler service riser shall be provided per NFPA 13 and as indicated in Section 7.

12.32.3.3. Control Relays: Any mechanical unit designated to be shutdown on a general fire alarm activation as indicated in Section 7, shall have its respective shutdown control module/relay mounted within .9 m (3 ft) of the unit it is controlling. Relays shall be mounted in junction boxes and labeled as to their function.

12.32.3.4. Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72.Fire Manual Release: A manual fire alarm pull station shall be located directly adjacent to the exit from the room leading to the exterior of the building. Manual fire alarm pull station shall be equipped with protective covers as indicated in Section 7.

12.32.3.5. Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each mechanical room as indicated in Section 7.

12.33. Electrical Rooms

12.33.1.Space Function: Spaces for electrical equipment

12.33.2.Architectural Issues: Provide dedicated areas for electrical equipment. Each battalion shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one battalion, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

12.33.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.
12.33.2.2. Base: resilient cove base.
12.33.2.3. Floor: sealed concrete.
12.33.2.4. Ceiling: none required
12.33.2.5. Other: Doors shall have storeroom function (F86) locksets

12.33.3. Fire Protection Issues These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

12.33.3.1. Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

12.33.3.2. Fire Alarm Control: The main fire alarm control panel and wireless fire alarm transceiver shall be wall mounted in the ground floor electrical room. All necessary fire alarm addressable monitor and control modules used for auxiliary fire alarm functions shall also be mounted adjacent to the main fire alarm control panel in junction boxes and labeled according to their function.

12.34. Communications Room

12.34.1. Space Function: Distribution areas for telephone, data network, and cable television.

12.34.2. Architectural Issues Provide dedicated room(s) for communication distribution equipment. Each room shall be dedicated to a single battalion, and shall not be combined with mechanical or electrical rooms. Provide each battalion with one main communication room; minimum size 3000 mm x 3300 mm. Provide additional communication rooms as needed; all spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m between outlet and communication room. Minimum dimensions of secondary communication rooms shall be 2100 mm x 3000 mm. Provide floor openings and vertical shaft spaces as necessary. Rooms shall be accessed from corridors. Access will be limited to authorized personnel.

12.34.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.
12.34.2.2. Base: resilient cove base.
12.34.2.3. Floor: sealed concrete.
12.34.2.4. Ceiling: none required
12.34.2.5. Other: Doors shall have storeroom function (F86) locksets

12.34.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

12.34.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

SECTION 13.0 – BRIGADE HEADQUARTERS ROOM BY ROOM REQUIREMENTS

13.1. Commanding Officer

13.1.1. Space Function: Private office for battalion commanding officer. Provide one, minimum $19.5m^2$.

13.1.2. Architectural Issues: Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

12.34.3.2. Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.1.2.1. Base: resilient Cove Base
13.1.2.2. Floor: Carpet.
13.1.2.3. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.1.2.4. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
13.1.2.5. Furnishings: Provide and design room to accommodate one desk, one credenza, one bookcase, two legal-size four-drawer file cabinets, one conference table, six side chairs, and one desk chair

13.1.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.1.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.2. Executive Office

13.2.1. Space Function: Private office for battalion executive officer. Provide one, minimum $14m^2$.

13.2.2. Architectural Issues: Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

13.2.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.2.2.2. Base: Resilient Cove Base
13.2.2.3. Floor: Carpet.
13.2.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.2.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
13.2.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair

13.2.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.2.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.2.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.3. Command Sergeant Major

13.3.1. Space Function: Private office for battalion command sergeant major. Provide one, minimum 17m^2.

13.3.2. Architectural Issues: Room shall be accessed through the Reception Area. Occupants: 1, and occasional visitors.

13.3.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.3.2.2. Base: Resilient Cove Base

13.3.2.3. Floor: Carpet.

13.3.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

13.3.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.

13.3.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.3.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.3.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.4. Reception Area

13.4.1. Space Function: Receptionist workstation and waiting area for visitors to the CO, XO, CSM offices. Provide one, minimum 22m^2.

13.4.2. Architectural Issues: Shall accommodate reception desk and waiting area. Occupants: 1, and space for four visitors.

13.4.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.4.2.2. Base: Resilient Cove Base

13.4.2.3. Floor: Carpet.

13.4.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

13.4.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.

13.4.2.6. Furnishings: Provide and design area to accommodate one reception desk, four side chairs and one magazine table.

13.4.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.4.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.4.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.5. Command Section Toilet

13.5.1. Space Function: Single-occupant toilet and lavatory, for use by command staff and visitors. Provide one.

13.5.2. Architectural Issues: Private toilet room. Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from reception area.

13.5.2.1. Walls: Painted Gypsum Wallboard or Painted CMU. Partitions shall extend to underside of structure above.

13.5.2.2. Base: porcelain tile, or ceramic tile

13.5.2.3. Floor: porcelain tile, or ceramic tile

13.5.2.4. Ceiling: minimum 2500 mm high, Painted gypsum wallboard or painted Portland Cement Plaster

13.5.2.5. Accessories: Provide one floor mounted toilet, one wall-hung lavatory, mirror with shelf above lavatory, Paper towel dispenser/waste receptacle, soap dispenser, toilet tissue dispenser, and wall mounted grab bars at toilet

13.5.2.6. Other: Door shall have privacy function (F76) lockset. Arrange space so that door does not open directly into reception area. Partitions shall have minimum STC rating of 49.

13.5.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.5.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.5.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.6. Coffee Area

13.6.1. Space Function: Sink and space for coffee maker and supplies; for use by command section staff and visitors. Provide one.

13.6.2. Architectural Issues: Area shall have countertop with kitchen sink; comply with handicap accessibility requirements.

13.6.2.1. Walls: painted gypsum wallboard or painted veneer plaster
13.6.2.2. Base: porcelain tile or ceramic tile
13.6.2.3. Floor: porcelain tile or ceramic tile
13.6.2.4. Ceiling: Suspended acoustical panel ceiling
13.6.2.5. Other Provide minimum 1200 mm wide x 600 mm deep plastic laminate countertop, with stainless steel kitchen sink. Provide minimum 1200 mm of wall cabinets; mounted to provide 600 mm clearance above countertop. Provide dedicated electrical receptacle for coffee maker (coffee maker not in contract).

13.6.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.6.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.6.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.7. S-1 Officer

13.7.1. Space Function: Private office for S-1 officer. Provide one, minimum 13.5m^2.

13.7.2. Architectural Issues: Room shall be accessed through the S-1 Clerical/Central Files area. Occupants: 1, and occasional visitors.

13.7.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.7.2.2. Base: Resilient Cove Base
13.7.2.3. Floor: Carpet.
13.7.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.7.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
13.7.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.7.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.7.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.8. S-1/PAC

13.8.1. Space Function: Private quarters for one enlisted personnel. Provide one, minimum $78m^2$.

13.8.2. Architectural Issues: Secure private quarters, with perimeter walls of the sleeping room and adjacent closet space extending to the underside of the precast concrete plank above.

13.8.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.8.2.2. Base: Resilient Cove Base
13.8.2.3. Floor: Carpet.
13.8.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.8.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2642 mm.
13.8.2.6. Furnishings: Provide and design room to accommodate seven type systems furniture workstations.

13.8.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.8.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.8.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.9. S-2 Officer

13.9.1. Space Function: Private office for S-2 officer. Provide one, minimum $14m^2$.

13.9.2. Architectural Issues: Room shall be accessed through the S-2 Clerical/Central Files area. Occupants: 1, and occasional visitors.

13.9.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.9.2.2. Base: Resilient Cove Base
13.9.2.3. Floor: Carpet.
13.9.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.9.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
13.9.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.9.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.9.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.10. Conference Room

12.34.4. Space Function: Conference room for battalion leadership, staff, and visitors. Functions will include staff meetings, hearings, disciplinary sessions, and training. Provide one, 36 m^2 minimum.

12.34.5. Architectural Issues: Room shall be located to allow direct access from the main corridor/lobby and the Command Section/S-1 Section. Occupants: up to 26 persons.

12.34.5.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.34.5.2. Base: Resilient Cove Base
12.34.5.3. Floor: Carpet.
12.34.5.4. Ceiling:Suspended acoustical panel ceiling. Minimum ceiling height 2642 mm
12.34.5.5. Other: Provide 900 mm wide doors into room; doors shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55.
12.34.5.6. Furnishings: Provide and design room to accommodate one conference table and 10 chairs. Provide one marker board (minimum 2400 mm wide x 1200 mm high). Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 4 recessed ceiling mounted speakers. Provide one 2400mm recessed ceiling mounted motorized projection screen.

13.10.1. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.10.1.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.10.1.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.11. S-2 Clerical/Central Files

13.11.1. Space Function: Open office area for S-2 admin staff; access to other S-2 spaces. Provide one, minimum 29.5m^2.

13.11.2. Architectural Issues: S-2 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-2 private offices, and the Secured Documents Vault. Occupants: 8 staff, and occasional visitors.

13.11.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.11.2.2. Base: Resilient Cove Base
13.11.2.3. Floor: Carpet.
13.11.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.11.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2650mm
13.11.2.6. Furnishings: Provide and design room to accommodate four type systems furniture workstations.

13.11.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.11.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.11.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.12. Cyrpto Vault

13.12.1. Space Function: Storage of documents classified 'secret' and below. Workspace for one clerk. Provide one, minimum 13m^2.

13.12.2. Architectural Issues: Vault shall be certified for open storage of secret material. Class M Modular construction is acceptable. Provide Class 5 vault door with day gate. To allow future flexibility in reconfiguring offices areas, locate vault on the perimeter of the administrative areas. Occupants: 1.

13.12.2.1. Walls: painted or pre-finished modular vault panels.
13.12.2.2. Base: Resilient Cove Base
13.12.2.3. Floor: Carpet or vinyl composition tile
13.12.2.4. Ceiling: painted or pre-finished modular vault panels
13.12.2.5. Furnishings: Provide and design room to accommodate one desk with return, and one desk chair.

13.12.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.12.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.12.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.13. **LNO Office**

13.13.1. Space Function: Private office for use by LNO. Provide one, minimum 12m^2..

13.13.2.Architectural Issues: Area may be a private office or a systems furniture workstation.

13.13.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.13.2.2. Base: Resilient Cove Base
13.13.2.3. Floor: Carpet.
13.13.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.13.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49.
13.13.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.13.3.Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.13.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.14. EOC Office

13.14.1.Space Function: Private office for use by EOC. Provide one, minimum 17m^2.

13.14.2.Architectural Issues: Area may be a private office or a systems furniture workstation.

13.14.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.14.2.2. Base: Resilient Cove Base
13.14.2.3. Floor: Carpet.
13.14.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.14.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
12.34.5.7. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair. Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 2 recessed ceiling mounted speakers.
12.34.5.8. Provide and design room to accommodate the following furnishings: Provide one marker board (minimum 3650 mm wide x 1200 mm high) and one 2400mm recessed ceiling mounted motorized projection screen.

13.14.3.Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.14.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

13.15. S-3 Officer

13.15.1. Space Function: Private office for S-3 officer. Provide one, minimum 8.8m^2.

13.15.2. Architectural Issues: Room shall be accessed through the S-3 Clerical/Central Files area. Occupants: 1, and occasional visitors.

13.15.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.15.2.2. Base: Resilient Cove Base
13.15.2.3. Floor: Carpet.
13.15.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.15.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
13.15.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.15.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.15.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.16. Office

13.16.1. Space Function: Private office. Provide three, minimum 8.8m^2 each.

13.16.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

13.16.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.16.2.2. Base: Resilient Cove Base
13.16.2.3. Floor: Carpet.
13.16.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.16.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
13.16.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.16.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.16.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.17. S-3 Clerical/Central Files

13.17.1. Space Function: Open office area for S-3 admin staff; access to other S-3 spaces. Provide one, minimum 61m^2.

13.17.2. Architectural Issues: S-3 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-3 private offices, and the Secured Documents Vault. Occupants: 8 staff , and occasional visitors.

13.17.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.17.2.2. Base: Resilient Cove Base
13.17.2.3. Floor: Carpet.
13.17.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.17.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2650mm
13.17.2.6. Furnishings: Provide and design room to accommodate six type systems furniture workstations.

13.17.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.17.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.17.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.18. FSO/AS3 Office

13.18.1. Space Function: Private office for FSO/AS3. Provide one, minimum 16m^2.

13.18.2. Architectural Issues: Area shall be a private office.

13.18.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.18.2.2. Base: Resilient Cove Base
13.18.2.3. Floor: Carpet.
13.18.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.18.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.

13.18.2.6. Furnishings: Provide and design room to accommodate two desks, one bookcase, two legal-size four-drawer file cabinets, one side chair, and two desk chairs.

13.18.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.18.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.19. S-4 Officer

13.19.1. Space Function: Private office for S-4 officer. Provide one, minimum 8.8m^2.

13.19.2. Architectural Issues: Room shall be accessed through the S-4 Clerical/Central Files area. Occupants: 1, and occasional visitors.

13.19.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.19.2.2. Base: Resilient Cove Base
13.19.2.3. Floor: Carpet.
13.19.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.19.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
13.19.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.19.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.19.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.19.3.2. Fire Suppression Sprinklers:
13.19.3.3. Fire Detection:

13.20. Planning

13.20.1. Space Function: Private office for Planning. Provide one, minimum 10m^2.

13.20.2. Architectural Issues: Area shall be a private office.

13.20.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.20.2.2. Base: Resilient Cove Base
13.20.2.3. Floor: Carpet.
13.20.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

13.20.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.

13.20.2.6. Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.20.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.20.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.20.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.21. S-4 Clerical/Central Files

13.21.1. Space Function: Open office area for S-4 admin staff; access to other S-4 spaces. Provide one, minimum 56m^2.

13.21.2. Architectural Issues: S-3 Clerical/Central Files shall be accessed from the lobby or corridor. The area shall have direct access to S-3 private offices, and the Secured Documents Vault. Occupants: 8 staff, and occasional visitors.

13.21.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.21.2.2. Base: Resilient Cove Base

13.21.2.3. Floor: Carpet.

13.21.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.

13.21.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49. Minimum ceiling height 2650mm

13.21.2.6. Furnishings: Provide and design room to accommodate eight type systems furniture workstations.

13.21.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.22. Tasking Office

13.22.1. Space Function: Private office. Provide one, minimum 10m^2.

13.22.2. Architectural Issues: Area shall be a private office.

13.22.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.22.2.2. Base: Resilient Cove Base

13.22.2.3. Floor: Carpet.

13.22.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.22.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49.
13.22.2.6. Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.22.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.22.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.23. Legal Office

13.23.1. Space Function: Private office. Provide one, minimum 12m^2.

13.23.2. Architectural Issues: Area shall be a private office.

13.23.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.23.2.2. Base: Resilient Cove Base
13.23.2.3. Floor: Carpet.
13.23.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.23.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49.
13.23.2.6. Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.23.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.23.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.24. Como Office

13.24.1. Space Function: Private office for use by COMMO personnel. Provide one, minimum 20m^2.

13.24.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

13.24.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.24.2.2. Base: Resilient Cove Base
13.24.2.3. Floor: Carpet.

13.24.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.24.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
13.24.2.6. Furnishings: Provide and design room to accommodate two desks, one bookcase, two legal-size four-drawer file cabinets, and two desk chair.

13.24.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.24.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.25. Duty Officer

13.25.1. Space Function: Duty Officer will provide physical security of the building, and visual control of the entrances and lobby, as well as functioning as an information source for visitors. Provide one, minimum $12m^2$.

13.25.2. Architectural Issues: Room shall be accessed from the main lobby. Occupants: 1.

13.25.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
13.25.2.2. Base: Resilient Cove Base
13.25.2.3. Floor: Carpet.
13.25.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.25.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset and glass vision panel. Provide duty officer counter (built-in casework) minimum 1800 mm long separating the Duty Officer room from the lobby/corridor. The counter on the corridor side shall be minimum 1500 mm wide x 1000 mm high x 300 mm deep. Counter on the office side shall be a minimum of 750mm deep and 750mm high.

13.25.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.25.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.26. Retention Office

13.26.1. Space Function: Private office for use by Retention personnel. Provide one, minimum $9m^2$.

13.26.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

13.26.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.26.2.2. Base: Resilient Cove Base

13.26.2.3. Floor: Carpet.
13.26.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.26.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49.
13.26.2.6. Furnishings: Provide and design area to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.26.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.26.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.27. NCOIC Office

13.27.1. Space Function: Private office for use by NCOIC personnel. Provide one, minimum $10m^2$.

13.27.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

13.27.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.27.2.2. Base: Resilient Cove Base
13.27.2.3. Floor: Carpet.
13.27.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.27.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49.
13.27.2.6. Furnishings: Provide and design area to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.27.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.27.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.28. Chaplain's Assistant

13.28.1. Space Function: Private office for Chaplain's Assistant and waiting area for visitors to Chaplain's office. Provide one, minimum $14m^2$.

13.28.2. Architectural Issues: Room shall be accessed from the lobby or main corridor. Occupants: 1, and visitors.

13.28.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.28.2.2. Base: Resilient Cove Base
13.28.2.3. Floor: Carpet.
13.28.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.28.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.
13.28.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, four side chairs, and one desk chair.

13.28.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.28.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.29. Chaplain

13.29.1. Space Function: Private office for Chaplain and visitors. Provide one, minimum 16m^2.

13.29.2. Architectural Issues: Room shall be accessed from the Chaplain's Assistant office. Occupants: 1, and visitors.

13.29.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.29.2.2. Base: Resilient Cove Base
13.29.2.3. Floor: Carpet.
13.29.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.29.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 55.
13.29.2.6. Furnishings: Provide and design room to accommodate one desk with return, one bookcase, one desk chair

13.29.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.29.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.30. ADA Office

13.30.1. Space Function: Private office for use by ADA personnel. Provide one, minimum 16m^2.

13.30.2. Architectural Issues: Area may be a private office or a systems furniture workstation.

13.30.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.30.2.2. Base: Resilient Cove Base
13.30.2.3. Floor: Carpet.
13.30.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.30.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
13.30.2.6. Furnishings: Provide and design area to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair, and one desk chair.

13.30.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.30.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.31. Classroom

13.31.1. Space Function: Soldier training and other meetings. Provide two (2) classrooms, minimum 66m^2.

13.31.2. Architectural Issues: Each classroom shall be located to allow direct access from the main corridor/lobby, and direct egress out of the building. In a two-story building, classrooms will be located on the first floor. Occupants: up to 40 persons in each room.

13.31.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
13.31.2.2. Base: Resilient Cove Base
13.31.2.3. Floor: vinyl composite tile.
13.31.2.4. Ceiling: Minimum ceiling height shall be 2600mm at perimeter and 3000mm in main portion of room, suspended acoustical panel ceiling.
12.34.5.9. Other: Provide 900 mm wide door into room; door shall have classroom function (F84) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49. Provide and design room to accommodate the following furnishings: minimum of 10 Training tables with 2 stacking chairs per table per classroom. Walls separating classrooms shall be operable panel partitions with minimum STC rating of 47. Provide data jacks around room near training tables. Provide one data jack per seat. Provide one additional telephone jack near instructor's position. Provide one CATV jack on wall where television bracket is installed. Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 4 recessed ceiling mounted speakers.
12.34.5.10. Provide and design room to accommodate the following furnishings: Provide one marker board (minimum 3650 mm wide x 1200 mm high) and one 2400mm recessed ceiling mounted motorized projection screen.

13.31.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.31.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.31.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.32. Learning Resource Center

13.32.1. Space Function: Provide one, minimum 18m^2. Soldier training and other meetings

13.32.2. Architectural Issues: Provide direct access from the main corridor/lobby. Occupants: up to 22 persons [verify with user].

13.32.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

13.32.2.2. Base: Resilient Cove Base

13.32.2.3. Floor: vinyl composite tile.

13.32.2.4. Ceiling: Minimum ceiling height shall be 2600mm at perimeter and 3000mm in main portion of room, suspended acoustical panel ceiling.

13.32.2.5. Other: Provide 900 mm wide door into room; door shall have classroom function (F84) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.

13.32.2.6. Furnishings: Provide and design room to accommodate the following furnishings: one (1) 30” by 60” worktables, eight (8) stacking chairs and four (4) bookcases (3 shelf). Partitions shall have minimum STC rating of 49. Provide one marker board minimum 8’-0” wide by 4’-0” high and one 8’-0” wide wall mounted pull-down projection screen.

13.32.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.32.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.32.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.33. Lobby and Corridors

13.33.1. Space Function: Entry to the facility; egress and circulation through the building.

13.33.2. Architectural Issues: Provide as required to allow access to building spaces. Unless otherwise required, minimum width of main corridors providing access to classroom area shall not be less than 2400 mm, minimum width of other main corridors shall not be less than 1800 mm. Corridor width shall comply with applicable egress codes.

13.33.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
13.33.2.2. Base: Resilient Cove Base
13.33.2.3. Floor: vinyl composition tile.
13.33.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.33.2.5. Other: Handicap Accessible. Provide wall mounted electric water cooler. Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide recessed space for three vending machines per building (machines are not in contract). Provide interior signage to identify major spaces. Provide two trophy cases (minimum size: 2400 mm wide x 1500 high x 400 mm deep) per battalion; provide one recessed building directory near each main entrance. Provide one 1200 mm high x 1800 mm wide wall mounted bulletin board.

13.33.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.33.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.33.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.34. Entry Vestibule

13.34.1. Space Function: Primary entry point into the facility; weather protection for interior spaces.

13.34.2. Architectural Issues: Provide at each exterior entrance to lobby/main corridor area.

13.34.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
13.34.2.2. Base: Resilient Cove Base
13.34.2.3. Floor: vinyl composition tile.
13.34.2.4. Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
13.34.2.5. Other: Handicap Accessible. Provide FRP entrance doors on exterior and corridor sides of vestibule. Additional aluminum storefront area (sidelights, transoms) is desirable. Provide minimum 1000 mm deep exterior covered area (entry porch) full width of storefront. Provide location for company identification signage on exterior wall above or adjacent to entrance.

13.34.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm control equipment

13.1.1.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.1.1.2 Fire Alarm Control: A fire alarm annunciator panel shall be recessed wall mounted in the south entry vestibule

13.35. Mens Toilet Rooms

13.35.1. Space Function: Restrooms for male occupants. Provide one.

13.35.2. Architectural Issues: Sized to accommodate the number of plumbing fixtures required for each battalion served. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

13.35.2.1. Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have minimum STC rating of 55.
13.35.2.2. Base: porcelain tile, or ceramic tile
13.35.2.3. Floor: porcelain tile, or ceramic tile.
13.35.2.4. Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.
13.35.2.5. Other: Handicap Accessible. Provide 3 lavatories, 3 floor mounted toilets, and 3 wall-hung urinals for each battalion. Lavatories shall be wall-hung. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door. Provide two ceramic tile shower stalls with rod and shower curtain. Shower shall have ceramic soap holder. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, located outside of circulation path.

13.35.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.35.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.35.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.36. Women's Toilet Rooms

13.36.1. Space Function: Restrooms for female occupants. Provide one.

13.36.2. Architectural Issues: Sized to accommodate the number of plumbing fixtures required for each battalion served. Toilet rooms will be accessed from corridors. Arrange entrance to provide visual privacy.

13.36.2.1. Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have minimum STC rating of 55.
13.36.2.2. Base: porcelain tile, or ceramic tile
13.36.2.3. Floor: porcelain tile, or ceramic tile.
13.36.2.4. Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.
13.36.2.5. Other: Handicap Accessible. Provide 3 lavatories, 3 floor mounted toilets. Lavatories shall be wall-hung. Provide toilet partitions at each toilet. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one sanitary napkin disposal at each toilet; and one robe hook on each toilet partition door. Provide two ceramic tile shower stalls with rod and shower curtain. Shower shall have ceramic soap holder. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, located outside of circulation path

13.36.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.36.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.36.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

13.37. Janitor Closet

13.37.1. Space Function: Sink and storage of cleaning supplies, soap and paper products.

13.37.2. Architectural Issues: Provide one at each group of toilets on each floor of the building. Room shall be accessed from the corridor

13.37.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
13.37.2.2. Base: ceramic tile or resilient cove base.
13.37.2.3. Floor: ceramic tile or sealed concrete.
13.37.2.4. Ceiling: Painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.
13.37.2.5. Other: Handicap Accessible. Door shall have classroom function (F84) lockset

13.37.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

13.37.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

13.38. Classroom Storage:

13.38.1. Space Function: Supply Storage. Provide one, shall be a minimum of $6m^2$.

13.38.2. Architectural Issues: Room shall be accessed from the corridor.

13.38.2.1. Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
13.38.2.2. Base: Resilient Cove Base
13.38.2.3. Floor: Sealed concrete.
13.38.2.4. Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction. Other: Door shall have storeroom function (F86) lockset

13.38.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.38.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
13.38.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

13.39. Storage:

13.39.1. Space Function: Supply Storage. Provide one, shall be a minimum of $14m^2$.

13.39.2. Architectural Issues: Room shall be accessed from the corridor.

13.39.2.1. Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
13.39.2.2. Base: Resilient Cove Base
13.39.2.3. Floor: Sealed concrete.
13.39.2.4. Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No

penetrations shall be made in the primary ceiling construction. Other: Door shall have storeroom function (F86) lockset

13.39.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

13.39.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

13.39.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

13.40. Mechanical Rooms

13.40.1. Space Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment

13.40.2. Architectural Issues: Provide dedicated areas for mechanical equipment. Each battalion shall have independent operation and control of HVAC system for its own spaces, but mechanical equipment may serve more than one battalion, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

13.40.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above. Partitions shall have minimum STC of 45.

13.40.2.2. Base: resilient cove base.

13.40.2.3. Floor: sealed concrete.

13.40.2.4. Ceiling: none required

13.40.2.5. Other: Doors shall have storeroom function (F86) locksets

13.40.3. Fire Protection Issues These areas shall receive fire suppression sprinklers, the building fire suppression sprinkler main water service/riser, mechanical unit control relays, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

13.40.3.1. Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size.

13.40.3.2. Fire Suppression Sprinklers Service: The sprinkler system main water service/riser shall enter and be located in the first floor mechanical room. A 200 mm (8”) double check detector back flow prevention valve assembly shall be connected to the fire service that enters the building. The main sprinkler riser shall be connected to the flow side of the back flow prevention valve. A 150 mm (6 inch) wet-pipe alarm check valve assembly and trim sprinkler service riser shall be provided per NFPA 13 and as indicated in Section 7.

13.40.3.3. Control Relays: Any mechanical unit designated to be shutdown on a general fire alarm activation as indicated in Section 7, shall have its

respective shutdown control module/relay mounted within .9 m (3 ft) of the unit it is controlling. Relays shall be mounted in junction boxes and labeled as to their function.

13.40.3.4. Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72.

13.40.3.5. Fire Manual Release: A manual fire alarm pull station shall be located directly adjacent to the exit from the room leading to the exterior of the building. Manual fire alarm pull station shall be equipped with protective covers as indicated in Section 7.

13.40.3.6. Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each mechanical room as indicated in Section 7.

13.41. Electrical Rooms

13.41.1. Space Function: Spaces for electrical equipment

13.41.2. Architectural Issues: Provide dedicated areas for electrical equipment. Each battalion shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one battalion, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

13.41.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.

13.41.2.2. Base: resilient cove base.

13.41.2.3. Floor: sealed concrete.

13.41.2.4. Ceiling: none required

13.41.2.5. Other: Doors shall have storeroom function (F86) locksets

13.41.3. Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

13.41.3.1. Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

13.41.3.2. Fire Alarm Control: The main fire alarm control panel and wireless fire alarm transceiver shall be wall mounted in the ground floor electrical room. All necessary fire alarm addressable monitor and control modules used for auxiliary fire alarm functions shall also be mounted adjacent to the main fire alarm control panel in junction boxes and labeled according to their function.

13.42. Communications Room

13.42.1. Space Function: Distribution areas for telephone, data network, and cable television.

13.42.2. Architectural Issues Provide dedicated room(s) for communication distribution equipment. Each room shall be dedicated to a single battalion, and shall not be combined with mechanical or electrical rooms. Provide each battalion with one main communication room; minimum size 3000 mm x 3300 mm. Provide additional communication rooms as needed; all spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m between outlet and communication room. Minimum dimensions of secondary communication rooms shall be 2100 mm x 3000 mm. Provide floor openings and vertical shaft spaces as necessary. Rooms shall be accessed from corridors. Access will be limited to authorized personnel.

13.42.2.1. Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.
13.42.2.2. Base: resilient cove base.
13.42.2.3. Floor: sealed concrete.
13.42.2.4. Ceiling: none required
13.42.2.5. Other: Doors shall have storeroom function (F86) locksets

13.42.3. Fire Protection Issues This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

13.42.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.
13.42.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

SECTION 14.0 – 1/10, 2/10 , 3/17 AND A-TROOP COFs
AND HHC BDE COF
ROOM-BY-ROOM REQUIREMENTS

14.1 Commander's Office

14.1.1 Space Function: Private office for commanding officer. Provide one, minimum 16m^2.

14.1.2 Architectural Issues: Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

14.1.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.1.2.2 Base: resilient cove base.
14.1.2.3 Floor: vinyl composition tile.
14.1.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.1.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55.
14.1.2.6 Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one conference table, four side chairs, and one desk chair.

14.1.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.1.1.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.2 Executive Office

14.2.1 Space Function: Private office for company executive officer. Provide one, minimum 10m^2.

14.2.2 Architectural Issues: Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

14.2.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.2.2.2 Base: resilient cove base.
14.2.2.3 Floor: vinyl composition tile.
14.2.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.2.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55

14.2.2.6 Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one side chair and one desk chair. Provide a floor anchor for one GFGI security safe. Coordinate anchor location with furniture layout

14.2.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.2.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.3 1st Sergeant Office

14.3.1 Space Function: Private office for company first sergeant. Provide one, minimum 11m^2.

14.3.2 Architectural Issues: Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

14.3.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.3.2.2 Base: resilient cove base.
14.3.2.3 Floor: vinyl composition tile.
14.3.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.3.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Room shall have exterior window. Partitions shall have minimum STC rating of 55
14.3.2.6 Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, four side chairs and one desk chair. Provide a floor anchor for one GFGI security safe. Coordinate anchor location with furniture layout.

14.3.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.3.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.4 Training Office

14.4.1 Space Function: Private office for company training officer. Provide one, minimum 9m^2.

14.4.2 Architectural Issues: Room shall be accessed through the Admin Office. Occupants: 1, and occasional visitors.

14.4.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.4.2.2 Base: resilient cove base.

14.4.2.3 Floor: vinyl composition tile.
14.4.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.4.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
14.4.2.6 Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, four side chairs and one desk chair. Provide a floor anchor for one GFGI security safe. Coordinate anchor location with furniture layout.

14.4.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.4.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.5 Administration Office

14.5.1 Space Function: Office for company administrative clerks, storage of files, access to private offices. Clerks will have visual control of waiting area and conference room door. Provide one, minimum 27m^2.

14.5.2 Architectural Issues: Room shall be accessed through the Waiting Area. Occupants: 2 clerks, and occasional visitors.

14.5.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.5.2.2 Base: resilient cove base.
14.5.2.3 Floor: vinyl composition tile.
14.5.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.5.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset.
14.5.2.6 Furnishings: Provide and design room to accommodate 1 clerk desks with returns and desk chairs. Provide reception desk (built-in casework) minimum 1800 mm long separating the Admin Office from the Waiting Area. The counter on the Waiting Area side shall be 1000 mm high x 300 mm deep. Admin side of reception desk shall be at desk height, and shall accommodate computer and monitor (not in contract), and writing area. Provide built-in communication and power receptacles or grommets in desk top to access wall receptacles. Desk shall have knee space and minimum two cabinets with hinged doors, and two drawers. Drawers and cabinets shall have keyed locks. Desk components shall have plastic laminate or stained wood finish. Provide a floor anchor for one GFGI security safe. Coordinate anchor location with furniture layout.

14.5.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.5.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.6 Platoon Open Office

14.6.1 Space Function: Private office for platoon leaders or other administrators. Provide one, minimum 50m^2. Open office shall accommodate four smaller individual offices.

14.6.2 Architectural Issues: . Offices shall be accessed directly from the Administrative Area Corridor, or through a common space that is accessed from the Administrative Area Corridor. Occupants: 2 in each office, and occasional visitors.

14.6.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.6.2.2 Base: resilient cove base.
14.6.2.3 Floor: vinyl composition tile.
14.6.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.6.2.5 Other: Exterior window is desirable but not required. Partitions shall have minimum STC rating of 49
14.6.2.6 Furnishings: Provide and design each office (4 total) to accommodate one desk with return, one side chair and one desk chair

14.6.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.6.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
14.6.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.7 Conference Room

14.7.1 Space Function: Conference room for company leadership, staff, and visitors. Functions will include staff meetings, hearings, disciplinary sessions, and training. Provide one, minimum 33m^2 except in HHC BDE COF, which shall be a minimum of, 50m^2.

14.7.2 Architectural Issues: . Room shall be accessed from the Waiting Area (preferable), or through the Admin Office. Admin clerks shall have visual control of Conference Room door. Occupants: up to 22 persons.

14.7.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
14.7.2.2 Base: resilient cove base.
14.7.2.3 Floor: vinyl composition tile.
14.7.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

14.7.2.5 Other: Door shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55. Exterior window is desireable but not required.

14.7.2.6 Furnishings: Provide and design room to accommodate one conference room table and seating for 22. Provide one marker board (minimum 2400 mm wide x 1200 mm high). Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 4 recessed ceiling mounted speakers. Provide one 2400mm recessed ceiling mounted motorized projection screen.

14.7.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.7.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.7.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.8 Admin Storage

14.8.1 Space Function: Closet for storage of office supplies. Provide one, minimum $3m^2$.

14.8.2 Architectural Issues:

14.8.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.

14.8.2.2 Base: resilient cove base.

14.8.2.3 Floor: vinyl composition tile.

14.8.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

14.8.2.5 Other: Door(s) shall have classroom function (F84) lockset.

14.8.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.8.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.8.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.9 Conference Storage

14.9.1 Space Function: Closet for storage of folding tables, display easels, etc. Provide one, minimum $6m^2$.

14.9.2 Architectural Issues:

14.9.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
14.9.2.2 Base: resilient cove base.
14.9.2.3 Floor: vinyl composition tile.
14.9.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
14.9.2.5 Other: Door(s) shall have classroom function (F84) lockset.

14.9.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.9.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
14.9.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.10 Entry Vestibule

14.10.1 Space Function: Primary entry point into the COF; weather protection for interior spaces.

14.10.2 Architectural Issues: . Provide at main exterior entrance to Administrative Area Corridor.

14.10.2.1 Walls: painted gypsum wallboard or painted veneer plaster
14.10.2.2 Base: resilient cove base.
14.10.2.3 Floor: vinyl composition tile.
14.10.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.10.2.5 Other: Provide FRP entrance doors on exterior and corridor sides of vestibule. Additional aluminum storefront area (sidelights, transoms) is desirable. Provide minimum 1000 mm deep exterior covered area (entry porch) full width of storefront. Provide location for company identification signage on exterior wall above or adjacent to entrance.

14.10.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm control equipment.

14.10.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.10.3.2 Fire Alarm Control: A fire alarm annunciator panel shall be recessed wall mounted in the south entry vestibule

14.11 Waiting

14.11.1 Space Function: Waiting and reception area for company soldiers and visitors. Control point for access to admin office and conference room. Provide one incorporated into the Administrative Area Corridor.

14.11.2 Architectural Issues: Occupants: Two or more visitors; additional visitors (e.g. those waiting to attend a large meeting in the conference room) will wait in the adjacent corridor.

14.11.2.1 Walls: painted gypsum wallboard or painted veneer plaster

14.11.2.2 Base: resilient cove base.

14.11.2.3 Floor: vinyl composition tile.

14.11.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

14.11.2.5 Furnishings: Provide two side chairs. Provide one 1200 mm high x 1800 mm wide wall mounted bulletin board.

14.11.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.11.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.11.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.12 Men's Toilet/Shower

14.12.1 Space Function: Private toilet, shower and dressing room for use by company leadership after physical training.

14.12.2 Architectural Issues: Room shall be used by able-bodied military personnel only. Rooms shall be accessed from Administrative Area Corridor.

14.12.2.1 Walls: ceramic tile or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted CMU above. Partitions shall extend to underside of structure above.

14.12.2.2 Base: resilient cove base.
14.12.2.3 Floor: porcelain tile or ceramic tile.
14.12.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.12.2.5 Other: Door shall have privacy function (F76) lockset. Partitions shall have minimum STC rating of 49.
14.12.2.6 Furnishings: Provide a minimum of: three floor mounted toilet, three wall hung urinals (4 wall hung urinals at the HHC BDE COF), three wall-hung lavatory, and mirror with shelf above lavatory. Provide toilet partitions at each toilet and urinal partitions between urinals. Provide the following toilet accessories: Paper towel dispenser/waste receptacle, soap dispenser per lavatory, one toilet tissue dispenser per toilet. Provide seven ceramic tile shower stalls with rod and shower curtain (Provide eight ceramic tile shower stalls with rod and shower curtain at the HHC BDE COF). Shower shall have ceramic soap holder. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, located outside of circulation path. Provide 4 lockers for each shower stall. Provide bench(s) near lockers.

14.12.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.12.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
14.12.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.13 Women's Toilet/Shower

14.13.1 Space Function: Private toilet, shower and dressing room for use by company leadership after physical training.

14.13.2 Architectural Issues: Room shall be used by able-bodied military personnel only. Rooms shall be accessed from Administrative Area Corridor.

14.13.2.1 Walls: ceramic tile or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted CMU above. Partitions shall extend to underside of structure above.
14.13.2.2 Base: resilient cove base.
14.13.2.3 Floor: porcelain tile or ceramic tile.
14.13.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
14.13.2.5 Other: Door shall have privacy function (F76) lockset. Partitions shall have minimum STC rating of 49.
14.13.2.6 Furnishings: Provide a minimum of: two floor mounted toilet, two wall-hung lavatories, and mirror with shelf above lavatory. Provide toilet partitions at each toilet and urinal partitions between urinals. Provide the following toilet accessories: Paper towel dispenser/waste receptacle, soap

dispenser per lavatory, one toilet tissue dispenser per toilet. Provide two ceramic tile shower stalls with rod and shower curtain. Shower shall have ceramic soap holder. Dressing area shall have bench, four towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, located outside of circulation path. Provide minimum 3 lockers for each shower stall. Provide bench(s) near lockers.

14.13.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.13.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.13.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.14 IMS Room

14.14.1 Space Function: Telephone and data network support spaces for the COF.

14.14.2 Architectural Issues: Provide dedicated interior room for communication distribution equipment. Room shall be dedicated to one company, and shall not be combined with mechanical or electrical rooms. Room may be accessed from Administrative Area Corridor, public unsecure corridor, or Equipment Maintenance Area. Access will be limited to authorized personnel. Provide each company with one main communication room; minimum size 2100 mm x 3000 mm. All spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m between outlet and communication room.

14.14.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

14.14.2.2 Base: resilient cove base.

14.14.2.3 Floor: sealed concrete.

14.14.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

14.14.2.5 Other: Door shall have minimum 900 mm wide door with storeroom function (F86) lockset.

14.14.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.14.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.14.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

14.15 Mens Toilet Rooms

14.15.1 Space Function: Restrooms for male occupants. Provide one.

14.15.2 Architectural Issues: Toilet rooms will be accessed from waiting area.

14.15.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have minimum STC rating of 55.
14.15.2.2 Base: porcelain tile, or ceramic tile
14.15.2.3 Floor: porcelain tile, or ceramic tile.
14.15.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.
14.15.2.5 Other: Provide 1 lavatory and 1 floor mounted toilet. Lavatories in single-occupant toilet rooms shall be wall-hung. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet.

14.15.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances
14.15.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
14.15.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.16 Women's Toilet Rooms

14.16.1 Space Function: Restrooms for female occupants. Provide one.

14.16.2 Architectural Issues: Toilet rooms will be accessed from the waiting rooms.

14.16.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have minimum STC rating of 55.
14.16.2.2 Base: porcelain tile, or ceramic tile
14.16.2.3 Floor: porcelain tile, or ceramic tile.
14.16.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.
14.16.2.5 Other: Provide 1 lavatory and 1 floor mounted toilet. Lavatories in single-occupant toilet rooms shall be wall-hung. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet.

14.16.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

14.16.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.16.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.17 Administration Corridor

14.17.1 Space Function: Circulation and means of egress. Minimum Corridor width 1800mm.

14.17.2 Architectural Issues: Provide as required to allow circulation to building spaces, and comply with applicable code egress requirements.

14.17.2.1 Walls: painted gypsum wallboard or painted veneer plaster

14.17.2.2 Base: resilient cove base.

14.17.2.3 Floor: vinyl composition tile.

14.17.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

14.17.2.5 Furnishings: Provide one electric water cooler. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes

14.17.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.17.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.17.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.18 General Storage

14.18.1 Space Function: Storage of soldier's personal or other miscellaneous items during times of Deployment, AWOL situations, etc. Provide one, minimum 38m^2 except in HHC BDE COF, which shall be a minimum of 44m^2.

14.18.2 Architectural Issues: Provide access from Equipment Maintenance Area.

14.18.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units.

14.18.2.2 Base: Resilient Cove Base.

14.18.2.3 Floor: sealed concrete.

14.18.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling

of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

14.18.2.5 Other: Door shall have minimum 900 mm wide door with storeroom function (F86) lockset. Extend partitions to underside of structure above. Provide 1050mm high laminated counter with flip-up walk through section.

14.18.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.18.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.18.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.19 Equipment Maintenance/Equipment Cleaning Area

14.19.1 Space Function: Equipment cleaning, repair and access to COF storage spaces. Provide one, minimum 90m^2.

14.19.2 Architectural Issues:]. Main exterior entry shall open to paved service yard. Provide interior access from COF administrative area via administrative area corridor, stairs, or public unsecured corridor connecting other COFs in the building..

14.19.2.1 Walls: Provide painted impact resistant gypsum wallboard, or painted concrete masonry units

14.19.2.2 Base: Resilient Cove Base.

14.19.2.3 Floor: sealed concrete.

14.19.2.4 Ceiling: painted exposed structure

14.19.2.5 Other: Provide an uncovered mud removal area for equipment cleaning near the Equipment Maintenance Area. This area will consist of eight freeze-proof hose bibs, a concrete slab with a removable non-slip grate cover. The floor slab should be designed to allow water to drain to the storm drainage system, and allow easy collection and disposal of mud removed during the cleaning process. Provide a pair of 900 mm wide hollow metal doors opening onto the paved service yard; doors shall have hold open devices. All entry doors into Equipment Maintenance Area shall have entry function (F82) locksets with auxiliary deadlocks (thumb turn inside, keyed cylinder outside), or function F08 exit devices (if exit devices are required by code).

14.19.2.6 Furnishings: Provide three stainless steel equipment cleaning sinks 600 mm x 600 mm x 350 mm deep. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide an eyewash station.

14.19.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.19.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.

14.19.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.20 TA-50 Storage

14.20.1 Space Function: Gear lockers for storage of individual soldier's TA-50 field gear. Provide one area.

14.20.2 Architectural Issues: Size and configure area to accommodate number TA-50 lockers shown on drawings (allow minimum 900 mm between open locker doors and obstructions). Provide access from Equipment Maintenance Area. Provide additional exit as required by applicable codes.

14.20.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Wire mesh partition will separate TA-50 storage area from equipment maintenance and adjacent storage areas.

14.20.2.2 Base: Resilient Cove Base.

14.20.2.3 Floor: sealed concrete.

14.20.2.4 Ceiling: painted exposed structure

14.20.2.5 Other: Extend partitions and wire mesh to underside of structure above.

14.20.2.6 Furnishings: : Lockers should be a minimum of 500 mm (w) x 1000 mm (d) x 2000 mm (h).

14.20.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.20.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.

14.20.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.21 Nuclear, Biological and Chemical Equipment (NBC) Storage

14.21.1 Space Function: Storage of equipment for use in defense of nuclear, biological or chemical warfare. Provide one, minimum 13m^2.

14.21.2 Architectural Issues: Main exterior entry shall open to paved service yard. Provide interior access from COF administrative area via administrative area corridor, stairs, or public unsecured corridor connecting other COFs in the building.

14.21.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.

14.21.2.2 Base: Resilient Cove Base.

14.21.2.3 Floor: sealed concrete.

14.21.2.4 Ceiling: painted exposed structure
14.21.2.5 Other: Provide 900 mm wide swinging door with keyed cylinder lock.

14.21.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.21.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.
14.21.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.22 Unit Storage

14.22.1 Space Function: Storage. Provide one, minimum 45m^2 except in HHC BDE COF, which shall be a minimum of, 55m^2.

14.22.2 Architectural Issues: Exterior entry shall open to paved service yard. Provide access from Equipment Maintenance Area and from exterior service yard.

14.22.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
14.22.2.2 Base: Resilient Cove Base.
14.22.2.3 Floor: sealed concrete.
14.22.2.4 Ceiling: painted exposed structure
14.22.2.5 Other: Provide 900 mm wide swinging door with keyed cylinder lock.

14.22.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.22.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.
14.22.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.23 COM Storage

14.23.1 Space Function: Storage of radios and communications field gear. Provide one, minimum 15m^2 except in HHC BDE COF, which shall be a minimum of, 30m^2.

14.23.2 Architectural Issues: Exterior entry shall open to paved service yard. Provide access from Equipment Maintenance Area.

14.23.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
14.23.2.2 Base: Resilient Cove Base.
14.23.2.3 Floor: sealed concrete.

14.23.2.4 Ceiling: painted exposed structure
14.23.2.5 Other: Provide 900 mm wide swinging door with keyed cylinder lock.

14.23.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.23.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.
14.23.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

14.24 Storage

14.24.1 Space Function: Closet for storage of general supplies. Provide one in HHC BDE COF only, minimum 6m^2.

14.24.2 Architectural Issues:

14.24.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
14.24.2.2 Base: resilient cove base.
14.24.2.3 Floor: vinyl composition tile.
14.24.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
14.24.2.5 Other: Door(s) shall have classroom function (F84) lockset.

14.24.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.24.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
14.24.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.25 Janitor Closet

14.25.1 Space Function: Sink and storage of cleaning supplies, soap, and paper products. Provide one, minimum 5.5m^2.

14.25.2 Architectural Issues:

14.25.2.1 Walls: Provide painted impact resistant gypsum wallboard, or painted concrete masonry units
14.25.2.2 Base: Resilient Cove Base.
14.25.2.3 Floor: sealed concrete.
14.25.2.4 Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster
14.25.2.5 Other: Door shall have classroom function (F84) lockset.

14.25.3 Fire Protection Issues: This area shall receive fire suppression sprinklers

14.25.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

14.26 Arms Vault

14.26.1 Space Function: Storage and issue of weapons. Provide one, minimum $30m^2$.

14.26.2 Architectural Issues: Room shall be accessed from Equipment Maintenance area. Construction of Arms Vault shall comply with Chapter 5.

14.26.2.1 Walls: painted concrete
14.26.2.2 Base: Resilient Cove Base.
14.26.2.3 Floor: sealed concrete.
14.26.2.4 Ceiling: painted concrete
14.26.2.5 Other: Provide a day gate in addition to the vault door.

14.26.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

14.26.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.
14.26.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

14.27 Mechanical Rooms

14.27.1 Space Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment

14.27.2 Architectural Issues: Provide dedicated areas for mechanical equipment. Each battalion shall have independent operation and control of HVAC system for its own spaces, but mechanical equipment may serve more than one battalion, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

14.27.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.
14.27.2.2 Base: resilient cove base.
14.27.2.3 Floor: sealed concrete.
14.27.2.4 Ceiling: none required
14.27.2.5 Other: Doors shall have storeroom function (F86) locksets.

14.27.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers, the building fire suppression sprinkler main water service/riser, mechanical unit control relays, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

14.27.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.
14.27.3.2 Fire Suppression Sprinklers Service: The sprinkler system main water service/riser shall enter and be located in the first floor mechanical room. A 200 mm (8”) double check detector back flow prevention valve assembly shall be connected to the fire service that enters the building. The main sprinkler riser shall be connected to the flow side of the back flow prevention valve. A 150 mm (6 inch) wet-pipe alarm check valve assembly and trim sprinkler service riser shall be provided per NFPA 13 and as indicated in Section 7.
14.27.3.3 Control Relays: Any mechanical unit designated to be shutdown on a general fire alarm activation as indicated in Section 7, shall have its respective shutdown control module/relay mounted within .9 m (3 ft) of the unit it is controlling. Relays shall be mounted in junction boxes and labeled as to their function.
14.27.3.4 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72.
14.27.3.5 Fire Manual Release: A manual fire alarm pull station shall be located directly adjacent to the exit from the room leading to the exterior of the building. Manual fire alarm pull station shall be equipped with protective covers as indicated in Section 7.
14.27.3.6 Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each mechanical room as indicated in Section 7

14.28 Electrical Rooms

14.28.1 Space Function: Spaces for electrical equipment

14.28.2 Architectural Issues: Provide dedicated areas for electrical equipment. Each battalion shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one battalion, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

14.28.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.
14.28.2.2 Base: resilient cove base.
14.28.2.3 Floor: sealed concrete.
14.28.2.4 Ceiling: none required
14.28.2.5 Other: Doors shall have storeroom function (F86) locksets.

14.28.3 Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

14.28.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in this area.
14.28.3.2 Fire Alarm Control: The main fire alarm control panel and wireless fire alarm transceiver shall be wall mounted in the ground floor electrical room. All necessary fire alarm addressable monitor and control modules used for auxiliary fire alarm functions shall also be mounted adjacent to the main fire alarm control panel in junction boxes and labeled according to their function.

SECTION 15.0 – DINING FACILITY ROOM-BY-ROOM REQUIREMENTS

15.1. Seating Area

15.1.1. Space Function: Seating/Dining Area for Dining Facility users.

15.1.2. Architectural Issues: Occupants: 300.

15.1.2.1. Walls: Painted gypsum wallboard.
15.1.2.2. Base: Quarry Tile or Resilient Cove Base.
15.1.2.3. Floor: Quarry Tile or Carpet.
15.1.2.4. Ceiling: Painted gypsum wallboard or suspended acoustical ceiling tile (SACT). Minimum ceiling height 3600mm.
15.1.2.5. Other: Provide exterior windows.
15.1.2.6. Furnishings: Seating shall be provided for minimum of 300 users.

15.1.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.1.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
15.1.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.2. C-Store

15.2.1. Space Function: Convenience Store to operate during hours when the main dining facility is closed.

15.2.2. Architectural Issues: Locate near entrance to allow Main Dining Facility to be locked while still keeping the Convenience store open. .

15.2.2.1. Walls: Painted gypsum wallboard or painted CMU
15.2.2.2. Base: Quarry Tile.
15.2.2.3. Floor: Quarry Tile.
15.2.2.4. Ceiling: Painted gypsum wallboard or suspended acoustical ceiling tile (SACT). Minimum ceiling height 3000mm.
15.2.2.5. Other: Provide 1800 mm wide door to vestibule. Partitions shall have minimum STC rating of 49
15.2.2.6. Furnishings: See Drawings for Equipment to be included in this area.

15.2.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.2.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

15.2.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.3. Ware Washing

15.3.1. Space Function: Drop off and wash area for dishies out of the Seating Area.

15.3.2. Architectural Issues:

15.3.2.1. Walls: Ceramic Tile on CMU or Glazed CMU
15.3.2.2. Base: Quarry Tile.
15.3.2.3. Floor: Quarry Tile.
15.3.2.4. Ceiling: Painted gypsum wallboard or suspended acoustical ceiling tile (SACT). Minimum ceiling height 3200mm.
15.3.2.5. Other: Partitions shall have minimum STC rating of 49
15.3.2.6. Furnishings: Provide eyewash station. See Drawings for additional Equipment to be included in this area

15.3.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.3.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
15.3.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.4. Servery

15.4.1. Space Function: Food Service area.

15.4.2. Architectural Issues:

15.4.2.1. Walls: Ceramic Tile on CMU or Glazed CMU
15.4.2.2. Base: Ceramic Tile.
15.4.2.3. Floor: Quarry Tile.
15.4.2.4. Ceiling: Painted gypsum wallboard or suspended acoustical ceiling tile (SACT). Minimum 3600mm high.
15.4.2.5. Other: Partitions shall have minimum STC rating of 49
15.4.2.6. Furnishings: See Drawings for Equipment to be included in this area

15.4.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.4.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

15.4.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.5. Manager Office

15.5.1. Space Function: Private office for use by Dining Facility manager. Provide 1 at minimum 9 m^2 each.

15.5.2. Architectural Issues:

15.5.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
15.5.2.2. Base: Resilient Cove Base
15.5.2.3. Floor: VCT or quarry tile.
15.5.2.4. Ceiling: minimum 2650 mm high, suspended acoustical panel ceiling.
15.5.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
15.5.2.6. Furnishings: Provide and design room to accommodate one desk, one bookcase, and one desk chair.

15.5.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.5.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

15.6. Receiving

15.6.1. Space Function: Processing area for supplies as they are delivered to the Dining facility. Provide one.

15.6.2. Architectural Issues: Space should include exterior Loading Dock.

15.6.2.1. Walls: Ceramic Tile on CMU or Glazed CMU.
15.6.2.2. Base: quarry tile.
15.6.2.3. Floor: quarry tile.
15.6.2.4. Ceiling: minimum 2650 mm high, painted gypsum wallboard or suspended acoustical ceiling tile (SACT).
15.6.2.5. Other: Provide three 1800 mm wide doors to dock, kitchen and Field Feeding; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49. Door to loading dock shall have an air curtain fly-control machine located immediately above door heads and shall be full width of doors.

15.6.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.6.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.6.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.7. Field Feeding

15.7.1. Space Function: Processing area for supplies as they are prepared for the field. Provide one.

15.7.2. Architectural Issues: Space should be adjacent to Receiving Area.

15.7.2.1. Walls: Ceramic Tile or Glazed CMU.

15.7.2.2. Base: Quarry tile.

15.7.2.3. Floor: Quarry tile.

15.7.2.4. Ceiling: minimum 2650 mm high, painted gypsum wallboard or suspended acoustical ceiling tile (SACT).

15.7.2.5. Other: Provide 1800 mm wide door to receiving. Partitions shall have minimum STC rating of 49

15.7.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.7.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

15.8. Locker Room

15.8.1. Space Function: Locker Room for storage of staff personal belongings. Provide one.

15.8.2. Architectural Issues: Located near kitchen.

15.8.2.1. Walls: Ceramic Tile or Glazed CMU. Partitions shall extend to underside of structure above. Partitions shall have a minimum STC rating of 45.

15.8.2.2. Base: Ceramic Tile.

15.8.2.3. Floor: Ceramic Tile.

15.8.2.4. Ceiling: minimum 2650 mm high, painted gypsum wallboard or suspended acoustical ceiling tile (SACT).

15.8.2.5. Other: Partitions shall have minimum STC rating of 49. Provide minimum of 20 lockers and bench(s) near lockers.

15.8.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.8.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

15.8.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.9. Office

15.9.1. Space Function: Private office. Provide 1, minimum 13m^2.

15.9.2. Architectural Issues:

15.9.2.1. Walls: Painted gypsum wallboard or painted veneer plaster.
15.9.2.2. Base: quarry tile or Resilient Cove Base
15.9.2.3. Floor: VCT or quarry tile.
15.9.2.4. Ceiling: minimum 2650 mm high, painted gypsum board.
15.9.2.5. Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Exterior window is desirable. Partitions shall have minimum STC rating of 49.
15.9.2.6. Furnishings: Provide and design room to accommodate one desk, one bookcase, and one desk chair.

15.9.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.9.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

15.10. Kitchen

15.10.1. Space Function: Food Preparation area.

15.10.2. Architectural Issues:

15.10.2.1. Walls: Ceramic Tile on CMU or Glazed CMU.
15.10.2.2. Base: Quarry Tile.
15.10.2.3. Floor: Quarry Tile.
15.10.2.4. Ceiling: Painted gypsum wallboard or suspended acoustical ceiling tile (SACT). Minimum ceiling height of 3000mm
15.10.2.5. Other: Partitions shall have minimum STC rating of 49
15.10.2.6. Furnishings: Provide eyewash station. See Drawings for additional Equipment to be included in this area

15.10.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.10.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.10.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.11. Pot Wash

15.11.1. Space Function: Dish washing area.

15.11.2. Architectural Issues:

15.11.2.1. Walls: Ceramic Tile on CMU or Glazed CMU.
15.11.2.2. Base: quarry tile.
15.11.2.3. Floor: quarry tile.
15.11.2.4. Ceiling: minimum 3200 mm high, painted gypsum wallboard or suspended acoustical ceiling tile (SACT).
15.11.2.5. Other: Partitions shall have minimum STC rating of 49
15.11.2.6. Furnishings: See Drawings for Equipment to be included in this area

15.11.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.11.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

15.12. Non Food Storage

15.12.1. Space Function: Storage Area.

15.12.2. Architectural Issues:

15.12.2.1. Walls: Ceramic Tile on CMU or Glazed CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
15.12.2.2. Base: Quarry Tile.
15.12.2.3. Floor: Quarry Tile.
15.12.2.4. Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended painted gypsum wallboard or suspended acoustical ceiling tile (SACT) at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
15.12.2.5. Other: Partitions shall have minimum STC rating of 49
15.12.2.6. Furnishings: See Drawings for Equipment to be included in this area

15.12.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.12.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.12.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.13. Dry Storage

15.13.1. Space Function: Food Storage area.

15.13.2. Architectural Issues:

15.13.2.1. Walls: Ceramic Tile on CMU or Glazed CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.

15.13.2.2. Base: Quarry Tile.

15.13.2.3. Floor: Quarry Tile.

15.13.2.4. Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended painted gypsum wallboard or suspended acoustical ceiling tile (SACT) at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

15.13.2.5. Other: Provide 1800 mm wide door to Kitchen. Partitions shall have minimum STC rating of 49

15.13.2.6. Furnishings: See Drawings for Equipment to be included in this area

15.13.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.13.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.13.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.14. Refrigerator/Freezer Area

15.14.1. Space Function: Food Refrigerator and Freezer.

15.14.2. Architectural Issues: Height of unit +/- 2600mm extends above ceiling line.

15.14.2.1. Walls: Painted gypsum wallboard

15.14.2.2. Base: Quarry Tile into box.

15.14.2.3. Floor: Quarry Tile into box.

15.14.2.4. Ceiling: Not required above box

15.14.2.5. Other: Floor slab shall be recessed a minimum of 4" to provide for insulated floor slab. Partitions shall have minimum STC rating of 49
15.14.2.6. Furnishings: See Drawings for Equipment to be included in this area

15.14.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.14.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size. Provide dry type pendant heads with wire protection guards for sprinklers within the walk in freezers and refrigerators.
15.14.3.2. Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.15. Janitor's Closet (Kitchen)

15.15.1. Space Function: Sink and storage of cleaning supplies, soap and paper products for Kitchen Area.

15.15.2. Architectural Issues: Provide one at each group of toilets of the building. Room shall be accessed from the corridor.

15.15.2.1. Walls: Painted gypsum wallboard
15.15.2.2. Base: quarry tile or Resilient Cove Base.
15.15.2.3. Floor: Quarry Tile or VCT.
15.15.2.4. Ceiling: minimum 2650 mm high, painted gypsum wallboard.
15.15.2.5. Other: Partitions shall have minimum STC rating of 49
15.15.2.6. Furnishings: Provide one floor mounted mop sink, mop rack for three mops, and a minimum of 1500mm of linear shelving.

15.15.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.15.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all heads in janitor's closet.

15.16. Janitor's Closet

15.16.1. Space Function: Sink and storage of cleaning supplies, soap and paper products for Toilet Rooms and/or Dining area.

15.16.2. Architectural Issues: Provide one at each group of toilets of the building. Room shall be accessed from the corridor.

15.16.2.1. Walls: Painted gypsum wallboard
15.16.2.2. Base: quarry tile or Resilient Cove Base.
15.16.2.3. Floor: Quarry Tile or VCT.
15.16.2.4. Ceiling: minimum 2650 mm high, painted gypsum wallboard.

15.16.2.5. Other: Partitions shall have minimum STC rating of 49
15.16.2.6. Furnishings: Provide one floor mounted mop sink, mop rack for three mops, and a minimum of 1500mm of linear shelving.

15.16.3. Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.16.3.1. Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi recessed type. Provide the appropriate number of spaced heads as dictated by room size.

15.17 Entry Vestibule

15.17.1 Space Function: Primary entry point into the Dining Facility. Weather protection for interior spaces. Provide two.

15.17.2 Architectural Issues: Provide at main exterior entrance to the Dining Facility.

15.17.2.1 Walls: painted gypsum wallboard or painted veneer plaster
15.17.2.2 Base: resilient cove base.
15.17.2.3 Floor: Quarry Tile.
15.17.2.4 Ceiling: minimum 2650 mm high, painted gypsum wallboard.
15.17.2.5 Other: Handicap Accessible. Provide FRP entrance doors on exterior and corridor sides of vestibule. Additional aluminum storefront area (sidelights, transoms) is desirable. Provide minimum 1000 mm deep exterior covered area (entry porch) full width of storefront. Provide location for company identification signage on exterior wall above or adjacent to entrance. Interior door shall have an air curtain fly-control machine located immediately above door heads and shall be full width of doors.

15.17.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm control equipment.

15.17.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
15.17.3.2 Fire Alarm Control: A fire alarm annunciator panel shall be recessed wall mounted in the south entry vestibule

15.18 Men's Toilet

15.18.1 Space Function: Men's single-occupant toilet and lavatory, for use by visitors. Provide one private toilet room.

15.18.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Waiting Area.

15.18.2.1 Walls: Ceramic Tile on CMU or Glazed CMU. Ceramic tile shall be either full height or 1800 mm high ceramic tile wainscot with painted concrete

masonry units above. Partitions shall extend to underside of structure above. Partitions shall have a minimum STC rating of 45.

15.18.2.2 Base: ceramic tile

15.18.2.3 Floor: ceramic tile.

15.18.2.4 Ceiling: minimum 2650 mm high. Painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

15.18.2.5 Other: Handicap Accessible. Provide 2 lavatories, 2 floor mounted toilets, and 2 wall-hung urinals. Lavatories shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door.

15.18.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.18.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.18.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.19 Women's Toilet

15.19.1 Space Function: Female single-occupant toilet and lavatory, for use by visitors. Provide one private toilet room.

15.19.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Waiting Area

15.19.2.1 Walls: Ceramic Tile on CMU or Glazed CMU. Ceramic tile shall be either full height or 1800 mm high ceramic tile wainscot with painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have a minimum STC rating of 45.

15.19.2.2 Base: ceramic tile

15.19.2.3 Floor: ceramic tile.

15.19.2.4 Ceiling: minimum 2650 mm high. Painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

15.19.2.5 Other: Handicap Accessible. Provide 2 lavatories, 3 floor mounted toilets. Lavatories shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet

room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door.

15.19.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.19.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.19.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.20 Male Staff Toilet

15.20.1 Space Function: Men's single-occupant toilet and lavatory, for use by staff. Provide one private toilet room.

15.20.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Waiting Area.

15.20.2.1 Walls: Ceramic Tile on CMU or Glazed CMU. Ceramic tile shall be either full height or 1800 mm high ceramic tile wainscot with painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have a minimum STC rating of 45.

15.20.2.2 Base: ceramic tile

15.20.2.3 Floor: ceramic tile.

15.20.2.4 Ceiling: minimum 2650 mm high. Portland cement plaster, or painted gypsum board or veneer plaster.

15.20.2.5 Other: Handicap Accessible. Provide 2 lavatories, 2 floor mounted toilets, and 1 wall-hung urinal. Lavatories shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door.

15.20.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.20.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.20.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.21 Female Staff Room

15.21.1 Space Function: Female's single-occupant toilet and lavatory, for use by staff. Provide one private toilet room.

15.21.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Waiting Area

15.21.2.1 Walls: Ceramic Tile on CMU or Glazed CMU. Ceramic tile shall be either full height or 1800 mm high ceramic tile wainscot with painted concrete masonry units above. Partitions shall extend to underside of structure above. Partitions shall have a minimum STC rating of 45.
15.21.2.2 Base: ceramic tile
15.21.2.3 Floor: ceramic tile.
15.21.2.4 Ceiling: minimum 2650 mm high. Painted Portland cement plaster, or painted gypsum board or veneer plaster.
15.21.2.5 Other: Handicap Accessible. Provide 2 lavatories, 3 floor mounted toilets. Lavatories shall be countertop mounted. Countertops shall be plastic laminate or solid surfacing material. Provide toilet partitions at each toilet, and urinal partitions between urinals. Provide the following toilet accessories: one continuous mirror full width of countertop at countertop mounted lavatories; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet; one robe hook on each toilet partition door.

15.21.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.21.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
15.21.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.22 Storage

15.22.1 Space Function: Closet for storage of folding tables, display easels, etc. Provide one, minimum $7m^2$.

15.22.2 Architectural Issues:

15.22.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units
15.22.2.2 Base: resilient cove base.
15.22.2.3 Floor: Quarry tile or VCT.
15.22.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to

base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

15.22.2.5 Other: Door(s) shall have classroom function (F84) lockset.

15.22.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.22.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

15.22.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

15.23 Mechanical Rooms

15.23.1 Space Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment

15.23.2 Architectural Issues: Provide dedicated areas for mechanical equipment. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

15.23.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.

15.23.2.2 Base: resilient cove base.

15.23.2.3 Floor: sealed concrete.

15.23.2.4 Ceiling: none required

15.23.2.5 Other: Doors shall have storeroom function (F86) locksets

15.23.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers, the building fire suppression sprinkler main water service/riser, mechanical unit control relays, combustible gas detection, carbon monoxide gas detection, and respective gas detection notification appliances.

15.23.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in mechanical room.

15.23.3.2 Fire Suppression Sprinklers Service: The sprinkler system main water service/riser shall enter and be located in the first floor mechanical room. A 200 mm (8”) double check detector back flow prevention valve assembly shall be connected to the fire service that enters the building. The main sprinkler riser shall be connected to the flow side of the back flow prevention valve. A 150 mm (6 inch) wet-pipe alarm check valve assembly and trim sprinkler service riser shall be provided per NFPA 13 and as indicated in Section 7.

15.23.3.3 Control Relays: Any mechanical unit designated to be shutdown on a general fire alarm activation as indicated in Section 7, shall have its respective shutdown control module/relay mounted within .9 m (3 ft) of the unit it is controlling. Relays shall be mounted in junction boxes and labeled as to their function.

15.23.3.4 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72.

15.23.3.5 Fire Manual Release: A manual fire alarm pull station shall be located directly adjacent to the exit from the room leading to the exterior of the building. Manual fire alarm pull station shall be equipped with protective covers as indicated in Section 7.

15.23.4 Gas Detection: Provide one combustible gas detector with notification appliance and one carbon monoxide detector with notification appliance in each mechanical room as indicated in Section 7

15.24 Electrical Rooms

15.24.1 Space Function: Spaces for electrical equipment

15.24.2 Architectural Issues: Provide dedicated areas for electrical equipment. Each building shall have independent metering and control of the electrical system for its own spaces. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

15.24.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units.
15.24.2.2 Base: resilient cove base.
15.24.2.3 Floor: sealed concrete.
15.24.2.4 Ceiling: none required
15.24.2.5 Other: Doors shall have storeroom function (F86) locksets

15.24.3 Fire Protection Issues: These areas shall receive both fire suppression sprinklers and fire alarm control equipment.

15.24.3.1 Fire Suppression Sprinklers: Sprinkler system for these spaces shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in mechanical room.

15.24.3.2 Fire Alarm Control: The main fire alarm control panel and wireless fire alarm transceiver shall be wall mounted in the ground floor electrical room. All necessary fire alarm addressable monitor and control modules used for auxiliary fire alarm functions shall also be mounted adjacent to the main fire alarm control panel in junction boxes and labeled according to their function.

15.25 Communications Room

15.25.1 Space Function: Distribution areas for telephone, data network, and cable television.

15.25.2 Architectural Issues Provide dedicated room(s) for communication distribution equipment. Each room shall be dedicated and shall not be combined with mechanical or electrical rooms. Provide each battalion with one main communication room; minimum size 3000 mm x 3300 mm. All spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m between outlet and communication room. Provide floor openings and vertical shaft spaces as necessary. Rooms shall be accessed from corridors. Access will be limited to authorized personnel.

15.25.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
15.25.2.2 Base: resilient cove base.
15.25.2.3 Floor: sealed concrete.
15.25.2.4 Ceiling: none required
15.25.2.5 Other: Doors shall have storeroom function (F86) locksets

15.25.3 Fire Protection Issues This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

15.25.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards on all sprinkler heads in mechanical room.
15.25.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

15.26 Cashier's Areas

15.26.1 Space Function: Check Out Area.

15.26.2 Architectural Issues: Shall be located between Servery and Seating Areas.

15.26.2.1 Walls: Ceramic Tile on CMU or Glazed CMU
15.26.2.2 Base: Quarry Tile.
15.26.2.3 Floor: Quarry Tile.
15.26.2.4 Ceiling: Painted gypsum board or suspended acoustical ceiling tile (SACT). Minimum ceiling height 3600mm.
15.26.2.5 Other: Partitions shall have minimum STC rating of 49

15.26.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.26.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

15.27 Beverage Area

15.27.1 Space Function: Area for refill of beverages.

15.27.2 Architectural Issues: Area shall be located in Seating Area.

15.27.2.1 Walls: Ceramic Tile on CMU or Glazed CMU
15.27.2.2 Base: Quarry Tile.
15.27.2.3 Floor: Quarry Tile.
15.27.2.4 Ceiling: Painted gypsum board or suspended acoustical ceiling tile (SACT). Minimum ceiling height 3600mm.
15.27.2.5 Other: Partitions shall have minimum STC rating of 49

15.27.3 Fire Protection Issues: This area shall receive fire suppression sprinklers.

15.27.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size.

SECTION 16.0 – HANGAR COMPANY OPERATIONS FACILITY ROOM-BY-ROOM REQUIREMENTS

16.1 Commander's Office

16.1.1 Space Function: Private office for commanding officer. Number and area of spaces to comply with drawings.

16.1.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.1.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
16.1.2.2 Base: resilient cove base.
16.1.2.3 Floor: vinyl composition tile.
16.1.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.1.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.
16.1.2.6 Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, one conference table, four side chairs, and one desk chair.

16.1.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.1.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.2 1st Sergeant

16.2.1 Space Function: Private office for company first sergeant. Number and area of spaces to comply with drawings.

16.2.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.2.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
16.2.2.2 Base: resilient cove base.
16.2.2.3 Floor: vinyl composition tile.
16.2.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.2.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.2.2.6 Furnishings: Provide and design room to accommodate one desk with return, one bookcase, two legal-size four-drawer file cabinets, four side chairs and one desk chair. Provide a floor anchor for one GFGI security safe. Coordinate anchor location with furniture layout.

16.2.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.2.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.3 Platoon Room (PLT)

16.3.1 Space Function: Private office for platoon leaders or other administrators. Number and area of spaces to comply with drawings.

16.3.2 Architectural Issues: Each Platoon Room will be subdivided into 4 smaller office spaces. Occupants: 1 in each office, and occasional visitors.

16.3.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
16.3.2.2 Base: resilient cove base.
16.3.2.3 Floor: vinyl composition tile.
16.3.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.3.2.5 Other: Partitions shall have minimum STC rating of 49
16.3.2.6 Furnishings: Provide and design each office to accommodate one desk with return, one side chair and one desk chair

16.3.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.3.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
16.3.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.4 Unit Storage

16.4.1 Space Function: Storage. Number and area of spaces to comply with drawings.

16.4.2 Architectural Issues: Provide access from Maintenance Area.

16.4.2.1 Walls: Wire mesh partitions will separate Unit Storage area from Maintenance and adjacent storage areas within the COF. Provide painted CMU walls where separating Unit Storage from adjacent non-storage areas. CMU shall be minimum 200mm units walls. Partitions shall extend to underside of structure above.
16.4.2.2 Base: Resilient Cove Base.
16.4.2.3 Floor: vinyl composition tile.
16.4.2.4 Ceiling: painted exposed structure

16.4.2.5 Other: Provide 900 mm wide swinging door with keyed cylinder lock in wire mesh partition at Equipment Storage. Extend wire mesh partitions to underside of structure above

16.4.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.4.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.4.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

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16.5 TA-50 Gear Storage

16.5.1 Space Function: Gear lockers for storage of individual soldier's TA-50 field gear. Number and area of spaces to comply with drawings.

16.5.2 Architectural Issues: Size and configure area to accommodate number of lockers shown on drawings (allow minimum 900 mm between open locker doors and obstructions). Provide access from Maintenance Area. Provide additional exit as required by applicable codes.

16.5.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Wire mesh partition will separate TA-50 storage area from equipment maintenance and adjacent storage areas.

16.5.2.2 Base: Resilient Cove Base.

16.5.2.3 Floor: sealed concrete.

16.5.2.4 Ceiling: painted exposed structure

16.5.2.5 Other: Extend partitions to underside of structure above. Provide wire mesh ceiling or extend wipe mesh partitions to underside of structure above.

16.5.2.6 Furnishings: : Lockers should be a minimum of 500 mm (w) x 1000 mm (d) x 2000 mm (h).

16.5.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.5.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type with wire protective guards. Provide the appropriate number of spaced heads as dictated by room size.

16.5.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.6 Maintenance Office

16.6.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.6.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.6.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
16.6.2.2 Base: resilient cove base.
16.6.2.3 Floor: vinyl composition tile.
16.6.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.6.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.6.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.6.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.6.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.7 Maintenance

16.7.1 Space Function: Equipment Maintenance Area. Number and area of spaces to comply with drawings.

16.7.2 Architectural Issues:

16.7.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
16.7.2.2 Base: resilient cove base.
16.7.2.3 Floor: vinyl composition tile.
16.7.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.7.2.5 Other: Partitions shall have minimum STC rating of 55
16.7.2.6 Furnishings: Provide two stainless steel equipment cleaning sinks 600 mm x 600 mm x 350 mm deep. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide an eyewash station.

16.7.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.
16.7.4 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.8 PSG Office

16.8.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.8.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.8.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
16.8.2.2 Base: resilient cove base.
16.8.2.3 Floor: vinyl composition tile.
16.8.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.8.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.8.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.8.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.8.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.9 P.O.L Storage

16.9.1 Space Function: Closet for storage Hazardous Materials. Number and area of spaces to comply with drawings.

16.9.2 Architectural Issues:

16.9.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
16.9.2.2 Base: resilient cove base.
16.9.2.3 Floor: vinyl composition tile.
16.9.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
16.9.2.5 Other: Door(s) shall have classroom function (F84) lockset

16.9.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.9.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
16.9.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.10 Paint Storage

16.10.1 Space Function: Closet for storage Hazardous Materials. Number and area of spaces to comply with drawings.

16.10.2 Architectural Issues:

16.10.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
16.10.2.2 Base: resilient cove base.
16.10.2.3 Floor: vinyl composition tile.
16.10.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
16.10.2.5 Other: Door(s) shall have classroom function (F84) lockset

16.10.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.10.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
16.10.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.11 Janitor

16.11.1 Space Function: Sink and storage of cleaning supplies, soap, and paper products. Number and area of spaces to comply with drawings.

16.11.2 Architectural Issues:

16.11.2.1 Walls: Provide painted impact resistant gypsum wallboard, or painted concrete masonry units
16.11.2.2 Base: Resilient Cove Base.
16.11.2.3 Floor: sealed concrete.
16.11.2.4 Ceiling: painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster
16.11.2.5 Other: Door shall have classroom function (F84) lockset.

16.11.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.11.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective tuards on all sprinkler heads in this area.

16.12 Stair

16.12.1 Space Function: Circulation and means of egress.

16.12.2 Architectural Issues: Provide as required to allow circulation to upper floor of the building, and to comply with applicable code egress requirements. Stair connecting second and first floors shall be an interior stair.

16.12.2.1 Landing floor: porcelain tile, quarry tile, resilient tile, vinyl composition tile, or sealed concrete.
16.12.2.2 Base: porcelain tile, quarry tile, or resilient cove base.
16.12.2.3 Treads: porcelain tile, quarry tile, resilient treads, or sealed concrete. Provide slip-resistant nosing if tile is used.
16.12.2.4 Risers: painted steel, porcelain tile, quarry tile, or sealed concrete.
16.12.2.5 Walls: painted impact resistant gypsum wallboard, or painted concrete masonry units.
16.12.2.6 Ceiling: suspended acoustical panel ceiling, painted gypsum wallboard, painted veneer plaster, or painted Portland cement plaster.
16.12.2.7 Other: Stairs shall be steel construction with concrete-filled treads, or cast-in-place concrete construction. Open risers are prohibited. Provide mechanical and electrical systems to comply with applicable codes. Railings shall be painted steel, or prefinished aluminum.

16.12.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.12.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.13 Storage

16.13.1 Space Function: Closet for storage of folding tables, display easels, etc. Number and area of spaces to comply with drawings.

16.13.2 Architectural Issues:

16.13.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above.
16.13.2.2 Base: resilient cove base.
16.13.2.3 Floor: vinyl composition tile.
16.13.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to

base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.

16.13.2.5 Other: Door(s) shall have classroom function (F84) lockset.

16.13.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.13.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.13.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.14 NVG Room

16.14.1 Space Function: Storage. Number and area of spaces to comply with drawings.

16.14.2 Architectural Issues:

16.14.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

16.14.2.2 Base: resilient cove base.

16.14.2.3 Floor: vinyl composition tile.

16.14.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

16.14.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55

16.14.2.6 Furnishings:

16.14.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.14.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.14.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.15 SIP Office

16.15.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.15.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.15.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.

16.15.2.2 Base: resilient cove base.
16.15.2.3 Floor: vinyl composition tile.
16.15.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.15.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.15.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.15.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.15.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.16 Training/Supply Office

16.16.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.16.2 Architectural Issues: Occupants: 2, and occasional visitors.

16.16.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above
16.16.2.2 Base: resilient cove base.
16.16.2.3 Floor: vinyl composition tile.
16.16.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
16.16.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.16.2.6 Furnishings: Provide and design room to accommodate two desk, one legal-size four-drawer file cabinets, two desk chair.

16.16.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.16.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.17 Safety Officer

16.17.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.17.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.17.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above
16.17.2.2 Base: resilient cove base.
16.17.2.3 Floor: vinyl composition tile.
16.17.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.17.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.17.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.17.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.17.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.18 Instructor Pilot Office

16.18.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.18.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.18.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above
16.18.2.2 Base: resilient cove base.
16.18.2.3 Floor: vinyl composition tile.
16.18.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.18.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.18.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.18.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.18.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.19 Men's Toilet/Shower Rooms

16.19.1 Space Function: Private toilet, shower and dressing room for use by company leadership after physical training.

16.19.2 Architectural Issues: Room shall be used by able-bodied military personnel only. Rooms shall be accessed from Administrative Area Corridor.

16.19.2.1 Walls: ceramic tile or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted CMU above. Partitions shall extend to underside of structure above
16.19.2.2 Base: resilient cove base.
16.19.2.3 Floor: porcelain tile or ceramic tile
16.19.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.19.2.5 Other: Door shall have privacy function (F76) lockset. Partitions shall have minimum STC rating of 49.
16.19.2.6 Furnishings: Provide minimum number of toilets, urinals, lavatories and ceramic tile showers, as shown on plans. Above lavatory provide mirror with shelf. Provide toilet partitions at each toilet and urinal partitions between urinals. Provide the following toilet accessories: Paper towel dispenser/waste receptacle, soap dispenser per lavatory, one toilet tissue dispenser per toilet. Provide the following at each shower stall: rod and shower curtain, ceramic soap holder. Dressing area shall have bench, towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, locate outside of circulation path. Provide 4 lockers for each shower stall.

16.19.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.19.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
16.19.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.20 Women's Toilet/Shower Rooms

16.20.1 Space Function: Private toilet, shower and dressing room for use by company leadership after physical training.

16.20.2 Architectural Issues: Room shall be used by able-bodied military personnel only. Rooms shall be accessed from Administrative Area Corridor.

16.20.2.1 Walls: ceramic tile or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted CMU above. Partitions shall extend to underside of structure above
16.20.2.2 Base: resilient cove base.
16.20.2.3 Floor: porcelain tile or ceramic tile.

16.20.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

16.20.2.5 Other: Door shall have privacy function (F76) lockset. Partitions shall have minimum STC rating of 49.

16.20.2.6 Furnishings: Provide minimum number of toilets, lavatories and ceramic tile showers, as shown on plans. Above lavatory provide mirror with shelf. Provide toilet partitions at each toilet. Provide the following toilet accessories: Paper towel dispenser/waste receptacle, soap dispenser per lavatory, one toilet tissue dispenser per toilet. Provide the following at each shower stall: rod and shower curtain, ceramic soap holder. Dressing area shall have bench, towel/robe hooks, and wall mounted full-length mirror. Provide floor drain at dressing area, locate outside of circulation path. Provide 4 lockers for each shower stall.

16.20.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.20.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.20.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.21 Crew Chief Office

16.21.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.21.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.21.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above

16.21.2.2 Base: resilient cove base.

16.21.2.3 Floor: vinyl composition tile.

16.21.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

16.21.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55

16.21.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.21.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.21.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.22 Platoon Sergeants

16.22.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.22.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.22.2.1 Walls: painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above
16.22.2.2 Base: resilient cove base.
16.22.2.3 Floor: vinyl composition tile.
16.22.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
16.22.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.22.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.22.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

16.22.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.23 Supply

16.23.1 Space Function: Private office. Number and area of spaces to comply with drawings.

16.23.2 Architectural Issues: Occupants: 1, and occasional visitors.

16.23.2.1 Walls: Painted CMU. CMU shall be minimum 200mm units. Partitions shall extend to underside of structure above
16.23.2.2 Base: resilient cove base.
16.23.2.3 Floor: vinyl composition tile.
16.23.2.4 Ceiling: Provide a primary ceiling constructed of a base material of 13mm plywood, 25mm tongue-in-groove wallboards, or 24–gauge steel deck. In addition, the primary ceiling construction shall include either 5/16–inch expanded metal mesh or 10–gauge 150mm x150mm woven wire fabric to base material. The primary ceiling construction shall be securely fastened to adjacent CMU walls. Contractor shall also provide a secondary ceiling of suspended acoustical panel ceiling at a minimum height of 2650mm. No penetrations shall be made in the primary ceiling construction.
16.23.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55
16.23.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair.

16.23.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.23.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.23.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.24 QC Area

16.24.1 Space Function: Equipment Checkout room. Number and area of spaces to comply with drawings.

16.24.2 Architectural Issues: Occupants: 2, and occasional visitors.

16.24.2.1 Walls: Provide painted, minimum 200mm CMU. Partitions shall extend to underside of structure above.

16.24.2.2 Base: resilient cove base.

16.24.2.3 Floor: vinyl composition tile.

16.24.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

16.24.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55

16.24.2.6 Furnishings: Provide and design room to accommodate one desk, one bookcase, two legal-size four-drawer file cabinets, two side chairs and one desk chair, and 12 linear meters of shelving. Provide 4 linear meters of 1000mm high laminated countertop.

16.24.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.24.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

16.24.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.25 Mechanical Rooms

16.25.1 Space Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment

16.25.2 Architectural Issues: Provide dedicated areas for mechanical equipment. Each battalion shall have independent operation and control of HVAC system for its own spaces, but mechanical equipment may serve more than one battalion, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

16.25.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units. Partitions shall extend to underside of structure above.
16.25.2.2 Base: resilient cove base.
16.25.2.3 Floor: sealed concrete.
16.25.2.4 Ceiling: none required
16.25.2.5 Other: Doors shall have storeroom function (F86) locksets

16.25.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

16.25.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size.
16.25.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

16.26 Electrical Rooms

16.26.1 Space Function: Spaces for electrical equipment

16.26.2 Architectural Issues: Provide dedicated areas for electrical equipment. Each battalion shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one battalion, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

16.26.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
16.26.2.2 Base: resilient cove base.
16.26.2.3 Floor: sealed concrete.
16.26.2.4 Ceiling: none required
16.26.2.5 Other: Doors shall have storeroom function (F86) locksets

16.26.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

16.26.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the upright type. Provide the appropriate number of spaced heads as dictated by room size
16.26.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72:

SECTION 17.0 – TROOP AID STATION
ROOM-BY-ROOM REQUIREMENTS

17.1 Reception

17.1.1 Space Function: Receptionist workstation and waiting area for visitors and patients.

17.1.2 Architectural Issues: Provide one to accommodate reception desk. Occupants: 2. Shall have access to Records room.

17.1.2.1 Walls: Painted gypsum wallboard or painted veneer plaster.
17.1.2.2 Base: Resilient Cove Base
17.1.2.3 Floor: Carpet.
17.1.2.4 Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
17.1.2.5 Other: Partitions shall have minimum STC rating of 49. Room shall have visual control of entry vestibule and waiting room. Provide counter (built-in casework) separating the Reception area from the lobby/corridor/waiting area. The counter on the corridor side shall be minimum 1000 mm high x 300 mm deep. Counter on the office side shall be a minimum of 750mm deep and 750mm high.

17.1.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.1.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.1.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.2 Nursing Station

17.2.1 Space Function: Nursing workstation.

17.2.2 Architectural Issues: Provide one to accommodate nursing station desk. Occupants: 2. Shall have access to Records room.

17.2.2.1 Walls: Painted gypsum wallboard or painted veneer plaster.
17.2.2.2 Base: Resilient Cove Base
17.2.2.3 Floor: Carpet.
17.2.2.4 Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
17.2.2.5 Other: Partitions shall have minimum STC rating of 49. Room shall have visual control of entry vestibule and waiting room. Provide counter (built-in casework) separating the Reception area from the lobby/corridor/waiting area. The counter on the corridor side shall be minimum 1000 mm high x 300 mm deep. Counter on the office side shall be a minimum of 750mm deep and 750mm high.

17.2.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.2.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.2.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.3 Waiting Area

17.3.1 Space Function: Waiting and reception area for company soldiers and visitors. Provide one, minimum 38m^2.

17.3.2 Architectural Issues: Occupants: Two or more visitors.

17.3.2.1 Walls: painted gypsum wallboard or painted veneer plaster

17.3.2.2 Base: resilient cove base.

17.3.2.3 Floor: vinyl composition tile.

17.3.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

17.3.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49. Provide one ceiling mounted TV bracket. Provide wall mounted electric water coolers.

17.3.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.3.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.3.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.4 Screening

17.4.1 Space Function: Screening Room. Provide two, minimum 10m^2 each.

17.4.2 Architectural Issues: Locate near Waiting Area and Corridor.

17.4.2.1 Walls: painted gypsum wallboard or painted veneer plaster

17.4.2.2 Base: resilient cove base.

17.4.2.3 Floor: vinyl composition tile.

17.4.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

17.4.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55

17.4.2.6 Furnishings: Provide fifteen side chairs and 4 end tables. Provide one 1200 mm high x 1800 mm wide wall mounted bulletin board. Provide one wall mounted porcelain hand sink.

17.4.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

17.4.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size

17.5 Records

17.5.1 Space Function: Personal Records Storage Room. Provide one, minimum 14m^2.

17.5.2 Architectural Issues: Locate Adjacent to the Reception Area.

17.5.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.5.2.2 Base: resilient cove base.
17.5.2.3 Floor: vinyl composition tile.
17.5.2.4 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 49
17.5.2.5 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

17.5.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.5.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.5.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.6 Men's Toilet

17.6.1 Space Function: Men's single-occupant toilet and lavatory, for use by visitors. Provide one private toilet room.

17.6.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Waiting Area.

17.6.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
17.6.2.2 Base: porcelain tile, or ceramic tile
17.6.2.3 Floor: porcelain tile, or ceramic tile.
17.6.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

17.6.2.5 Other: Handicap Accessible. Provide 1 wall hung lavatories, 1 floor mounted toilets. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet;

17.6.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.6.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.6.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.7 Women's Toilet

17.7.1 Space Function: Women's single-occupant toilet and lavatory, for use by visitors. Provide one private toilet room.

17.7.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Waiting Area.

17.7.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.

17.7.2.2 Base: porcelain tile, or ceramic tile

17.7.2.3 Floor: porcelain tile, or ceramic tile.

17.7.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

17.7.2.5 Other: Handicap Accessible. Provide 1 wall hung lavatories, 1 floor mounted toilets. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet;

17.7.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.7.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.7.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.8 Exam Room

17.8.1 Space Function: Patient exam room. Provide eight, minimum $10m^2$ each.

17.8.2 Architectural Issues:

17.8.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.8.2.2 Base: resilient cove base.
17.8.2.3 Floor: vinyl composition tile.
17.8.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.8.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55. Provide minimum 1500mm wide x 600mm deep plastic laminate countertop, with stainless steel sink. Provide minimum of 1500mm wide wall cabinets; mounted to provide a minimum of 600mm clearance above countertop.

17.8.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.8.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.8.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.9 Clean

17.9.1 Space Function: Clean linens room. Provide one, minimum 5.5m^2 each.

17.9.2 Architectural Issues:

17.9.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.9.2.2 Base: resilient cove base.
17.9.2.3 Floor: vinyl composition tile.
17.9.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.9.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.

17.9.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.9.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.9.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.10 Soiled

17.10.1 Space Function: Soiled linens room. Provide one, minimum 5.5m^2 each.

17.10.2 Architectural Issues:

17.10.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.10.2.2 Base: resilient cove base.
17.10.2.3 Floor: vinyl composition tile.
17.10.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.10.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55. Provide one utility sink.

17.10.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.10.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.10.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.11 Procedure/Treatment

17.11.1 Space Function: Patient Treatment Room. Provide one, minimum 22m^2 each

17.11.2 Architectural Issues: Locate near Corridor and Exterior Entrance.

17.11.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.11.2.2 Base: resilient cove base.
17.11.2.3 Floor: vinyl composition tile.
17.11.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.11.2.5 Other: Provide two 900 mm wide door into room; door shall have storeroom function (F86) lockset. Partitions shall have minimum STC rating of 49. Provide minimum 1500mm wide x 600mm deep plastic laminate countertop, with stainless steel sink. Provide minimum of 1500mm wide wall cabinets; mounted to provide a minimum of 600mm clearance above countertop.

17.11.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.11.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.11.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.12 Mechanical Rooms

17.12.1 Space Function: Spaces for HVAC, water heating, and other plumbing and mechanical equipment

17.12.2 Architectural Issues: Provide dedicated areas for mechanical equipment. Each battalion shall have independent operation and control of HVAC system for its own spaces, but mechanical equipment may serve more than one battalion, and mechanical rooms may be combined. Mechanical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces as necessary.

17.12.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
17.12.2.2 Base: resilient cove base.
17.12.2.3 Floor: sealed concrete.
17.12.2.4 Ceiling: none required
17.12.2.5 Other: Doors shall have storeroom function (F86) locksets

17.12.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

17.12.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

17.13 Electrical Rooms

17.13.1 Space Function: Spaces for electrical equipment

17.13.2 Architectural Issues: Provide dedicated areas for electrical equipment. Each battalion shall have independent metering and control of the electrical system for its own spaces, but electrical equipment may serve more than one battalion, and electrical rooms may be combined. Electrical rooms shall not be used for storage or other purposes. Access will be limited to authorized personnel. Size and locate room(s) to allow equipment removal and maintenance.

17.13.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
17.13.2.2 Base: resilient cove base.
17.13.2.3 Floor: sealed concrete.
17.13.2.4 Ceiling: none required
17.13.2.5 Other: Doors shall have storeroom function (F86) locksets

17.13.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

17.13.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size. Provide wire protective guards for all sprinkler heads in this area.

17.14 OIC Office

17.14.1 Space Function: Private office. Provide one, minimum 11m^2 each.

17.14.2 Architectural Issues: Private office for those working in the Troop Aid Building.

17.14.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.14.2.2 Base: resilient cove base.
17.14.2.3 Floor: vinyl composition tile.
17.14.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.14.2.5 Other: Provide 900 mm wide door into room; door shall have storeroom function (F86) lockset. Partitions shall have minimum STC rating of 55

17.14.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers

17.14.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size

17.15 NCOIC

17.15.1 Space Function: Private office. Provide one, minimum 9m^2 each.

17.15.2 Architectural Issues: Private office for those working in the Troop Aid Building.

17.15.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.15.2.2 Base: resilient cove base.
17.15.2.3 Floor: vinyl composition tile.
17.15.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.15.2.5 Other: Provide 900 mm wide door into room; door shall have storeroom function (F86) lockset. Partitions shall have minimum STC rating of 55

17.15.3 Fire Protection Issues: These areas shall receive fire suppression sprinklers.

17.15.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size

17.16 Male Staff Toilet Room

17.16.1 Space Function: Men's single-occupant toilet and lavatory, for use by staff. Provide one private toilet room.

17.16.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Male Staff Locker Room.

17.16.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
17.16.2.2 Base: porcelain tile, or ceramic tile
17.16.2.3 Floor: porcelain tile, or ceramic tile.
17.16.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.
17.16.2.5 Other: Handicap Accessible. Provide 1 wall hung lavatories, 1 floor mounted toilets. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet.

17.16.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.16.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.16.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.17 Female Staff Toilet Room

17.17.1 Space Function: Female single-occupant toilet and lavatory, for use by staff. Provide one private toilet room.

17.17.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Female Staff Locker Room

17.17.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.
17.17.2.2 Base: porcelain tile, or ceramic tile
17.17.2.3 Floor: porcelain tile, or ceramic tile.
17.17.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.
17.17.2.5 Other: Handicap Accessible. Provide 1 wall hung lavatories, 1 floor mounted toilets. Provide the following toilet accessories: one mirror with shelf above each wall-hung lavatory; one paper towel dispenser/waste receptacle per toilet room; one soap dispenser per lavatory; one toilet tissue dispenser per toilet;

17.17.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.17.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.17.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.18 Male Staff Locker Room

17.18.1 Space Function: Men's locker and shower, for use by staff. Provide one handicap accessible shower.

17.18.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Break Area.

17.18.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.

17.18.2.2 Base: porcelain tile, or ceramic tile

17.18.2.3 Floor: porcelain tile, or ceramic tile.

17.18.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

17.18.2.5 Other: Handicap Accessible. Provide one handicap accessible shower. Provide a minimum of 15 lockers.

17.18.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.18.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.18.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.19 Female Staff Locker Room

17.19.1 Space Function: Female locker and shower, for use by staff. Provide one handicap accessible shower.

17.19.2 Architectural Issues: Room shall be sized to comply with handicap accessibility requirements. Room shall be accessed from Break Area.

17.19.2.1 Walls: ceramic tile, or 1800 mm high ceramic tile wainscot with painted impact resistant gypsum wallboard or painted concrete masonry units above.

17.19.2.2 Base: porcelain tile, or ceramic tile

17.19.2.3 Floor: porcelain tile, or ceramic tile.

17.19.2.4 Ceiling: painted Portland cement plaster, or painted gypsum wallboard or veneer plaster.

17.19.2.5 Other: Handicap Accessible. Provide one handicap accessible shower. Provide a minimum of 15 lockers.

17.19.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.19.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.19.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.20 Break Room

17.20.1 Space Function: Sink, space for coffee maker and supplies, and space for two vending machines; for use by command section staff and visitors. Provide one.

17.20.2 Architectural Issues: Area shall have countertop with kitchen sink; comply with handicap accessibility requirements.

17.20.2.1 Walls: painted gypsum wallboard or painted veneer plaster

17.20.2.2 Base: resilient cove base.

17.20.2.3 Floor: vinyl composition tile.

17.20.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling.

17.20.2.5 Other: Vending machines shall be supplied and installed by the government. Provide electrical and plumbing services required for vending machines. Provide minimum 2400mm wide x 600mm deep plastic laminate countertop, with stainless steel sink. Provide minimum of 2400mm wide wall cabinets; mounted to provide a minimum of 600mm clearance above countertop.

17.20.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.20.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.20.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.21 Storage

17.21.1 Space Function: Supply Storage. Provide one, minimum 2.8m^2 each.

17.21.2 Architectural Issues: Room shall be accessed from the corridor.

17.21.2.1 Walls: Painted gypsum wallboard or painted veneer plaster or painted CMU.
17.21.2.2 Base: Resilient Cove Base
17.21.2.3 Floor: Sealed concrete.
17.21.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling.
17.21.2.5 Other: Door shall have storeroom function (F86) lockset

17.21.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.21.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.21.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.22 Corridor

17.22.1 Space Function: Entry to the facility; egress and circulation through the building.

17.22.2 Architectural Issues: Provide as required to allow access to building spaces. Minimum corridor width shall comply with applicable egress codes.

17.22.2.1 Walls: Painted gypsum wallboard or painted veneer plaster.
17.22.2.2 Base: Resilient Cove Base
17.22.2.3 Floor: vinyl composition tile.
17.22.2.4 Ceiling: minimum 2500 mm high, suspended acoustical panel ceiling.
17.22.2.5 Other: Handicap Accessible. Provide mechanical and electrical systems to comply with applicable codes. Provide fire extinguishers in semi-recessed fire extinguisher cabinets to comply with applicable codes. Provide interior signage to identify major spaces. Provide one recessed building directory near each main entrance; Provide one 1200 mm high x 1800 mm wide wall mounted bulletin board

17.22.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.22.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.22.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.18 Entry Vestibule

17.18.1 Space Function: Primary entry point into the Troop Aid Facility; weather protection for interior spaces. Provide one.

17.18.2 Architectural Issues: Provide at main exterior entrance to the Troop Aid Facility.

17.18.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.18.2.2 Base: resilient cove base.
17.18.2.3 Floor: vinyl composition tile.
17.18.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.18.2.5 Other: Handicap Accessible. Provide FRP entrance doors on exterior and corridor sides of vestibule. Additional aluminum storefront area (sidelights, transoms) is desirable. Provide minimum 1000 mm deep exterior covered area (entry porch) full width of storefront. Provide location for company identification signage on exterior wall above or adjacent to entrance. .

17.18.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm control equipment.

17.18.3.1 Fire Suppression Sprinklers Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.18.3.2 Fire Alarm Control: A fire alarm annunciator panel shall be recessed wall mounted in the south entry vestibule

17.19 Communications Room

17.19.1 Space Function: Distribution areas for telephone, data network, and cable television.

17.19.2 Architectural Issues Provide dedicated room(s) for communication distribution equipment. Each room shall be dedicated and shall not be combined with mechanical or electrical rooms. Provide each battalion with one main communication room; minimum size 3000 mm x 3300 mm. All spaces having telephone or computer data outlets shall be located to allow a maximum cable length of 90 m between outlet and communication room. Provide floor openings and vertical shaft spaces as necessary. Rooms shall be accessed from corridors. Access will be limited to authorized personnel.

17.19.2.1 Walls: painted water-resistant gypsum wallboard, or painted concrete masonry units
17.19.2.2 Base: resilient cove base.
17.19.2.3 Floor: sealed concrete.
17.19.2.4 Ceiling: none required
17.19.2.5 Other: Doors shall have storeroom function (F86) locksets

17.19.3 Fire Protection Issues This area shall receive both fire suppression sprinklers and fire alarm notification appliances.
17.19.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent

type. Provide the appropriate number of spaced heads as dictated by room size.

17.19.3.2 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72.

17.20 Therapy

17.20.1 Space Function: Patient therapy room. Provide one, minimum 22m^2 each.

17.20.2 Architectural Issues:

17.20.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.20.2.2 Base: resilient cove base.
17.20.2.3 Floor: vinyl composition tile.
17.20.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.20.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55. Provide minimum 1500mm wide x 600mm deep plastic laminate countertop, with stainless steel sink. Provide minimum of 1500mm wide wall cabinets; mounted to provide a minimum of 600mm clearance above countertop.

17.20.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.20.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.20.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.21 Screening/Vision Testing Room

17.21.1 Space Function: Patient screening room. Provide one, minimum 20m^2 each.

17.21.2 Architectural Issues:

17.21.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.21.2.2 Base: resilient cove base.
17.21.2.3 Floor: vinyl composition tile.
17.21.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.21.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55. Provide minimum 1500mm wide x 600mm deep plastic laminate countertop, with stainless steel sink. Provide minimum of 1500mm wide wall cabinets; mounted to provide a minimum of 600mm clearance above countertop.

17.21.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.21.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.21.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.22 Phleb Room

17.22.1 Space Function: Patient Phleb room. Provide one, minimum 12m^2 each.

17.22.2 Architectural Issues:

17.22.2.1 Walls: painted gypsum wallboard or painted veneer plaster

17.22.2.2 Base: resilient cove base.

17.22.2.3 Floor: vinyl composition tile.

17.22.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

17.22.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55. Provide minimum 1500mm wide x 600mm deep plastic laminate countertop, with stainless steel sink. Provide minimum of 1500mm wide wall cabinets; mounted to provide a minimum of 600mm clearance above countertop.

17.22.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.22.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.22.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.23 Pharmacy

17.23.1 Space Function: Pharmacy for troop aid. Provide one, minimum 7m^2 each.

17.23.2 Architectural Issues:

17.23.2.1 Walls: painted gypsum wallboard or painted veneer plaster

17.23.2.2 Base: resilient cove base.

17.23.2.3 Floor: vinyl composition tile.

17.23.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling

17.23.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.

17.23.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.23.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.23.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.24 Hearing Room

17.24.1 Space Function: Hearing testing room for patients. Provide one, minimum 12m^2 each.

17.24.2 Architectural Issues:

17.24.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.24.2.2 Base: resilient cove base.
17.24.2.3 Floor: vinyl composition tile.
17.24.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.24.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55.

17.24.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.24.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.24.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

12.35. Conference Room

12.35.1. Space Function: Conference room for staff and patients. Functions will include staff meetings and patient consultations. Provide one, minimum 38m^2.

12.35.2. Architectural Issues: Room shall be located to allow direct access from the main corridor/lobby and waiting area. Occupants: up to 15 persons.

12.35.2.1. Walls: Painted gypsum wallboard or painted veneer plaster. Partitions shall extend to underside of structure above.
12.35.2.2. Base: Resilient Cove Base
12.35.2.3. Floor: Carpet.
12.35.2.4. Ceiling: Suspended acoustical panel ceiling. Minimum ceiling height 2640 mm
12.35.2.5. Other: Provide 900 mm wide doors into room; doors shall have classroom function (F84) lockset. Partitions shall have minimum STC rating of 55. Exterior window is desirable.

12.35.2.6. Furnishings: Provide and design room to accommodate one conference table and 10 chairs. Provide one marker board (minimum 2400 mm wide x 1200 mm high). Provide ceiling receptacle for projector. Provide conduit infrastructure for projector control cables from a laptop or desktop computer to ceiling projector. Coordinate exact location of computer with Contracting Officer. Provide a minimum of 4 recessed ceiling mounted speakers. Provide one 2400mm recessed ceiling mounted motorized projection screen.

12.35.3. Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances

12.35.3.1. Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendant type. Provide the appropriate number of spaced heads as dictated by room size

17.24.3.3 Fire Notification: Fire alarm notification appliances shall be located in this space per NFPA 72

17.25 Janitor Closet

17.25.1 Space Function: Janitor's closet. Storage of cleaning supplies. Provide 1.

17.25.2 Architectural Issues:

17.25.2.1 Walls: painted gypsum wallboard or painted veneer plaster
17.25.2.2 Base: resilient cove base.
17.25.2.3 Floor: vinyl composition tile.
17.25.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.25.2.5 Other: Provide 900 mm wide door into room; door shall have entry function (F81) lockset. Partitions shall have minimum STC rating of 55. Provide one utility sink.

17.25.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.25.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.

17.25.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

17.26 Sub-Waiting Room

17.26.1 Space Function: Waiting room for patients after processing through screening room. Provide 1.

17.26.2 Architectural Issues:

17.26.2.1 Walls: painted gypsum wallboard or painted veneer plaster

17.26.2.2 Base: resilient cove base.
17.26.2.3 Floor: vinyl composition tile.
17.26.2.4 Ceiling: Minimum ceiling height 2650mm, suspended acoustical panel ceiling
17.26.2.5 Other: Partitions shall have minimum STC rating of 55. Provide seating for 4 occupants and end table.

17.26.3 Fire Protection Issues: This area shall receive both fire suppression sprinklers and fire alarm notification appliances.

17.26.3.1 Fire Suppression Sprinklers: Sprinkler system for this space shall be designed per NFPA 13. Sprinkler heads shall be the semi-recessed pendent type. Provide the appropriate number of spaced heads as dictated by room size.
17.26.3.2 Fire Notification: Fire alarm notification appliances shall be located in these spaces per NFPA 72

SECTION 18 – OPTIONS

Option A – Geothermal

Barracks Buildings (Geothermal Option): Provide a geothermal heat pump system for each of the barracks buildings as described below. Each building system shall be independent of other building systems. This system will replace the air cooled chiller, chilled water pumps, chilled water accessories, fan coil units, chilled water make-up air units, and finned tube radiant heaters in the base bid. All other systems shall remain the same as the base bid.

1) Cooling System Design: Each Barracks building shall be served with its own geothermal heat pump system. Pumps and accessories shall be located in the Mechanical Room located on the first floor of the Barracks Building. Design parameters shall be as defined in paragraph 8.4 of section 01010.
2) Heating System Design: Heating for the Barracks Buildings will be accomplished using the geothermal heat pump system and a hot water system. Hot water system will be used to preheat ventilation air, reheat ventilation air, heat mechanical, electrical and storage rooms. Each barracks building shall be served by a minimum of two cast iron boilers. Each boiler shall be sized for 60% of the maximum heating load capacity at all times. System shall be provided with two hot water pumps each sized for full system flow. Pumps and accessories shall be located in the Mechanical Room located on the first floor of the Barracks Building.

3) Air System Design and Zoning:

    a) HVAC for Living/Sleeping Modules: Cooling and heating for each Living/Sleeping Module shall be provided by floor mounted console type geothermal heat pumps. Ventilation air shall be ducted directly into each of the sleeping rooms.

        i) Heat pumps shall be provided with sub-base and wall mounted thermostat. Piping for each heat pump shall include automatic flow control valves, ball valves with pressure/temperature ports, and y-strainer with blow down valve. Footprint of the heat pumps shall not exceed 50”x 12”.

    b) HVAC System for Knuckle (Lobby) Areas: All rooms in the Knuckle area excluding mechanical, electrical and storage rooms shall be conditioned using geothermal heat pumps. Ventilation air shall be ducted directly into each of the spaces.

    c) Corridors: All corridors shall be conditioned using geothermal heat pumps. Ventilation air for the corridors shall be supplied to each.

4) Ventilation System Design:

    a) Ventilation air for all spaces shall be provided by dedicated geothermal heat pumps designed to handle 100% outside air. These units shall be located in the attic mechanical space. Ductwork shall be routed from these units to each space. The air handling units shall be provided with 30% efficient pleated filters. Each ventilation unit shall be provided with factory installed modulating hot-gas reheat circuits. The units shall be sized to cool the outside air to 55 deg. F in order to dehumidify the ventilation air. The heating coils for these units shall be sized to heat the outside air to 68 deg. F. Duct mounted hot water coils shall

preheat ventilation air to 50 deg. F before entering ventilation units. A duct mounted hot water coil shall also be provided to reheat air before delivering it to each space.

b) Ventilation air supply temperature shall be determined by a reset schedule. Temperature shall be 55 deg. F when the outside air temperature is equal to the summer design outside air temperature and 68 deg. F when the outside air temperature is equal to the winter design outside air temperature.

c) The outside air quantity for each module shall be sufficient to offset the space exhaust requirements and to slightly pressurize the space.

d) Bathroom Exhaust Systems: Same as base bid.

e) Kitchen Exhaust Systems: Same as base bid.

5) Ground-Coupling System

a) These systems shall be ground coupled type systems and shall utilize closed vertical loops for heat transfer. All plastic pipe connections shall be thermally welded. Threaded plastic pipe connections will not be allowed. Proposer shall determine depth and quantity of wells based on underground soil temperatures and soil type at Ft. Drum. Appendix J has information on wells that have been drilled at Ft. Drum. Proposer is responsible for determining the soil's thermal characteristics.

Option B – Dining Facility Seating Area Design and Furnishings

Contractor shall work with Fort Drum PW and the Food Service Manager to create an interior design for the seating area. Design should maintain the existing seating capacity while creating the ambiance of a commercial restaurant.

The furniture used will depend on the Contractor's seating plan design. The following is a description of the furniture requirements. The Contractor is not required to use all of the pieces described below but is provided if they choose to do so.

- Dining Chairs: sturdy, metal-steel framed, with seat back, padded seat at minimum. Padded back can be considered. Materials used for cushion and covering must able to withstand high traffic use and be easy to clean. Consider customer usage is largely soldiers with military gear on their bodies.

- Bar Stools: require 4 sturdy, metal-steel framed, padded seat at a minimum. Stools must have a seat back for support. Stools shall match and coordinate with dining chairs purchased for use.

- Tables: solid, formica or other laminate top, coordinated with dining chairs. No decorative edges such as brass corners. May require single and double pedestal depending on final determination of square footage and approximate number of personnel to seat in facility. Majority of tables required shall be able to seat 4 people comfortably. A minimum of 2 tables shall seat 6 people. Tables used with dining chairs (vs. booths) shall be double pedestal to ensure sturdiness.

- Booths: commercial look. Materials used for cushion and covering must able to withstand high traffic use and be easy to clean. Consider customer usage is largely soldiers with military gear on their bodies. Can be trimmed in wood. Booth end caps shall have hooks available to hang items such as coats. Normal booths shall seat up to four people with corner booths able to accommodate six. Unable to determine appropiate numbers without knowledge of square footage and interior design layout.

- Divider walls and partitions: laminates or wood coordinated with chair and tables. Ease of cleaning and high durabilty required. Decorative elements such as planters can be considered.

During the design phase, the Contractor will work with the Ft. Drum Architect and Food Service Manager to develop the color scheme for the seating area. Contractor will submit color boards for approval.

Contractor is encouraged to maintain natural lighting to the greatest extent possible.

Option C - Dining Facility Equipment

Contractor shall furnish and install all equipment listed on plates FS 101, FS 102 and FS 103 on the Volume 3 Dining Facility Drawings.

Option D – Decommission Existing Airfield Water Tower

General: Contractor shall include all labor, materials, and equipment necessary to remove an existing water tank and supporting structure located at the airfield. Work effort is to remove existing tank and supporting structure only. Tower is located within a fenced area designated as hazardous for soil contaminated with lead. Appropriate precautions shall be taken to ensure worker safety and protection and to minimize exposure to lead and lead based paint.

Description: Tower is steel/steel framed, approximately 161 ft high to include a beacon-light and approximately 44 ft wide at tank. Tower is located within a chain-link fenced area to prevent accidental exposure to lead-contaminated soil contained therein. Coordination with Fort Drum Public Works may be required to ensure utilities are locked out and tank is empty.

Requirements: Work is required to be performed by personnel trained in hazardous waste operations and in compliance with 29 CFR Part 1910. Training shall meet the requirements of 20 CFR Part 1926.62 and 49 CFR Part 172 as applicable, and all state and local requirements. Training certifications shall be provided prior to start of work, if requested. Records shall be retained at proposer's expense, in accordance with 29 CFR Part 1910. Medical surveillance may be required to include biological monitoring for lead as required by 29 CFR part 1926 and all relevant state and local regulations. A written Health and Safety Plan or Plan Addendum shall be submitted specific to decommissioning effort.

Site Controls: Limited site access shall be maintained. Only personnel trained in accordance with requirements in 3.18.3 shall be authorized to access site.

Disposal: Metal shall be salvaged as scrap and any other materials suitable for recycle/re-use shall be collected and appropriately handled. Scrap metal and any other materials shall be tracked, recorded by weight, and handled off-post as recyclable/reuse materials, as appropriate. Weights can be tallied by best estimate (tons/pounds) and shall be reported to Fort Drum Public Works.

Site Restoration: Work shall include all materials, tools, and labor necessary to ensure no additional site degradation due to removal of the structure. All disturbed areas shall be covered and seeded in accordance with the Fort Drum standard recommendation for seeding sandy soils. Fence and existing signs shall be maintained and remain/be replaced after decommissioning.

Option E– Water Treatment Plant

General: Contractor shall include all labor, materials, and equipment necessary to construct a public drinking water treatment plant. Work effort includes construction of a treatment facility and infrastructure to include piping, treatment systems, plant operator office space, etc. necessary to provide three types of water treatment, fluoridation, chlorination (using sodium hypochlorite vs. chlorine gas), and ultra-violet disinfection. Plant is to be located adjacent to new water tower. Treatment plant shall meet the requirements of NYS Department of Health (NYSDOH), Part 5, Sub-part 5-1, Public Drinking Water Systems (Statutory: Public Health Law, Section 225).

Description: Treatment plant structure shall be a concrete block building with metal siding, and standing seam metal roof approximately 40' x 60' in size or of sufficient size to accommodate public drinking water treatment systems. Architectural theme of the structure shall follow the attached guidance. Building shall be constructed to 100 MPH wind load and 70 pound per square foot live load. Structure shall have full basement capable of containing the treatment systems in such a manner to achieve efficient and effective operation. Drinking water treatment systems shall be installed according to supplier recommended standards for chlorination, fluoridation, and ultra-violet disinfection. System shall be sized to treat up to 3 million gallons daily for approximately 15,000 customers.

Main floor area shall contain office space suitable for a plant operator, file storage area, unisex bathroom, electronic control functions/panels, and laboratory area suitable to test raw water and finish water. Sodium hypochlorite storage area shall be constructed in compliance with applicable regulations and ensure appropriate ventilation. Storage areas shall meet requirements necessary for hazardous materials storage in accordance with NYS and OSHA guidance. Consideration shall be made for access and storage of bulk materials, i.e. at least 55 gallon drum sizes or larger depending on system and manufacturer recommendations for treatment system operation. Building shall include a lockable, metal, overhead door access.

Coordination with Fort Drum Public Works may be required to locate and install appropriate utilities and piping necessary. Building utilities shall include a small, cast iron boiler system with glycol and unit heaters. An on-site septic system appropriately sized for anticipated use of plant operator and incidentals shall be installed. Lighting shall be installed adequate to meet needs of security and system operation, i.e. commercial grade, moisture, and break resistant. Interior lighting level shall be uniform and shall be at least 10-foot candles, ceiling mounted controlled by wall switch. Lighting shall include consideration of exterior motion detection lighting or other exterior lighting as necessary to meet security requirements. All electrical work and material shall conform to the contract clauses and specifications and the current editions of all applicable codes, including UBC, NEC, NFPA, IES, NESC, Life Safety, and Military Handbook. Where differences appear, the strictest interpretation shall apply.

A gravel parking area shall be provided for up to 4 vehicles parking in the vicinity of the treatment plant. An access road shall be provided to water treatment plant off of Well Road (see map).

Requirements: References: *Recommended Standards for Water Works*, published by Health Research, Inc. and *Rural Water Supply*, published by NYS Department of Health shall in their entirety, be the basis on which all plans and specification for public water systems are approved by NYS (citation by NYSDOH Part 5, Subpart 5-1.22). *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (Public Law 107-188) and the *Safe Drinking Water Act*. All work shall be accomplished to ensure compliance with NYSDOH requirements for operating public water drinking water systems. Additional reference information can be found on the American Water Works Association website as well other public drinking water supply sources.

Site/Security Controls: Construction shall be performed to meet current security standards for protection of public drinking water systems. Includes such items as (but not limited to) windows covered with metal security mesh, and doors of commercial grade with metal frame construction, one-sided lock, and push bar for release. Also includes consideration for fencing at least 10' high with barbed wire on top with access gate and consideration for appropriate fencing placement to prevent access from climbing over. Fencing shall also be secure to the ground to prevent access underneath. Gate access shall be incorporated to allow access for delivery vehicles.

Additional site and security controls shall include a Monaco fire alarm transmitter (Monaco mode BT27 or BT28, compatible with the Monaco model D700 plus), the Trane Tracer 100 or Trane Summit facility control system or equal, and the Advantor intrusion detection system, Model AVR plus bas-c or equal.

Site Restoration: Work shall include all materials, tools, and labor necessary to restore the site and piping/utility groundwork. All disturbed areas shall be covered and seeded in accordance with the Fort Drum standard recommendation for seeding sandy soils.

Map: Reference attached map for informational use only. Map indicates general references to roads, existing lines and structures, raw water lines (16 inch), general reference to proposed water tower and water treatment plant location, and basic, conceptual piping needs associated with water tower and plant (solid red lines on map).

Appendix A

ARCHITECTURAL THEME for ARIFIELD AREAS of FORT DRUM, NY

CHART # 1 - ARCHITECTURAL THEME for ALL FACILITIES in the MOUNTAIN VIEW and AIRFIELD AREAS of FROT DRUM, N.Y.

LAND USE/ ZONE PLAN	ZONE 1, 2 & 6	ZONE 3 & 4	ZONE 5 (See Gen Note No. 4 Below)	ZONE 5 (See Gen Note No. 5 Below)	ZONE 5		See revision # 6 below
FUNCTION TYPE	OPERATIONS AND MEDICAL FACILITIES	INDUSTRIAL BUILDINGS	COMMUNITY FACILITIES (Sloped roof)	COMMUNITY FACILITIES (Sloped roof)	COMMUNITY FACILITIES (Flat roof)	AIRFIELD BUILDINGS Maintenance Facilities	AIRFIELD BUILDINGS Barracks & HQ facilities
MATERIALS	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH
METAL ROOF Standing Seam Only	~~Glidden Paint Color~~ ~~No. 79-10 - Grey~~ Old Glidden no./~~name changed~~ to '30YY 22/059 ~~"Grey Tweed"~~ see revision ~~# 2 below~~	~~Glidden Paint Color~~ ~~No. 79-10 - Grey~~ Old Glidden no./~~name changed~~ to '30YY 22/059 ~~"Grey Tweed"~~ see revision ~~# 2 below~~	~~Glidden Paint Color~~ ~~No. 79-10 - Grey~~ Old Glidden no./~~name changed~~ to '30YY 22/059 ~~"Grey Tweed"~~ see revision ~~# 2 below~~ ~~Also see note (c) below~~	~~PPG DURANAR~~ Blue-Grey ~~No. 5MA94902~~	~~NOT APPLICABLE~~	~~PPG Musket Gray No. 665255 -~~ Metal roof & fascia/Trim Use Glidden 30YY 16/032 "Grey Hearth" in lieu of PPG color indicated see revision # 5 below **For accent strip use:** "Coloraid" Red Orange	Glidden Paint Color ~~No. 79-10 - Grey~~ Old Glidden no./name changed to '30YY 22/059 "Grey Tweed" see revision # 2 below
STANDARD BRICK	Glen-Gery ~~"Old Bridge"~~ No. C-107 ~~or approved~~ equal ~~see note (6) below~~	~~NOT APPLICABLE~~	Glen-Gery ~~"Old Bridge"~~ No. C-107 ~~or approved~~ equal ~~see note (6) below~~	Glen-Gery ~~"Old Bridge"~~ No. C-107 ~~or approved~~ equal ~~see note (6) below~~	~~NOT APPLICABLE~~	NOT APPLICABLE	Glen-Gery "Old Bridge" No. C-107 or approved equal see note (6) below
ACCENT BRICK	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	~~Glen-Gery Fall Gray "wire cut" (At designers discretion)~~	~~Glen-Gery Fall Gray "wire cut" (At designers discretion)~~	~~NOT APPLICABLE~~	NOT APPLICABLE	NOT APPLICABLE
METAL SIDING	~~NOT APPLICABLE~~	~~Benjamin Moore~~ ~~Color No. ET-28~~ Old no. ~~changed to 1222~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	Benjamin Moore ~~Color No. ET-28~~ Old no. changed to 1222	NOT APPLICABLE
LOUVERS & EXTERIOR CAULKING	~~Colors to match surrounding building materials~~	~~Colors to match surrounding building materials~~	~~Colors to match surrounding building materials~~	~~Colors to match surrounding building materials~~	~~Colors to match surrounding building materials~~	Colors to match surrounding building materials	Colors to match surrounding building materials
WINDOW FRAMES	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden no./~~name changed~~ to 40YY 48/048 ~~"Grey Expectations" see revision # 4 below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden no./~~name changed~~ to 40YY 48/048 ~~"Grey Expectations" see revision # 4 below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden no./~~name changed~~ to 40YY 48/048 ~~"Grey Expectations" see revision # 4 below~~ ~~Also see note (c) below~~	~~PPG DURANAR~~ Blue-Grey ~~No. 5MA94902~~ or Dark Brown ~~or Bronze~~ ~~Also see note (d) below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden no./~~name changed~~ to 40YY 48/048 ~~"Grey Expectations" see revision # 4 below~~	Pratt & Lambert Sequoia Color No. RO202A	Glidden Paint Color ~~No. 79-31 Light Grey~~ Old Glidden no./name changed to 40YY 48/048 "Grey Expectations" see revision # 4 below
GLAZING	~~Clear~~	~~PPG Bronze tinted~~	~~PPG SOLEX~~ ~~Blue-Green Tint or Clear~~ ~~Also see note (e) below~~	~~PPG SOLEX~~ ~~Blue-Green Tint or Clear~~ ~~Also see note (e) below~~	~~PPG SOLEX~~ ~~Blue-Green Tint~~	Clear	Clear

FOR THE NYARNG MATES FACILITY ONLY

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CHART # 1 - ARCHITECTURAL THEME for ALL FACILITIES in the MOUNTAIN VIEW and AIRFIELD AREAS of FROT DRUM, N.Y.

LAND USE/ ZONE PLAN	ZONE 1, 2 & 6	ZONE 3 & 4	ZONE 5 (See Gen Note No. 4 Below)	ZONE 5 (See Gen Note No. 5 Below)	ZONE 5		See revision # 6 below
FUNCTION TYPE	OPERATIONS AND MEDICAL FACILITIES	INDUSTRIAL BUILDINGS	COMMUNITY FACILITIES (Sloped roof)	COMMUNITY FACILITIES (Sloped roof)	COMMUNITY FACILITIES (Flat roof)	AIRFIELD BUILDINGS Maintenance Facilities	AIRFIELD BUILDINGS Barracks & HQ facilities
MATERIALS	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH
MANDOORS AND FRAMES	~~Glidden Paint Color~~ ~~# 79-11 Dark Gray (Rev 3) or~~ ~~#79-31 Light Gray (Rev 4)~~ Old Glidden ~~nos./names~~ changed to ~~30YY 16/032 "Grey~~ Hearth" and ~~or to 40YY 48/048~~ "Grey Expectations" ~~see revision~~ ~~# 3 & 4 below~~ ~~Also see note (a) below~~	~~Glidden Paint Color~~ ~~No. 79-11 Dark Grey~~ Old Glidden ~~no./name changed~~ to 30YY 16/032 ~~"Grey Hearth"~~ see revision ~~# 3 below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden ~~no./name changed~~ to 40YY ~~48/048 "Grey~~ Expectations" ~~see revision # 4~~ ~~below~~ ~~Also see note (c) below~~	~~PPG DURANAR~~ Blue-Grey ~~No. 5MA94902~~ or Dark ~~Brown or Bronze~~ ~~Also see note (d) below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden ~~no./name changed~~ to 40YY ~~48/048 "Grey~~ Expectations" ~~see revision # 4~~ ~~below~~	Pratt & Lambert Sequoia Color No. RO202A	Glidden Paint Color ~~# 79-11 Dark Gray (Rev 3) or~~ ~~#79-31 Light Gray (Rev 4)~~ Old Glidden nos./names changed to 30YY 16/032 "Grey Hearth" and or to 40YY 48/048 "Grey Expectations" see revision # 3 & 4 below **Also see note (a) below**
ALUMINUM STOREFRONT	~~Glidden Paint Color~~ ~~# 79-11 Dark Gray (Rev 3) or~~ ~~#79-31 Light Gray (Rev 4)~~ Old Glidden ~~nos./names~~ changed to ~~30YY 16/032 "Grey~~ Hearth" and ~~or to 40YY 48/048~~ "Grey Expectations" ~~see revision~~ ~~# 3 & 4 below~~ ~~Also see note (a) below~~	~~Glidden Paint Color~~ ~~No. 79-11 Dark Grey~~ Old Glidden ~~no./name changed~~ to 30YY 16/032 ~~"Grey Hearth"~~ see revision ~~# 3 below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden ~~no./name changed~~ to 40YY ~~48/048 "Grey~~ Expectations" ~~see revision # 4~~ ~~below~~ ~~Also see note (c) below~~	~~PPG DURANAR~~ Blue-Grey ~~No. 5MA94902~~ or Dark ~~Brown or Bronze~~ ~~Also see note (d) below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden ~~no./name changed~~ to 40YY ~~48/048 "Grey~~ Expectations" ~~see revision # 4~~ ~~below~~	Pratt & Lambert Sequoia Color No. RO202A	Glidden Paint Color ~~# 79-11 Dark Gray (Rev 3) or~~ ~~#79-31 Light Gray (Rev 4)~~ Old Glidden nos./names changed to 30YY 16/032 "Grey Hearth" and or to 40YY 48/048 "Grey Expectations" see revision # 3 & 4 below **Also see note (a) below**
OVERHEAD DOORS AND FRAMES	~~Glidden Paint Color~~ ~~# 79-11 Dark Gray (Rev 3) or~~ ~~#79-31 Light Gray (Rev 4)~~ Old Glidden ~~nos./names~~ changed ~~to 30YY 16/032 "Grey~~ Hearth" and ~~or to 40YY 48/048~~ "Grey Expectations" ~~see revision~~ ~~# 3 & 4 below~~ ~~Also see note (a) below~~	~~Pratt & Lambert~~ ~~Sequoia Color No. RO202A~~	~~Glidden Paint~~ ~~No. 79-31 Light Grey~~ Old Glidden ~~no./name changed~~ to 40YY ~~48/048 "Grey~~ Expectations" ~~see revision # 4~~ ~~below~~ ~~Also see note (c) below~~	~~PPG DURANAR~~ Blue-Grey ~~No. 5MA94902~~ or Dark ~~Brown or Bronze~~ ~~Also see note (d) below~~	~~Glidden Paint Color~~ ~~No. 79-31 Light Grey~~ Old Glidden ~~no./name changed~~ to 40YY ~~48/048 "Grey~~ Expectations" ~~see revision # 4~~ ~~below~~	Pratt & Lambert Sequoia Color No. RO202A	Glidden Paint Color ~~# 79-11 Dark Gray (Rev 3) or~~ ~~#79-31 Light Gray (Rev 4)~~ Old Glidden nos./names changed to 30YY 16/032 "Grey Hearth" and or to 40YY 48/048 "Grey Expectations" see revision # 3 & 4 below **Also see note (a) below**

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CHART # 1 - ARCHITECTURAL THEME for ALL FACILITIES in the MOUNTAIN VIEW and AIRFIELD AREAS of FROT DRUM, N.Y.

LAND USE/ ZONE PLAN	ZONE 1, 2 & 6	ZONE 3 & 4	ZONE 5 (See Gen Note No. 4 Below)	ZONE 5 (See Gen Note No. 5 Below)	ZONE 5		See revision # 6 below
FUNCTION TYPE	OPERATIONS AND MEDICAL FACILITIES	INDUSTRIAL BUILDINGS	COMMUNITY FACILITIES (Sloped roof)	COMMUNITY FACILITIES (Sloped roof)	COMMUNITY FACILITIES (Flat roof)	AIRFIELD BUILDINGS Maintenance Facilities	AIRFIELD BUILDINGS Barracks & HQ facilities
MATERIALS	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH
SPLIT FACE BLOCK	~~Natural Gray No. 110 Adams Concrete Products of Durham, North Carolina~~	~~Natural Gray No. 110 Adams Concrete Products of Durham, North Carolina~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	~~Cossit Concrete Products Color R-15 from Hamilton, NY~~	Natural Gray No. 110 Adams Concrete Products of Durham, North Carolina	Natural Gray No. 110 Adams Concrete Products of Durham, North Carolina
SMOOTH FACE BLOCK	~~NOT APPLICABLE~~	~~Natural Gray No. 110 Adams Concrete Products of Durham, North Carolina~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	NOT APPLICABLE	NOT APPLICABLE
MORTAR AND CONTROL JOINTS	~~Warm gray color for both brick & block. MEDUSA Group No. "Brikset"~~	~~Warm gray color: MEDUSA Group No. "Brikset"~~	~~Warm gray color: MEDUSA Group No. "Brikset"~~	~~Warm gray color: MEDUSA Group No. "Brikset"~~	~~Red Color: MEDUSA Group No.48B~~	Warm gray color for both brick & block. MEDUSA Group No. "Brikset"	Warm gray color for both brick & block. MEDUSA Group No. "Brikset"
PRECAST	~~Warm gray color produced with type I cement from Glens Falls, NY Also see note (b) below.~~	~~Warm gray color produced with type I cement from Glens Falls, NY Also see note (b) below.~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	~~NOT APPLICABLE~~	NOT APPLICABLE	Warm gray color produced with type I cement from Glens Falls, NY Also see note (b) below.

SEE PAGE NO. 4 FOR FOOTNOTES, GENERAL NOTES AND REVISIONS.

CHART # 1 - ARCHITECTURAL THEME for ALL FACILITIES in the MOUNTAIN VIEW and AIRFIELD AREAS of FROT DRUM, N.Y.

LAND USE/ ZONE PLAN	ZONE 1, 2 & 6	ZONE 3 & 4	ZONE 5 (See Gen Note No. 4 Below)	ZONE 5 (See Gen Note No. 5 Below)	ZONE 5		See revision # 6 below
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MATERIALS	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH	COLOR/FINISH

FOOTNOTES:
(a) - For Operations Facilities use Color 79-11 & for Medical Facilities use Color 79-31.
(b) - With Lightly Sandblasted Finish.
(c) - Color selected shall match for the Windows, Mandoors and Frames, Storefronts, and Overhead Doors & Frames.
(d) - This could be either Dark Brown Paint (Fed Std Color No. 20122) or Bronze Anodized Finish.
(e) - This is optional for aesthetic or safety reasons.

GENERAL NOTES :
(1) - ALL COLOR AND MATERIAL SELECTIONS SHALL BE APPROVED BY THE ARCHITECTURAL COMPLIANCE BOARD OF FORT DRUM. (AKA A.C.BOARD OR A.C.B.)
(2) - COLORS AND PATTERNS INDICATED ABOVE ARE FOR IDENTIFICATION PURPOSES AND PRODUCTS OF EQUAL COLOR AND PATTERN MAY BE SELECTED WITH A.C. BOARD APPROVAL.
(3) - ALL EXTERIOR SITE FINISHES SHALL BE IN HARMONY WITH THE OVERALL EXTERIOR BUILDING MATERIALS.
(4) - CONSTRUCTED FACILITIES THAT FALL INTO THIS CATEGORY ARE: Youth Activity Center, Religious Ed/Child Care.
(5) - CONSTRUCTED FACILITIES THAT FALL INTO THIS CATEGORY ARE: Shopping Center; Fire Station No. 1; Child Care; Credit Union; Car Wash.
(6) - "TIFFANY BLEND, (RANGE B)" BRICK AS MANUFACTURED BY GENERAL CLAY PRODUCTS, INC., SHALL BE CONSIDERED AS AN EQUAL.

REVISIONS: (Rev #)

Rev 1 - The latest Benjamin Moore color No. to match the old ET-28, is now No. 1222 .	Revised 25 Apr 96
Rev 2 - The latest Glidden Paint Color No. to match the old # 79-10 "Grey" is now No. 30YY 22/059 "Grey Tweed".	Revised 24 Aug 98
Rev 3 - The latest Glidden Paint Color No. to match the old # 79-11 "Dark Grey" is now No. 30YY 16/032 "Grey Hearth"	Revised 24 Aug 98
Rev 4 - The latest Glidden Paint Color No. to match the old # 79-31 "Light Grey" is now No. 40YY 48/048 "Grey Expectations"	Revised 24 Aug 98
Rev 5 - The Metal Roof color for Airfield facilities shall match Glidden Paint No. 30YY 16/032 "Grey Hearth"in lieu of PPG Musket Gray which has been dropped.	Revised 24 Mar 99
Rev 6 - This column was added for new Barracks and Headquarters facilities to be constructed at WSAAF for the Aviation Brigade and shall match theme of the Mountain View Operations & Medical Facilities.	Revised 25 Jan 02

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APPENDIX B
FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS

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NOTE TO DESIGNER: This document is a preliminary analysis used for concept development. It does not contain all requirements and does not relieve the designer of complete code and criteria review, compliance and documentation responsibilities during proposal preparation and final design development.

REFERENCES:
United Facilities Criteria (UFC) 1 -200-01, Design: General Building Requirements, 31 July 2002.
United Facilities Criteria (UFC) 3 -600-01, Design: Fire Protection Engineering for Facilities, 17 April 2003.
International Building Code (IBC), 2000 Edition.
NFPA 101, Life Safety Code, 2000 Edition.
NFPA 10, Standard for Portable Fire Extinguishers, 1998 Edition.

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FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
BARRACKS BUILDINGS

BUILDING DESCRIPTION:
Two (2) Separate Buildi ngs of Three (3) Stories, approximately 8072 Square Meters for each building.

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 310, Residential Group R
   Paragraph 310.1
   Group R-2 (Apartment Building)

2. Use or Occupancy
   NFPA 101
   Chapter 30 - New Apartment Buildings

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Single occupancy/None required

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accorda nce with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      16.8 Meters

   b. Height Modifications
      Group R-2
      Section 504 Height Modifications
      Paragraph 504.2 Automatic Sprinkler System Increase
      May increase height 6.1 meters and 1 story, but not to exceed four stories or 18.3 meters.

   c. Actual Building Height (as designed)
      18.3 Meters

   d. Number of Story Limitation
      Group R-2: Four (4)

   e. Actual Number of Stories (as designed)
      Group R-2: Four (4)

   f. Allowable Floor Area (per floor)
      Group R-2
      2229.7 Square Meters

g. Area Modifications
Group R-2
Section 506 Area Modifications
Paragraph 506.3 Automatic Sprinkler System Increase
A = 1486.4 + (1486.4 x 200÷100) = 4459.2 square meters per floor

h. Actual Floor Area (as designed)
Group R-2
8072.0 Square Meters (all floors)

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

Chapter 6 Special Occupancies and Hazards
Paragraph 6-1.1: Complete automatic sprinkler protection must be provided for buildings that include personnel housing and lodging. NFPA 13 or NFPA 13R, Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, sprinkler systems are permitted when listed for the specific use.

NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.3.5.1: In buildings up to and including four stories in height, systems in accordance with NFPA 13R, shall be permitted.
Paragraph 30.3.5.2: All buildings shall be protected throughout by an approved, supervised automatic sprinkler system.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	

Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.3.6 Corridors
Paragraph 30.3.6.1: Walls. Exit access corridor walls shall consist of fire barriers in accordance with 8.2.3 that have not less than a 1 -hour fire resistance rating.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system in accordance with 30.3.5, corridor walls shall have not less than a ½-hour fire resistance rating.
Paragraph 30.3.6.2: Doors. Doors that open onto exit access corridors shall have not less than a 20-minute fire protection rating in accordance with 8.2.3.2.
Paragraph 30.3.6.3 Doors that open onto exit access corridors shall be self-closing and self-latching.

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group R

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.1, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accord ance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01

Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Residential Use/Apartment Buildings
18.6 square meters per person

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
8072.0 ÷ 18.6 = 434 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 30 - New Apartment Buildings
Paragraph 30.2.4
Number of Exits Required: Two (2)
Number of Exits Provided: Four (4)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group R-2
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: 434 x 0.8 = 347.2 cm
Level Components: 434 x 0.5 = 217 cm
Width of Egress Provided
Stairways: 120 x 3 = 360 cm (360 ÷ 0.8 = 450 persons)
Level Components: (85.5 x 2) + (171 x 2) = 513 cm (513 ÷ 0.5 = 1026 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 30 - New Apartment Buildings
Paragraph 30.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Common Paths of Travel
NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.2.5.2
Common paths of travel shall not exceed 10.7 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, common paths of travel shall not exceed 15.2 meters.

19. Dead-End Corridors
NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.2.5.3
Dead-end corridors shall not exceed 10.7 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

20. Travel Distance to Exits
NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.2.6.1
Travel distance within a dwelling unit (apartment) to a corridor door shall not exceed 22.9 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, the travel di stance shall not exceed 38.1 meters.
Paragraph 30.2.6.2
The travel distance from a dwelling unit (apartment) entrance door to the nearest exit shall not exceed 30.5 meters.
Exception No. 1: In buildings protected throughout by an approved, supervised aut omatic sprinkler system, the travel distance shall not exceed 61 meters.
Exception No. 2: Travel distance to exits shall not exceed 61 meters for exterior ways of exit access.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.2.9
Emergency lighting in accordance with Section 7.9 shall be provided in all buildings with more than twelve (12) dwelling units or more than three (3) stories in height.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporti ng system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, man ual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of

UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 30 - New Apartment Buildings
Paragraph 30.3.2
The areas described in Table 30.3.2.1 shall be protected as indicated. Where sprinkler protection without fire -rated separation is used, areas shall be separated from other spaces by smok e partitions complying with 8.2.4.
Table 30.3.2.1
Boiler and Fuel -fired heater rooms serving more than a single dwelling unit shall have separation/protection of 1 hour and sprinklers.

Bulk Laundries shall have separation/protection of 1 hour and sprinklers.

Laundries less than or equal to 9.3 square meters outside of dwelling units shall have separation/protection of 1 hour or sprinklers. Where sprinkles are provided, separation shall not be required.

Laundries greater than 9.3 square meters outside of dwelling units shall have a separation/protection of 1 hour and sprinklers.

Storage rooms outside of dwelling units shall have a separation/protection of 1 hour or sprinklers.

-- END OF BARRACKS BUILDING --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
HANGER COF (BUILDING 2060)

BUILDING DESCRIPTION:
Two (2) Story Building Addition, Approximately 2203 Square Meters

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 304, Business Group B
   Paragraph 304.1
   Group B (Hanger Company Operations Facility)
   Section 311, Storage Group S
   Paragraph 311.2
   Group S-1 Moderate Hazard Storage (Aircraft Hanger)

2. Use or Occupancy
   NFPA 101
   Chapter 38 - New Business Occupancies
   Chapter 42 - Storage Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Mixed Occupancy/Three (3) Hour separation required between Group B and Group S-1 occupancies.

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accor dance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      19.8 Meters

   b. Actual Building Height (as designed)
      8.95 Meters

   c. Number of Story Limitation
      Group B: Four (4)
      Group S-1: Three (3)

   d. Actual Number of Stories (as designed)
      Group B: Two (2)
      Group S-1 One (1)

   e. Allowable Floor Area (per floor)
      Group B

2136.8 Square Meters
Group S-1
1625.8 Square Meters

f. Area Modifications
Section 506 Area Modifications
Paragraph 506.3 Automatic Sprinkler System Increase
Group B
A = 2136.8 + (2136.8 x 200÷100) = 6410.4 square meters per floor
Existing Building = 1898.6 square meters
2202.8 (Additions) + 1898.6 (Existing) = 4101.4 square meters
Group S-1
Existing Hanger Building = 3577.5 Square Meters
No changes to Existing Hanger Building required.

g. Actual Floor Area (as designed)
Group B
4101.4 Square Meters (all floors)

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkl er Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Hanger Company Operations Facility shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In bu ildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear r ooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	

Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Business Use
9.3 square meters per person
Group S-1
Not Applicable

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
4101.4 ÷ 9.3 = 441 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Five (5)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: 441 x 0.8 = 352.8 cm
Level Components: 441 x 0.5 = 220.5 cm
Width of Egress Provided
Stairways: 111.8 x 4 = 447.2 cm (447.2 ÷ 0.8 = 559 persons)
Level Components: 85.5 x 5 = 427.5 cm (427.5 ÷ 0.5 = 855 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridor
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.

Exception: Travel distance shall not exceed 91.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Paragraph 38.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A f ire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with bat tery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1 - hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire -resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF HANGER COF (BUILDING 2060) --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
HANGER COF (BUILDING 2072)

BUILDING DESCRIPTION:
Two (2) Story Building Addition, Approximately 1606 Square Meters

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 304, Business Group B
   Paragraph 304.1
   Group B (Hanger Company Operations Facility)
   Section 311, Storage Group S
   Paragraph 311.2
   Group S-1 Moderate Hazard Storage (Aircraft Hanger)

2. Use or Occupancy
   NFPA 101
   Chapter 38 - New Business Occupancies
   Chapter 42 - Storage Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Mixed Occupancy/Three (3) Hour separation required between Group B and Group S-1 occupancies.

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      19.8 Meters

   b. Actual Building Height (as designed)
      8.95 Meters

   c. Number of Story Limitation
      Group B: Four (4)
      Group S-1: Three (3)

   d. Actual Number of Stories (as designed)
      Group B: Two (2)
      Group S-1: One (1)

   e. Allowable Floor Area (per floor)
      Group B
      2136.8 Square Meters

Group S-1
1625.80 Square Meters

f. Area Modifications
Section 506 Area Modifications
Paragraph 506.3 Automatic Sprinkler System Increase
Group B
A = 2136.8 + (2136.8 x 200÷100) = 6410.4 square meters per floor
Existing Building = 1301.0 square meters
1606.0 (Additions) + 1301.0 (Existing) = 2907.00 square meters
Group S-1
Existing Hanger Building = 2934.5 Square Meters
No changes to Existing Hanger Building required.

g. Actual Floor Area (as designed)
Group B
2907.00 Square Meters (all floors)

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Hanger Company Operations Facility shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone roo ms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602

Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum a rea of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Business Use
9.3 square meters per person
Group S-1
Not Applicable

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
2907.00 ÷ 9.3 = 313 Persons

15. Number of Means of Egress

NFPA 101
Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Three (3)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: 313 x 0.8 = 250.4 cm
Level Components: 313 x 0.5 = 156.5
Width of Egress Provided
Stairways: 111.8 x 4 = 447.2 cm (447.2 ÷ 0.8 = 559 persons)
Level Components: (85.5 x 2) + (171) = 342 cm (342 ÷ 0.5 = 684 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridor
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected th roughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.

Exception: Travel distance shall not exceed 9 1.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Paragraph 38.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuat ion of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordan ce with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The sys tem shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1 - hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire -resistive separati on, the space protected shall be enclosed with smoke partitions.

-- END OF HANGER COF (BUILDING 2072) --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
HANGER COF (BUILDING 2074)

BUILDING DESCRIPTION:
Two (2) Story Building Addition, Approximately 960 Square Meters

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 304, Business Group B
   Paragraph 304.1
   Group B (Hanger Company Operations Facility)
   Section 311, Storage Group S
   Paragraph 311.2
   Group S-1 Moderate Hazard Storage (Aircraft Hanger)

2. Use or Occupancy
   NFPA 101
   Chapter 38 - New Business Occupancies
   Chapter 42 - Storage Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Mixed Occupancy/Three (3) Hour separation required between Group B and Group S-1 occupancies.

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      19.8 Meters

   b. Actual Building Height (as designed)
      8.95 Meters

   c. Number of Story Limitation
      Group B: Five (5)
      Group S-1: Three (3)

   d. Actual Number of Stories (as designed)
      Group B: Two (2)
      Group S-1: One (1)

   e. Allowable Floor Area (per floor)
      Group B
      2136.8 Square Meters
      Group S-1

1625.8 Square Meters

f. Area Modifications
Section 506 Area Modifications
Paragraph 506.3 Automatic Sprinkler System Increase
Group B
A = 2136.8 + (2136.8 x 200÷100) = 6410.4 square meters per floor
Existing Building = 1149.18 square meters
960.4 (Additions) + 1149.2 (Existing) = 2109.6 square meters
Group S-1
Existing Hanger Building = 1773.0 Square Meters
No changes to Existing Hanger Building required.

g. Actual Floor Area (as designed)
Group B
2109.6 Square Meters (all floors)

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Hanger Company Operations Facility shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of t he building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provid ed in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602

Floor Construction Including supporting beams and joists	0 Hr
Roof Construction Including supporting beams and joists	0 Hr

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥1.5, < 3.0	1 Hr
≥3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Business Use
9.3 square meters per person
Group S-1
Not Applicable

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
2109.6 ÷ 9.3 = 227 Persons

15. Number of Means of Egress
NFPA 101

Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Two (2)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum width of Egress Required
Stairways: 227 x 0.8 = 181.6 cm
Level Components: 227 x 0.5 = 113.5
Width of Egress Provided
Stairways: 111.8 x 4 = 447.2 cm (447.2 ÷ 0.8 = 559 persons)
Level Components: 85.5 x 2 = 171 cm (171 ÷ 0.5 = 342 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit path s in all buildings requiring more than one exit.

18. Dead-End Corridor
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughout by an approved, supervise d automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.

Exception: Travel distance shall not exceed 91.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Paragraph 38.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1 - hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire -resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF HANGER COF (BUILDING 2074) --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
HHC BDE COMPANY OPERATIONS FACILITY

BUILDING DESCRIPTION:
One (1) Story Building, Approximately 965 Square Meters

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 304, Business Group B
   Paragraph 304.1
   Group B (HHC BDE Company Operations Facility)

2. Use or Occupancy
   NFPA 101
   Chapter 38 - New Business Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Single occupancy/None required

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy sh all be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      19.8 Meters

   b. Actual Building Height (as designed)
      8.6 Meters

   c. Number of Story Limitation
      Group B: Four (4)

   d. Actual Number of Stories (as designed)
      Group B: One (1)

   e. Allowable Floor Area (per floor)
      Group B
      2136.8 Square Meters

   f. Area Modifications
      Section 506 Area Modifications
      Group B
      None Required

   g. Actual Floor Area (as designed)
      Group B

964.6 Square Meters

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Company Operations Facility (BDE) shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr

≥ 9.1 0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Business Use
9.3 square feet per person

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 1003.2.2
965 ÷ 9.3 = 104 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Two (2)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Egress Width per Occupant Served
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm

Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 104 x 0.5 = 52 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: 85.5 x 2 = 171 cm (171 ÷ 0.5 = 342 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marki ng the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridors
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughou t by an approved, supervised automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.
Exception: Travel distance shall not exceed 91.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 38 - New Business Occupancies

Paragraph 38.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alar m/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery bac k up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation, to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1 - hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire -resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF HHC BDE COMPANY OPERATIONS FACILITY --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
1/10, 2/10, 3/17 & A-TROUP HHC COMPANY OPERATIONS FACILITY

BUILDING DESCRIPTION:
One (1) Story Building, Approximately 1595 Square Meters

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 304, Business Group B
   Paragraph 304.1
   Group B (1/10, 2/10, 3/17 & A-Troup HHC Company Operations Facility)

2. Use or Occupancy
   NFPA 101
   Chapter 38 - New Business Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Single occupancy/None required

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the port ion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      9.18 Meters

   b. Actual Building Height (as designed)
      7.2 Meters

   c. Number of Story Limitation
      Group B: Four (4)

   d. Actual Number of Stories (as designed)
      Group B: One (1)

   e. Allowable Floor Area (per floor)
      Group B
      2136.8 Square Meters

   f. Area Modifications
      Section 506 Area Modifications
      Group B
      None Required

   g. Actual Floor Area (as designed)
      Group B

1595.3 Square Meters

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprink ler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Company Operations Facility (1/10 & 2/10 HHC) shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Cov erage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr

≥ 9.1 0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permi tted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assem blies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Business Use
9.3 square meters per person

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
1595.3 ÷ 9.3 = 172 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, stor y, or portion thereof shall not be less than two (2).
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Four (4)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required

Stairways: Not Applicable
Level Components: 172 x 0.5 = 86 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: 171 x 4 = 684 cm (684 ÷ 0.5 = 1368 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridors
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.
Exception: Travel distance shall not exceed 91.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.9

Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1-hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire-resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF 1/10, 2/10, 3/17 & A-TROUP HHC COMPANY OPERATIONS FACILITY --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
TROOP AID STATION

BUILDING DESCRIPTION:
One (1) Story Building, Approximately 721 Square Meters

1. Use and Occupancy Classification
   IBC, Chapter 3
   Section 304, Business Group B
   Paragraph 304.1
   Group B (Troop Aid Station)

2. Use or Occupancy
   NFPA 101
   Chapter 38 - New Business Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Single occupancy/None required

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      9.18 Meters

   b. Actual Building Height (as designed)
      7.1 Meters

   c. Number of Story Limitation
      Group B: Four (4)

   d. Actual Number of Stories (as designed)
      Group B: One (1)

   e. Allowable Floor Area (per floor)
      Group B
      2136.77 Square Meters

   f. Area Modifications
      Section 506 Area Modifications
      Group B
      None Required

   g. Actual Floor Area (as designed)
      Group B

721.3 Square Meters

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler p rotection must be provided in all new and renovated DOD facilities.
Exception: Non-mission essential buildings of Type I or II construction less than 1394 square meters gross floor area

NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Port able fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enc losure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Business Use
9.3 square meters per person

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
721.3 ÷ 9.3 = 78 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Three (3)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group B
Stairways (width per person): 0.8 cm
Level Components (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 78 x 0.5 = 39 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: (2 x 171) + 85.5 = 427.5 cm (427.5 ÷ 0.5 = 855 persons)

17. Marking of Means of Egress

NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit pat hs in all buildings requiring more than one exit.

18. Dead-End Corridors
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughout by an approved, supervi sed automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path o f travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.
Exception: Travel distance shall not exceed 91.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.2.9
Furnish self -contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems

A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull station s, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:

1. Enclose the area with a fire barrier without windows that has a 1 - hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire -resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF TROOP AID STATION --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
DINING FACILITY

BUILDING DESCRIPTION:
One (1) Story Building, Approximately 2080 Square Meters

1. Use or Occupancy Classification
   IBC, Chapter 3
   Section 303, Assembly Group A
   Paragraph 303.1
   Group A-2 (Dining Areas)
   Section 306, Factory Group F
   Paragraph 306.2
   Group F-1 Factory Industrial Moderate-Hazard (Kitchen Areas)

2. Use or Occupancy
   NFPA 101
   Chapter 12 - New Assembly Occupancies
   Chapter 40 - Industrial Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Mixed Occupancy/Three (3) Hour separation required between Group A-2 and Group F-1 occupancies.
   Footnote h: Commercial kitchens need not be separated from the restaurant seating areas that they serve.

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      16.8 Meters

   b. Actual Building Height (as designed)
      10.4 Meters

   c. Number of Story Limitation
      Group A-2: Two (2)
      Group F-1: Two (2)

   d. Actual Number of Stories (as designed)
      Group A-2: One (1)
      Group F-1: One (1)

   e. Allowable Floor Area (per floor)
      Group A-2

882.6 Square Meters
Group F-1
1440.0 Square Meters

f. Area Modifications
Section 506 Area Modifications
Group A-2
None Required
Group F-1
None Required

g. Actual Floor Area (as designed)
Group A-2: 692.9
Group F-1: 1386.7
Total: 2079.6 Square Meters

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Dining Facility shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.3.5: Buildings containing assembly occupancies with occupant loads of more than 300 shall be protected by an approved, supervised automatic sprinkler system.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602

Floor Construction Including supporting beams and joists	0 Hr
Roof Construction Including supporting beams and joists	0 Hr

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3
Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Assembly Use
Less concentrated use, without fixed seating: 1.4 net square meters per person
Group F-1
Not Applicable

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
Group A-2
692.9 ÷ 1.4 = 495 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.4
Number of Exits Required: Two (2)
Number of Exits Provided: Two (2)
Chapter 40 - Industrial Occupancies
Paragraph 40.2.4
Number of Exits Required: Two (2)
Number of Exits Provided: Two (2)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group A-2
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 495 x 0.5 = 247.5 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: 171 x 2 = 342 cm (342 ÷ 0.5 = 684 persons)
Group F-1
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: Not Applicable
Width of Egress Provided
Stairways: Not Applicable
Level Components: 171 x 2 = 342 cm (342 ÷ 0.5 = 684 persons)

17. Marking of Means of Egress
NFPA 101
Chapter 7 - Means of Egress
Section 7.10
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.10
Chapter 40 - Industrial Occupancies
Paragraph 40.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridors
NFPA 101
Chapter 12 - New Assembly Occupancies
Chapter 7 - Means of Egress
Paragraph 7.5.1.6
Exit access shall be arrange d so that there shall are no dead ends in corridors.
Chapter 40 - Industrial Occupancies

Paragraph 40.2.5.2
Dead-end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.5.1
Exits shall be located remotely from each other and shall be arranged to minimize the possibility that they might be blocked by an emergency.
Exception: A common path of travel shall be permitted for the first 6.1 meters from any point where serving any number of occupants and for the first 22.9 meters from any point where serving not more than 50 occupants.
Chapter 40 - Industrial Occupancies
Paragraph 40.2.5.3
Common paths of travel shall not exceed 15.2 meters.
Exception: In buildings protected throughout b y an approved, supervised automatic sprinkler system, common path of travel shall not exceed 30.5 meters.

20. Travel Distance to Exits
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.6
Travel distance to exits shall not exceed 45.7 meters.
Exception: Travel distance shall not exceed 61 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.
Chapter 40 - Industrial Occupancies
Paragraph 40.2.6
Travel distance to exits shall not exceed 61 meters.
Exception: Travel distance shall not exceed 76.2 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher
NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.9
Emergency lighting shall be provided in accordance with Section 7.9.
Chapter 40 - Industrial Occupancies
Paragraph 40.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems

UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards

NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.3.2
Subparagraph 12.3.2.1.3
Rooms or spaces for the storage, processing or use of materials in the following list shall be protected in accordance with the following:

(1) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour or protection of such rooms by automatic extinguishing systems in the following areas:
   a. Boiler and furnace rooms

Exception: The requirement of (1) above shall not apply to rooms enclosing furnaces, heating and air -handling equipment, or compressor equipment with a total aggregate input rating less than 200,000 Btu. Such rooms shal l not be used for storage unless otherwise protected as required.

   b. Rooms or spaces used for the storage of combustible supplies in quantities deemed hazardous by the authority having jurisdiction.
   c. Rooms or spaces used for the storage of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

(2) Separation from the remainder of the building by fire barriers having a fire resistance rating of not less than 1 hour and protection of such rooms by automatic extinguishing systems in the following areas:
   a. Laundries
   b. Maintenance shops, including woodworking and painting areas.
   c. Rooms or spaces used for processing or use of combustible supplies deemed hazardous by the authority having jurisdiction.
   d. Rooms or spaces used for processing or use of hazardous materials or flammable or combustible liquids in quantities deemed hazardous by recognized standards.

-- END OF DINING FACILITY --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
BRIGADE HEADQUARTERS (BDE)

BUILDING DESCRIPTION:
One (1) Story Building, Approximately 1186 Square Meters

1. Use or Occupancy Classification
   IBC, Chapter 3
   Section 303, Assembly Group A
   Paragraph 303.1
   Group A-3 (Classrooms)
   Section 304, Business Group B
   Paragraph 304.1
   Group B (Offices)

2. Use or Occupancy
   NFPA 101
   Chapter 12 - New Assembly Occupancies
   Chapter 38 - New Business Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Mixed Occupancy/Two (2) Hour separation required between Group A-3 and Group B occupancies.

3a. Nonseparated Uses
   IBC, Chapter 3
   Paragraph 302.3.2
   Each portion of the building shall be individually classified as to use. The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction shall apply to the entire building. The other requirements shall apply to ea ch portion of the building based on the use of that space except that the most restrictive applicable fire -protection system requirements shall apply to these nonseparated uses. Fire separations are not required between uses, except as required by other provisions.

4. Incidental Use Areas
   IBC, Chapter 3
   Section 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classified in accordance with the main occupancy of the por tion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      16.8 Meters

   b. Actual Building Height (as designed)
      7.3 Meters

c. Number of Story Limitation
Group A-3: Two (2)
Group B: Four (4)

d. Actual Number of Stories (as designed)
Group A-3: One (1)
Group B: One (1)

e. Allowable Floor Area (per floor)
Group A-3
882.58 Square Meters
Group B
2136.77 Square Meters

f. Area Modifications
Section 506 Area Modifications
Group A-3
None Required
Group B
None Required

g. Actual Floor Area (as designed)
Group A-3: 149.7
Group B: 1036.7
Total: 1186.4 Square Meters

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be provided in all new and renovated DOD facilities. The Brigade Headquarters Building (BDE) shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provide coverage throughout 100 percent of the bui lding except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accord ance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.3.5: Buildings containing assembly occupancies with oc cupant loads of more than 300 shall be protected by an approved, supervised automatic sprinkler system.
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3

Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Assembly Use
Concentrated use, without fixed seating: 0.65 net square meters per person
Business Use
9.3 square meters per person

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
Assembly Use
149.7 ÷ 0.65 = 229 Persons
Group B
1036.7 ÷ 9.3 = 112 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzanine, story, or portion thereof shall not be less than two (2).
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.4
Number of Exits Required: Two (2)
Number of Exits Provided: Two (4)
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Three (3)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group A-3
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 229 x 0.5 = 115 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: 85.5 x 4 = 342 cm (342 ÷ 0.5 = 684 persons)
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 112 x 0.5 = 56 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: (85.5 x 2) + 171 = 342 cm (342 ÷ 0.5 = 684 persons)

17. Marking of Means of Egress
NFPA 101

Chapter 7 - Means of Egress
Section 7.10
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridors
NFPA 101
Chapter 12 - New Assembly Occupancies
Chapter 7 - Means of Egress
Paragraph 7.5.1.6
Exit access shall be arranged so that there shall are no dead ends in corridors.
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings p rotected throughout by an approved, supervised automatic sprinkler system, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.5.1
Exits shall be located remotely fro m each other and shall be arranged to minimize the possibility that they might be blocked by an emergency.
Exception: A common path of travel shall be permitted for the first 6.1 meters from any point where serving any number of occupants and for the first 22.9 meters from any point where serving not more than 50 occupants.

Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.6
Travel distance to exits shall not exceed 45.7 meters.
Exception: T ravel distance shall not exceed 61 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.
Exception: Travel distance shall not exceed 91.4 meters in buildings protected throughout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher

NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.9
Emergency lighting shall be provided in accordance with Section 7.9.
Chapter 38 - New Business Occupancies
Paragraph 38.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops tha t include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1 - hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire -resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF BRIGADE HEADQUARTERS (BDE) --

FIRE PROTECTION ANALYSIS/LIFE SAFETY CODE ANALYSIS
BATTALION HEADQUARTERS

BUILDING DESCRIPTION:
One (1) Story Building, Approximately 1262 Square Meters

1. Use or Occupancy Classification
   IBC, Chapter 3
   Section 303, Assembly Group A
   Paragraph 303.1
   Group A-3 (Classrooms)
   Section 304, Business Group B
   Paragraph 304.1
   Group B (Offices)

2. Use or Occupancy
   NFPA 101
   Chapter 12 - New Assembly Occupancies
   Chapter 38 - New Business Occupancies

3. Occupancy Separation
   IBC, Chapter 3
   Table 302.3.3
   Mixed Occupancy/Two (2) Hour separation required between Group A-3 and Group B occupancies.

3a. Nonseparated Uses
   IBC, Chapter 3
   Paragraph 302.3.2
   Each portion of the building shall be individually classified as to use . The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction shall apply to the entire buil ding. The other requirements shall apply to each portion of the building based on the use of that space except that the most restrictive applicable fire -protection system requirements shall apply to these nonseparated uses. Fire separations are not required between uses, except as required by other provisions.

4. Incidental Use Areas
   IBC, Chapter 3
   Paragraph 302.1.1
   Areas that are incidental to the main occupancy shall be separated and protected in accordance with Table 302.1.1 and shall be classifie d in accordance with the main occupancy of the portion of the building in which the incidental use is located.

5. General Building Heights and Areas
   IBC, Chapter 5
   Table 503

   a. Building Height Limitation (above grade)
      16.8 Meters

   b. Actual Building Height (as designed)
      7.3 Meters

c. Number of Story Limitation
Group A-3: Two (2)
Group B: Four (4)

d. Actual Number of Stories (as designed)
Group A-3: One (1)
Group B: One (1)

e. Allowable Floor Area (per floor)
Group A-3
882.58 Square Meters
Group B
2136.77 Square Meters

f. Area Modifications
Section 506 Area Modifications
Group A-3
None Required
Group B
None Required

g. Actual Floor Area (as designed)
Group A-3: 192.6
Group B: 1069.7
Total: 1262.3 Square Meters

6. Type of Construction
IBC, Chapter 6
Section 602.2
Type II-B Buildings

7. Automatic Sprinkler System
UFC 3-600-01
Chapter 4 Fire Extinguishing Systems
Paragraph 4 -2.2: Automatic Sprinkler Systems. Complete automatic sprinkler protection must be pr ovided in all new and renovated DOD facilities. The Battalion Headquarters Building shall be provided with a complete automatic sprinkler system.

Paragraph 4 -2.3.5: Sprinkler Coverage. In buildings protected by automatic sprinklers, sprinklers must provid e coverage throughout 100 percent of the building except as permitted by NFPA 13. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler must be in accordance with NFPA 13, except that it must not exceed 20.9 square meters for light hazard occupancies or 12.1 square meters for ordinary hazard.

NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.3.5: Buildings containing assembly occupancies with occupant loads of more than 300 shall be protected by an approved, supervised automatic sprinkler system.
Chapter 38 - New Business Occupancies
Paragraph 38.3.5: Portable fire extinguishers shall be provided in every business occupancy.

8. Fire-Resistance Rating Requirements for Building Elements
IBC, Chapter 6
Table 601
Type II-B Buildings

Structural Frame:	0 Hr
Including columns, girders and trusses	
Bearing Walls:	
Exterior	0 Hr
Interior	0 Hr
Nonbearing Walls and partitions:	
Exterior	Table 602
Interior	Section 602
Floor Construction	0 Hr
Including supporting beams and joists	
Roof Construction	0 Hr
Including supporting beams and joists	

9. Fire-Resistance Rating Requirements for Exterior Walls Based on Fire Separation Distance
IBC, Chapter 6
Table 602
Construction Type II-B
Group B

Fire Separation Distance (meters)	Fire-Resistance Rating
< 1.5	1 Hr
≥ 1.5, < 3.0	1 Hr
≥ 3.0, < 9.1	0 Hr
≥ 9.1	0 Hr

10. Allowable Area of Openings (Exterior Walls)
IBC, Chapter 7
Section 704.8
The maximum area of protected and unprotected openings permitted in an exterior wall in any story shall not exceed the values set forth in Table 704.8.

11. Shaft Enclosures
IBC, Chapter 7
Section 707, Paragraph 707.1
All openings or penetrations in floor/ceiling or roof/ceiling assemblies shall be required to be protected with a vertical shaft enclosure, except as allowed by exceptions listed in Paragraph 707.2.

12. Opening Protectives
IBC, Chapter 7
Section 714
Fire door, fire shutter and fire -protection-rated-glazing opening protection assemblies' fire -protection ratings shall be in accordance with Table 714.2.

13. Capacity of Means of Egress
UFC 3-600-01
Paragraph 2-1.1
NFPA 101
Chapter 7, Section 7.3

Paragraph 7.3.1 Occupant Load
Table 7.3.1.2 Occupant Load Factor
Assembly Use
Concentrated use, without fixed seating: 0.65 net square meters per person
Business Use
9.3 square meters per person

14. Occupant Load
NFPA 101
Chapter 7, Paragraph 7.3.1.2
Group A-3
192.6 ÷ 0.65 = 296 Persons
Group B
1069.7 ÷ 9.3 = 115 Persons

15. Number of Means of Egress
NFPA 101
Chapter 7 Means of Egress
Paragraph 7.4.1.1
The number of means of egress from any balcony, mezzan ine, story, or portion thereof shall not be less than two (2).
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.4
Number of Exits Required: Two (2)
Number of Exits Provided: Two (4)
Chapter 38 - New Business Occupancies
Paragraph 38.2.4.2
Number of Exits Required: Two (2)
Number of Exits Provided: Three (3)

16. Egress Width
NFPA 101, Chapter 7
Paragraph 7.3.3 Egress Capacity
Table 7.3.3.1 Capacity Factors
Group A-3
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 296 x 0.5 = 148 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: 85.5 x 4 = 342 cm (342 ÷ 0.5 = 684 persons)
Group B
Stairways (width per person): 0.8 cm
Level Components and Ramps (width per person): 0.5 cm
Minimum Width of Egress Required
Stairways: Not Applicable
Level Components: 115 x 0.5 = 57.5 cm
Width of Egress Provided
Stairways: Not Applicable
Level Components: (85.5 x 2) + 171 = 342 cm (342 ÷ 0.5 = 684 persons)

17. Marking of Means of Egress
NFPA 101

Chapter 7 - Means of Egress
Section 7.10
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.10
Chapter 38 - New Business Occupancies
Paragraph 38.2.10
Means of egress shall have signs for marking the exits and exit paths in all buildings requiring more than one exit.

18. Dead-End Corridors
NFPA 101
Chapter 12 - New Assembly Occupancies
Chapter 7 - Means of Egress
Paragraph 7.5.1.6
Exit access shall be ar ranged so that there shall are no dead ends in corridors.
Chapter 38 - New Business Occupancies
Paragraph 38.2.5.2
Dead-end corridors shall not exceed 6.1 meters.
Exception: In buildings protected throughout by an approved, supervised automatic sprinkler s ystem, dead -end corridors shall not exceed 15.2 meters.

19. Common Paths of Travel
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.5.1
Exits shall be located remotely from each other and shall be arranged to minimize the possibility that they might be blocked by an emergency.
Exception: A common path of travel shall be permitted for the first 6.1 meters from any point where serving any number of occupants and for the first 22.9 meters from any point where serving not more than 50 occupants.

Chapter 38 - New Business Occupancies
Paragraph 38.2.5.3
Common paths of travel shall not exceed 22.9 meters.
Exception: A common path of travel shall be permitted for the first 30.5 meters in a building protected throughout by an approved, supervised automatic sprinkler system.

20. Travel Distance to Exits
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.6
Travel distance to exits shall not exceed 45.7 meters.
Exception: Travel distance shall not exceed 61 meters in buildings protected thr oughout by an approved, supervised automatic sprinkler system.
Chapter 38 - New Business Occupancies
Paragraph 38.2.6
Travel distance to exits shall not exceed 61 meters.
Exception: Travel distance shall not exceed 91.4 meters in buildings protected throug hout by an approved, supervised automatic sprinkler system.

21. Travel Distance to Fire Extinguisher

NFPA 10
Chapter 3, Table 3-2.1
22.9 Meters, Maximum

22. Fire Extinguisher Cabinets
NFPA 10
Chapter 3
Cabinets for portable fire extinguishers shall be provided as required in Paragraph 3.2.

23. Emergency Lighting
NFPA 101
Chapter 12 - New Assembly Occupancies
Paragraph 12.2.9
Emergency lighting shall be provided in accordance with Section 7.9.
Chapter 38 - New Business Occupancies
Paragraph 38.2.9
Furnish self-contained battery units to provide a reasonable degree of public safety within the building and for safe evacuation of the building.

24. Fire Alarms and Detection Systems
UFC 3-600-01
Chapter 5 Fire Alarm Systems
A fire alarm/reporting system shall be provided as required by, Paragraphs 5-2, 5-3 and 5-4.

NFPA 101
The fire alarm system shall be designed in accordance with the applicable sections of NFPA 101. The system shall include a fire alarm control panel with battery back up, manual pull stations, automatic smoke/thermal detectors and audio/visual indicating devices meeting requirements of UFAS and ADA. The system shall include local alarms as well as annunciation to the existing central fire alarm system.

25. Protection from Hazards
NFPA 101
Chapter 38 - New Business Occupancies
Paragraph 38.3.2
Hazardous areas including, but not limited to, areas used for general storage, boiler or furnace rooms, and maintenance shops that include woodworking and painting areas shall be protected by one of the following means:
1. Enclose the area with a fire barrier without windows that has a 1-hour fire resistance rating.
2. Protect the area with automatic extinguishing systems.
3. Apply both 1 and 2 where the hazard is severe.

Paragraph 8.4.1.2
In new construction, where protection is provided with automatic extinguishing systems without fire-resistive separation, the space protected shall be enclosed with smoke partitions.

-- END OF BATTALION HEADQUARTERS --

APPENDIX C

Hangar COF Pictures

Photo Locations in Hangars (2 Disks)

ADMIN AREA

Bldg. 2074
3/17 Hgr.

Bay 3	Bay 2	Bay 1
7 6 5	4 3	2 1

Photo No.
(Facing admin area)

ADMIN AREA

Bldg. 2072
1/10 Hgr.

Bay 5	Bay 4	Bay 3	Bay 2	Bay 1
26 ← 19	18 17	16 15	14 13 12	11 10 9 8

Photo No.

ADMIN AREA

Photo No.

Bldg. 2060
2/10 Hgr.

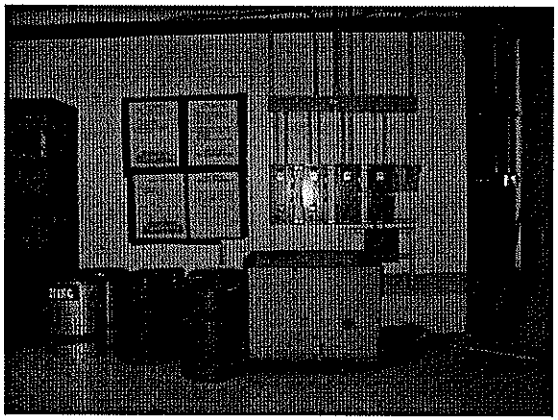
Bay 6	Bay 5	Bay 4	Bay 3	Bay 2	Bay 1
24 23 ← 20	19 ← 16	15 ← 11	10 9 8	7 6 5	4 3 2 1

→ 25

20 Jan 2004
C Hayes
772-0098

BUILDING 2060
2/10 HANGAR

BLDG 2060



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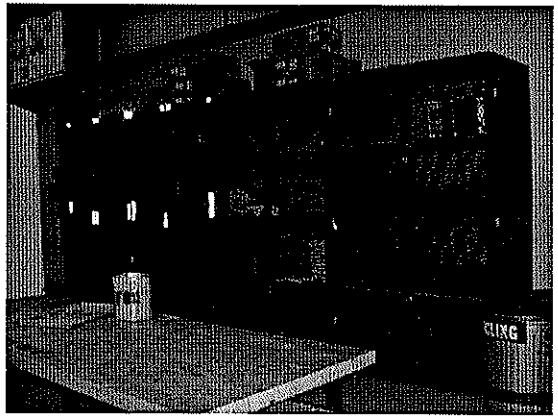

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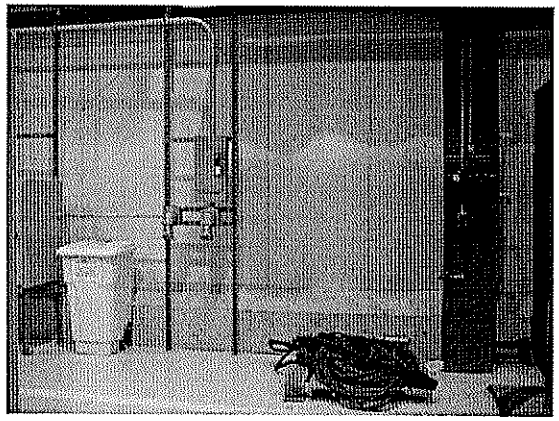

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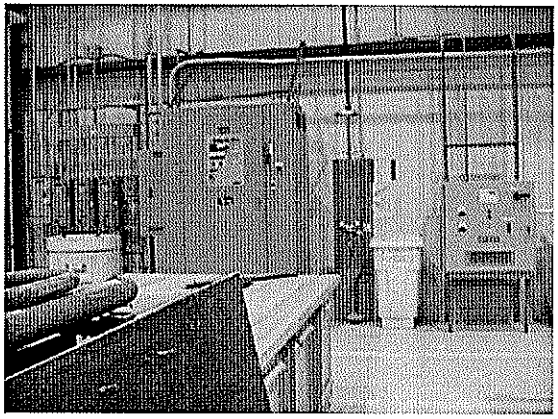

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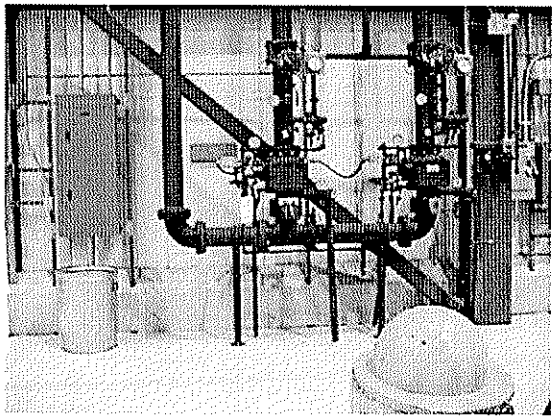

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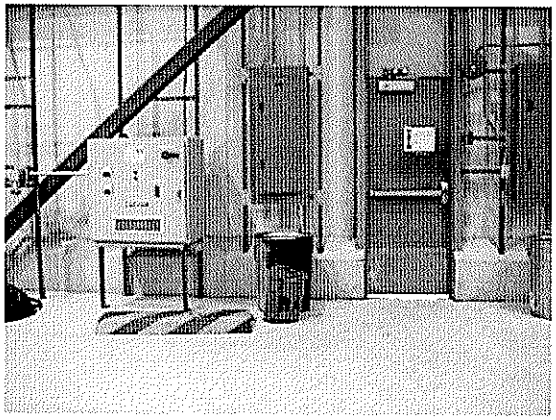

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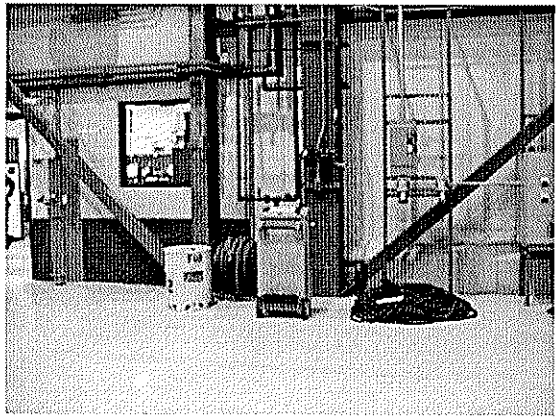

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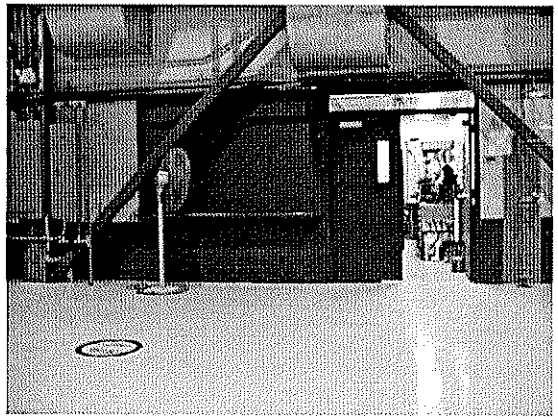

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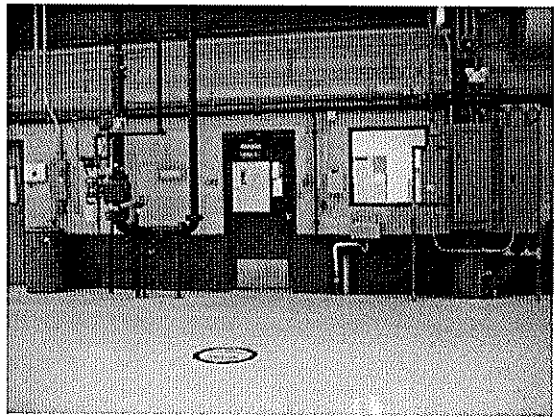

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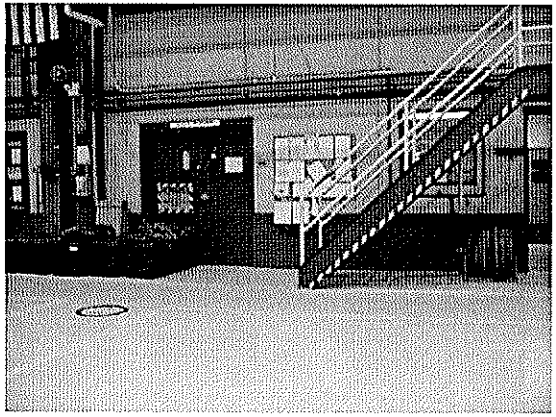

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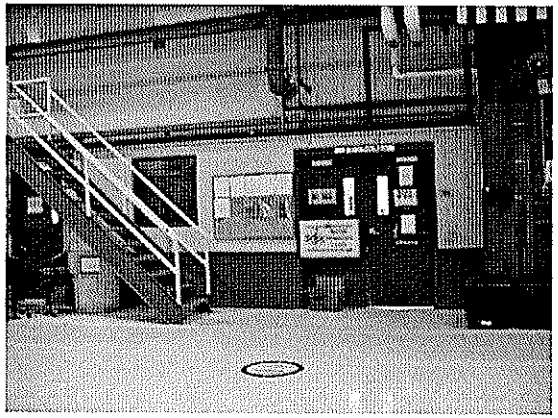

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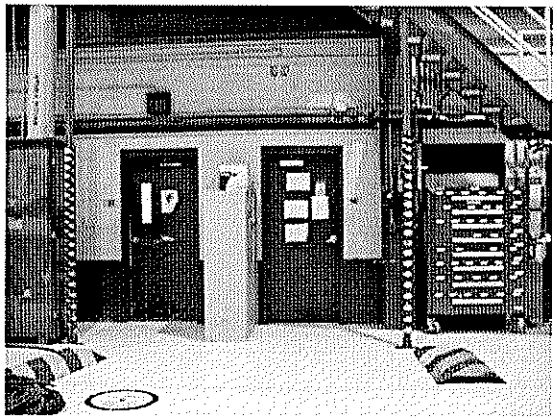

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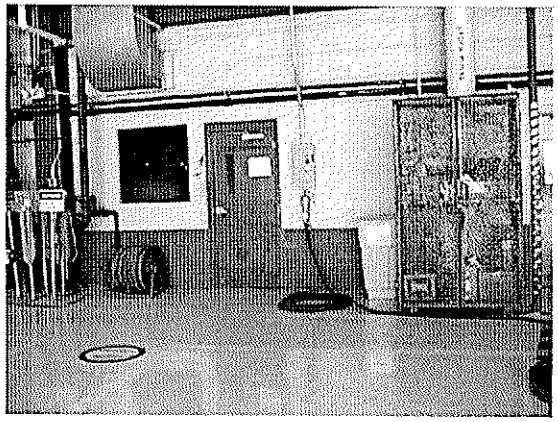

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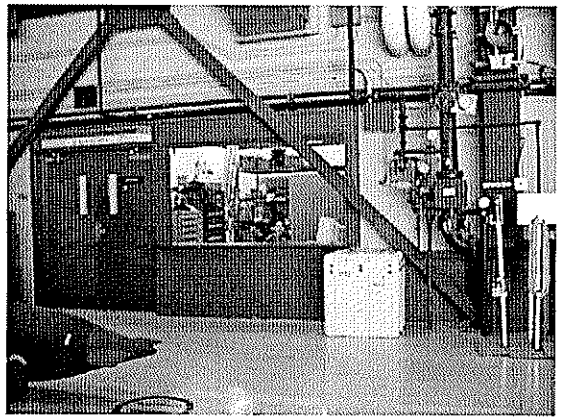

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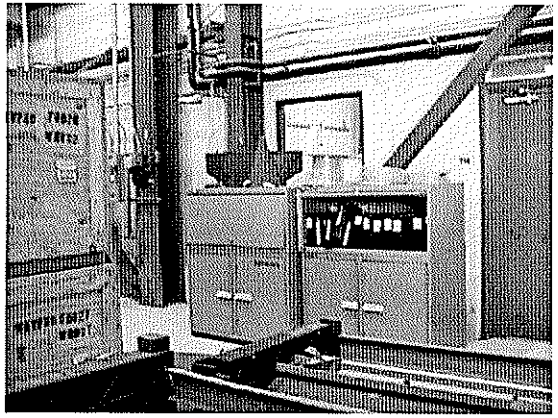

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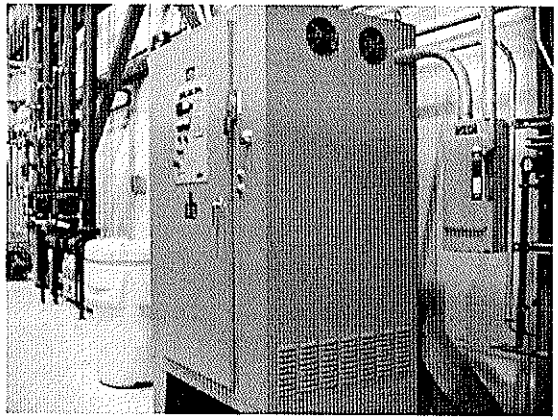

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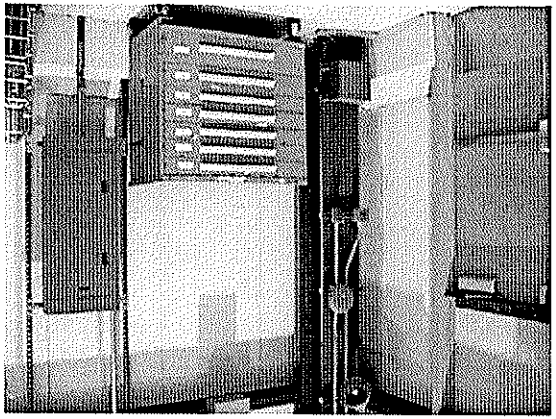

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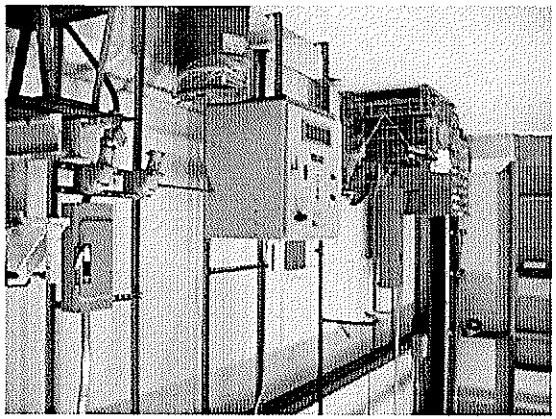

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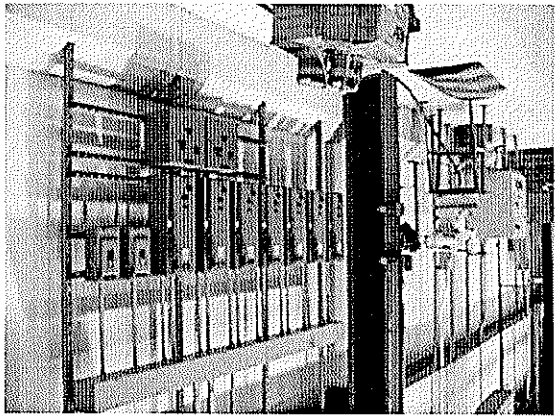

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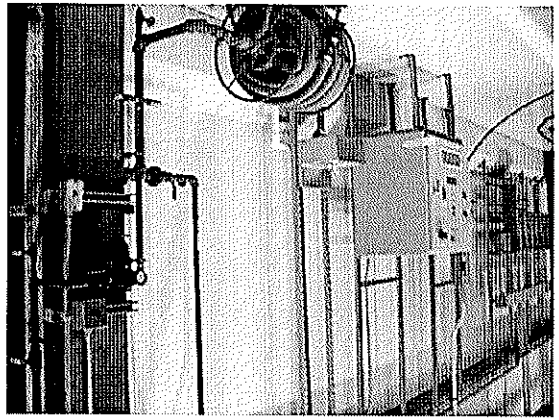

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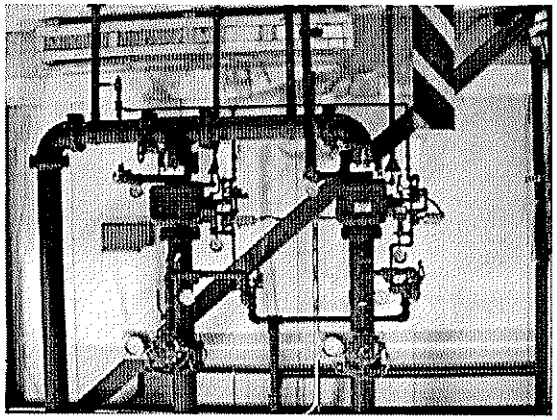

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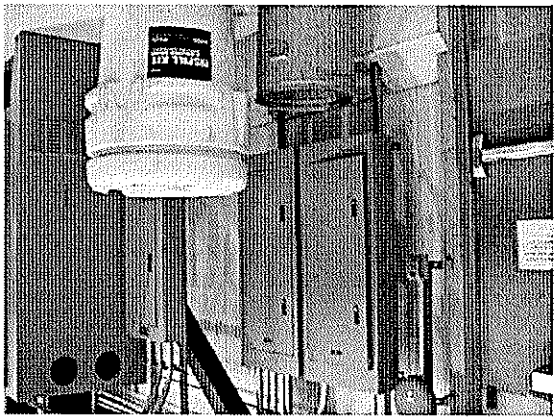

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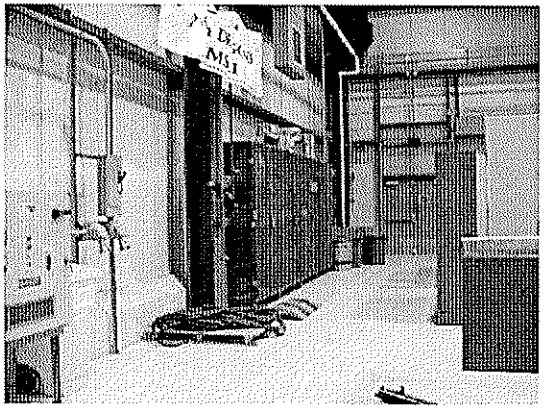

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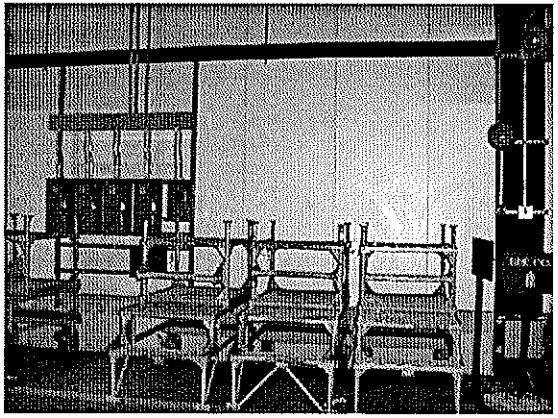
BUILDING 2072
1/10 HANGAR

BLDG 2072



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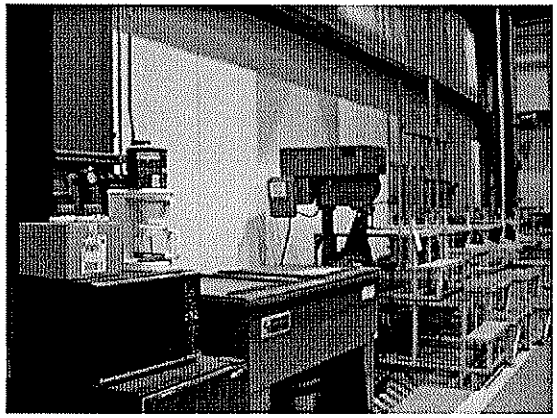

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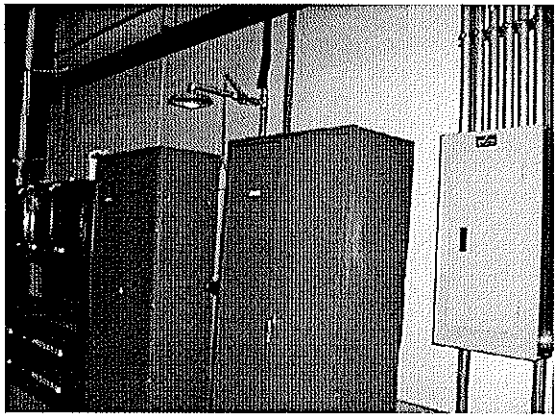

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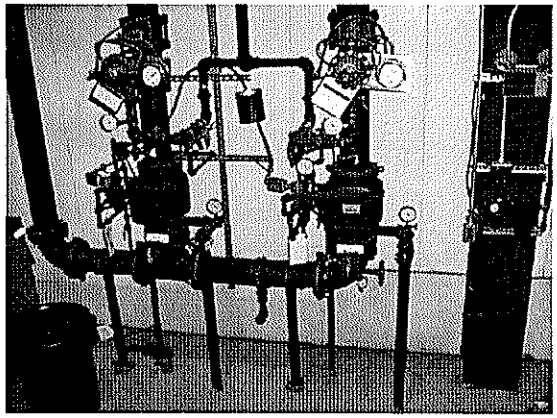

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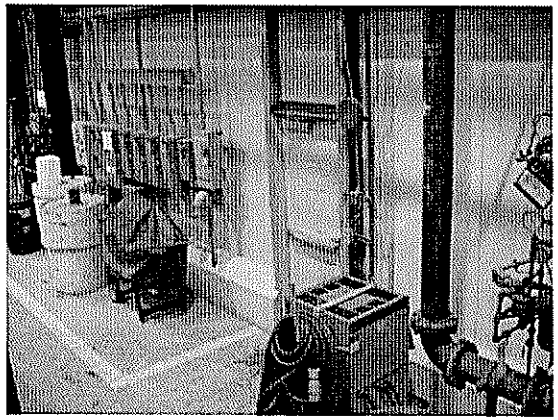

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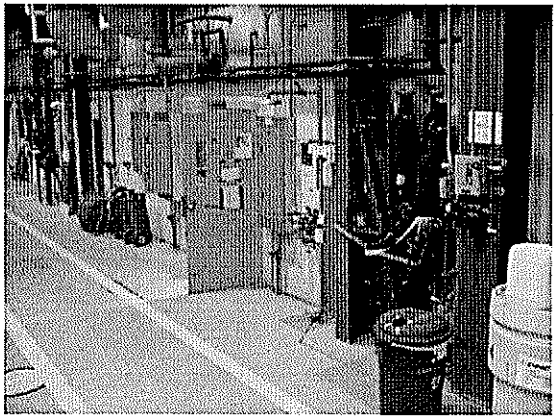

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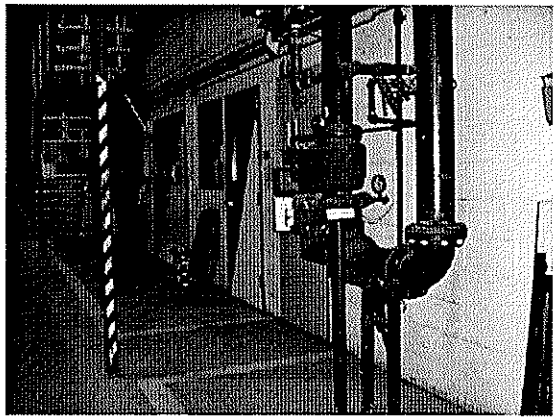

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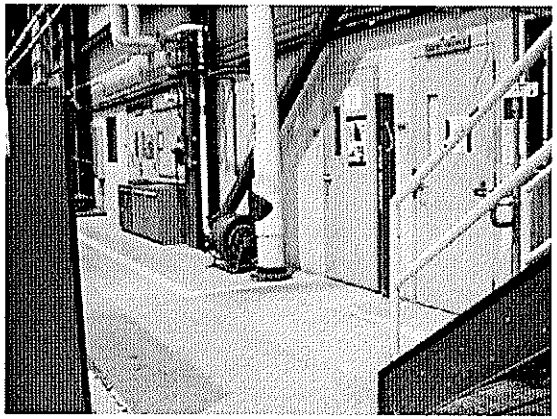

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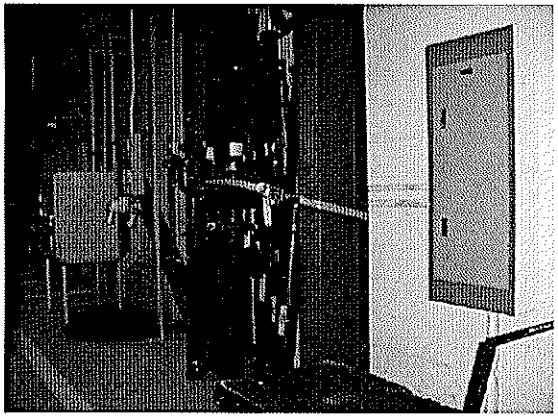

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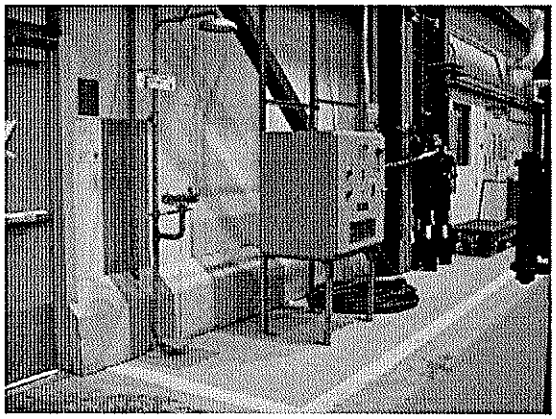

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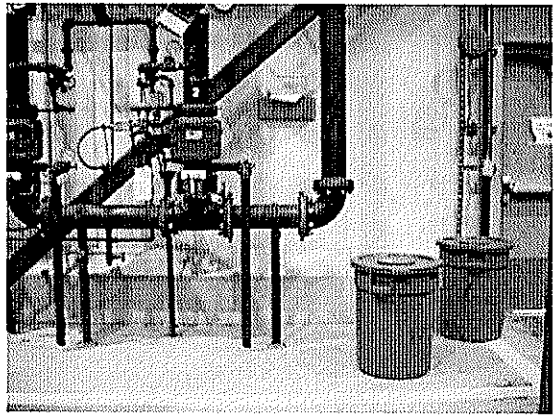

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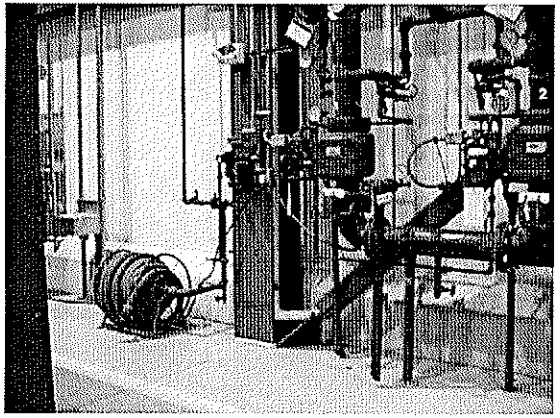

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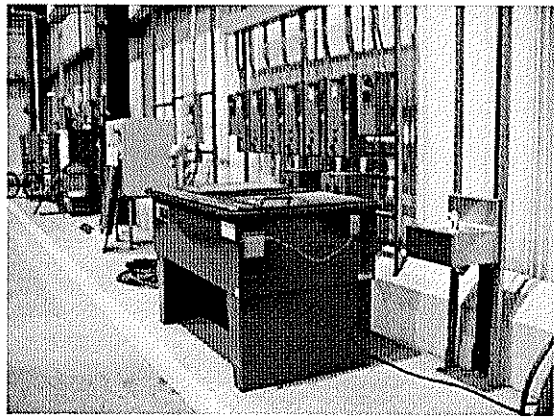

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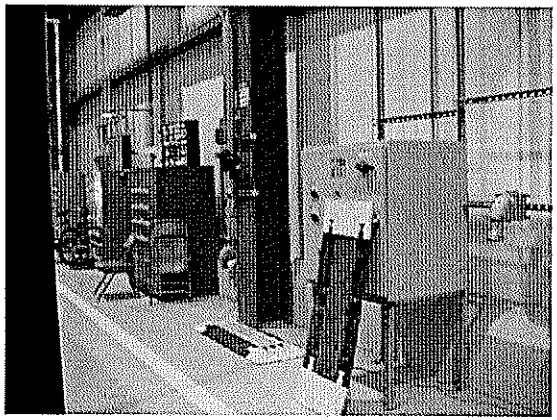

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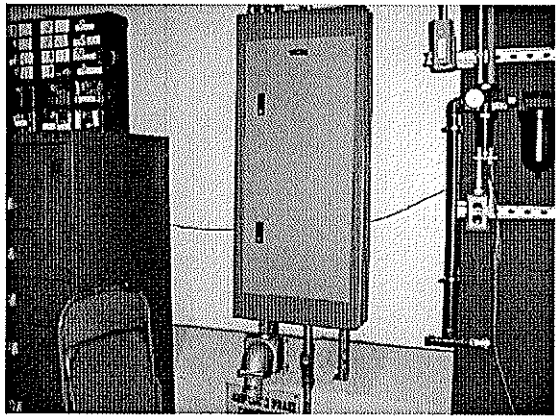

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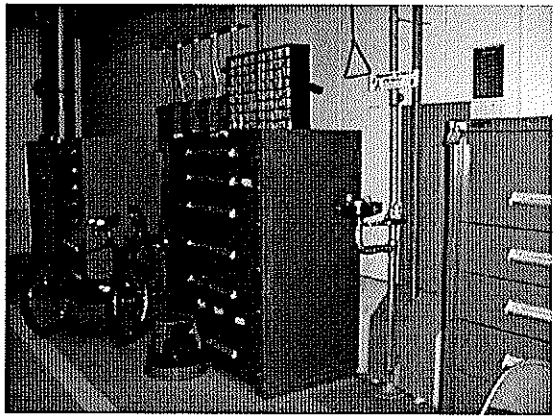

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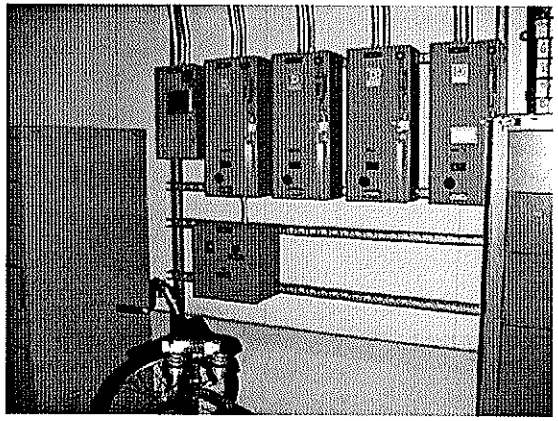

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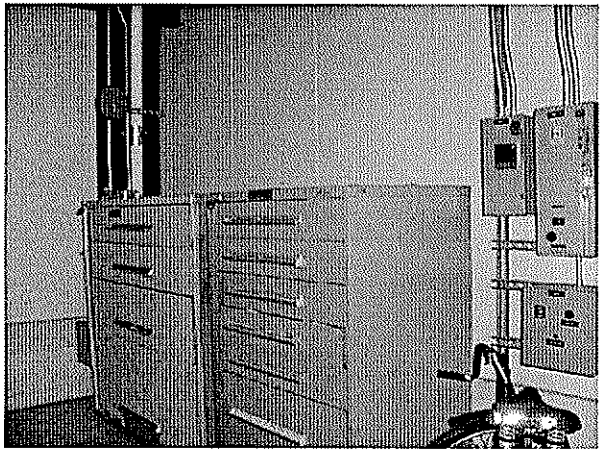

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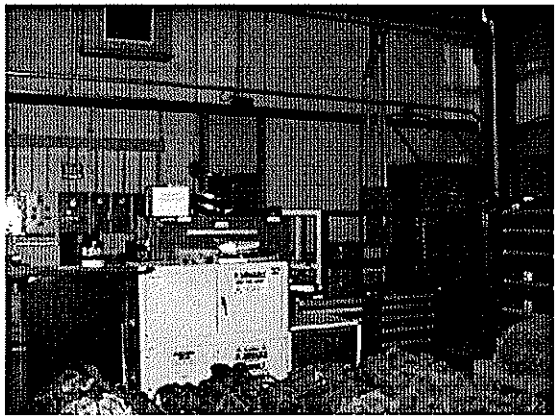
BUILDING 2074
3/17 HANGAR

BLDG 2074



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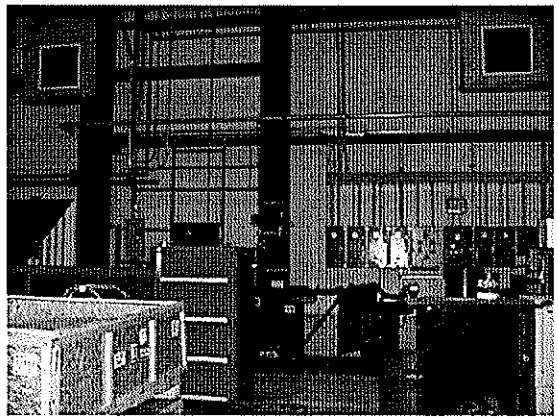

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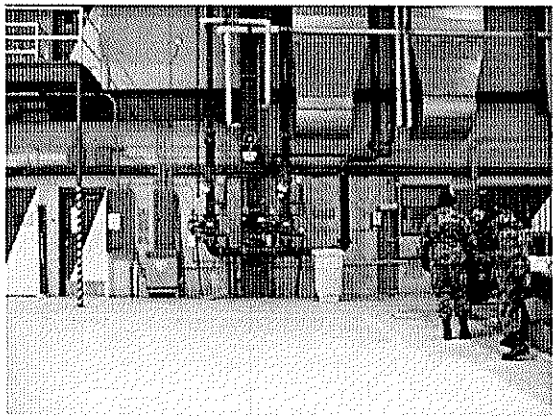

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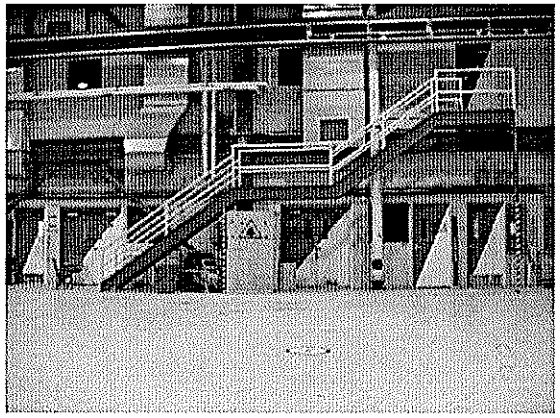

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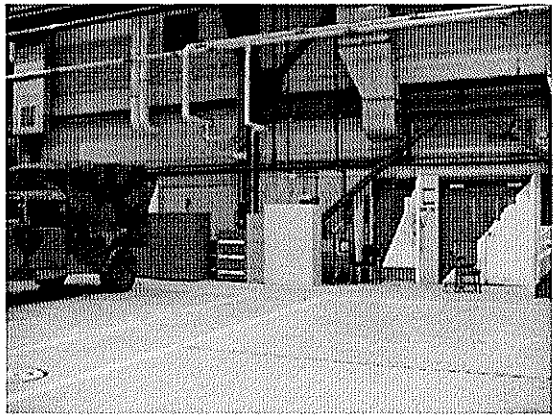

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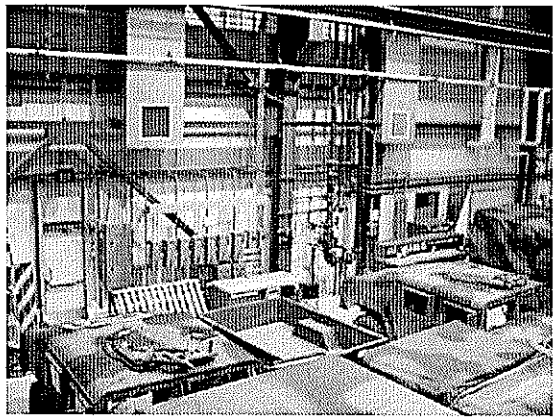

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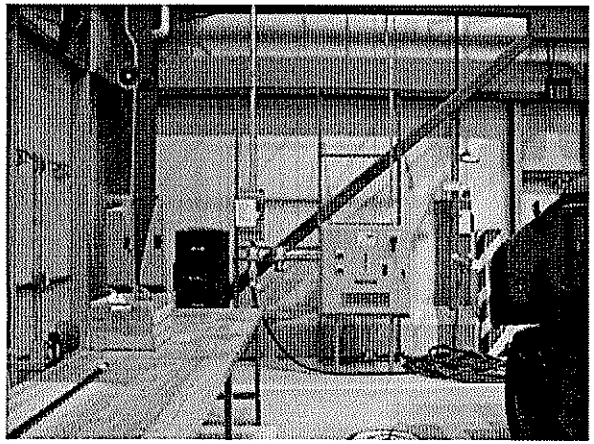

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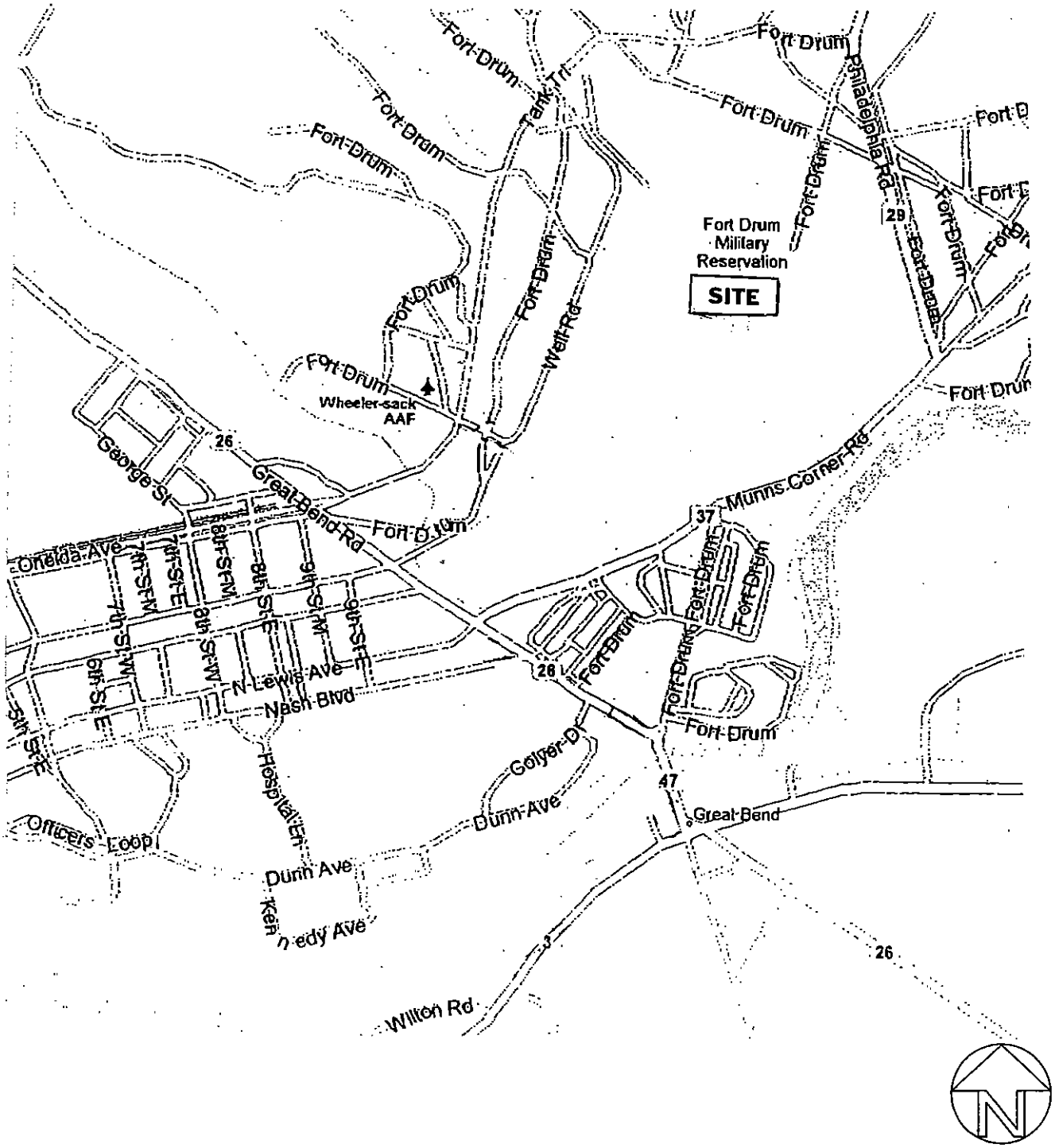
APPENDIX D

GEOTECHNICAL REPORT

FILE: P:\2003 Projects\3551\0110\Acad\Ft Drum Fig 1.dwg DRAWN BY/DATE: CHECKED BY/DATE: APPROVED BY/DATE:



FT. DRUM WSAAF BARRACKS

MACTEC

MACTEC Engineering and Consulting of Georgia, Inc.
22455 Davis Drive, Suite 100
Sterling, Virginia 20164

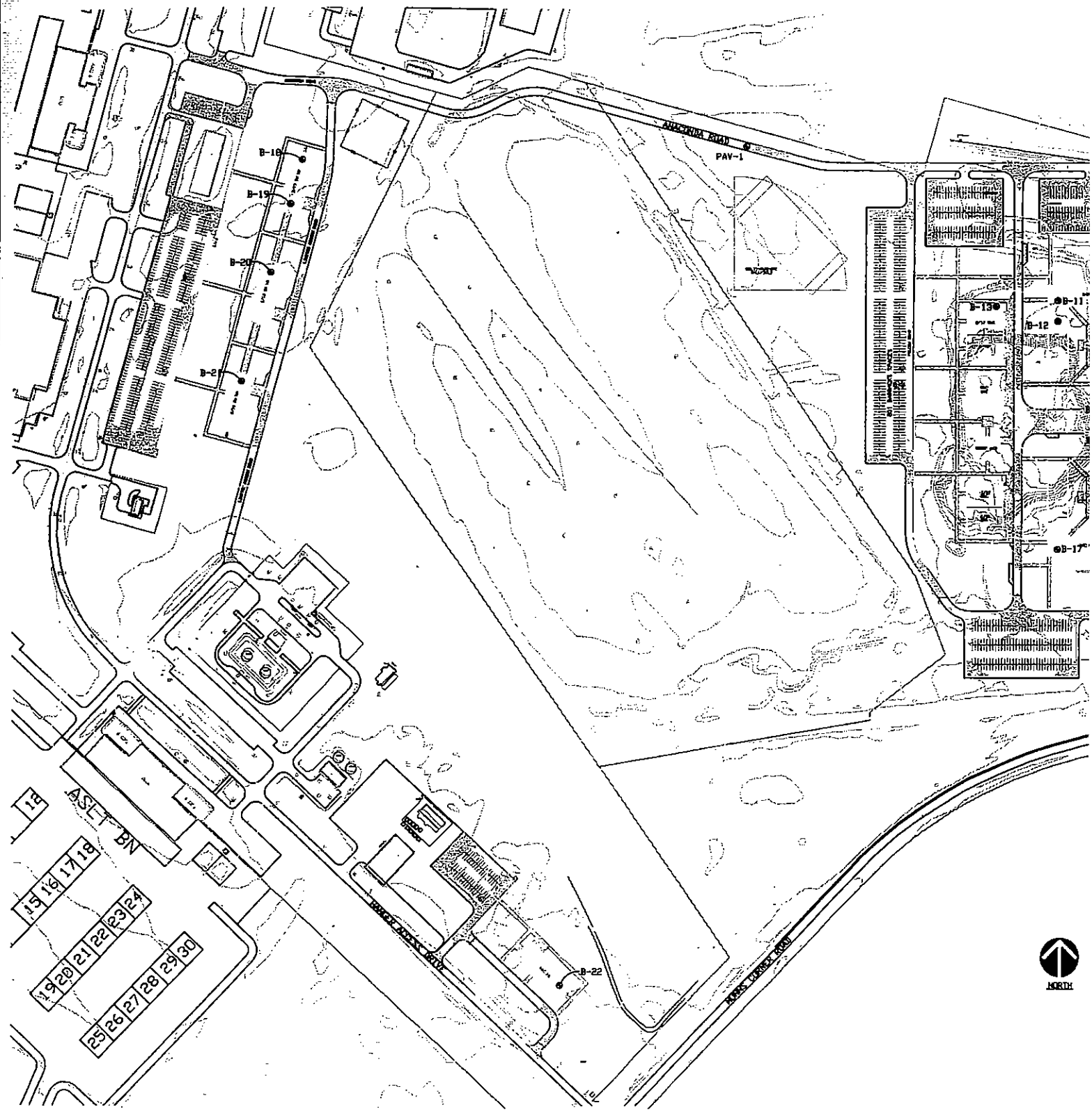
SITE LOCATION MAP

PROJECT NO.
3551-03-0110

FIGURE 1

FILE: P:\2003 Projects\3551\0110\Acadd\Ft Drum Fig 2.dwg

PREPARED BY/DATE: DA/8.6.03



APPROXIMATE SCALE IN METERS

100 50 0 100

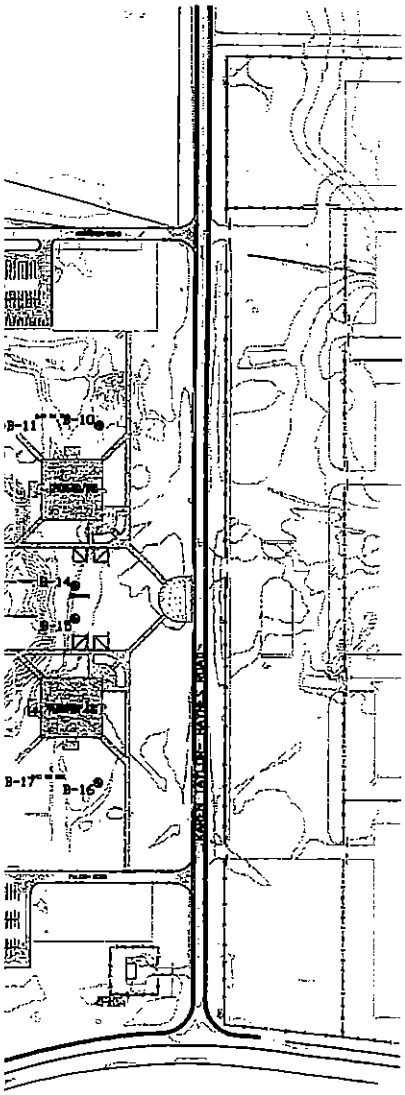
FT. DRUM WSAAF

NOTE: BASE PLAN PROVIDED BY US ARMY CORPS OF ENGINEERS

SEE CONTINUATION OF FIGURE 2 ON NEXT PAGE

CHECKED BY/DATE:

APPROVED BY/DATE:



BORING NUMBER	NORTHING	EASTING	PROPOSED STRUCTURE
B-10	451465	321043	NORTH BARRACKS
B-11	451465	320978	NORTH BARRACKS
B-12	451449	320978	NORTH BARRACKS
B-13	451459	320920	HHC BUILDING
B-14	451028	321028	DINING HALL
B-15	451337	321028	DINING HALL
B-16	451229	321043	SOUTH BARRACKS
B-17	451229	320978	SOUTH BARRACKS
B-18	451596	320261	BATTALION HEADQUARTERS
B-19	451555	320250	BATTALION HEADQUARTERS
B-20	451491	320232	BATTALION HEADQUARTERS
B-21	451388	320205	BATTALION HEADQUARTERS
B-22	450814	320507	BRIGADE HEADQUARTERS
PAV-1	451610	320682	NEW ANACONDA ROAD

LEGEND

BORING LOCATION

ALL DIMENSIONS ARE IN METERS (M) UNLESS OTHERWISE NOTED.

AF BARRACKS

MACTEC

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22455 Davis Drive, Suite 100
Sterling, Virginia 20164

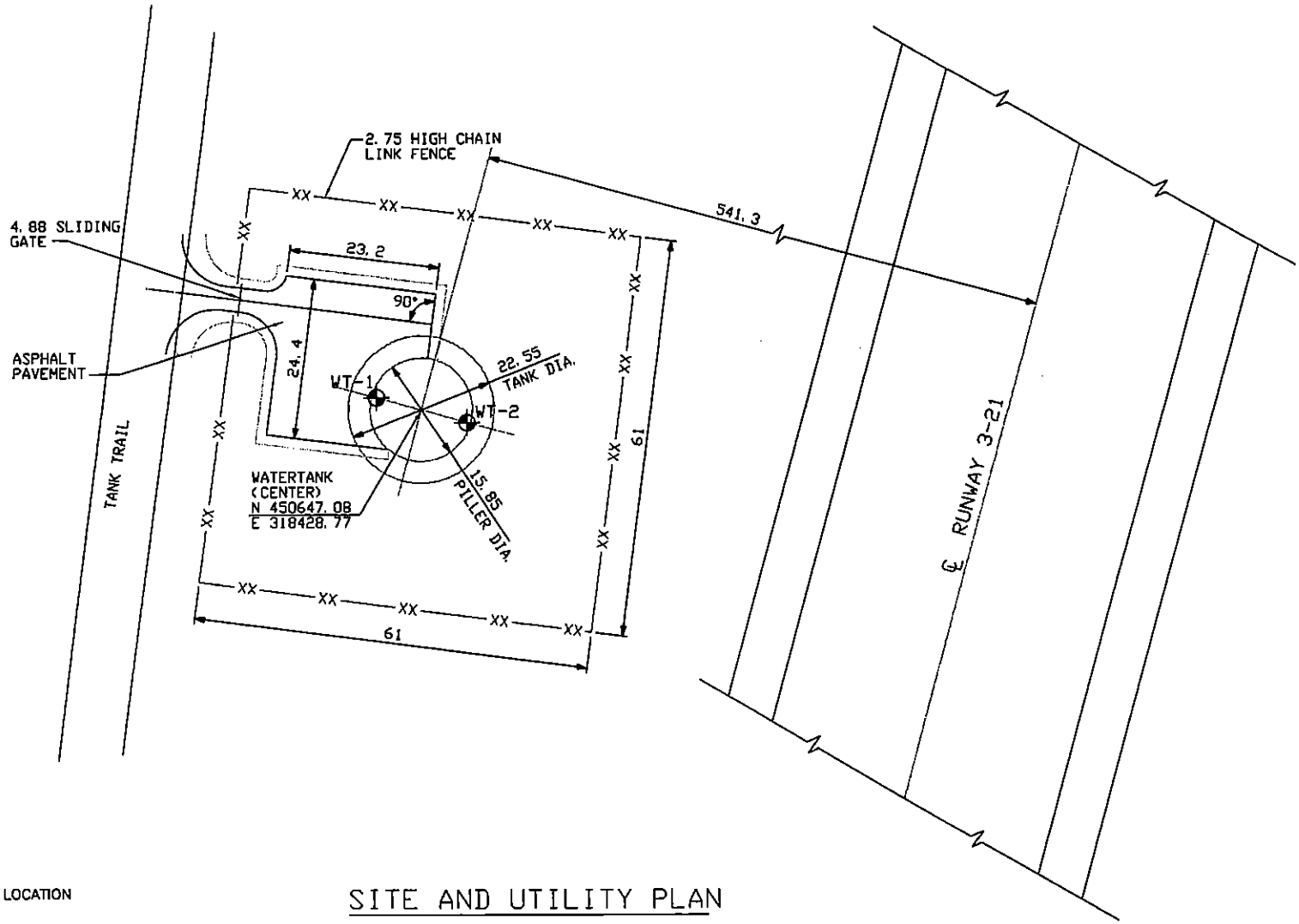
PROPOSED SITE LAYOUT
WITH BORING LOCATIONS

PROJECT NO.
3551-03-0110

FIGURE 2

SEE CONTINUATION OF FIGURE 2 ON PREVIOUS PAGE

FILE: P:\2003 Projects\3551\0110\Acadd\Ft Drum Fig 3.dwg PREPARED BY/DATE: DA/8.6.03 CHECKED BY/DATE: APPROVED BY/DATE:



LEGEND

BORING LOCATION

SITE AND UTILITY PLAN

SCALE 1:10

ALL DIMENSIONS ARE IN METERS (M) UNLESS OTHERWISE NOTED.

NOTE: DRAWING PROVIDED BY US ARMY CORPS OF ENGINEERS

FT. DRUM WSAAF BARRACKS

MACTEC

MACTEC Engineering and Consulting of Georgia, Inc.
22455 Davis Drive, Suite 100
Sterling, Virginia 20164

PROPOSED WATER TOWER SITE PLAN

PROJECT NO. 3551-03-0110

FIGURE 3

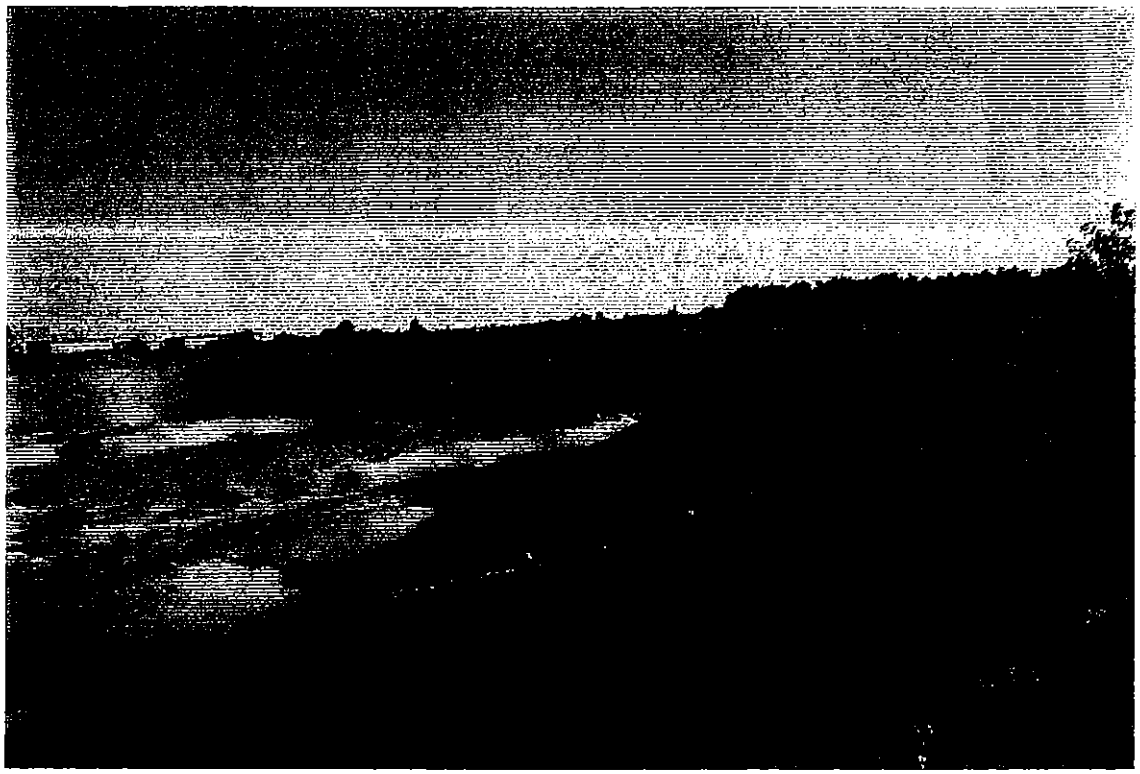


Figure 4. North side slope of borrow pit (from east side).

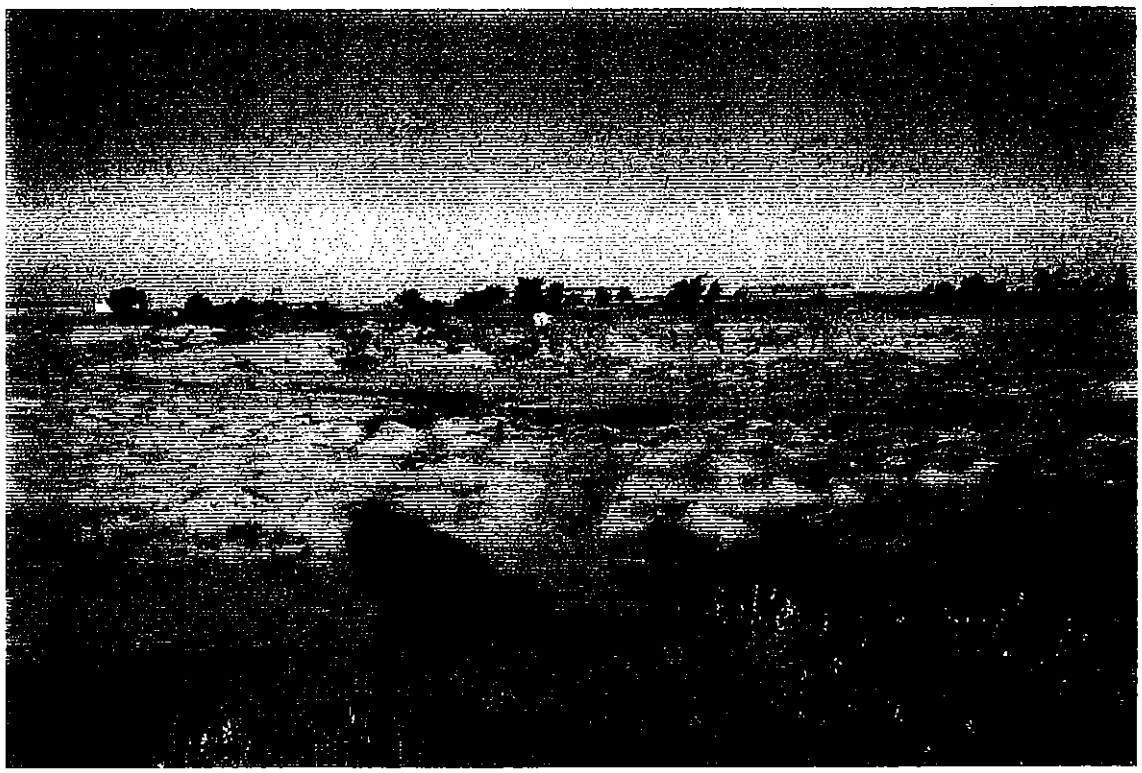


Figure 5. Borrow pit looking west (from the east side).

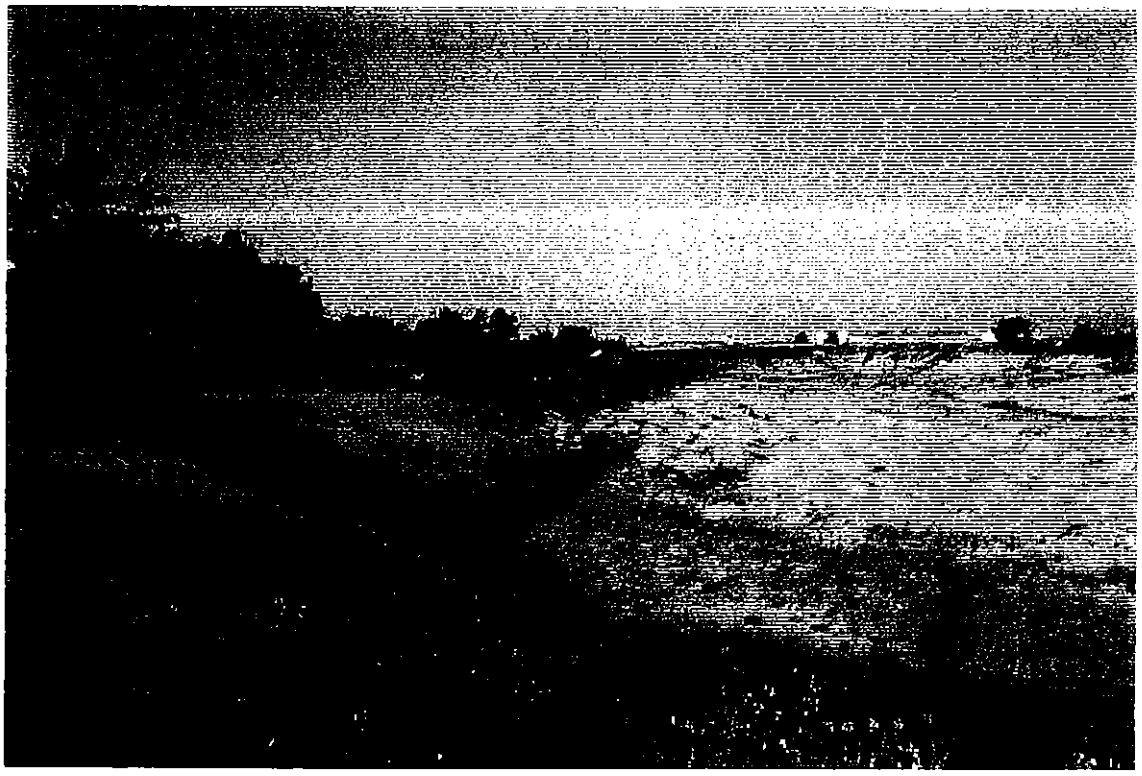


Figure 6. Borrow pit looking southwest (from the east side).

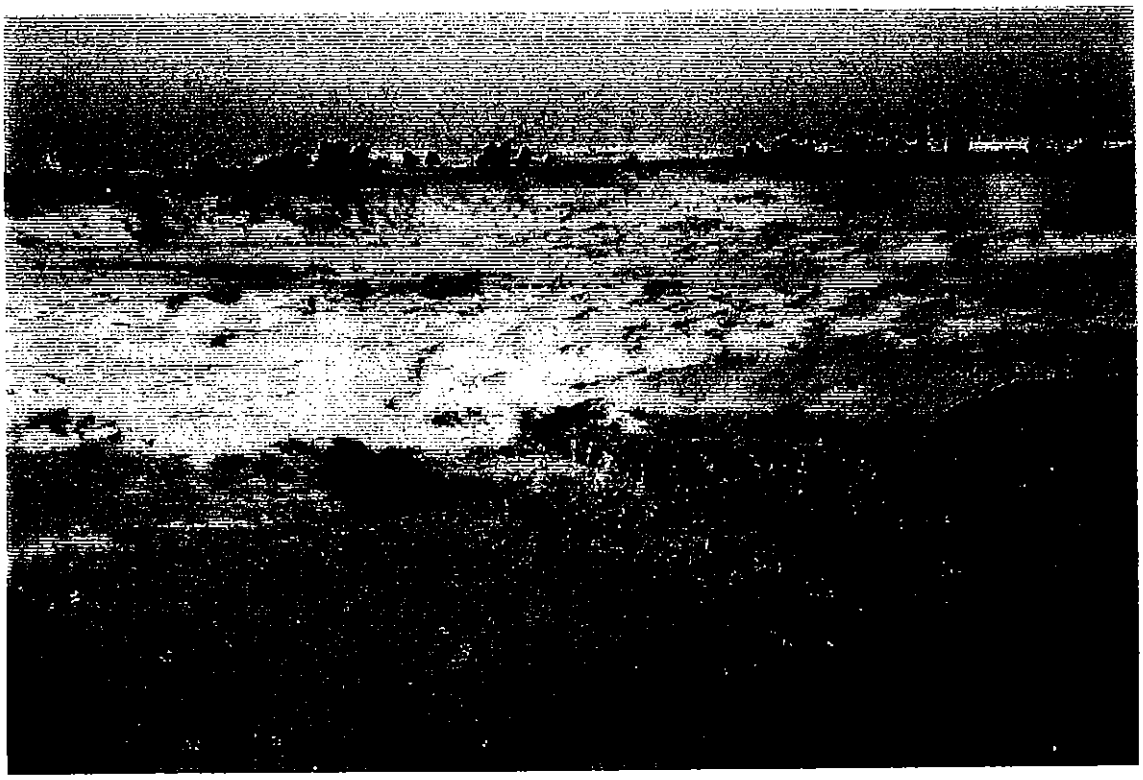


Figure 7. Bottom of borrow pit (from east side).

APPENDIX B

FIELD OPERATIONS

FIELD OPERATIONS

The general field procedures employed by MACTEC are summarized in ASTM Specification D 420 entitled "Investigating and Sampling Soils and Rocks for Engineering Purposes." This recommended practice lists recognized methods for determining soil and rock distribution and ground-water conditions. These methods include geophysical and in-situ methods as well as borings.

Borings are drilled to depths to obtain subsurface samples using one of several alternate techniques depending upon the subsurface conditions. These techniques are:

(a) Continuous 2¼- to 4¼-inch I.D. hollow stem augers or solid flight augers;
(b) Wash borings using roller cone or drag bits (mud or water);
(c) Continuous flight augers (ASTM D 1452).

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

The subsurface conditions encountered during drilling are reported on a field test boring record by the Driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observation of ground water. It also contains the driller's interpretation of the soil conditions between samples. Therefore, these boring records contain both factual and interpretive information.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soils in general accordance with the procedures outlined in ASTM Specification D 2488 and prepares the final boring records that are the basis for evaluations and recommendations.

The final test boring records represent our interpretation of the contents of the field records based on the results of the engineering examination and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and ground-water conditions at these boring locations. The lines designating the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The actual transition between materials may be gradual. The final Test Boring Records are included in this appendix.

SOIL SAMPLING PROCEDURES

Penetration Test and Split-barrel Sampling

The borings were drilled using hollow-stem augers or solid-flight augers (or as noted on the Test Boring Records). Penetration testing and split-barrel sampling were conducted in the borings at regular intervals.

The standard penetration test (SPT) provides an indication of the soil strength and compressibility. The SPT resistances and split-barrel sampling are conducted simultaneously according to ASTM Specification D 1586. At regular intervals, soil samples are obtained with a standard split-tube sampler. The sampler is first seated 6 inches to penetrate any loose cuttings, then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the 12-inch increment is recorded and is designated the "penetration resistance."

Representative portions of the soil samples obtained from each split-barrel sample are placed in glass jars, sealed, and transported to our laboratory. Descriptions of the split-tube samples and the penetration resistances are shown on the attached Test Boring Records.

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures.
			GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand - silt mixtures
			SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts and with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts.
DECOMPOSED ROCK			DR	Residual material that retains the relict structure of the parent bedrock & exhibits SPT resistances consistently over 60 bpf.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

U.S. STANDARD SIEVE SIZE

Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

Undisturbed Sample		Auger Cuttings	
Split Spoon Sample		Bulk Sample	
Rock Core		Grab Sample	
Dilatometer		Pressure Meter	
Packer		No Recovery	
Water Table at time of drilling		Water Table after 24 hours	

Correlation of Penetration Resistance with Relative Density and Consistency

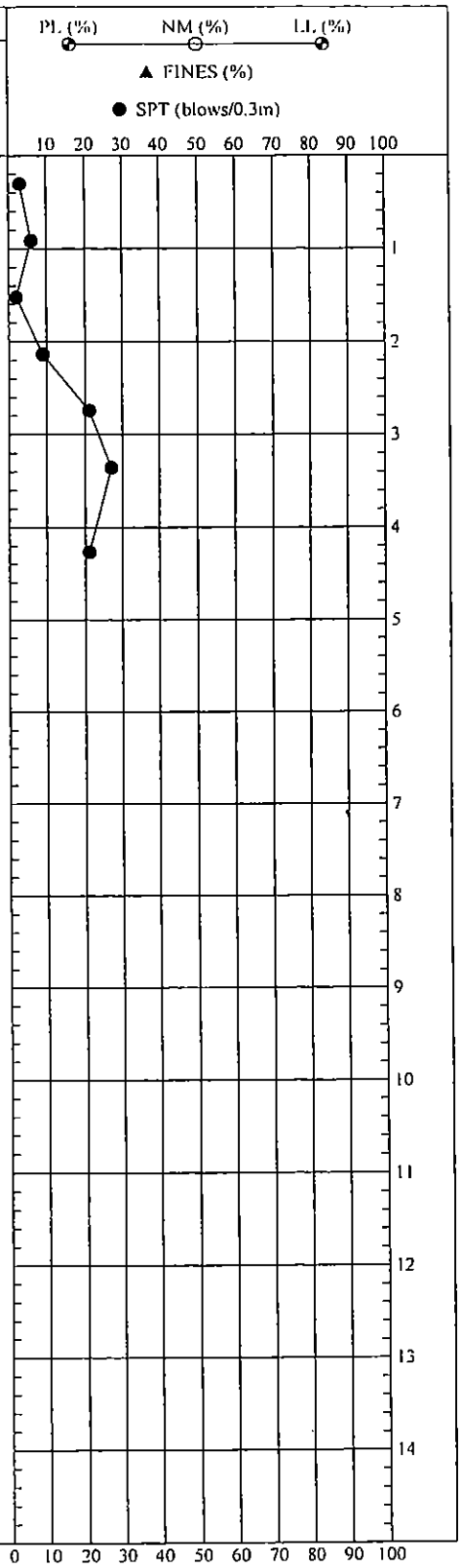
SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 20	Firm	5 - 8	Firm
21 - 30	Very Firm	9 - 15	Stiff
31 - 50	Dense	16 - 30	Very Stiff
Over 50	Very Dense	Over 31	Hard

KEY TO SYMBOLS AND DESCRIPTIONS

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Very loose to very firm brown fine SAND (SP-SM) with little silt, damp		
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/14/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/14/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-1-2 N=3
SPT - 2	X	2-3-3 N=6
SPT - 3	X	2-1-1 N=2
SPT - 4	X	2-3-6 N=9
SPT - 5	X	7-10-11 N=21
SPT - 6	X	11-13-14 N=27
SPT - 7	X	5-9-12 N=21



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

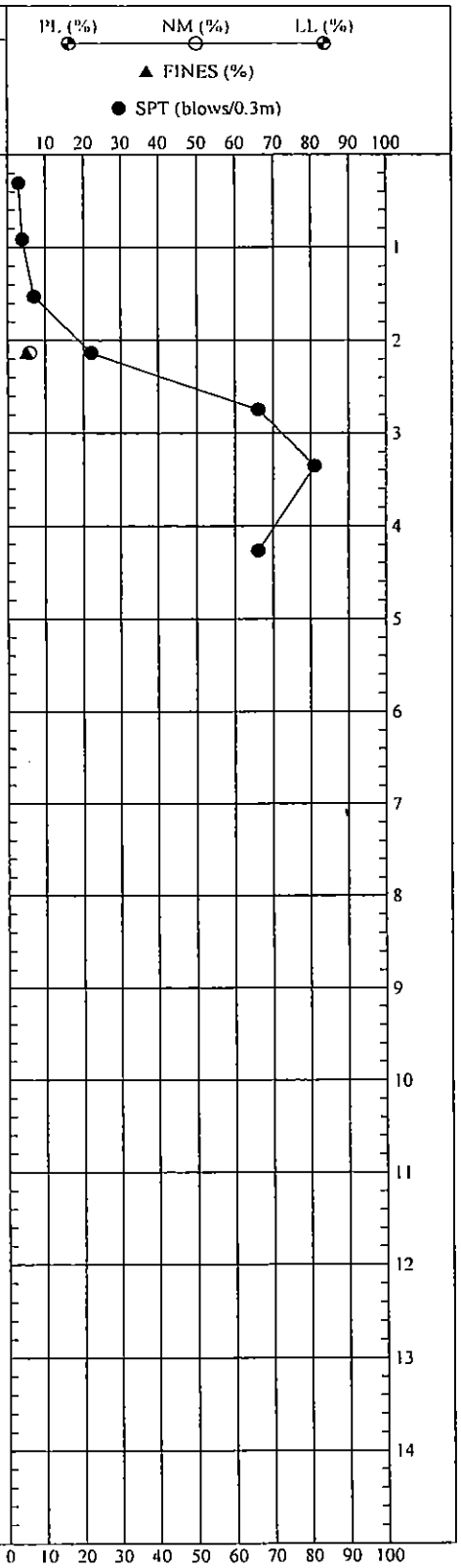
TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-10

DRILLED: July 14, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)	SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
0	Very loose to firm brown fine SAND (SP-SM) with little silt, damp			SPT - 1	X	WOH-1-2 N=3
1				SPT - 2	X	2-2-2 N=4
				SPT - 3	X	1-2-5 N=7
2				SPT - 4	X	7-9-13 N=22
	- becomes dense at 2.4 m bgs			SPT - 5	X	17-28-38 N=66
3				SPT - 6	X	40-39-42 N=81
4				SPT - 7	X	11-25-41 N=66
	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/14/03.					
5	**NOTES:** 1. No ground water was encountered at time of drilling on 7/14/03.					
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: ATV CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-11

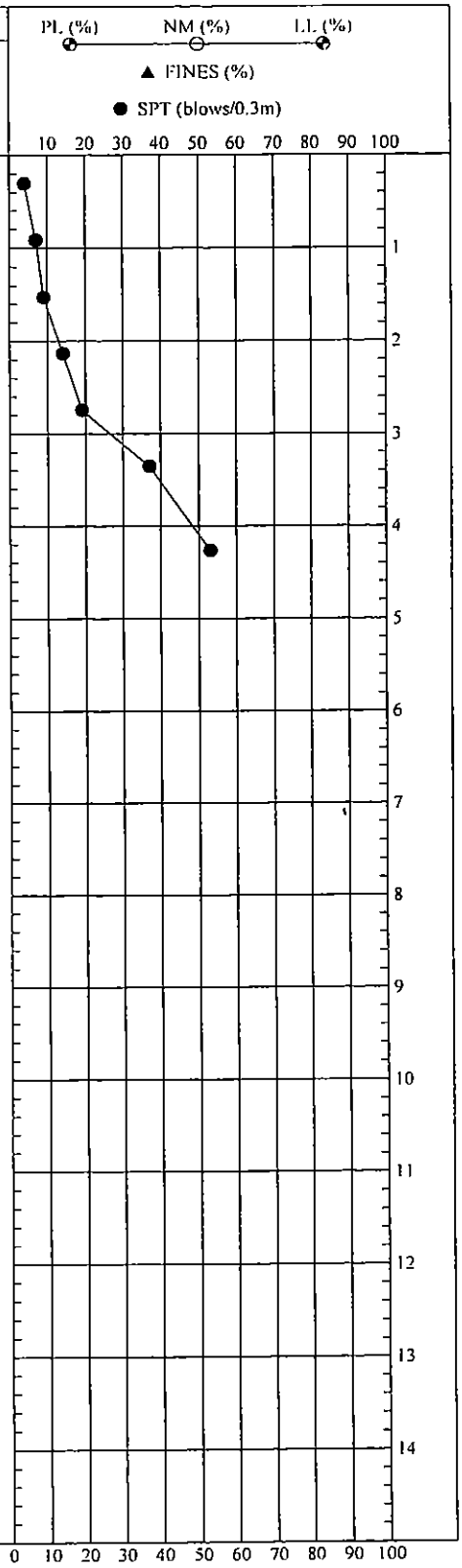
DRILLED: July 14, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Very loose to firm brown fine SAND (SP-SM) with little silt, damp		
3	- becomes dense at 3 m bgs		
4	- becomes very dense at 4 m bgs		
	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/14/03.		

NOTES:
1. No ground water was encountered at time of drilling on 7/14/03.

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	WOH-1-3 N=4
SPT - 2	X	3-3-4 N=7
SPT - 3	X	2-4-5 N=9
SPT - 4	X	7-7-7 N=14
SPT - 5	X	6-9-10 N=19
SPT - 6	X	15-14-23 N=37
SPT - 7	X	11-22-31 N=53



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: ATV CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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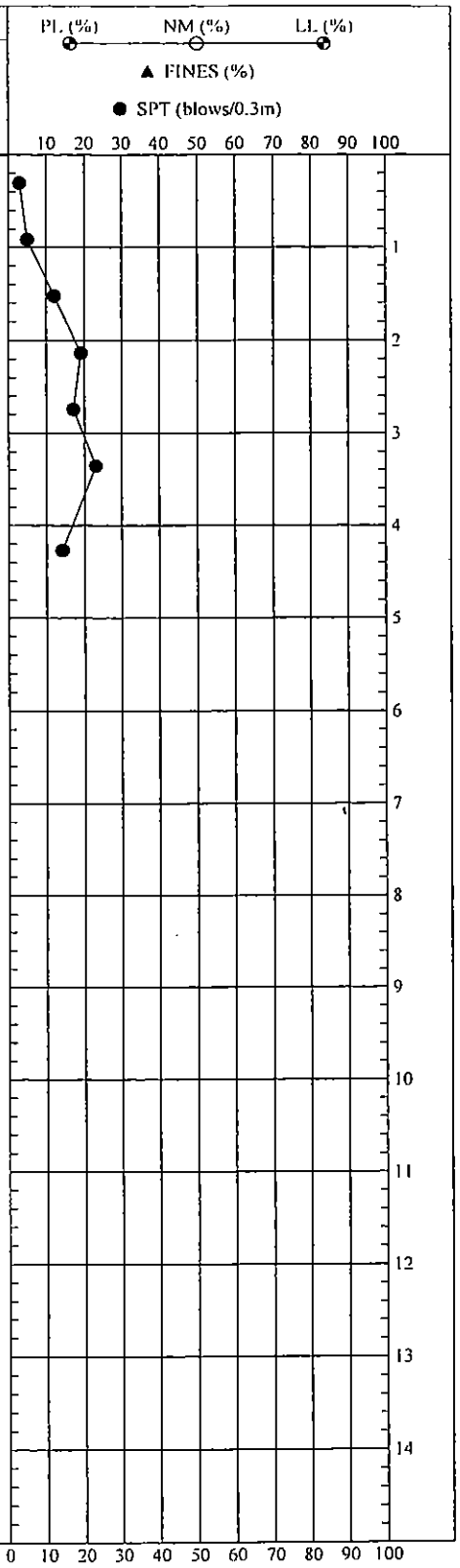
TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-12

DRILLED: July 14, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)	SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
0	Very loose to firm brown fine SAND (SP-SM) with little silt, damp			SPT - 1	X	1-1-2 N=3
				SPT - 2	X	3-2-3 N=5
				SPT - 3	X	2-5-7 N=12
				SPT - 4	X	10-9-10 N=19
				SPT - 5	X	5-7-10 N=17
				SPT - 6	X	14-10-13 N=23
				SPT - 7	X	4-6-8 N=14
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/14/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/14/03.					



20310 03-0110.GPJ LAW_JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: ATV CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

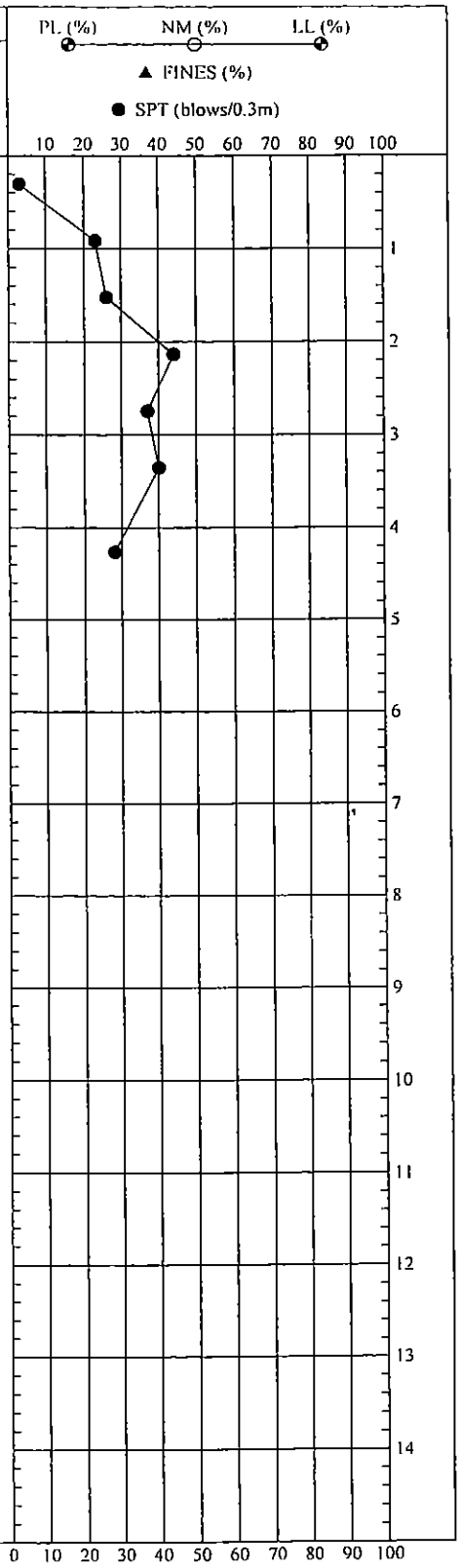
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-13

DRILLED: July 14, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Very loose to firm brown fine SAND (SP-SM) with little silt, damp		
2	- becomes dense at 1.8 m bgs		
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/14/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/14/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	WOH-1-2 N=3
SPT - 2	X	8-10-13 N=23
SPT - 3	X	4-11-15 N=26
SPT - 4	X	23-23-21 N=44
SPT - 5	X	10-17-20 N=37
SPT - 6	X	17-19-21 N=40
SPT - 7	X	7-11-17 N=28



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

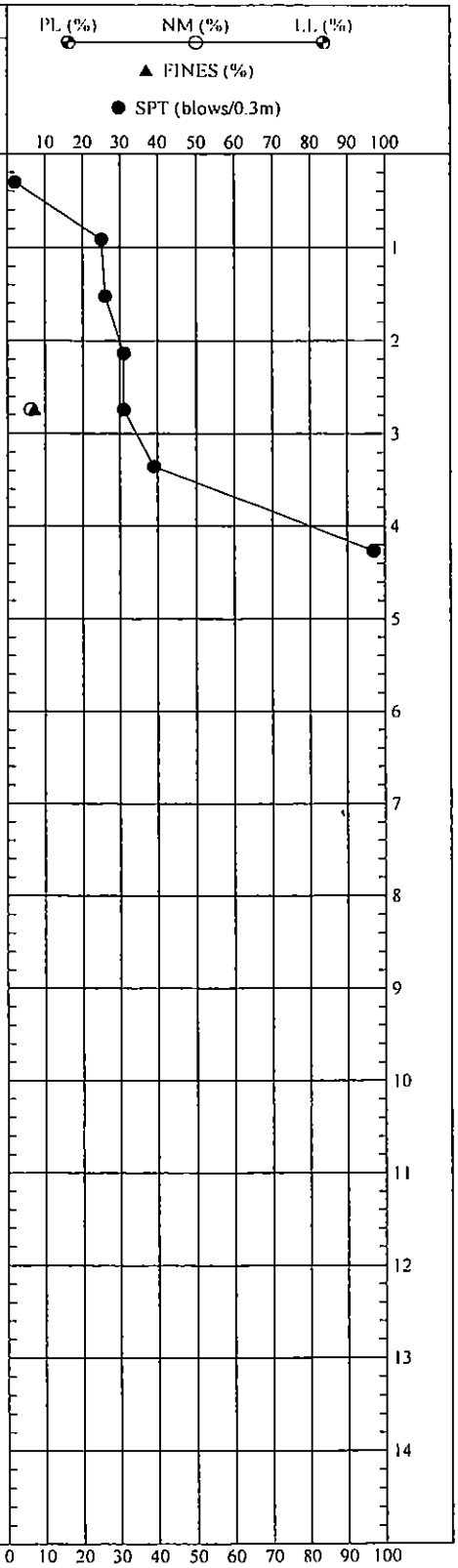
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-14

DRILLED: July 14, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW	LEGEND	ELEV (m)
0	Very loose to firm brown fine SAND (SP-SM) with little silt, damp		
1	- becomes very firm at 1.2 m bgs		
2	- becomes dense at 1.8 m bgs		
3			
4	- becomes very dense at 4 m bgs		
5	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.		
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1		WOH-1-1 N=2
SPT - 2		6-12-13 N=25
SPT - 3		5-13-13 N=26
SPT - 4		12-16-15 N=31
SPT - 5		7-14-17 N=31
SPT - 6		14-18-21 N=39
SPT - 7		3-35-62 N=97



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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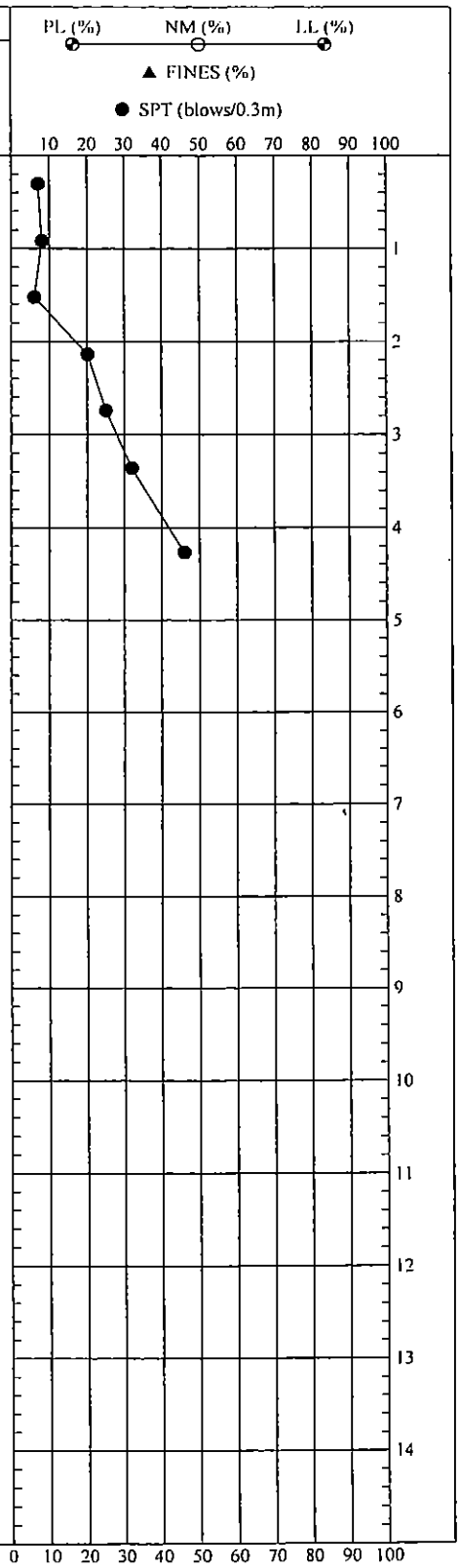
TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-15

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)	SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (blows/0.3m)
0	TOPSOIL Loose to very firm yellowish brown fine SAND (SP), trace silt, damp			SPT - 1	X	2-3-4 N=7	
1				SPT - 2	X	3-3-5 N=8	
				SPT - 3	X	2-2-4 N=6	
2				SPT - 4	X	9-9-11 N=20	
				SPT - 5	X	8-12-13 N=25	
3	- becomes dense at 3 m bgs			SPT - 6	X	9-13-19 N=32	
4				SPT - 7	X	10-20-26 N=46	
5	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.						
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

TEST BORING RECORD

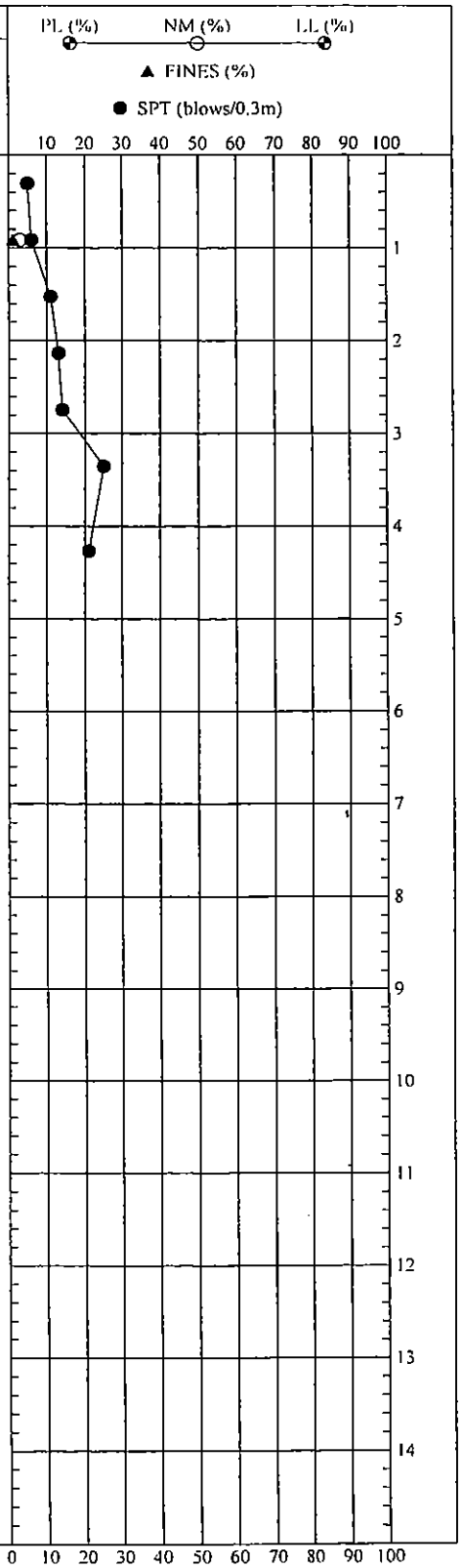
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-16

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	TOPSOIL Loose to very firm yellowish brown fine SAND (SP), trace silt, damp		
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-2-3 N=5
SPT - 2	X	2-3-3 N=6
SPT - 3	X	3-5-6 N=11
SPT - 4	X	8-7-6 N=13
SPT - 5	X	4-6-8 N=14
SPT - 6	X	10-11-14 N=25
SPT - 7	X	5-9-12 N=21



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

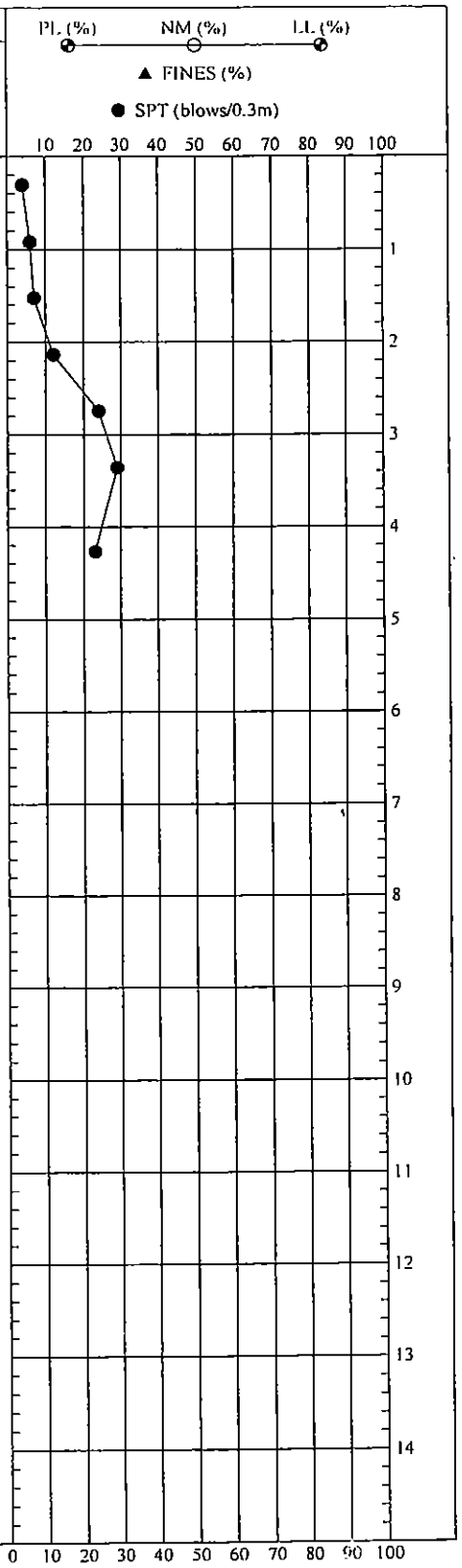
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-17

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Very loose to firm brown fine SAND (SP-SM) with little silt, damp		
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-2-2 N=4
SPT - 2	X	2-2-4 N=6
SPT - 3	X	2-3-4 N=7
SPT - 4	X	5-5-7 N=12
SPT - 5	X	4-11-13 N=24
SPT - 6	X	11-13-16 N=29
SPT - 7	X	6-10-13 N=23



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-18

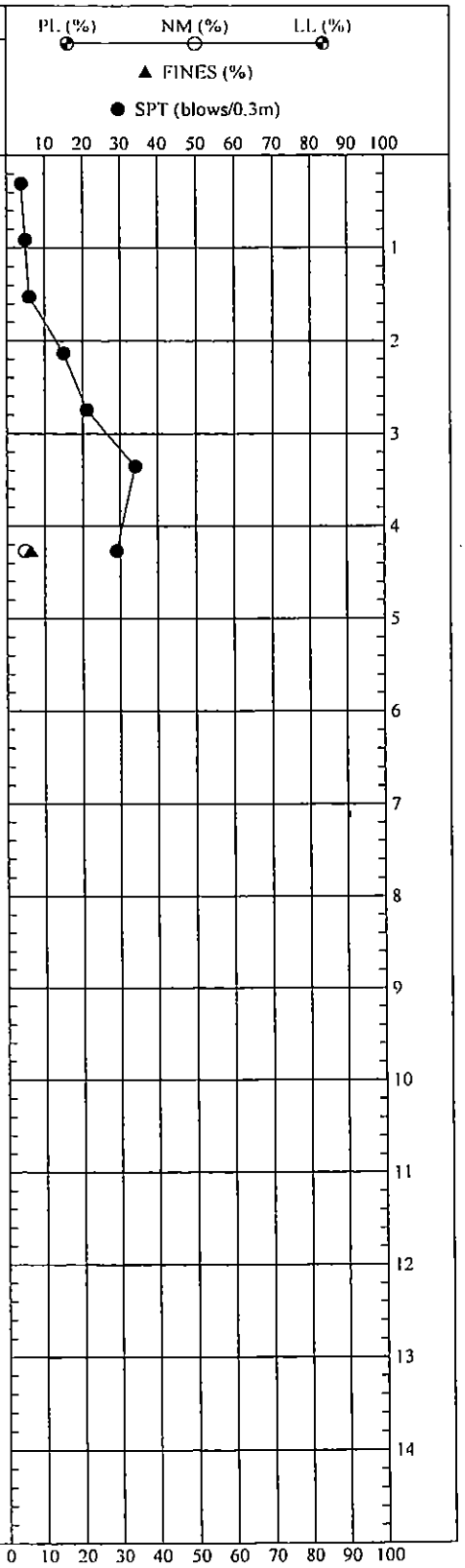
DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Very loose to very firm brown fine SAND (SP-SM) with little silt, damp		
3	- becomes dense at 3 m bgs		
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03.		

NOTES:
1. No ground water was encountered at time of drilling on 7/15/03.

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-2-2 N=4
SPT - 2	X	2-2-3 N=5
SPT - 3	X	2-2-4 N=6
SPT - 4	X	5-6-9 N=15
SPT - 5	X	6-10-11 N=21
SPT - 6	X	13-14-20 N=34
SPT - 7	X	7-11-18 N=29



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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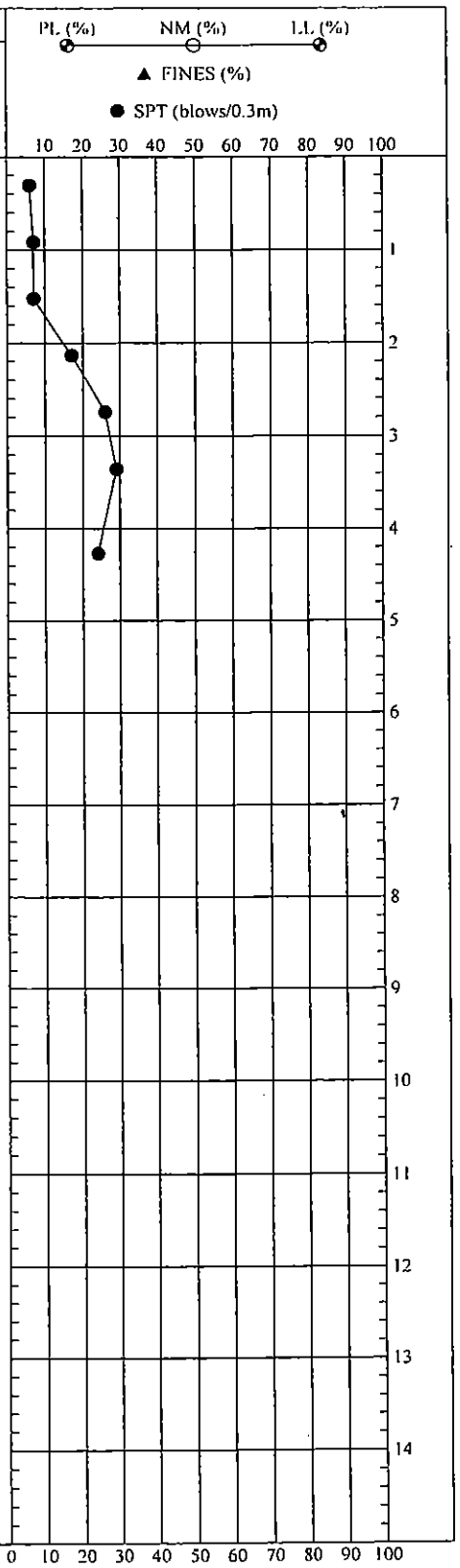
TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-19

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)	SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
0	Loose to very firm brown fine SAND (SP-SM) with little silt, damp			SPT - 1	X	1-3-3 N=6
				SPT - 2	X	3-3-4 N=7
				SPT - 3	X	2-3-4 N=7
				SPT - 4	X	7-8-9 N=17
				SPT - 5	X	6-10-16 N=26
				SPT - 6	X	16-15-14 N=29
				SPT - 7	X	6-10-14 N=24
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.					



20310 03-0110.GPJ LAW_JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: ATV CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

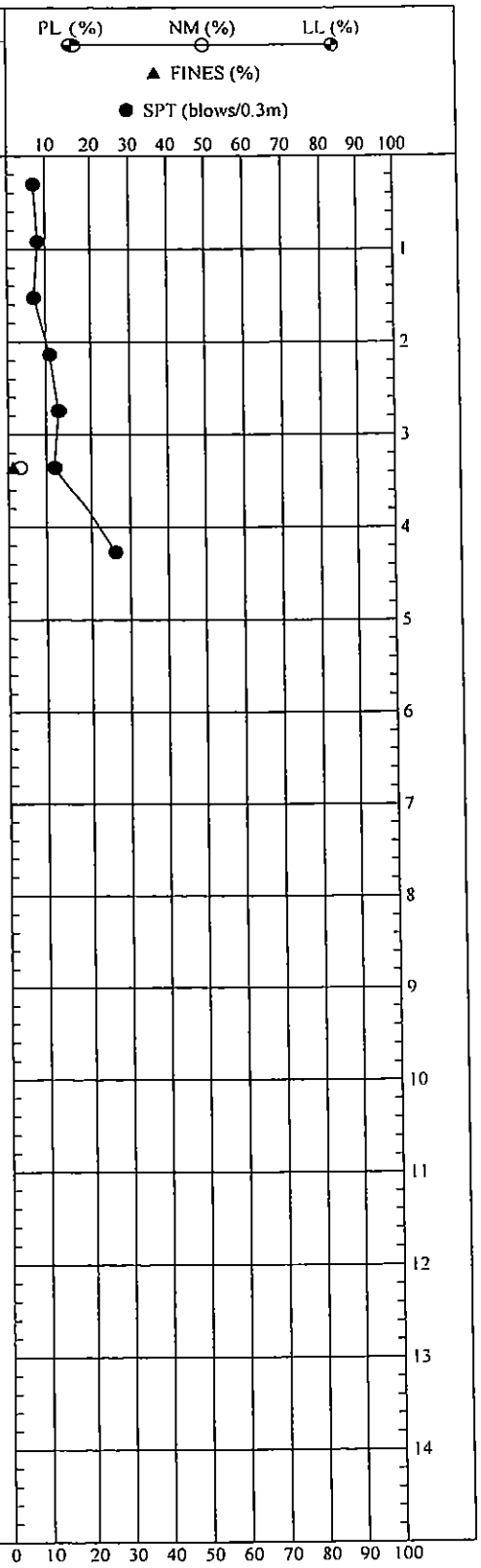
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-20

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Loose to very firm dark brown fine SAND (SP), trace silt, damp		
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-3-4 N=7
SPT - 2	X	2-4-4 N=8
SPT - 3	X	2-3-4 N=7
SPT - 4	X	4-5-6 N=11
SPT - 5	X	3-6-7 N=13
SPT - 6	X	5-5-7 N=12
SPT - 7	X	5-11-15 N=26



20310 03-0110.GPJ LAW_JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

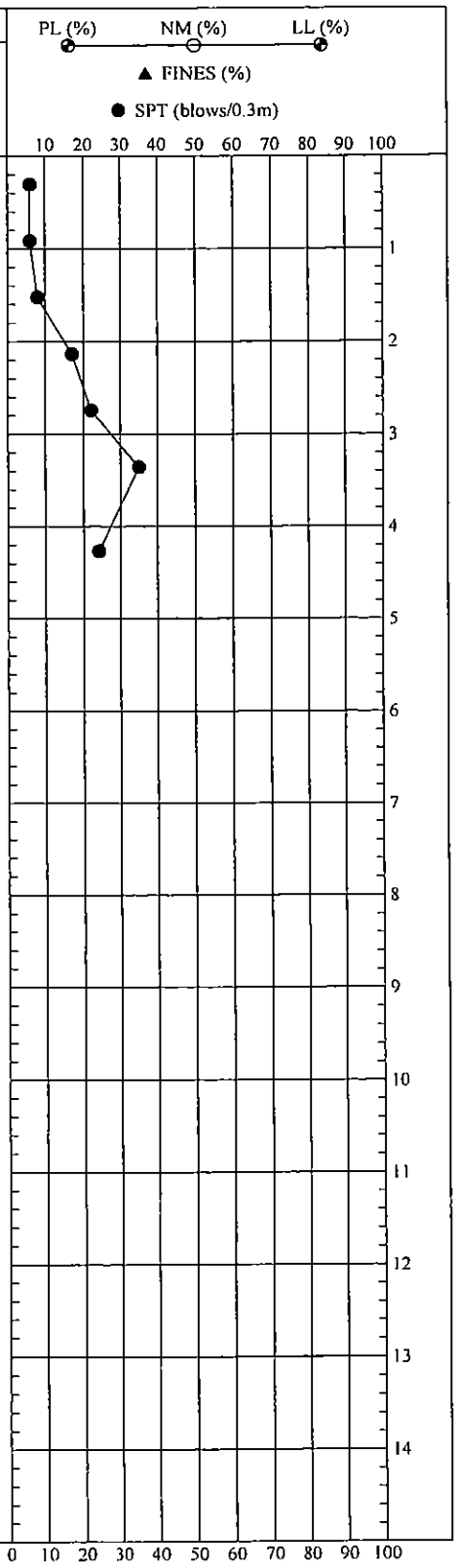
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-22

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Loose to very firm brown fine SAND (SP-SM) with little silt, damp		
1			
2			
3	- becomes dense at 3 m bgs		
4			
4.6	BORING TERMINATED AT 4.6 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03.		
5	**NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.		
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

SAMPLES IDENT	TYPE	N COUNT (1st 2nd 3rd)
SPT - 1	X	1-3-3 N=6
SPT - 2	X	4-3-3 N=6
SPT - 3	X	2-3-5 N=8
SPT - 4	X	8-9-8 N=17
SPT - 5	X	6-10-12 N=22
SPT - 6	X	11-15-20 N=35
SPT - 7	X	6-10-14 N=24



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

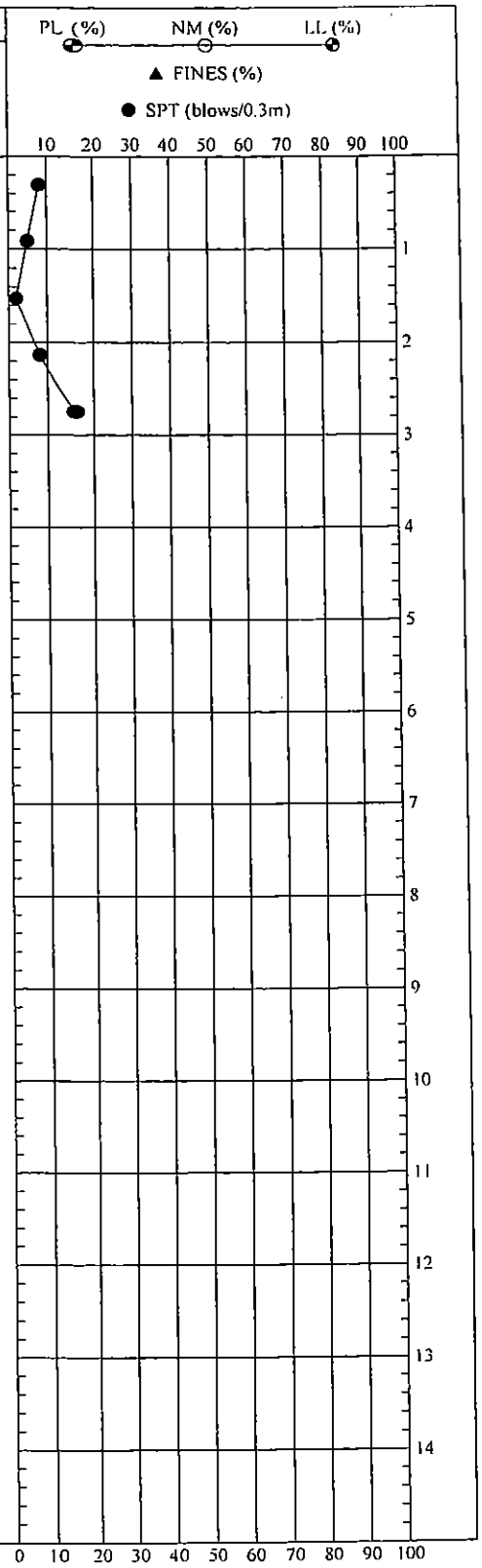
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. B-21

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Loose to firm yellowish brown fine SAND (SM) with some silt, damp.		
3	BORING TERMINATED AT 3 METERS BELOW GROUND SURFACE (BGS) ON 7/15/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/15/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-4-4 N=8
SPT - 2	X	3-2-3 N=5
SPT - 3	X	2-1-1 N=2
SPT - 4	X	3-4-4 N=8
SPT - 5	X	8-8-8 N=16



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

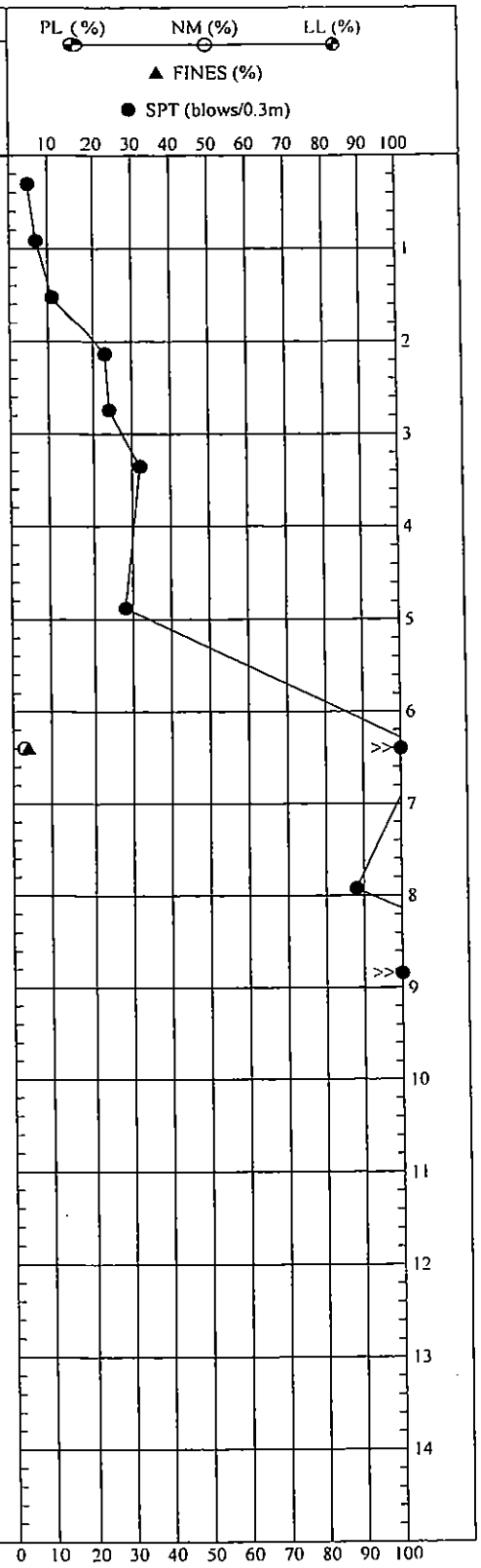
PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. PAV-1

DRILLED: July 15, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)
0	Loose to very firm brown fine SAND (SP), trace silt, damp		
3	- becomes dense at 3 m bgs		
6	- becomes very dense at 6.1 m bgs		
9	BORING TERMINATED AT 9.1 METERS BELOW GROUND SURFACE (BGS) ON 7/16/03. **NOTES:** 1. No ground water was encountered at time of drilling on 7/16/03.		

SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
SPT - 1	X	1-2-3 N=5
SPT - 2	X	2-3-4 N=7
SPT - 3	X	2-6-5 N=11
SPT - 4	X	8-11-12 N=23
SPT - 5	X	5-9-15 N=24
SPT - 6	X	15-13-19 N=32
SPT - 7	X	12-14-14 N=28
SPT - 8	X	17-50-56 N=106
SPT - 9	X	15-35-53 N=88
SPT - 10	X	16-50-90 N=140



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
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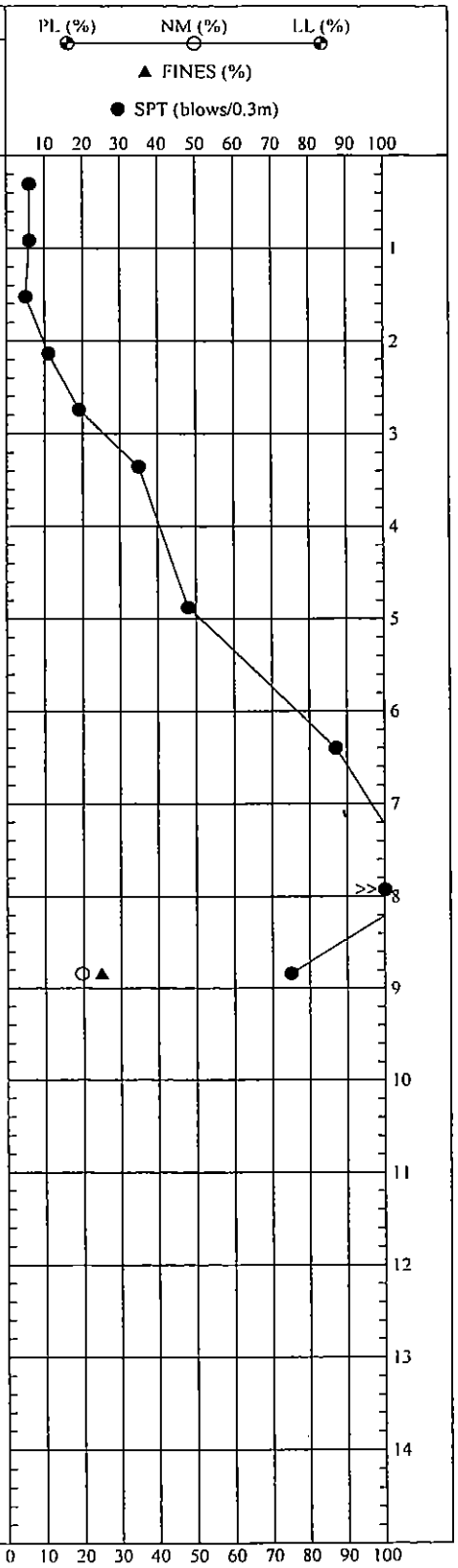
TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. WT-1

DRILLED: July 16, 2003
PROJ. NO: 3551-03-0110

MACTEC

DEPTH (m)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (m)	SAMPLES IDENT	TYPE	N COUNT 1st 2nd 3rd
0	Loose to firm brown fine SAND (SM) with some silt, damp			SPT - 1	X	1-2-4 N=6
1				SPT - 2	X	3-3-3 N=6
				SPT - 3	X	2-2-3 N=5
2				SPT - 4	X	4-5-6 N=11
				SPT - 5	X	4-7-12 N=19
3	- becomes dense at 3 m bgs			SPT - 6	X	13-16-19 N=35
4						
5				SPT - 7	X	10-20-28 N=48
6	- becomes very dense at 6.1 m bgs			SPT - 8	X	15-36-51 N=87
7						
8				SPT - 9	X	26-43-68 N=111
	- wet spoon at 8.5 m bgs			SPT - 10	X	15-32-43 N=75
9	BORING TERMINATED AT 9.1 METERS BELOW GROUND SURFACE (BGS) ON 7/16/03.					
10	**NOTES:** 1. No ground water was encountered at time of drilling on 7/16/03.					
11						
12						
13						
14						
15						



20310 03-0110.GPJ LAW JLF.GDT 8/19/03

DRILLER: SJB
EQUIPMENT: CME 850
METHOD: HSA
HOLE DIA.:
Logged by: V. Zofchak
Checked by: J.C. Giese
REMARKS:

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TEST BORING RECORD

PROJECT Ft. Drum WSAAF Barracks - Ft. Drum, NY
BORING NO. WT-2

DRILLED: July 16, 2003
PROJ. NO: 3551-03-0110

MACTEC

APPENDIX C

LABORATORY TESTING

LABORATORY TESTS

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types. Representative samples obtained during drilling operations are examined in our laboratory by an engineer. Soils are visually classified according to ASTM D 2488 based on color, texture, and consistency (determined from the number of blows per foot in standard penetration tests).

The classification system discussed above is primarily qualitative. For detailed soil classification, two laboratory tests are required: grain size analysis and index tests. Using these test results, soil can be classified according to the AASHTO, FAA, or UNIFIED Classification Systems (ASTM D 2487). Soil classifications, along with in-place physical soil properties, provide an index for estimating the behavior of a soil.

GRAIN SIZE ANALYSIS

Grain size analysis (ASTM D 422) are performed to determine the distribution of particle sizes in soil. Samples are prepared for testing according to ASTM D 2217. Particles passing the No. 200 sieve (0.074 mm opening) are labeled as fines (silts and clays). Particles retained on the No. 200 sieve are labeled the coarse fraction of the sample (sands and gravels). Further differentiation is possible by passing the sample through a standard set of nested sieves and/or by performing hydrometer tests, in which particles are suspended in water and the particle size distribution is calculated from the measured settlement rate.

INDEX TESTS

Index tests (ASTM D 4318) are performed to determine the moisture content boundaries between the liquid, plastic, and solid states of soils. These boundaries are called the Liquid Limit (LL) and Plastic Limit (PL). From these we derive the Plasticity Index (PI). Together, the LL, PL, and PI are referred to as the Atterberg Limits.

MOISTURE CONTENT

The natural moisture content is determined in accordance with ASTM D 854 by oven-drying and weighing the sample.

LABORATORY CBR TESTS

CBR (California Bearing Ratio) tests are conducted to determine soils resistance to penetration. The primary use of CBR tests is in the design and section thickness of flexible pavement systems.

Depending upon the locality, CBR tests are conducted in accordance with either ASTM D 1883 (AASHTO T-193) or VTM-8. All of the methods employ the same basic procedure, with slight differences in sample size, compactive effort, and calculations.

A six-inch diameter specimen is compacted at, or near, optimum moisture, a surcharge weight is applied, and the sample is soaked in water for four days. A three square-inch piston is then driven 0.5 inch into the surface and the resultant stresses recorded at each 0.1 inch penetration. The CBR value at a given penetration is expressed as a percentage of the standard value, at that same penetration, for a well-graded crushed limestone.

Typical CBR values range from 1 for poor subgrade soils to over 20 for very good materials, with CBR = 100 at 0.1 inch established as the reference value for the standard crushed limestone.

MOISTURE-DENSITY RELATIONSHIPS

The moisture-density relationship (also termed "Proctor" or "Compaction Test") is performed to determine the optimum moisture content and maximum dry density of a soil under controlled conditions of compaction. Several different test methods can be used, but all include the same basic procedure.

A representative soil sample is mixed with a small amount of water and compacted into a calibrated mold. The water content is determined and the wet and dry unit weights calculated. This process is repeated until successive additions of water produce a decrease in the dry unit weight (usually a minimum of four trials). The dry unit weights are plotted versus the water contents, and the maximum dry density and optimum moisture content are graphically obtained

The three main test standards include:

Standard (ASTM D 698) or AASHTO T-99): Each specimen is compacted in three layers using a 5.5 pound hammer falling 12 inches. For a four-inch diameter mold, 25 blows/layer; for a six-inch diameter mold, 56 blows/layer. Input energy - 12,375 ft-lbs/ft^3.

Modified (ASTM D 1557 or AASHTO T-180): Each specimen is compacted in five layers using a 10-pound hammer falling 18 inches. For a four-inch diameter mold, 25 blows/layer; for a six-inch diameter mold, 56 blows/layer. Input energy = 56,250 ft/lbs/ft^3.

Virginia (VTM-1): Soil is compacted same as "STANDARD" (using four-inch diameter mold), but maximum dry density and optimum moisture are empirically adjusted based upon the amount and type of gravel present.

MACTEC
Mactec Engineering and Consulting, Inc.
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-7000

Summary of Soil Classification Test Data

PROJECT NAME: Fort Drum USAAF Barracks
PROJECT NUMBER: 3551-03-0110
DATE: 08/05/03

SAMPLE ID	SAMPLE DEPTH (ft.)	SAMPLE TYPE	SOIL DESCRIPTION	SOIL CLASS.	% RETAINED NO. 4 SIEVE	% FINER NO. 200 SIEVE	NAT MOIST (%)	ATTERBERG LIMITS L.L	ATTERBERG LIMITS P.L	ATTERBERG LIMITS P.I.	COMMENTS
B-1	0 - 3	Bulk	Black poorly graded SAND with silt	SP-SM	0.1	8.6		NLL	NP	---	
B-2	0 - 3	Bulk	Brown poorly graded SAND with silt	SP-SM	0.3	5.4		NLL	NP	---	
B-3	0 - 3	Bulk	Black poorly graded SAND with silt	SP-SM	0.2	8.3		NLL	NP	---	
B-11	6 - 8	Jar	Brown poorly graded SAND with silt	SP-SM	0.0	5.0	5.8	NLL	NP	---	
B-15	8 - 10	Jar	Yellowish brown poorly graded SAND with silt	SP-SM	0.0	7.1	6.2	NLL	NP	---	
B-17	2 - 4	Jar	Yellowish brown poorly graded sand	SP	0.0	1.1	3.0	NLL	NP	---	
B-19	13 - 15	Jar	Brown poorly graded SAND with silt	SP-SM	0.0	6.2	4.8	NLL	NP	---	
B-22	10 - 12	Jar	Dark brown poorly graded SAND	SP	0.0	1.2	3.3	NLL	NP	---	
PAV-1	4 - 6	Jar	Yellowish brown silty SAND	SM	0.0	20.8	5.9	NLL	NP	---	
WT-1	20 - 22	Jar	Brown poorly graded SAND	SP	0.6	4.0	3.0	NLL	NP	---	
WT-2	28 - 30	Bag	Brown silty SAND	SM	0.0	24.7	19.5	NLL	NP	---	

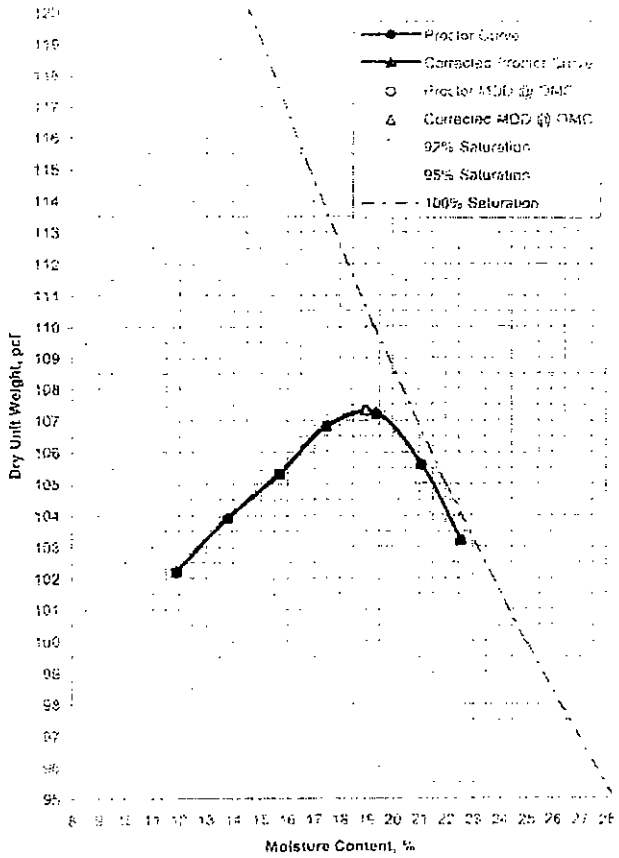
NOTES: 1. Soil classification and testing in accordance with USCS, ASTM D2487, D421, D422 & D4318
2. L.L. - Liquid Limit N.P. - Non-Plastic
P.L. - Plastic Limit N.L.L. - No Liquid Limit
P.I. - Plasticity Index
3. Soil color determined from Munsell Soil Chart

8/11/03
Reviewed
Chan Tin
Manager, Laboratory Services

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164

Project Name:	Fort Drum USAAF Barracks
Project Number:	3551-03-0110
Report Date:	7/23/03
Sample I.D.:	B-1
Test Method:	ASTM D698 A
Description:	Black poorly graded SAND with silt
Material Source:	Boring B-1

Moisture Density Curves



MATERIAL PASSING NO. 4	[illegible]
% MATERIAL RETAINED	[illegible]
% RETAINED MATERIAL	[illegible]
CORRECTED MDD, PCF	107.3
CORRECTED OMC, %	15.0

Zero Air-Voids Curves for Gs=2.67

Sieve Size	Wt Passing (%)
3 in	
2 in.	
1.5 in.	
1 in	
3/4 in	
3/8 in	100.0
No. 4	99.9
No. 10	99.7
No. 20	98.2
No. 40	75.2
No. 60	26.5
No. 100	[illegible]
No. 200	[illegible]

SAMPLE #	SAMPLE DEPTH (ft.)	SAMPLE TYPE	SOIL CLASS	% FINER NO. 200 SIEVE	NAT MOIST (%)	ATTERBERG LIMITS LL	PL	PI
B-1	0-3	Bulk	SP-SM	8.6	N/A	NL	NP	---

Reviewed by: [illegible]

Proctor B-1

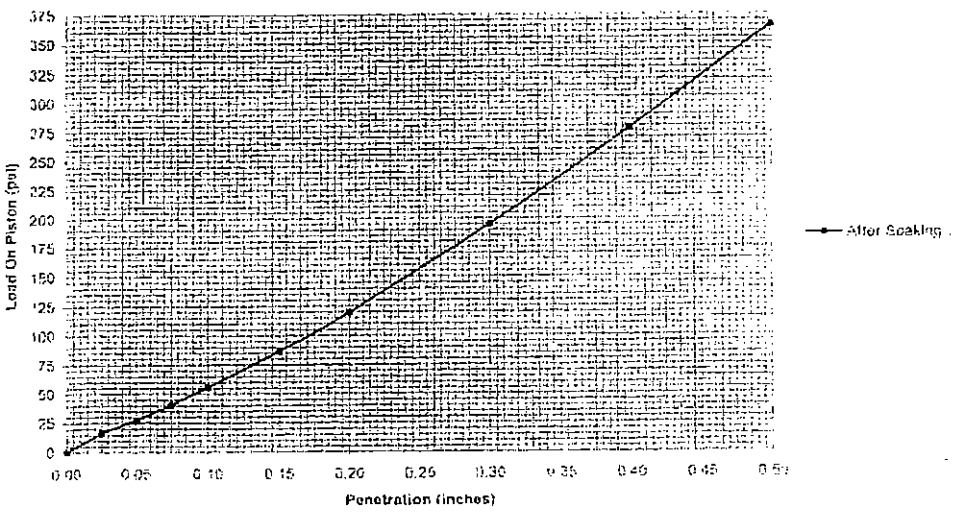
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
22455 Davis Drive, Suite 195
Sterling, VA 20164

PROJECT NAME	Fort Drum USAAF Barracks
PROJECT NUMBER	3551-03-0110
REPORT DATE	5/8/03

LOCATION	Boring B-1
SAMPLE NUMBER	B-1
DEPTH, FT	0-3
CLASSIFICATION	SP-SM
CONDITION	SOAKED
SURCHARGE WT., LBS.	10
INITIAL DRY DENSITY, PCF	105.8
INITIAL MOISTURE, %	19.1
INITIAL COMPACTION, %	98.6
FINAL DRY DENSITY, PCF	106.0
FINAL MOISTURE, %	16.6
FINAL MOISTURE, TOP 1", %	18.6
FINAL COMPACTION, %	98.8
SWELL, %	-0.150
CBR Value @ 0.1", uncorrected	5.6
CBR Value @ 0.2", uncorrected	8.0
Corrected Value @0.1"	N/A
Corrected Value @ 0.2	N/A

Penetration vs. Piston Load



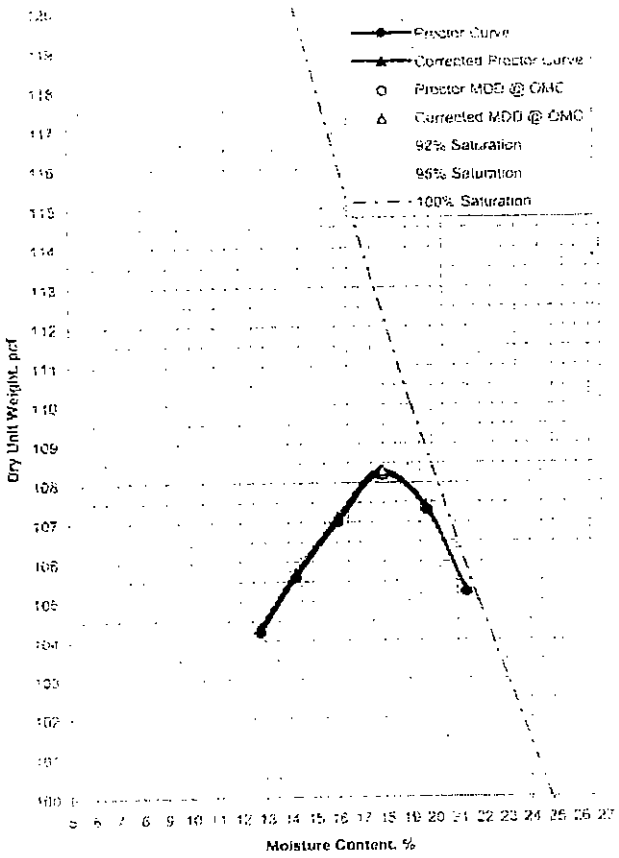
Reviewed by

B-1 CBR-ASTM

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164

Project Name:	Fort Drum USAAF Barracks
Project Number:	3551-03-0110
Report Date:	7/23/03
Sample I.D.:	B-2
Test Method:	ASTM D698 A
Description:	Brown poorly graded SAND with silt
Material Source:	Boring B-2

Moisture Density Curves



PROC. TOP MAX. DRY DENSITY	[illegible]
PROCTOR OPT. MOISTURE, %	18
MATERIAL PASSING SIEVE	No. 4
% MATERIAL RETAINED	[illegible]
Gs RETAINED MATERIAL	2.65
CORRECTED MDD, PCF	108.4
CORRECTED OMC, %	16.0

Zero Air-Voids Curves for Gs=2.65

Sieve Size	Wt. Passing (%)
3 in	
2 in.	
1.5 in	
1 in.	
3/4 in.	
3/8 in	100.0
No. 4	99.7
No. 10	95.4
No. 20	90.0
No. 40	75.8
No. 60	45.3
No. 100	10.2
No. 200	5.4

SAMPLE #	SAMPLE DEPTH (ft.)	SAMPLE TYPE	SOIL CLASS.	% FINER NO. 200 SIEVE	NAT MOIST. (%)	ATTERBERG LIMITS		
						LL	PL	PI
B-2	0-3	Bulk	N/A	5.4	N/A	N/A	N/A	N/A

Reviewed by: _____

Proctor B-2

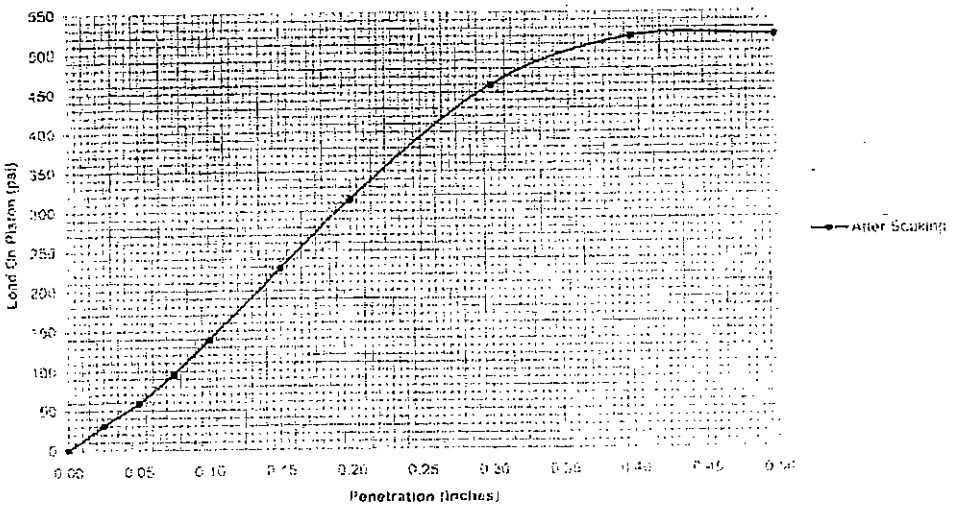
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
22455 Davis Drive Suite 100
Sterling, VA 20164

PROJECT NAME	Fort Drum USAAF Barracks
PROJECT NUMBER	3551-03-0110
REPORT DATE	5/8/03

LOCATION	Boring B-2
SAMPLE NUMBER	B-2
DEPTH, FT	0-3
CLASSIFICATION	SP-SM
CONDITION	SOAKED
SURCHARGE WT., LBS	10
INITIAL DRY DENSITY, PCF	106.9
INITIAL MOISTURE, %	17.9
INITIAL COMPACTION, %	98.8
FINAL DRY DENSITY, PCF	106.9
FINAL MOISTURE, %	14.5
FINAL MOISTURE, TOP 1", %	15.3
FINAL COMPACTION, %	98.8
SWELL, %	0.017
CBR Value @ 0.1", uncorrected	**13.9**
CBR Value @ 0.2", uncorrected	**21.0**
Corrected Value @0.1"	**N/A**
Corrected Value @ 0.2	**N/A**

Penetration vs. Piston Load



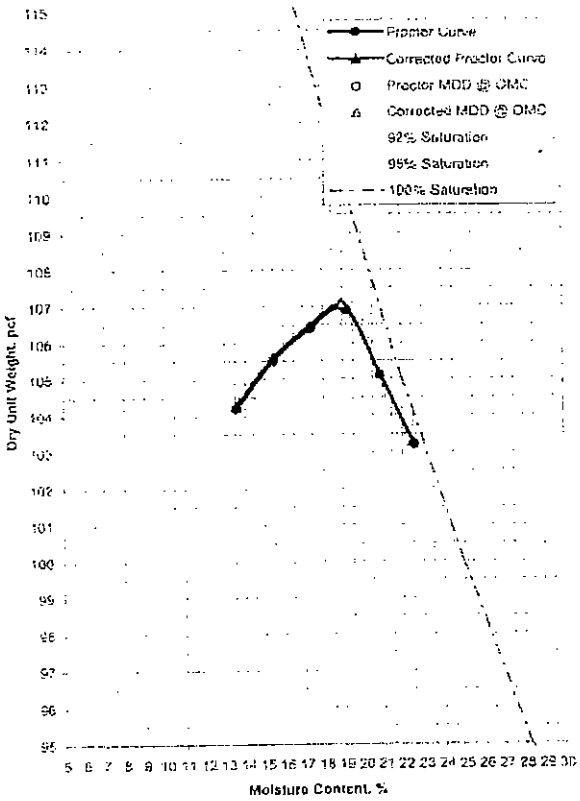
Reviewed by

B-2 CBR-ASTM

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164

Project Name:	Fort Drum USAAF Barracks
Project Number:	3551-03-0110
Report Date:	7/23/03
Sample I.D.:	B-3
Test Method:	ASTM D698 A
Description:	Black poorly graded SAND with silt
Material Source:	Boring B-3

Moisture Density Curves



PROCTOR MAX. DRY DENSITY	107
PROCTOR OPT. MOISTURE, %	19
MATERIAL PASSING SIEVE	No. 4
% MATERIAL RETAINED	0.7
Gs, RETAINED MATERIAL	2.67
CORRECTED MDD, PCF	107.1
CORRECTED OMC, %	19.0

Zero Air-Voids Curves for Gs = 2.67

Sieve Size	% Passing (%)
3 in.	
2 in.	
1.5 in.	
1 in.	
3/4 in.	
3/8 in.	99.0
No. 4	99.3
No. 10	99.3
No. 20	96.1
No. 40	74.1
No. 60	[illegible]
No. 100	[illegible]
No. 200	[illegible]

SAMPLE #	SAMPLE DEPTH (ft.)	SAMPLE TYPE	SOIL CLASS	% FINER NO. 200 SIEVE	NAT. MOIST (%)	ATTERBERG LIMITS		
						LL	PL	PI
B-3	0-2	Bulk	SP-SM	8.3	N/A	NLL	NP	---

Reviewed by [illegible]

Proctor B-3

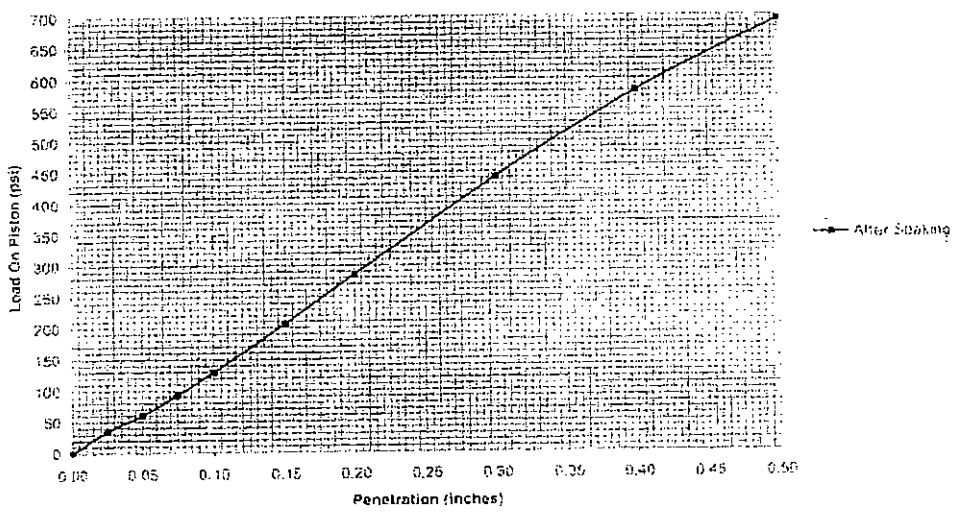
MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
22455 Davis Drive Suite 100
Sterling, VA 20164

PROJECT NAME	Fort Drum USAAF Barracks
PROJECT NUMBER	3551-03-0110
REPORT DATE	5/8/03

LOCATION	Boring B-3
SAMPLE NUMBER	B-3
DEPTH, FT	0-3
CLASSIFICATION	SP-SM
CONDITION	SOAKED
SURCHARGE WT., LBS	10
INITIAL DRY DENSITY, PCF	105.6
INITIAL MOISTURE, %	19.0
INITIAL COMPACTION, %	98.8
FINAL DRY DENSITY, PCF	105.9
FINAL MOISTURE, %	15.1
FINAL MOISTURE, TOP 1", %	17.4
FINAL COMPACTION, %	98.9
SWELL, %	-0.100
CBR Value @ 0.1", uncorrected	12.9
CBR Value @ 0.2", uncorrected	19.0
Corrected Value @0.1"	N/A
Corrected Value @ 0.2	N/A

Penetration vs. Piston Load



Reviewed by: [illegible] 5/[illegible]

B-3 CBR-ASTM

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-7000

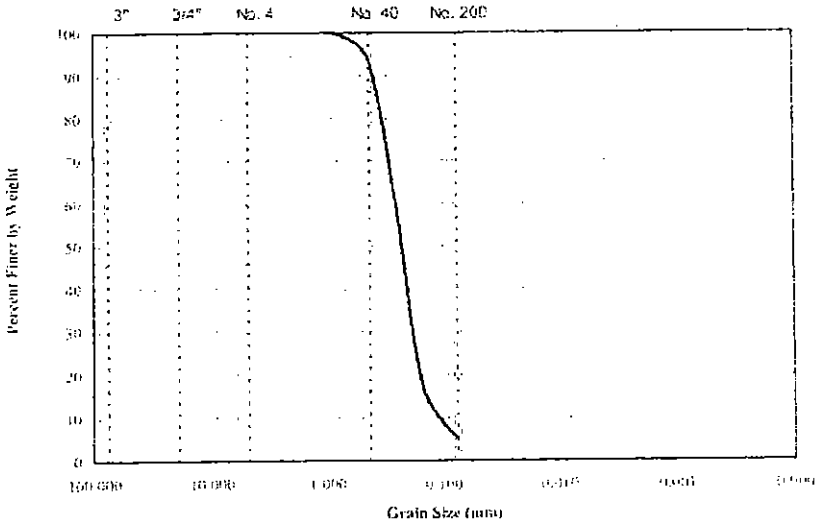
Project Name	Fort Drum USAAF Barracks
Project Number	3551-03-0110
Report Date:	08/05/03

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: B-11 @ 6' - 8'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained Each Sieve (g)	Cumulative % Passing
# 10	0.00	[illegible]	100.0
# 20	0.18	[illegible]	99.8
# 40	5.90	[illegible]	[illegible]
# 60	36.28	[illegible]	[illegible]
# 100	75.68	[illegible]	[illegible]
# 200	86.74	[illegible]	5.0
Wt. of Soil, g	91.35		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed by: [illegible] 8/7/03

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20166
(703) 404-7000

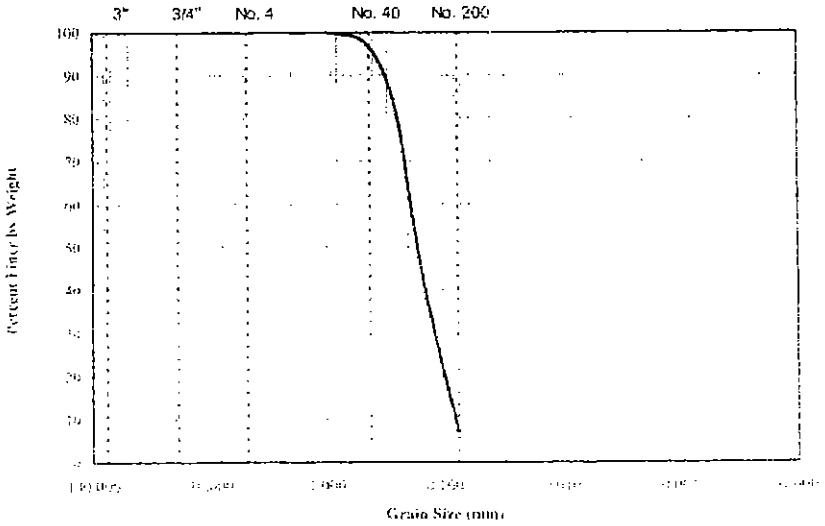
Project Name:	Fort Drum USAAF Barracks
Project Number:	3551-03-0116
Report Date:	06/05/03

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: B-15 @ 8' - 10'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained per Sieve (g)	% Finer by Weight Passing
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	
Wt. of Soil, g	82.95		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed By: [illegible]

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-7000

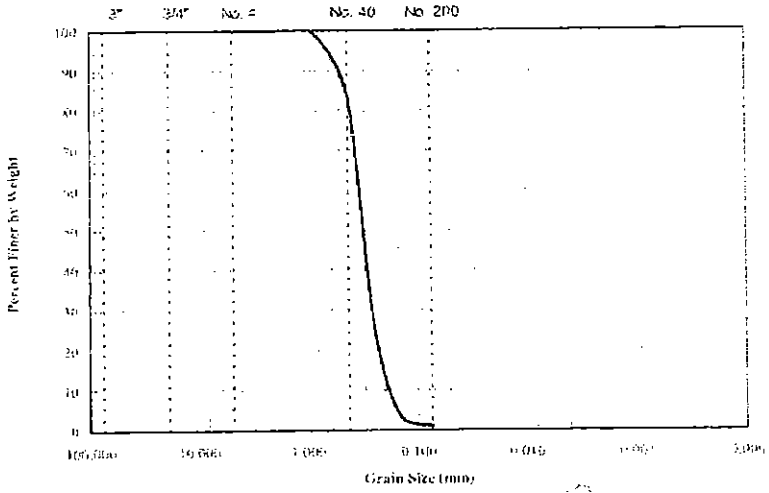
Project Name: [illegible]
Project Number: [illegible]
Report Date: [illegible]

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: B-17 @ 2' - 4'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained (g)	Cumulative % Passing
# 4	0.06	[illegible]	[illegible]
# 10	0.14	[illegible]	99.9
# 20	0.74	[illegible]	[illegible]
# 40	18.09	[illegible]	[illegible]
# 60	81.36	[illegible]	[illegible]
# 100	106.63	[illegible]	[illegible]
# 200	110.22	3.6	[illegible]
Wt. of Soil, g	111.39		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed by: [illegible]

[illegible]

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-2000

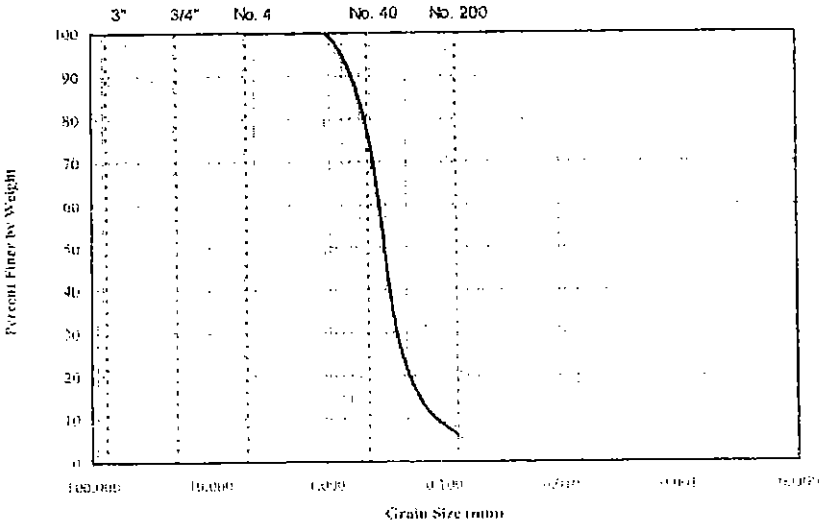
Project Name	Fort Drum USAAF Barracks
Project Number	3551-03-0110
Report Date:	05/08/03

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: B-19 @ 13' - 15'

Sieve Size	Cumulative Wt Retained (g)	Wt Retained Each Sieve (g)	Cumulative % Passing
# 4	0.00	[illegible]	100.0
# 10	0.16	[illegible]	99.9
# 20	1.84	[illegible]	98.4
# 40	25.33	[illegible]	[illegible]
# 60	36.05	[illegible]	[illegible]
# 100	96.11	[illegible]	[illegible]
# 200	104.36	[illegible]	[illegible]
Wt of Soil, g	111.03		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed by [illegible]

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404 7000

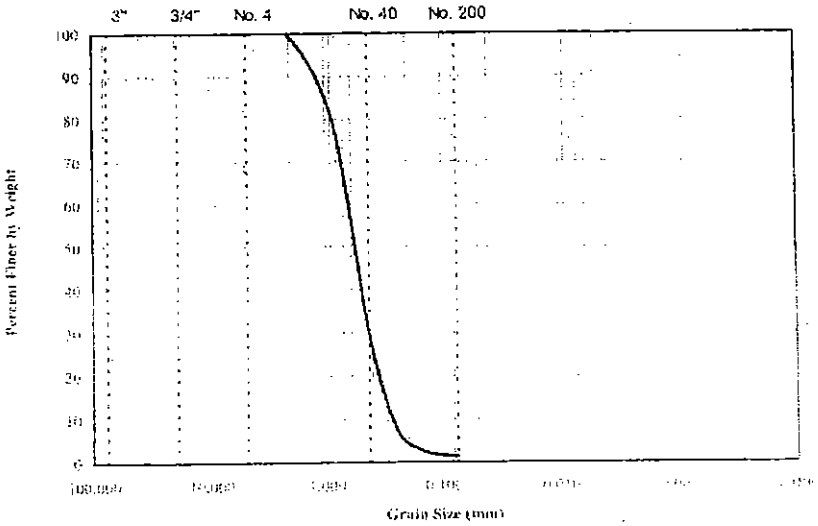
Project Name: Fort Drum USAAF Barracks
Project Number: 3551-03-0110
Report Date: 05/05/03

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: B-22 @ 10' - 12'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained Each Sieve (g)	Cumulative Passing
# 4	0.50	[illegible]	[illegible]
# 10	0.76	[illegible]	99.[illegible]
# 20	12.04	13.[illegible]	72.4
# 40	66.73	[illegible]	[illegible]
# 60	88.02	21.[illegible]	[illegible]
# 100	92.76	[illegible]	[illegible]
# 200	94.16	1.2	1.2
Wt. of Soil, g	95.25		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed by: [illegible]

B-22 Sieve

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-7000

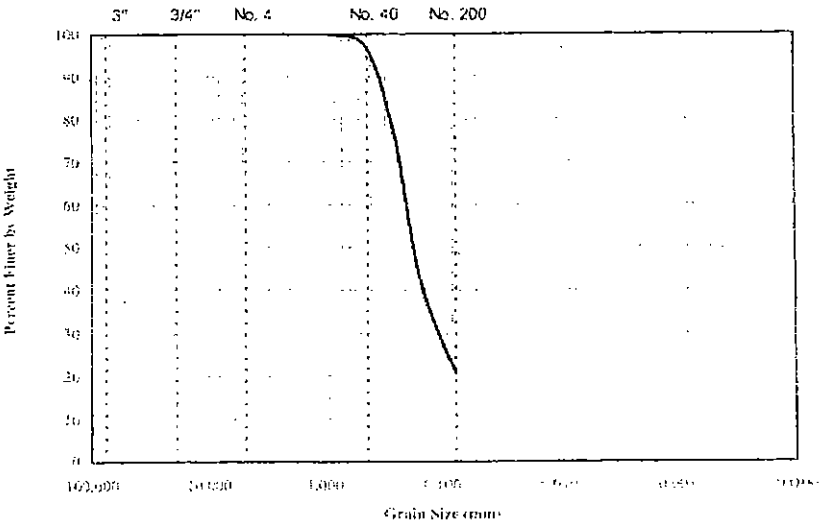
Project Name:	Fort Drum USAA Barracks
Project Number:	3551-03-0110
Report Date:	08/05/03

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: PAV-1 @ 4' -6'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained on Sieve (g)	% Cumulative % Passing
# 10	0.00	0.0	100.0
# 20	0.06	0.1	99.9
# 40	3.04	3.0	96.6
# 60	21.87	18.8	76.2
# 100	52.41	30.5	42.2
# 200	71.27	18.9	20.5
Wt. of Soil, g	90.65		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed By: _____

Page 1 Sieve

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-7000

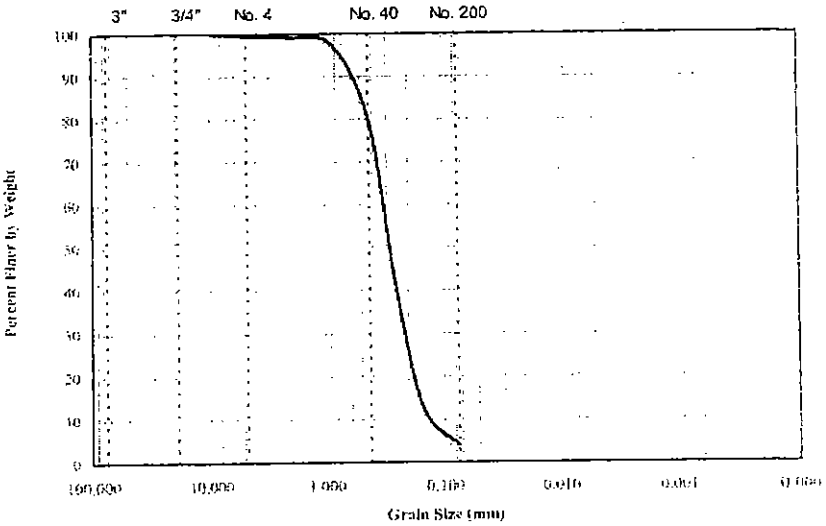
Project Name: Fort Drum USAAF Barracks
Project Number: 3551-03-0110
Report Date: 08/05/03

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: WT-1 @ 20' - 22'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained Each Sieve (g)	Cumulative % Passing
3/8 in.	0.00	0.0	100.0
# 4	0.91	0.9	99.4
# 10	1.37	0.5	99.1
# 20	4.14	2.7	97.4
# 40	31.47	27.4	80.0
# 60	94.74	63.3	39.7
# 100	137.34	42.6	12.6
# 200	150.82	13.5	4.0
Wt. of Soil, g	157.12		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed by: [signature] 8/6/03

WT-1 Sieve

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC
22455 Davis Drive, Suite 100
Sterling, Virginia 20164
(703) 404-7000

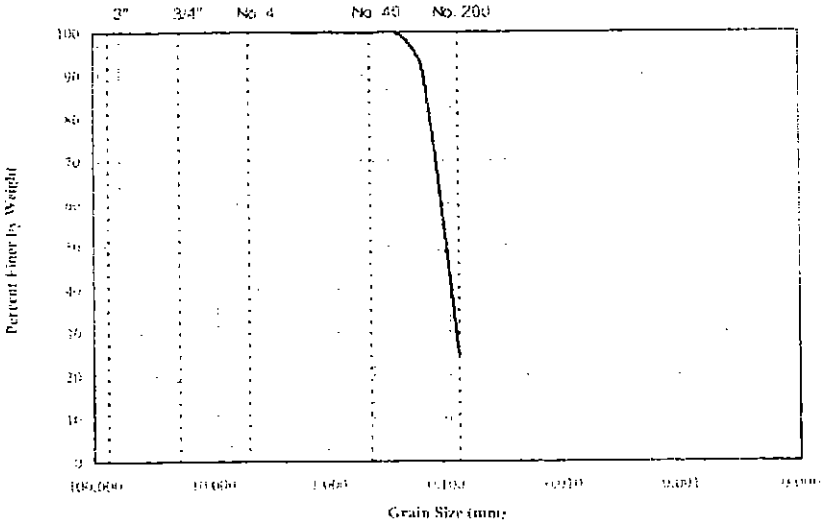
Project Name: [illegible]
Project Number: [illegible]
Report Date: [illegible]

Washed Particle Size/Gradation Test Report
ASTM D422

Sample Number: WT-2 @ 28' - 30'

Sieve Size	Cumulative Wt. Retained (g)	Wt. Retained on Sieve (g)	% Cumulative % Passing
# 10	0.00	0.0	100.0
# 20	0.02	0.0	100.0
# 40	0.05	0.0	99.9
# 60	0.22	0.2	99.8
# 100	8.04	8.4	[illegible]
# 200	22.40	66.8	24.3
Wt. of Soil, g	92.51		

Particle Size Analysis
U.S. Standard Sieve Sizes



Reviewed by: [illegible]

ADDITIONAL BORING LOGS
FORT DRUM WHEELER SACK ARMY AIRFIELD BARRAKS COMPLEX
FORT DRUM, NEW YORK

SCHNABEL ENGINEERING ASSOCIATES
Consulting Engineers and Geologists
IDENTIFICATION OF SOIL

I. DEFINITION OF SOIL GROUP NAMES **ASTM D2487**

			Symbol	Group Name
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels - More than 50% of coarse fraction retained on No. 4 sieve Coarse, : to 3" Fine, No. 4 to :"	Clean Gravels Less than 5% fines	GW	Well Graded Gravel
			GP	Poorly Graded Gravel
		Gravels with Fines More than 12% fines	GM	Silty Gravel
			GC	Clayey Gravel
	Sands - 50% or more of coarse fraction passes No. 4 sieve Coarse, No. 10 to No. 4 Medium, No. 40 to No. 10 Fine, No. 200 to No. 40	Clean Sands Less than 5% fines	SW	Well Graded Sand
			SP	Poorly Graded Sand
		Sands with Fines More than 12% fines	SM	Silty Sand
			SC	Clayey Sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays - Liquid Limit less than 50 Low to medium plasticity	Inorganic	CL	Lean Clay
			ML	Silt
		Organic	OL	Organic Clay
				Organic Silt
	Silts and Clays - Liquid Limit 50 or more Medium to high plasticity	Inorganic	CH	Fat Clay
			MH	Elastic Silt
		Organic	OH	Organic Clay
				Organic Silt
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		PT	Peat

II. DEFINITION OF MINOR COMPONENT PROPORTIONS

Minor Component	Approximate Percentage of Fraction by Weight
Adjective Form	
Gravelly, Sandy	30 % or more coarse grained
With	
Sand, Gravel	15% or more coarse grained
Silt, Clay	5% to 12% fine grained
Trace	
Sand, Gravel	Less than 15% coarse grained
Silt, Clay	Less than 5% fine grained

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS: Unified Soil Classification Symbols are shown above as group symbols. Use A Line Chart for laboratory identification. Dual symbols are used for borderline classifications.

BOULDERS & COBBLES: Boulders are considered rounded pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inch size.

DISINTEGRATED ROCK: Residual rock material with Standard Penetration Resistance (SPT) of more than 60 blows per foot, and less than refusal. Refusal is defined as a SPT of 100 blows for 2" or less penetration.

ROCK FRAGMENTS: Angular pieces of rock, distinguished from transported gravel, which have separated from original vein or strata and are present in a soil matrix.

QUARTZ: A hard silica mineral often found in residual soils.

IRONITE: Iron oxide deposited within a soil layer forming cemented deposits.

CEMENTED SAND: Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate or other materials.

MICA: A soft plate of silica mineral found in many rocks, and in residual or transported soil derived therefrom.

ORGANIC MATERIALS (Excluding Peat):
- Topsoil - Surface soils that support plant life and which contain considerable amounts of organic matter;
- Organic Matter - Soil containing organic colloids throughout its structure;
- Lignite - Hard, brittle decomposed organic matter with low fixed carbon content (a low grade of coal).

FILL: Man-made deposit containing soil, rock and often foreign matter.

PROBABLE FILL: Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

LENSES: 0 to 2 inch seam of minor soil component.

LAYERS: 2 to 12 inch seam of minor soil component.

POCKET: Discontinuous body of minor soil component.

COLOR SHADES: Light to dark to indicate substantial difference in color.

MOISTURE CONDITIONS: Wet, moist, or dry to indicate visual appearance of specimen.

BLF-01

204.0

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	1 2 1	S1		Tan-brown, fine SAND, tr. Silt (SP)	v. loose to loose
	2	2 9				
1	3	44 20 24	S2			dense
	4	10			4.5'	
	5	12 16 16	S3		GRAVEL (crushed stone)	5.0' fill
2	6	20 32			Tan, fine SAND, trace Silt (SP)	natural soil
	7	28 40	S4			cross-bedded
	8	17 17				
3	9	20 24	S5			dense
	10	12 17				
	11	20 28 29	S6			
	12					
4	13					
	14	20 41 50	S7			very dense
	15					TD = -15.0'
5	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
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	40					
	41					

BLF-02

204.5

DEPTH METERS	DEPTH FEET	BLOWS 6"	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	1 2 3 4	S1		Tan-brown, very-fine to fine SAND, trace Silt (SP)	trace gravel 2.0' loose fill
	2	6 8 14 15	S2		Tan, v-fine to fine SAND, trace Silt (SP)	native soil
1	3	12 14 14 16	S3		6.0'	medium density
	4	10 12 12 18	S4		Tan, v-fine to fine SAND, trace to little Silt (SP-SM)	
2	5	8 8 11 12	S5			(medium to dense)
	6	10 14 24 10	S6			
	7					
	8					
	9					
3	10					
	11					
	12					
4	13					
	14	11 16 25	S7			
	15					TD = -15.0'
5	16					
	17					
	18					
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BLF-03

212.0

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	6, 12, 12, 14	S1		Dark brown SAND, little Silt, trace Gravel (SM)	.5' fibrous topsoil; medium dense
	2	12, 14			Red-brown, fine-medium SAND, trace Silt (SP)	2.0'
1	3	15, 12	S2			cross-bedded
	4	7, 7			Tan, fine SAND, trace Silt (SP)	
	5	12, 14	S3			
	6	12, 15				
2	7	20, 15	S4			
	8	12, 15			Tan, v-fine to fine SAND, trace Silt (SP)	8.0'
	9	20, 26	S5			
3	10	8, 12				medium to dense
	11	14, 15	S6			
	12	17				
4	13					
	14					
	15					
5	16	9, 11	S7			
	17	1				
	18					
6	19					
	20					
	21	8, 10	S8			
	22	12				
7	23					
	24					
	25					
8	26	18, 24	S9			
	27	20				
	28					
9	29	14, 22	S10			very dense
	30	40				TD = -30.0'
	31					
	32					
10	33					
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BLF-04

210.0

DEPTH METERS	DEPTH FEET	BLOWS 6"	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	4 7 8 12	S1		Brown, fine SAND, trace Silt (SP)	1.5' fill
	2	9				fiberous topsoil
1	3	15 15 17	S2		Dark-brown SAND, trace Silt (SM-SP)	medium to dense
	4	7				
	5	9 11 12	S3		Tan to brown, very-fine to fine SAND, trace Silt (SP)	6.0'
2	6	9				
	7	12 12 14	S4		Tan, fine to medium SAND, trace Silt (SP)	cross-bedded medium to dense
	8	7				
	9	9 16 16	S5			
3	10	9				
	11	11 11 14	S6			
	12					
4	13					
	14					
	15					
5	16	9				
	17	14 14	S7			
	18					
	19					
6	20				Light tan, very-fine SAND, trace to little Silt (SP-SM)	
	21	9				
	22	14 15	S8			
7	23					medium to dense
	24					
	25	9				
8	26	14 16	S9			
	27					
	28					28.5'
	29	12 15 17	S10		Light tan, very-fine SAND, trace Silt (SP)	
9	30					TD = -30.0'
	31					
	32					
10	33					
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BLF-05

206.5

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	1 2 2 1	S1		Tan, v. fine to fine SAND trace Silt (SP) 2.0'	very loose
1	2 3	2 2 10 8	S2		Dark-brown SILT and fine SAND, trace Gravel (ML-SM)	4.0' fill
	4 5	10 14 14 12	S3		GRAVEL, crushed stone	native soil
2	6 7	12 14 12 14	S4		Dark-brown SAND, trace Silt, trace Gravel (SP)	medium dense
	8 9	8 10 11 11	S5		Tan fine to medium SAND, trace Silt (SP)	cross-bedded
3	10 11	12 14 14 16	S6			
4	12 13 14 15	10 12 15	S7			TD = -15.0'
5	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41					

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BLF-06

204.0

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	2 5 12 12	S1		Reddish-tan, v. fine SAND trace Silt (SP)	1.0' loose fill / native soil
	2	12 15 15 12			Tan to red-brown, fine SAND, trace Silt (SP)	medium
1	3		S2			
	4	8 12 15 25			Tan to brown, very-fine SAND, trace Silt, trace Gravel (SP)	cross-bedded
	5		S3			
2	6	15 27 30 33				medium to dense
	7		S4			
	8	2 16 16 24				
	9		S5			
3	10	16 20 20 26				
	11		S6			
	12					
4	13					
	14	22 36 52	S7			very dense
	15					TD = -15.0'
5	16					
	17					
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BAF-07

212.2

DEPTH METERS	DEPTH FEET	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	S1 (2, 4, 5, 5)		Dark-brown SAND, little Silt (SM)	.5' top soil loose
1	2, 3	S2 (2, 4, 5, 5, 7)		Yellow-brown, fine to medium SAND, trace Silt (SP)	
	4, 5	S3 (5, 5, 7, 12)		Tan, fine to medium SAND, trace Silt (SP)	cross-bedded
2	6, 7	S4 (6, 10, 12, 14)			medium
	8, 9	S5 (8, 11, 14, 15)			
3	10, 11	S6 (7, 9, 14, 16)			
	12				
4	13, 14	S7 (8, 14, 17, 19)		Tan very-fine SAND, trace Silt (SP)	medium to dense
	15				TD = -15.0'
5	16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42				

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BAF-08

211.4

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	2 3 4 4	S1		Dark-brown fine to medium SAND, trace Silt (SP)	10.0" top soil loose
1	2 3	3 4 4 5	S2		Tan, fine to medium SAND, trace Silt (SP)	
	4 5	6 8 10 11	S3		Tan, medium-coarse SAND, trace Silt, trace Gravel (SP)	medium
2	6 7 8 9	10 12 16 8 10 14 14	S4 S5		Tan fine to medium SAND, trace Silt (SP)	cross-bedded
3	10 11 12	8 10 10 14	S6		Tan very-fine to fine SAND trace Silt (SP)	medium to dense
4	13 14 15	8 16 20	S7			TD = -15.0'
5	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41					

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BAF-09

210.7

DEPTH METERS	DEPTH FEET	6"	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1	3 5 6 7	S1		Dark-brown, fine SAND, little Silt (SM) .9'	fibrous topsoil
	2	6 8			Tan-brown, fine to medium SAND, trace Silt (SP)	loose to medium
1	3	5 8	S2			
	4	6				
	5	8 9 11	S3		Tan-brown, medium to coarse SAND, trace Silt and Gravel	medium to dense
2	6	10				
	7	16 15 24	S4		Tan very-fine to fine SAND trace Silt (SP)	
	8					
	9		NS			cross-bedded
3	10	12				
	11	12 20 24	S5			
	12					
4	13					
	14	14 20 21	S6			
	15					TD = -15.0'
5	16					
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TP1

212.0

DEPTH METERS	DEPTH FEET	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1			Dark-brown, fine-med. SAND, trace Silt .6'	fibrous topsoil
	2			Red-brown fine to medium SAND, trace Silt (SP)	
1	3				
	4			Tan very-fine to fine SAND trace Silt (SP)	cross-bedded
	5				
2	6				
	7				
	8				
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3	10				
	11				
	12				TD = -12.0'
4	13				
	14				
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TP2

212.5

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1				Dark-brown, f. – m. SAND little Silt and Gravel (SM) 9'	fibrous topsoil
	2				Red-brown, fine-medium SAND, trace Silt (SP)	
1	3				Tan, v. fine to fine SAND trace Silt (SP)	cross-bedded
	4					
	5					
2	6					
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	12					TD = -12.0'
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TP3

212.0

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1				Dark-brown, fine SAND Little Silt, tr. Gravel .4'	fibrous topsoil
	2				Red-brown fine SAND, trace Silt (SP)	cross-bedded
1	3				Tan, v. fine to fine SAND trace Silt (SP)	
	4					
	5					
2	6					
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	12					TD = -12.0'
4	13					
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TP4

212.5

DEPTH METERS	DEPTH FEET	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1			Dark-brown, fine-med. SAND little Silt & Gravel (SM) .7'	fibrous topsoil
	2			Red-brown, fine to med. SAND, trace Silt (SP)	cross-bedded
1	3			Tán, v. fine to fine SAND trace Silt (SP)	
	4				
	5				
2	6				
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3	10				
	11				
	12				TD = -12.0'
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TP5

211.5

DEPTH METERS	DEPTH FEET	BLOWS 6"	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1				Dark-brown f. to med. SAND tr. - little Silt (SP-SM)	2"topsoil
	2				Red-brown fine to medium SAND. trace Silt (SP)	
1	3				Tan, v. fine to fine SAND trace Silt (SP)	cross-bedded
	4					
	5					
2	6					
	7					
	8					
	9					
3	10					
	11					
	12					TD = -12.0'
4	13				**Topsoil stripped off	
	14					
	15					
5	16					
	17					
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TP6

211.5

DEPTH METERS	DEPTH FEET	BLOWS 6"	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1				Dark-brown SAND, tr. Silt	1" fibrous topsoil
	2				Red-brown, fine to med. SAND (SP)	
1	3				Tan, v.fine to fine SAND, trace Silt (SP)	cross-bedded
	4					
	5					
2	6					
	7					
	8					
	9					
3	10					
	11					
	12					TD = -12.0'
4	13				** topsoil stripped-off	
	14					
	15					
5	16					
	17					
	18					
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	20					
	21					
	22					
	23					
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TP7

211.75

DEPTH METERS	DEPTH FEET	BM W	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1				Dark-brown fine to medium SAND, little Silt (SM)	8" fibrous topsoil
	2				Red-brown fine to medium SAND, trace Silt (SP)	
1	3					
	4				Tan, fine SAND, trace Silt (SP)	cross-bedded
	5					
2	6					
	7					
	8					
	9					
3	10					
	11					
	12					TD = -12.0'
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TP8

208.0

DEPTH METERS	DEPTH FEET	BLOWS	SAMPLE NUMBER	LEGEND	CLASSIFICATION OF MATERIALS (Description)	REMARKS
	1				Dark-brown/brown fine to medium SAND, trace to little Silt and Gravel (SP-SM)	Debris (cable-wire) fill
	2				Crushed Stone Aggregate	varies 6"-2.5'
1	3				Red-brown fine SAND, trace Silt (SP)	possible fill
	4				Tan fine SAND, trace Silt (SP)	cross-bedded natural soil
	5					
2	6					
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4	13					
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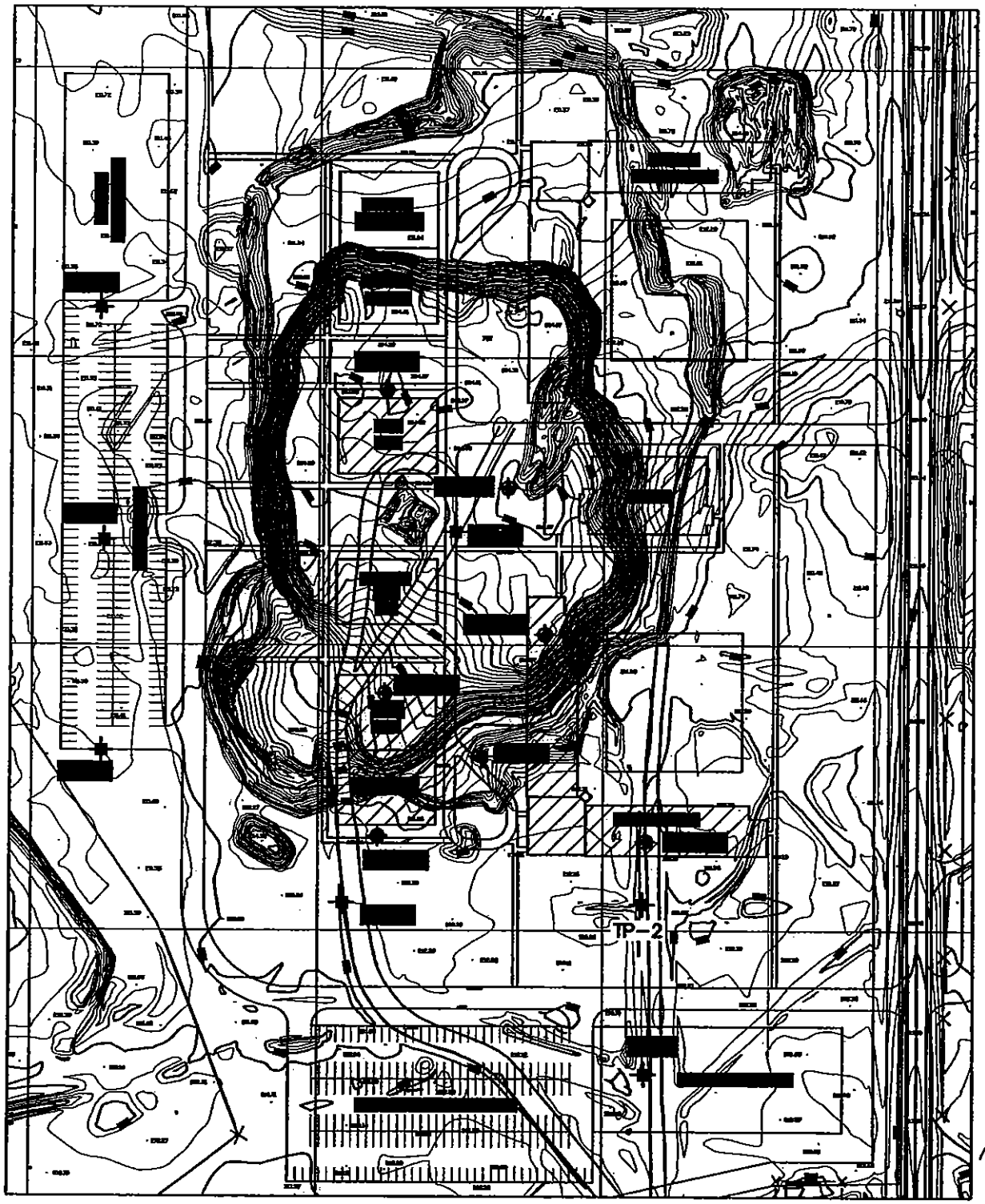

GRAPHIC SCALE

(IN METERS)

1 : 2000

LEGEND

APROXIMATE TEST BORING LOCATION

APROXIMATE TEST PIT LOCATION

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5/20/02

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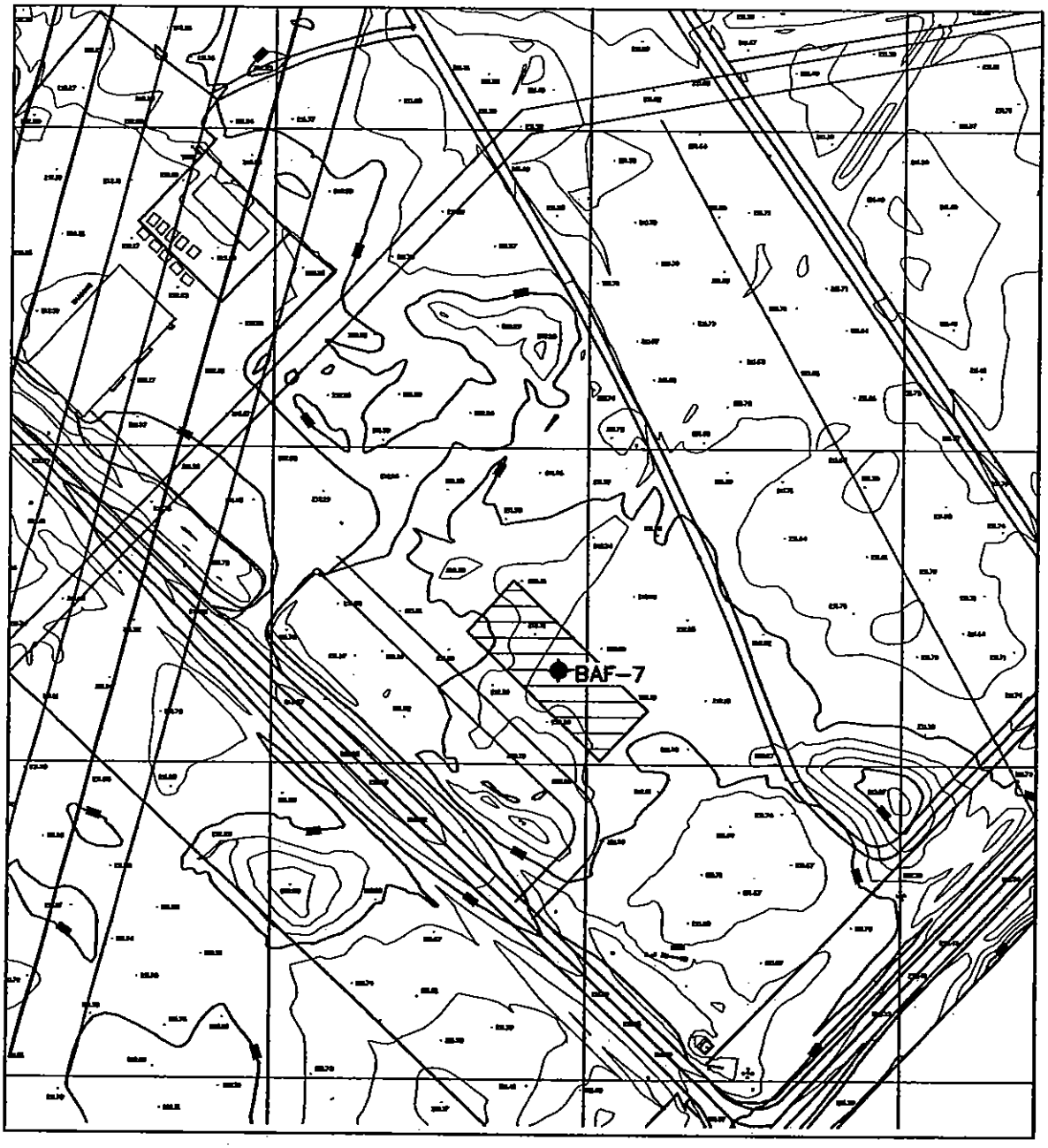
BARRACKS COMPLEX
WSAAF PHASE I

FT. DRUM, NEW YORK
SEA PROJECT NO. 02191010.00

TEST BORING
LOCATION PLAN

SHEET 1



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GRAPHIC SCALE

(IN METERS)

1 : 2000

LEGEND

APROXIMATE TEST BORING LOCATION

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5/20/02

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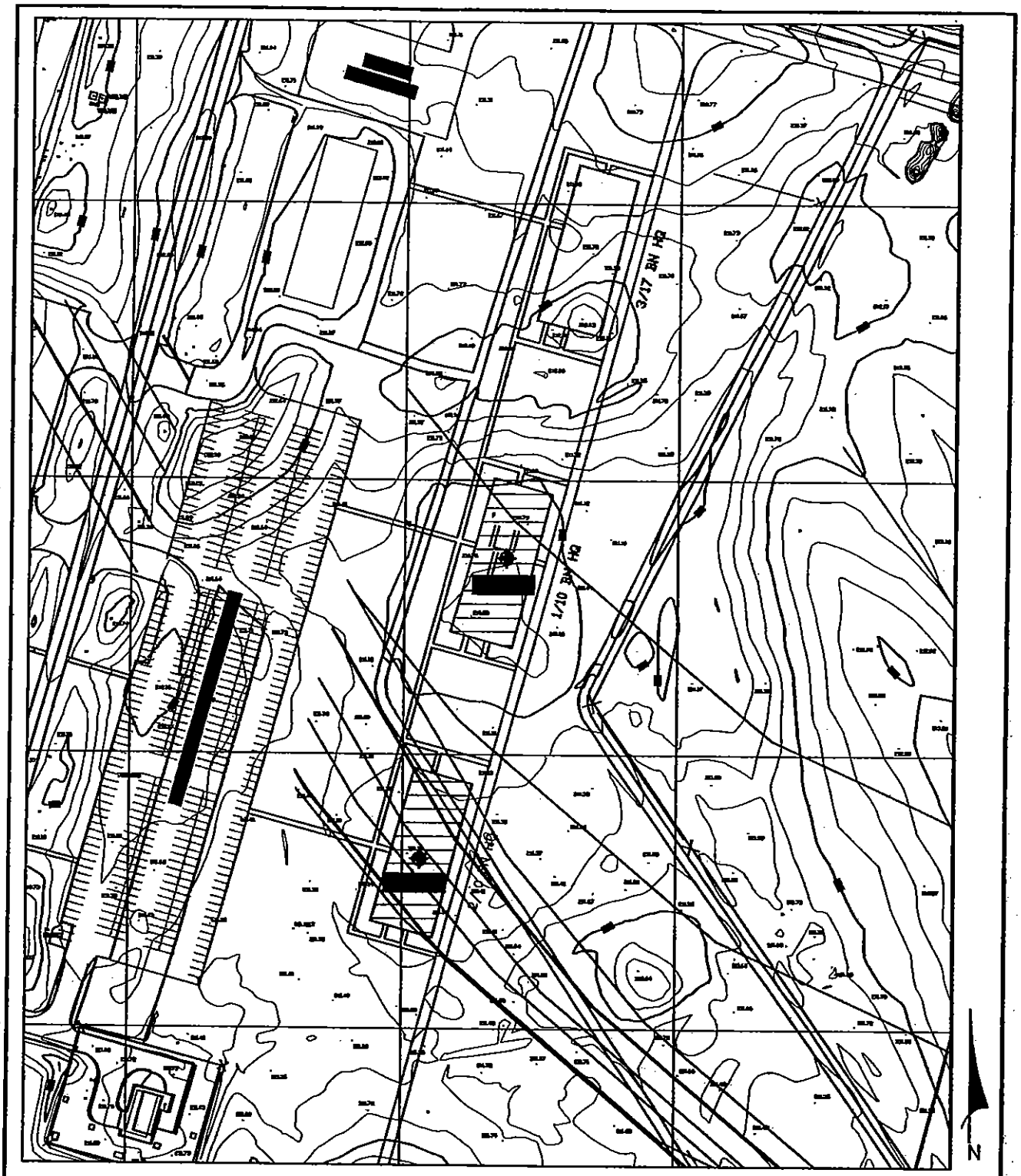
BARRACKS COMPLEX
WSAAF PHASE I

FT. DRUM, NEW YORK
SEA PROJECT NO. 02191010.00

TEST BORING
LOCATION PLAN

SHEET 2



GRAPHIC SCALE

(IN METERS)

1 : 2000

LEGEND

◆ APROXIMATE TEST BORING LOCATION

G:\Projects\Active\2002\workingx2.dwg

5/20/02

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BARRACKS COMPLEX
WSAAF PHASE I

FT. DRUM, NEW YORK

SEA PROJECT NO. 02191010.00

TEST BORING
LOCATION PLAN

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(For Information Only)

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NOTES

1) This Sustainable Project Rating Tool (SPiRiT) is derived from The U. S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System ™.

2) The SPiRiT numbering scheme parallels, but does not match LEED 2.0. LEED does not number major sections, which it calls 'Credit Categories,' ex. 'Sustainable Sites,' rather it numbers criteria or 'credits' within each major section. SPiRiT credit numbers match those of LEED where there is a 1:1 comparison. Where additional credits have been added they fall at the end of major sections.

3) The SPiRiT Credits all follow the format: Intent, Requirement and Technologies/Strategies. Intent: A statement of the primary goal for the credit; Requirement: Quantifiable conditions necessary to achieve stated intent; Technologies/Strategies: Suggested technologies, strategies and referenced guidance on the means to achieve identified requirements.

4) Projects are evaluated for each SPiRiT credit which are either 'Prerequisites' or result in a point score: Prerequisites: These credits are a statement of minimum requirements and must be met. No further points will be awarded unless the minimum is achieved. These credits are recognizable by an 'R' in the number scheme, ex. 1.R1, and a 'Reqd.' in the score column. Point Score: These credits are evaluated and result in a point score. Where the potential score is greater than 1, no partial points are granted.

5) SPiRiT Sustainable Project Certification Levels:

SPiRiT Bronze 25 to 34 Points
SPiRiT Silver 35 to 49 Points
SPiRiT Gold 50 to 74 Points
SPiRiT Platinum 75 to 100 Points

6) SPiRiT credits have been developed to address facility life cycle phases including programming, design, construction, and commissioning. Additional rating tools will be developed to address installation/base master planning and facilities operations and maintenance, rehabilitation, recycling, and disposal.

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8) Sustainable Project Rating Tool (SPiRiT) Authors are:

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9) Army/USACE employees are members of the USGBC with membership privileges accessible via the USGBC web site, http://www.usgbc.org. For information on membership and access to available LEED resources to support use of SPiRiT and sustainable design in your projects, contact Richard Schneider at (217) 373-6752 or richard.l.schneider@erdc.usace.army.mil (Annette Stumpf at (217) 352-6511 ext. 7542 or annette.l.stumpf@erdc.usace.army.mil alternate).

10) For the latest information on SPiRiT and for access to guidance, tools and resources supporting sustainable design initiatives, visit the CERL 'Sustainable Design and Development Resource' website, http://www.cecer.army.mil/SustDesign. There you may also join the CERL Sustainable Design ListServ to be directly notified of information pertinent to sustainable design.

11) Comments: ☑ mark shown in the ratings box indicates suggested attainable points.

☒ mark shown in the ratings box indicates suggested points that may not, will not or cannot be attained suggested conveniently for this project.

1.0 Sustainable Sites — Score 20

1.R1 **Erosion, Sedimentation, and Water Quality Control** [1] **Reqd.**

Intent: Control erosion and pollutants to reduce negative impacts on water and air quality.

Requirement: ☑ Design a site sediment and erosion control plan and a pollution prevention plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-001, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:

- Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.
- Prevent hazardous material discharge into storm water systems.
- Prevent petroleum oils and lubricants (POL) discharge into storm water systems.

Technologies/ Strategies: The EPA standard lists numerous measures such as silt fencing, sediment traps, oil grit separators, construction phasing, stabilization of steep slopes, maintaining vegetated ground cover and providing ground cover that will meet this prerequisite.

Comment: ***REQUIRED COMPLIANCE.***

1.C1 **Site Selection** [1]

Intent: Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site. Select site based on functional adjacencies/relationships and land use compatibility.

Requirement:

☑ Do not develop buildings on portions of sites that meet any one of the following criteria: 1

- Prime training or maneuver land.
- Land whose elevation is lower than 5 ft. above the 100-year flood elevation as defined by FEMA.
- Land that provides habitat for any species on the Federal or State threatened or endangered list.
- Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent.

☑ Select site based on functional adjacencies/relationships and land use compatibility. 1

- Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure.
- Select site in area of high density.
- Site facilities based on the strength of their relationships to other facilities/land-uses to limit travel distances. The stronger the relationship/functional interaction, the closer the distance between two facilities.
- Select for distance to installation/base transit systems and access to pedestrian ways and bike paths.
- Select for development previously used or developed suitable and available sites.

Technologies /Strategies: Screen potential building sites for these criteria and/or ensure that these criteria are addressed by the designer during the conceptual design phase. Utilize landscape architects, ecologists, environmental engineers, civil engineers, and similar professionals for the screening process. New wetlands constructed as part of stormwater mitigation or other site restoration efforts are not affected by the restrictions of this prerequisite.

Comment: ***COMPLIANCE IS ATTAINABLE.***

(1) Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.C2 Installation/Base Redevelopment [1]

Intent: Channel development to installation/base cantonment areas with existing infrastructure, protecting greenfields and preserving habitat and natural resources.

Requirement: ☑ Increase localized density to conform to existing or desired density goals by utilizing sites that are located within existing cantonment areas of high development density. **1**

Comment: *THIS SITE IS LOCATED WITHIN EXISTING CONTONMENT AREAS OF THE POST AND MEETS DESIRED DENSITY.*

☒ Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure. **X**

Comment: *THIS POINT CANNOT BE MET AS NEW INFRASTRUCTURE IS REQUIRED FOR THIS PROJECT.*

Technologies /Strategies: During the site selection process give preference to previously developed sites with installation/base cantonment redevelopment potential such as facility reduction program cleared sites.

1.C3 Brownfield Redevelopment [1]

Intent: Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirement: ☒ Develop on a site classified as a brownfield and provide remediation as required by EPA's Brownfield Redevelopment program requirements OR Develop a brownfield site (a site that has been contaminated by previous uses). **X**

Technologies /Strategies: Screen potential damaged sites for these criteria prior to selection for rehabilitation.

Utilize EPA OSWER Directive 9610.17 and ASTM Standard Practice E1739 for site remediation where required.

Comment: *THIS WORK DOES NOT INCLUDE A BROWNFIELD SITE IN ACCORDANCE WITH EPA'S DESIGNATION – THIS POINT IS NOT ATTAINABLE.*

1.C4 **Alternative Transportation** [1]

Intent: Reduce pollution and land development impacts from automobile use.

Requirement: ☑ Locate building within ½ mile of installation/base transit systems. 1

Comment: *PRESENTLY BASE HAS NO OVERALL POST TRANSIT SYSTEMS, HOWEVER, WHEN POST TRANSIT BECOMES AVAILABLE, IT WILL BE EXTENDED TO THIS DEVELOPMENT.*

☑ Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants. 1

Comment: *100% OF OCCUPANTS HAVE AVAILABLE SHOWER FACILITIES, THE DESIGN WILL INCLUDE MEANS FOR SECURING BICYCLES FOR 5% OF BUILDING OCCUPANTS.*

☒ Locate building within 2 miles of alternative-fuel refueling station(s). X

Comment: *THIS PROJECT DOES NOT MEET THIS REQUIREMENT.*

☒ Size parking capacity not to exceed minimum installation/base cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants. X

Comment: *THIS PROJECT DOES NOT MEET THIS REQUIREMENT.*

Technologies /Strategies: Select sites near public installation/base transit served by safe, convenient pedestrian pathways.

(1) Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.C5 Reduced Site Disturbance [1]

Intent: Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirement:

☑ On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation. 1

Comment: *THE CONTRACTOR MUST MEET THE CLEAR WAY LIMITATIONS FOR THIS WORK.*

☒ Reduce the development footprint (including building, access roads and parking) to exceed the installation/base's/base's master plan local zoning's open space requirement for the site by 25% or in accordance with installation/base policy on open space set asides, whichever is greater. X

Comment: *THIS PROJECT DOES NOT MEET THIS REQUIREMENT.*

Technologies /Strategies: Note requirements on plans and in specifications. Establish contractual penalties for destruction of trees and site areas noted for protection. Reduce footprints by tightening program needs and stacking floor plans. Establish clearly marked construction and disturbance boundaries. Delineate laydown, recycling, and disposal areas. Use areas to be paved as staging areas. Work with local horticultural extension services, native plant societies, or installation/base agronomy staff to select indigenous plant species for site restoration and landscaping.

1.C6 Stormwater Management [1]

Intent: Limit disruption of natural water flows by minimizing storm water runoff, increasing on-site infiltration and reducing contaminants.

Requirement: Implement a stormwater management plan that results in:

☑ No net increase in the rate or quantity of stormwater runoff from undeveloped to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff. 1

Comment: *COMPLIANCE IS ATTAINABLE.*

☒ Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA-840-B-92-002 1/93). X

Comment: *CONTRACT DOES NOT INCLUDE PROVISIONS FOR TREATMENT FOR POST DEVELOPMENT TOTAL SUSPENDED SOLIDS.*

Technologies /Strategies: Significantly reduce impervious surfaces, maximize on-site stormwater infiltration, and retain pervious and vegetated areas. Capture rainwater from impervious areas of the building for groundwater recharge or reuse within building. Use green/vegetated roofs. Utilize biologically-based and innovative stormwater management features for pollutant load reduction such as constructed wetlands, stormwater filtering systems, bioswales, bioretention basins, and vegetated filter strips. Use open vegetated swales to reduce drainage velocity and erosion, reduce system maintenance, increase vegetative variety and support wildlife habitat where space permits.

1.C7 **Landscape and Exterior Design to Reduce Heat Islands** [2]

Intent: Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirement:

☒ Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/ high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space under-ground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area. X

Comment: *THIS PROJECT WILL NOT MEET THIS REQUIREMENT.*

☒ Use ENERGY STAR Roof compliant, high-reflectance AND low emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area. X

Comment: *THIS PROJECT WILL NOT MEET THIS REQUIREMENT.*

Technologies /Strategies: Employ design strategies, materials, and landscaping designs that reduce heat absorption of exterior materials. Note albedo/reflectance requirements in the drawings and specifications. Provide shade (calculated on June 21, noon solar time) using native or climate tolerant trees and large shrubs, vegetated trellises, or other exterior structures supporting vegetation. Substitute vegetated surfaces for hard surfaces. Explore elimination of blacktop and the use of new coatings and integral colorants for asphalt to achieve light colored surfaces.

1.C8 **Light Pollution Reduction** [1]

Intent: Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

Requirement: ☑ Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site. **1**

Technologies /Strategies: Consult IESNA Recommended Practice Manual: Lighting for Exterior Environments for Commission Internationle de l'Eclairage (CIE) zone and pre and post curfew hour descriptions and associated ambient lighting level requirements. Ambient lighting for pre-curfew hours for CIE zones range between .01 footcandles for areas with dark landscapes such as parks, rural, and residential areas, and 1.5 footcandles for areas with high ambient brightness such as installation/base areas with high levels of nighttime activity. Design site lighting and select lighting styles and technologies to have a minimal impact off-site and minimal contribution to sky glow. Minimize lighting of architectural and landscape features. Exterior lighting should be consistent with security lighting requirements.

Comment: ***THIS REQUIREMENT CAN BE MET WITH MINIMUM IMPACT TO THE PROJECT.***

1.C9 **Optimize Site Features**

Intent: Optimize utilization of the site's existing natural features and placement of man-made features on the site.

Requirement: ☑ Perform both of the following: **1**

- Maximize the use of free site energy.
- Plan facility, parking and roadways to "fit" existing site contours and limit cut and fill.

Technologies /Strategies: Evaluate site resources to ascertain how each can enhance the proposed project and visa versa. Work to maximum advantage of the site's solar and wind attributes. Use landscaping to optimize solar and wind conditions and to contribute to energy efficiency; Locate and orient the facility on the site to optimize solar and wind conditions.

Comment: ***THE DESIGN ENCOURAGES PASSIVE SOLAR TECHNIQUES AND THE DESIGN HAS BEEN PLANNED TO "FIT" THE EXISTING SITE CONTOURS TO (AND) LIMIT(S) CUT AND FILL.***

1.C10 Facility Impact

Intent: Minimize negative impacts on the site and on neighboring properties and structures; avoid or mitigate excessive noise, shading on green spaces, additional traffic, obscuring significant views, etc.

Requirement: ☑ Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit. 1

Comment: *THE DESIGN IS SPECIFIED CLUSTERED TO ALLOW ATTAINMENT OF THIS REQUIREMENT.*

☑ Collaborate with installation/base and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport. 1

Comment: *SEE 1.C4 – COMPLIANCE IS ATTAINABLE.*

Technologies /Strategies: Involve local/regional planners and community members in installation/base master planning processes. Recognize the context and the impact of a project beyond site boundaries, and integrate it with the larger installation/base/community context/land use.

1.C11 Site Ecology

Intent: Identify and mitigate all existing site problems including contamination of soil, water, and air, as well as any negative impacts caused by noise, eyesores, or lack of vegetation, enhancing or creating new site habitat.

Requirement: ☑ Develop site environmental management and mitigation plan. 1

Technologies /Strategies: Understand site and surrounding ecosystem interdependence and interconnectivity. Plan landscaping scheme to incorporate biodiversity. Preserve/enhance existing trees, hydrological features, ecosystems, habitats, and cultural resources. Increase the existence of healthy habitat for native species. Reintroduce native plants and trees where they have been destroyed by previous development.

Comment: *A PLAN FOR SITE AND ENVIRONMENTAL MANAGEMENT AND "MITIGATIONS" IS POSSIBLE..*

2.0 Water Efficiency — Score 5

2.C1 Water Efficient Landscaping [2]

Intent: Limit or eliminate the use of potable water for landscape irrigation.

Requirement: [X] Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. — X

Comment: *THIS CONTRACT SHALL REQUIRE LIMITED OR ZERO USE OF POTABLE WATER FOR LANDSCAPING.*

[✓] Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. — 1

Comment: *PERMANENT LANDSCAPE IRRIGATION SYTEMS ARE NOT INCLUDED IN THIS DESIGN.*

Technologies /Strategies: Develop a landscaping water use baseline according to the methodology outlined in the LEED Reference Guide. Specify water-efficient, native or adapted, climate tolerant plantings. High efficiency irrigation technologies include micro irrigation, moisture sensors, or weather data based controllers. Feed irrigation systems with captured rainwater, gray water, or on-site treated wastewater.

2.C2 Innovative Wastewater Technologies [2]

Intent: Reduce generation of wastewater and potable water demand, while increasing local aquifer recharge.

Requirement: [X] Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards. — X

Technologies /Strategies: Develop a wastewater baseline according to the methodology outlined in the LEED Reference Guide. Implement decentralized on-site wastewater treatment and reuse systems. Decrease the use of potable water for sewage conveyance by utilizing gray and/or black water systems. Non-potable reuse opportunities include, toilet flushing, landscape irrigation, etc. Provide advanced wastewater treatment after use by employing innovative, ecological, on-site technologies including constructed wetlands, a mechanical recirculating sand filter, or aerobic treatment systems.

Comment: *ALL BUILDING SEWAGE INFLOW IS TO THE LOCAL MUNICIPAL SEWER. THERE IS NO OPPORTUNITY TO OBTAIN THIS REQUIREMENT.*

2.C3 Water Use Reduction [1]

Intent: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement: ☑ Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act (EPACT) of 1992 fixture performance requirements. 1

Comment: ***PROVIDE AND DOCUMENT COMPLIANCE WITH THIS REQUIREMENT.***

☒ Exceed the potable water use reduction by an additional 10% (30% total efficiency increase). X

Technologies /Strategies: Develop a water use baseline including all water consuming fixtures, equipment, and seasonal conditions according to methodology guidance outlined in the LEED Reference Guide. Specify water conserving plumbing fixtures that exceed Energy Policy Act (EPACT) of 1992 fixture requirements in combination with ultra high efficiency or dry fixture and control technologies. Specify high water efficiency equipment (dishwashers, laundry, cooling towers, etc.). Use alternatives to potable water for sewage transport water. Use recycled or storm water for HVAC/process make up water. Install cooling tower systems designed to minimize water consumption from drift, evaporation and blowdown.

Comment: ***THIS STRATEGY IS NOT CONSIDERED ATTAINABLE ALTHOUGH COMLPIANCE WOULD CERTAINLY BE ENCOURAGED TO TAKE ADVANTAGE OF THIS ELEMENT IF POSSIBLE.***

3.0 Energy and Atmosphere — Score 28

3.R1 **Fundamental Building Systems Commissioning [1]** **Reqd.**

Intent: Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Requirement: ☑ Implement all of the following fundamental best practice commissioning procedures.

- Engage a commissioning authority.
- Develop design intent and basis of design documentation.
- Include commissioning requirements in the construction documents.
- Develop and utilize a commissioning plan.
- Verify installation, functional performance, training and documentation.
- Complete a commissioning report.

Technologies /Strategies: Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Perform additional commissioning in accordance with the DOE Building Commissioning Guide, Version 2.2. Refer to the LEED Reference Guide for detailed descriptions of required elements and references to additional commissioning guides. Specify pre-occupancy baseline IAQ testing at time of commissioning. Test for indoor air concentrations of CO, CO2, total VOCs and particulates. Test to assure that adequate ventilation rates have been achieved prior to initial occupancy.

Comment: ***REQUIRED COMPLIANCE.***

3.R2 **Minimum Energy Performance [1]** **Reqd.**

Intent: Establish the minimum level of energy efficiency for the base building and systems.

Requirement: ☑ Design to meet building energy efficiency and performance as required by TI 800-01 (Design Criteria).

Technologies /Strategies: Use building modeling and analysis techniques to establish and document compliance. ASHRAE/IESNA 90.1-1999 provides guidance for establishing building base case development and analysis. Refer to the LEED Reference Guide for a wide variety of energy efficiency strategy resources.

Use a professionally recognized and proven computer program or programs that integrate architectural features with air-conditioning, heating, lighting, and other energy producing or consuming systems. These programs will be capable of simulating the features, systems, and thermal loads used in the design. Using established weather data files, the program will perform 8760 hourly calculations. BLAST, DOE-2 or EnergyPlus are acceptable programs for these purposes.

Comment: ***REQUIRED COMPLIANCE.***

3.R3 **CFC Reduction in HVAC&R Equipment [2]** **Reqd.**

Intent: Reduce ozone depletion.

Requirement: ☑ Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.

Technologies /Strategies: Specify only non-CFC-based refrigerants in all base building HVAC&R systems.

Comment: ***REQUIRED COMPLIANCE.***

3.C1 **Optimize Energy Performance [1]**

Intent: Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirement: ☑ Reduce design energy usage (DEU) compared to the energy use budget (EUB) in joules per square meter per year for regulated energy components as described in the requirements of Chapter 11 of the TI 800-01 (Design Criteria), as demonstrated by a whole building simulation. **20**

- 1 Point will be awarded for every reduction in design energy use of 2.5% for both new and existing facilities for a maximum score of 20 points.

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.

Technologies /Strategies: Develop and use building modeling and analysis techniques to establish a base case that meets the minimum prerequisite standard. ASHRAE/IESNA 90.1-1999 provides guidance for establishing building base case development and analysis. Perform interactive energy use analysis for selected design elements that affect energy performance and document compliance.

Unit of measure for performance shall be annual energy usage in joules per square meter. Life-Cycle energy costs shall be determined using rates for purchased energy, such as electricity, gas, oil, propane, steam, and chilled water and approved by the adopting authority. Refer to the LEED Reference Guide or Whole Building Design Guide for a wide variety of energy efficiency resources and strategies including conservation measures, electromechanical energy efficiency technologies (for example ground-source heat pumps), passive heating and cooling strategies, solar hot water, and daylighting.

Life-Cycle costing will be done in accordance with 10 CFR 436.

Consider installation of an Energy Management and Control System (EMCS), which is compatible with exiting installation systems to optimize performance. Use sensors to control loads based on occupancy, schedule and/or the availability of natural resources use (day light or natural ventilation).

Comment: ***AS A MINIMUIM REDUCE DESIGN ENERGY USE BY 5.0% TO OBTAIN 4.0 POINTS UNDER THIS STRATEGY.***

3.C2 **Renewable Energy** [1]

Intent: Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

Requirement: ☒ Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems.

% of Total Annual Energy Usage in Renewables	
5%	✗
10%	✗
15%	✗
20%	✗

Technologies /Strategies: Employ the use of on-site non-polluting-source renewable technologies contributing to the total energy requirements of the project. Consider and use high temperature solar and/or geothermal, photovoltaics, wind, biomass (other than unsustainably harvested wood), and bio-gas. Passive solar, solar hot water heating, groundsource heat pumps, and daylighting do not qualify for points under this credit. Credit for these strategies is given in Energy & Atmosphere Credit 1: Optimizing Energy Performance.

Comment: ***LOOK FOR WAYS TO MEET SUCH STRTEGIES, NONE NOW APPEAR ATTAINABLE WITHIN CURRENT DESIGN APPROACH.***

(1) Adapted material not reviewed or endorsed by U. S. Green Building Council.

3.C3 **Additional Commissioning** [2]

Intent: Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirement: ☑ In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks: 1

1. Conduct a focused review of the design prior to the construction documents phase.
2. Conduct a focused review of the construction documents when close to completion.
3. Conduct a selective review of contractor submittals of commissioned equipment.
4. Develop a system and energy management manual.
5. Have a contract in place for a near-warranty end or post occupancy review.

Items 1, 2, and 3 must be performed by someone other than the designer.

Technologies /Strategies: Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Refer to the LEED Reference Guide for detailed descriptions of required elements and references to additional guidelines.

Comment: ***THIS STRATEGY SHOULD BE FULLY ATTAINABLE.***

(2) . U. S. Green Building Council. Used by permission.

3.C4 **<< Deleted >> (1)**

3.C5 **Measurement and Verification (1)**

Intent: Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

Requirement: ☑ Comply with the installed equipment requirements for continuous metering as stated in Selected Measurement and Verification Methods - Option B: Retrofit Isolation of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following: **1**

- Lighting systems and controls.
- Constant and variable motor loads.
- Variable frequency drive (VFD) operation.
- Chiller efficiency at variable loads (kW/ton).
- Cooling load.
- Air and water economizer and heat recovery cycles.
- Air distribution static pressures and ventilation air volumes.
- Boiler efficiencies.
- Building specific process energy efficiency systems and equipment.
- Indoor water risers and outdoor irrigation systems.

Technologies /Strategies: Design and specify equipment to be installed in base building systems to allow for comparison, management, and optimization of actual vs. estimated energy and water performance. Employ building automation systems to perform M&V functions where applicable. Tie contractor final payments to documented M&V system performance and include in the commissioning report. Provide for ongoing M&V system maintenance and operating plan in building operations and maintenance manuals. Consider installation/base of an Energy Management and Control System (EMCS), which is compatible with exiting installation/base systems to optimize performance.

Comment: ***SHOULD BE COMPIANT WITH THESE STRATEGIES.***

3.C6 **Green Power** [1]

Intent: Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Requirement: ☒ Engage in a two year contract to purchase the amount of power equal to projected building consumption generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements. X

Technologies /Strategies: Purchase power from a provider that guarantees a fraction of its delivered electric power is from net nonpolluting renewable technologies. Begin by contacting local utility companies. If the project is in an open market state, investigate Green Power and Power Marketers licensed to provide power in that state. Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass, or low-impact hydro sources. Low-impact hydro shall comply with the Low Impact Hydropower Certification Program.

Comment: ***THESE STRATEGIES ARE INCONSISTENT WITH THE REQUIREMENTS OF THE PROJECT AND ON POST PROCUREMENT CIRCUMSTANCES.***

3.C7 **Distributed Generation**

Intent: Encourage the development and use of distributed generation technologies, which are less polluting than gridsource energy.

Requirement: ☒ Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conversion. Generate at least 50% of the building's projected annual consumption by onsite distributed generation sources. 1

Technologies /Strategies: Investigate the use of integrated generation and delivery systems, such as co-generation, fuel cells, microturbines and off-peak thermal storage.

Comment: ***THESE STRATEGIES ARE INCONSISTENT WITH THE DESIGN OPERATION OF THESE FACILITIES AND THE POST'S EXISTING CIRCUMSTANCES.***

4.0 Materials and Resources — Score 13

4.R1 **Storage & Collection of Recyclables** [1] **Reqd.**

Intent: Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirement: ☑ Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.

Technologies /Strategies: Establish a waste management plan which meets requirements of the installation/base environmental and/or solid waste management plans in cooperation with users to encourage recycling. Reserve space for recycling functions early in the building occupancy programming process and show areas dedicated to collection of recycled materials on space utilization plans. Broader recycling support space considerations should allow for collection and storage of the required elements and newspaper, organic waste (food and soiled paper), and dry waste. When collection bins are used, bin(s) should be able to accommodate a 75% diversion rate and be easily accessible to custodial staff and recycling collection workers. Consider bin designs that allow for easy cleaning to avoid health issues.

Comment: ***REQUIRED COMPLIANCE.***

4.C1 **Building Reuse** [1]

Intent: Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement: Reuse large portions of existing structures during renovation or redevelopment projects

- [X] Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies). X
- [X] Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies). X
- [X] Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems). X

Technologies /Strategies: Evaluate retention of existing structure. Consider facade preservation, particularly in installation /base areas. During programming and space planning, consider adjusting needs and occupant use patterns to fit within existing building structure and interior partition configurations. Identify and effectively address energy, structural, and indoor environmental (lead & asbestos) issues in building reuse planning and deconstruction documents. Percentage of reused non-shell building portions will be calculated as the total area (s.f.) of reused walls, floor covering, and ceiling systems, divided by the existing total area (s.f.) of walls, floor covering, and ceiling systems.

Comment: ***NOT AVAILABLE TO NEW CONSTRUCTION PROJECTS.***

4.C2 **Construction Waste Management** [1]

Intent: Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

Requirement: Develop and implement a waste management plan, quantifying material diversion by weight:

☑	Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste.	1

Comment: ***COMPLIANCE SHOULD BE ENCOURAGED TO PERSUE AND OBTAIN ACCEPTANCE OF THIS ELEMENT.***

☐	Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris.	1
X		X

Comment: ***75% ACHIEVEMENT FOR THIS ELEMENT IS NOT LIKELY TO BE OBTAINABLE WITHOUT HARDSHIP UDNER THIS COTNRACT.***

Technologies /Strategies: Develop and specify a waste management plan which meets requirements of the installation/base environmental and/or solid waste management plans that identifies licensed haulers and processors of recyclables; identifies markets for salvaged materials; employs deconstruction, salvage, and recycling strategies and processes, includes waste auditing; and documents the cost for recycling, salvaging, and reusing materials. Source reduction on the job site should be an integral part of the plan.

The plan should address recycling of corrugated cardboard, metals, concrete brick, asphalt, land clearing debris (if applicable), beverage containers, clean dimensional wood, plastic, glass, gypsum board, and carpet; evaluate the cost-effectiveness of recycling rigid insulation, engineered wood products and other materials; hazardous materials storage and management; and participation in manufacturers' "take-back" programs to the maximum extent possible. Refer to the LEED Reference Guide for guidelines and references that provide waste management plan development and implementation support including model bid specifications.

4.C3 **Resource Reuse** [2]

Intent: Extend the life cycle of targeted building materials, reducing environmental impacts related to materials manufacturing and transport.

Requirement:

- ☑ Specify salvaged or refurbished materials for 5% of building materials. 1
- ☑ Specify salvaged or refurbished materials for 10% of building materials. 1

Technologies /Strategies: Commonly salvaged building materials include wood flooring/ paneling/cabinets, doors and frames, mantels, iron work and decorative lighting fixtures, brick, masonry and heavy timbers. See the LEED Reference Guide for calculation tools and guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars* (see exclusions) of the salvaged or refurbished material.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: In total dollar calculations, exclude; labor costs; all mechanical and electrical material and labor costs; and project overhead and fees. *If the cost of the salvaged or refurbished material is below market value, use replacement cost to estimate the material value, otherwise use actual cost to the project.

Comment: ***10% SALVAGE OR REFURBISHED MATERIALS SHOULD BE ATTAINABLE BY FOR THIS PROJECT. BECAUSE THESE BUILDINGS COULD BE SEQUESNTIALLY CONSTRUCED, FRAMEWORK FROM ONE PART OF THE CONSTRUCTION COULD BE REUSED, RECYCLEDFOR USE IN OTHER PORTIONS OF THE CONSTRUCTION THUS REDUCING USE (OR PURCHSE) OF NEW (RAW) MATERIALS.***

4.C4 **Recycled Content** [1]

Intent: Increase demand for building products that have incorporated recycled content material, reducing the impacts resulting from extraction of new material.

Requirement:

☑ Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. **1**

☒ Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post consumer recycled content material, OR, a minimum weighted average of 40% postindustrial recycled content material. **X**

Technologies Select products

Specify building materials containing recycled content /Strategies: for a fraction of total building materials and materials with supporting information from the AIA Resource Guide or the EPA Environmentally Preferable Purchasing (EPP) Program. Common building materials and products with recycled content include; wall, partition, and ceiling materials and systems; insulation; tiles and carpets; cement, concrete, and reinforcing metals; structural and framing steel. For products/materials not listed, selection should be made on the basis of EPP criterion and/or:

- Toxicity;
- Embodied energy;
- Production use of water, energy and ozone depleting substances (ODSs);
- Production limits on toxic emissions and effluents;
- Minimal, reusable or recycled/recyclable packaging;
- Impact on indoor environmental quality (IEQ);
- Installation that limits generation of waste;
- Materials that limit waste generation over their life;
- EPA guideline compliance; and
- Harvested on a sustainable yield basis.

See the LEED Reference Guide for a summary of the EPA guidelines and calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of the material that contain recycled content.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees)

Comment: ***MEET THE INITIAL LEVEL FOR COMPLIANCE WITH THIS STRATEGY.***

4.C5 **Local/Regional Materials** [2]

Intent: Increase demand for building products that are manufactured locally, reducing the environmental impacts resulting from transportation, and supporting the local economy.

Requirement: ☑ Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles. 1

Comment: *THIS ELEMENT IS ATTAINABLE.*

☒ Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles. X

Comment: *SUGGEST THAT THE INITIAL LEVEL FOR COMPLIANCE IS ATTAINABLE, FULL COMPLIANCE IS CERTAINLY ENCOURAGED BUT NOT CREDITED AT THIS TIME.*

Technologies /Strategies: Specify and install regionally extracted, harvested, and manufactured building materials. Contact the state and local waste management boards for information about regional building materials. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of material that is locally or regionally manufactured.

2. Calculate total dollars (see exclusions) of all building materials.

3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.

4.C6 **Rapidly Renewable Materials** [2]

Intent: Reduce the use and depletion of finite raw and long cycle renewable materials by replacing them with rapidly renewable materials.

Requirement: ☒ Specify rapidly renewable building materials for 5% of total building materials. X

Technologies /Strategies: Rapidly renewable resources are those materials that substantially replenish them-selves faster than traditional extraction demand (e.g. planted and harvested in less than a 10 year cycle) and do not result in significant biodiversity loss, increase erosion, air quality impacts, and that are sustainably managed. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of materials that are considered to be rapidly renewable.

2. Calculate total dollars (see exclusions) of all building materials.

3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.

Comment: *5% COMPLIANCE SHOULD BE ENCOURAGED (BUT NOT REQUIRED)TO BE ATTAINED.*

4.C7 **Certified Wood** [2]

Intent: Encourage environmentally responsible forest management.

Requirement: ☑ Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers. 1

Technologies /Strategies: Refer to the Forest Stewardship Council guidelines for wood building components that qualify for compliance to the requirements and incorporate into material selection for the project.

Comment: ***ADEQUATE MATERIAL AT OR EQUAL TO OTHER NON-APPROVED MATERIALS ARE AVAILABLE. COMPLIANCE SHOULD BE ENCOURAGED.***

5.0 Indoor Environmental Quality (IEQ) Score 17

5.R1 **Minimum IAQ Performance [1]** **Reqd.**

Intent: Establish minimum IAQ performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

Requirement: ☑ Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

Technologies /Strategies: Include proactive design details that will eliminate some of the common causes of indoor air quality problems in buildings. Introduce standards into the design process early. Incorporate references to targets in plans and specifications. Ensure ventilation system outdoor air capacity can meet standards in all modes of operation. Locate building outdoor air intakes (including operable windows) away from potential pollutants/contaminant sources such as sporulating plants (allergens), loading areas, building exhaust fans, cooling towers, sanitary vents, dumpsters, vehicular exhaust, and other sources. Include operational testing in the building commissioning report. Design cooling coil drain pans to ensure complete draining. Include measures to control and mitigate radon buildup in areas where it is prevalent. Limit humidity to a range that minimizes mold growth and promotes respiratory health.

Comment: ***REQUIRED COMPLIANCE.***

5.R2 **Environmental Tobacco Smoke (ETS) Control [2]** **Reqd.**

Intent: Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Requirement: ☑ Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETScontaining air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

Technologies /Strategies: Prohibit smoking in the building and/or provide designated smoking areas outside the building in locations where ETS cannot reenter the building or ventilation system and away from high building occupant or pedestrian traffic.

Comment: ***REQUIRED COMPLIANCE.***

5.C1 **IAQ Monitoring [1]**

Intent: Provide capacity for indoor air quality (IAQ) monitoring to sustain long term occupant health and comfort.

Requirement: ☑ Install a permanent carbon dioxide (CO_2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time. 1

Technologies /Strategies: Install an independent system or make CO_2 monitoring a function of the building automation system. Situate monitoring locations in areas of the building with high occupant densities and at the ends of the longest runs of the distribution ductwork. Specify that system operation manuals require calibration of all of the sensors per manufacturer recommendations but not less than one year. Include sensor and system operational testing and initial set point adjustment in the commissioning plan and report. Also consider periodic monitoring of carbon monoxide (CO), total volatile organic compounds (TVOCs), and particulates (including PM10).

Comment: ***COMPLIANCE IS ATTAINABLE.***

5.C2 **Increase Ventilation Effectiveness [2]**

Intent: Provide for the effective delivery and mixing of fresh air to building occupants to support heir health, safety, and comfort.

Requirement: ☑ For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy. 1

Technologies /Strategies: Employ architectural and HVAC design strategies to increase ventilation effectiveness and prevent short-circuiting of airflow delivery. Techniques available include use of displacement ventilation, low velocity, and laminar flow ventilation (under floor or near floor delivery) and natural ventilation. Operable windows with an architectural strategy for natural ventilation, cross ventilation, or stack effect can be appropriate options with study of inlet areas and locations. See the LEED Reference Guide for compliance methodology guidelines.

Comment: ***COMPLIANCE IS ATTAINABLE, OPERABLE WINDOWS ARE ALREADY INCORPORATED INTO THE DESIGN POR DOCUMENTS.***

5.C3 Construction IAQ Management Plan (2)

Intent: Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long term installer and occupant health and comfort.

Requirement: Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

☑ During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999). 1

Comment: ***COMPLIANCE IS ATTAINALBE***

☑ Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. 1

Comment: ***COMPLIANCE IS ATTAINABLE.***

Technologies /Strategies: Specify containment control strategies including protecting the HVAC system, controlling pollutant sources, interrupting pathways for contamination, enforcing proper housekeeping and coordinating schedules to minimize disruption. Specify the construction sequencing to install absorptive materials after the prescribed dry or cure time of wet finishes to minimize adverse impacts on indoor air quality. Materials directly exposed to moisture through precipitation, plumbing leaks, or condensation from the HVAC system are susceptible to microbial contamination. Absorptive materials to protect and sequence installation include; insulation, carpeting, ceiling tiles, and gypsum products. Appoint an IEQ Manager with owner's authority to inspect IEQ problems and require mitigation as necessary.

5.C4 **Low-Emitting Materials** [2]

Intent: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.

Requirement:

- ☑ Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows: **1**
  - ☑ Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51. **1**
  - ☑ Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. **1**
  - ☑ Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. **1**
  - ☑ Composite wood or agrifiber products must contain no added urea-formaldehyde resins. **1**

Technologies /Strategies: Evaluate and preferentially specify materials that are low emitting, non-irritating, nontoxic and chemically inert. Request and evaluate emissions test data from manufacturers for comparative products. Ensure that VOC limits are clearly stated in specifications, in General Conditions, or in each section where adhesives, sealants, coatings, carpets, and composite woods are addressed.

Comment: ***THREE OUT OF THE FIVE AVAILABLE STRATEGIES SHOULD BE ATTAINABLE UDNER THE CONTRACT. THE A/E CONTRACTS SHALL BE ENCOURAGED TO PERSON SAME FOR A MINMUIM OF THREE OUT OF FIVE ELEMENTS FOR COMPLIANCE.***

5.C5 **Indoor Chemical and Pollutant Source Control** [1]

Intent: Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirement: ☑ Design to minimize cross-contamination of regularly occupied areas by chemical pollutants:

- Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

Technologies /Strategies: Design to physically isolate activities associated with chemical contaminants from other locations in the building, providing dedicated systems to contain and remove chemical pollutants from source emitters at source locations. Applicable measures include eliminating or isolating high hazard areas; designing all housekeeping chemical storage and mixing areas (central storage facilities and janitors closets) to allow for secure product storage; designing copy/fax/printer/printing rooms with structural deck to deck partitions and dedicated exhaust ventilation systems; and including permanent architectural entryway system(s) to catch and hold particles to keep them from entering and contaminating the building interior.

Consider utilization of EPA registered anti-microbial treatments in carpet, textile or vinyl wall coverings, ceiling tiles or paints where microbial contamination is a concern. Utilize "breathable" wall finishes where circumstances require, to reduce moisture build-up and prevent microbial contamination. Minimize selection of fibrous materials, e.g. insulation, carpet and padding and flexible fabrics, whose exposed surfaces when exposed to the air stream or occupied space can contribute significant emissions and absorb and re-emit other contaminants over time.

Comment: ***COMPLIANCE IS ATTAINABLE.***

5.C6 **Controllability of Systems** [2]

Intent: Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

Requirement:

- ☑ Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall. **1**
- ☑ Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. **1**

Technologies /Strategies: Provide individual or integrated controls systems that control lighting, airflow, and temperature in individual rooms and/or work areas. Consider combinations of ambient and task lighting control and operable windows for perimeter and VAV systems for non perimeter with a 1:1: 2 terminal box to controller to occupant ratio.

Comment: ***COMPLIANCE FOR THIS ELEMENT SHOULD IS ATTAINABLE.***

5.C7 **Thermal Comfort** [2]

Intent: Provide for a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

Requirement:

- ☒ Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. **X**

Comment: ***WINTER HUMIDITY CONTROL IS NOT A PART OF THIS PROJECT.***

- ☒ Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building. **X**

Comment: ***"AND/OR" DEHUMIDIFICATION IS POSSIBLE WITH THE SUGGESTED SYSTEMS. RECOMMEND PERSUIT OF THIS ELEMENT.***

Technologies /Strategies: Integrated envelope and HVAC system design strategies that achieve thermal comfort conditions based on mean radiant temperature, local air velocity, relative humidity, and air temperature. Install and maintain a temperature and humidity monitoring system for key areas of the building (i.e., at the perimeter, and spaces provided with humidity control). This function can be satisfied by the building automation system. Specify in system operation manuals that all sensors require quarterly calibration. Include criteria verification and system operation in commissioning plan and report.

5.C8 **Daylight and Views** [2]

Intent: Provide a connection between indoor spaces and the outdoor environment through the introduction of sunlight and views into the occupied areas of the building.

Requirement: ☑ Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. 1

Comment: ***COMPLIANCE IS ATTAINABLE.***

☑ Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. 1

Comment: ***COMPLIANCE IS ATTAINABLE.***

Technologies /Strategies: Implement design strategies to provide access to daylight and views to the outdoors in a glare-free way using exterior sun shading, interior light shelves, and /or window treatments. Orient buildings to maximize daylighting options. Consider shallow or narrow building footprints. Employ courtyards, atriums, clerestory windows, skylights, and light shelves to achieve daylight penetration (from other than direct effect or direct rays from the sun) deep into regularly occupied areas of the building.

5.C9 **Acoustic Environment /Noise Control**

Intent: Provide appropriate acoustic conditions for user privacy and comfort.

Requirement: ☑ Minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation. 1

Technologies /Strategies: Evaluate each occupied environment and determine the appropriate layout, materials and furnishings design.

Comment: ***COMPLIANCE IS ATTAINABLE.***

5.C10 **Facility In-Use IAQ Management Plan**

Intent: Insure the effective management of facility air quality during its life.

Requirement: ☑ Perform all of the following:

- Develop an air quality action plan to include scheduled HVAC system cleaning.
- Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.
- Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO 2), total volatile organic compounds (TVOCs), and particulates (including PM10).

Technologies /Strategies: Provide action plan for periodic system maintenance, monitoring, occupant/manager training.

Comment: ***COMPLIANCE IS ATTAINABLE.***

6.0 Facility Delivery Process — Score 7

6.C1 **Holistic Delivery of Facility**

Intent: Encourage a facility delivery process that actively engages all stakeholders in the design process to deliver a facility that meets all functional requirements while effectively optimizing tradeoffs among sustainability, first costs, life cycle costs and mission requirements.

Requirement:

- ☑ Choose team leaders that are experienced in holistic delivery of facilities. **1**
- ☑ Train the entire team in the holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members. **1**
- ☑ Identify project goals and metrics.
- ☑ Plan and execute charrettes with team members at critical phases of the facility delivery. **1**
- ☑ Identify and resolve tradeoffs among sustainability, first costs, life cycle costs and mission requirements through charrettes and other collaborative processes. **2**
- ☑ Document required results for each phase of project deliverables that achieve the project goals and are measurable throughout the facility life span. **1**

Technologies /Strategies:

Develop performance specifications or choose competitive range of products that meet environmental criteria. Use automated modeling and analysis tools to assess site and facility design alternatives.

Conduct life-cycle cost analysis (LCCA) in the design process according to the Federal Facilities Council Technical Report, Sustainable Federal Facilities: A Guide To Integrating Value Engineering, Life Cycle Costing, and Sustainable Development, FFC # 142, 2000.

Conduct a full ecological assessment to include soil quality, water resources and flows, vegetation and trees, wildlife habitats and corridors, wetlands, and ecologically sensitive areas to identify the least sensitive site areas for development. Evaluate space utilization/functions to reduce overall space requirements, considering networking, flextime, flexi-place, dual-use, and other strategies to reduce space requirements/optimize facility size.

Comment: ***ESTABLISH REQUIRED STRATEGIES FOR ATTAINMENT OF THESE ELEMENTS THROUGH REGULAR TIMELY AND EFFECTIVE PARTNERING, INSTRUCTIONS AND VALUE ENGINEERING AT EACH CRITICAL PHASE OF THE FACILITY DELIVERY.***

7.0 Current Mission — Score 6

7.C1 **Operation and Maintenance**

Intent: Encourage the development of a facility delivery process that enhances efficient operation and maintenance of the facility.

Requirement:

☑ Develop a facility operations and maintenance program to include: 1

- Commissioning instructions for all facility systems.
- Comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warrantee information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed.
- A periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities.
- Instructions on sustainable cleaning and pest control practices.
- Develop a comprehensive site/facility recycling/waste management plan.

☑ Provide surfaces, furnishings, and equipment that are appropriately durable, according to life cycle cost analysis. 1

Technologies /Strategies:

Maintain facility elements, systems and subsystems on a routine maintenance schedule to ensure integrity and longevity.

Perform scheduled cleaning and maintenance activities with nontoxic environmentally preferable cleaning products and procedures. Keep air ducts clean and free of microorganisms through a structured program of preventive maintenance. Clean lighting systems following a regular maintenance schedule to ensure optimum light output and energy efficiency.

Use pesticides and herbicides sparingly and only when necessary with preference to natural methods and materials over poisons and toxic agents.

Use automated monitors and controls for energy, water, waste, temperature, moisture, and ventilation monitors and controls. Turn off the lights, computers, computer monitors, and equipment when not in use. Enable powerdown features on office equipment.

Comment: ***COMPLIANCE IS ATTAINABLE.***

7.C2 **Soldier and Workforce Productivity and Retention**

Intent: Provide a high-quality, functional, healthy and safe work environment to promote soldier and workforce productivity and retention.

Requirement:

- ☑ Provide a high quality indoor environment to enhance user/occupant quality of life (QOL). **1**
- ☑ Provide a highly functional work environment to promote user/occupant work productivity. **1**
- ☑ Provide a healthy and safe work environment to sustain QOL and productivity. **1**

Technologies /Strategies: Use a registered/certified interior designer to provide stimulating interior environments with pleasant colors, surface treatments, room proportions and ceiling heights, external views, natural lighting, and quality detailing for interior furnishings, equipment, materials and finishes. Use IES standards to provide light to occupied space with variations in level, comfortable contrasts, natural color rendition, natural/man-made, and adequate controls to optimize light aesthetic qualities. Provide occupant control of individual work areas configuration, and lighting, thermal and ventilation systems.

Collaborate with end users to identify functional and technical requirements and to perform adjacency studies. Configure occupied space to address the specific workers/occupants functions and activities that will be carried out there. Meet TI 800-01 Design Guide requirements. Design and configure occupied space, and select furniture and equipment using human ergonomics. Identify existing user amenities, such as dining, recreation, socialization, shopping and child care facilities. Identify what amenities should be incorporated into the project or provided in the future, nearby facility. Provide ventilation air in sufficient volume free from natural and man made contaminants.

Comment: ***COMPLIANCE IS ATTAINABLE.***

8.0 Future Missions — Score 4

8.C1 **Functional Life of Facility and Supporting Systems**

Intent: Assess the functional life of a facility and its supporting systems to optimize the infrastructure investment.

Requirement:

- ☑ Identify how long the designed function is likely to occupy the current facility. **1**
- ☑ Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional and physical obsolescence. **1**

Technologies /Strategies: Assess the typical or likely lifespan of the function(s) to be accommodated to forecast eventual adaptation to a different use(s). Assess the life spans of the various building systems/components to forecast their revision/replacement during the facility lifespan and design in a manner that facilitates revision/replacement.

Consider the life span of the weapon systems, doctrines, or other programs supported by the facility.

Use life cycle data and other sources to identify the life span of the embodied systems.

Comment: ***COMPLIANCE IS ATTAINABLE.***

8.C2 **Adaptation, Renewal and Future Uses**

Intent: Encourage facility design that is responsive to change over time to maximize accommodation of future uses without creating waste and insuring maximum useful life of products.

Requirement:

☑ Identify possible future uses for the facility; consider alternatives that expand the list of possible future uses. AND Design the building to accommodate as wide a range of future uses, as practical. AND Design the installation of building systems to accommodate foreseeable change with a minimum amount of disruption, cost, and additional materials. 1

Comment: ***COMPLIANCE IS ATTAINABLE.***

☑ Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems. 1

Comment: ***COMPLIANCE IS ATTAINABLE.***

Technologies /Strategies: Create durable, long-lasting and adaptable facility shell and structural system. Create an adaptable, flexible facility design using open planning, service corridors, interstitial space, access floors, demountable walls/partitions, modular furniture and other adaptable space configuration/utilization strategies.

Select materials that are recyclable, avoiding composite materials, such as reinforced plastics and carpet fibers and backing. Consider selecting materials and labeling construction materials with identification information to facilitate recycling. Use pre-cut/pre-fabricated materials and use standard lengths and sizes (dimensional modularity) in design. Design facility systems and subsystems for reconfiguration and/or disassembly/recycling using reversible/reusable connectors.

Facility Points Summary - Barracks

1.0 Sustainable Sites (S) — Score 12 — Max 20

1.R1	☐ Erosion, Sedimentation and Water Quality Control [Required]	R	[Required]
1.C1	☐ Site Selection	2	2
1.C2	☐ Installation/Base Redevelopment	1	2
1.C3	☐ Brownfield Redevelopment	0	1
1.C4	☐ Alternative Transportation	2	4
1.C5	☐ Reduced Site Disturbance	1	2
1.C6	☐ Stormwater Management	1	2
1.C7	☐ Landscape and Exterior Design to Reduce Heat Islands	0	2
1.C8	☐ Light Pollution Reduction	1	1
1.C9	☐ Optimize Site Features	1	1
1.C10	☐ Facility Impact	2	2
1.C11	☐ Site Ecology	1	1

2.0 Water Efficiency (W) — Score 2 — Max 5

2.C1	☐ Water Efficient Landscaping	1	2
2.C2	☐ Innovative Wastewater Technologies	0	1
2.C3	☐ Water Use Reduction	1	2

3.0 Energy and Atmosphere (E) — Score 6 — Max 28

3.R1	☐ Fundamental Building Systems Commissioning	R	[Required]
3.R2	☐ Minimum Energy Performance	R	[Required]
3.R3	☐ CFC Reduction in HVAC&R Equipment	R	[Required]
3.C1	☐ Optimize Energy Performance	4	20
3.C2	☐ Renewable Energy	0	4
3.C3	☐ Additional Commissioning	1	1
3.C4	☐ <<Deleted>>	——	——
3.C5	☐ Measurement and Verification	1	1
3.C6	☐ Green Power	0	1
3.C7	☐ Distributed Generation	0	1

4.0 Materials and Resources (M) — Score 6 — Max 13

4.R1	☐ Storage & Collection of Recyclables	R	[Required]
4.C1	☐ Building Reuse	0	3
4.C2	☐ Construction Waste Management	1	2
4.C3	☐ Resource Reuse	2	2
4.C4	☐ Recycled Content	1	2
4.C5	☐ Local/Regional Materials	1	2
4.C6	☐ Rapidly Renewable Materials	0	1
4.C7	☐ Certified Wood	1	1

Facility Points Summary (Continued)

Maximum Points

5.0 Indoor Environmental Quality (IEQ) [Q]

		Score	Max 17
5.R1	☐ Minimum IAQ Performance	R	[Required]
5.R2	☐ Environmental Tobacco Smoke (ETS) Control	R	[Required]
5.C1	☐ IAQ Monitoring	1	1
5.C2	☐ Increase Ventilation Effectiveness	1	1
5.C3	☐ Construction IAQ Management Plan	2	2
5.C4	☐ Low-Emitting Materials	3	4
5.C5	☐ Indoor Chemical and Pollutant Source Control	1	1
5.C6	☐ Controllability of Systems	2	2
5.C7	☐ Thermal Comfort	0	2
5.C8	☐ Daylight and Views	2	2
5.C9	☐ Acoustic Environment /Noise Control	1	1
5.C10	☐ Facility In-Use IAQ Management Plan	1	1

6.0 Facility Delivery Process (P)

		Score	Max 7
6.C1	☐ Holistic Delivery of Facility	7	7

7.0 Current Mission Score

		Score	Max 6
7.C1	☐ Operation and Maintenance	3	3
7.C2	☐ Soldier and Workforce Productivity and Retention	3	3

8.0 Future Missions

		Score	Max 4
8.C1	☐ Functional Life of Facility and Supporting Systems	2	2
8.C2	☐ Adaptation, Renewal and Future Uses	2	2

Total Score 57 Max100

SPiRiT Sustainable Project Certification Levels

SPiRiT Bronze		25 to 34 points
SPiRiT Silver		35 to 49 points
SPiRiT Gold	57	50 to 74 points
SPiRiT Platinum		75 to 100 points

Facility Points Summary – Non-Barrack Facilities

1.0 Sustainable Sites (S) — Score 12 — Max 20

1.R1	☐	Erosion, Sedimentation and Water Quality Control [Required]	R	[Required]
1.C1	☐	Site Selection	2	2
1.C2	☐	Installation/Base Redevelopment	1	2
1.C3	☐	Brownfield Redevelopment	0	1
1.C4	☐	Alternative Transportation	2	4
1.C5	☐	Reduced Site Disturbance	1	2
1.C6	☐	Stormwater Management	1	2
1.C7	☐	Landscape and Exterior Design to Reduce Heat Islands	0	2
1.C8	☐	Light Pollution Reduction	1	1
1.C9	☐	Optimize Site Features	1	1
1.C10	☐	Facility Impact	2	2
1.C11	☐	Site Ecology	1	1

2.0 Water Efficiency (W) — Score 2 — Max 5

2.C1	☐	Water Efficient Landscaping	1	2
2.C2	☐	Innovative Wastewater Technologies	0	1
2.C3	☐	Water Use Reduction	1	2

3.0 Energy and Atmosphere (E) — Score 2 — Max 28

3.R1	☐	Fundamental Building Systems Commissioning	R	[Required]
3.R2	☐	Minimum Energy Performance	R	[Required]
3.R3	☐	CFC Reduction in HVAC&R Equipment	R	[Required]
3.C1	☐	Optimize Energy Performance	2	20
3.C2	☐	Renewable Energy	0	4
3.C3	☐	Additional Commissioning	0	1
3.C4	☐	<<Deleted>>	----	
3.C5	☐	Measurement and Verification	0	1
3.C6	☐	Green Power	0	1
3.C7	☐	Distributed Generation	0	1

4.0 Materials and Resources (M) — Score 3 — Max 13

4.R1	☐	Storage & Collection of Recyclables	R	[Required]
4.C1	☐	Building Reuse	0	3
4.C2	☐	Construction Waste Management	1	2
4.C3	☐	Resource Reuse	0	2
4.C4	☐	Recycled Content	0	2
4.C5	☐	Local/Regional Materials	1	2
4.C6	☐	Rapidly Renewable Materials	0	1
4.C7	☐	Certified Wood	1	1

Facility Points Summary (Continued)

				Maximum Points
5.0 Indoor Environmental Quality (IEQ) [Q]		**Score**	**0**	**Max 17**
5.R1	☐	Minimum IAQ Performance	R	[Required]
5.R2	☐	Environmental Tobacco Smoke (ETS) Control	R	[Required]
5.C1	☐	IAQ Monitoring	0	1
5.C2	☐	Increase Ventilation Effectiveness	0	1
5.C3	☐	Construction IAQ Management Plan	0	2
5.C4	☐	Low-Emitting Materials	3	4
5.C5	☐	Indoor Chemical and Pollutant Source Control	1	1
5.C6	☐	Controllability of Systems	0	2
5.C7	☐	Thermal Comfort	0	2
5.C8	☐	Daylight and Views	0	2
5.C9	☐	Acoustic Environment /Noise Control	1	2
5.C10	☐	Facility In-Use IAQ Management Plan	1	1
6.0 Facility Delivery Process (P)		**Score**	**7**	**Max 7**
6.C1	☐	Holistic Delivery of Facility	7	7
7.0 Current Mission Score		**Score**	**6**	**Max 6**
7.C1	☐	Operation and Maintenance	3	3
7.C2	☐	Soldier and Workforce Productivity and Retention	3	3
8.0 Future Missions		**Score**	**4**	**Max 4**
8.C1	☐	Functional Life of Facility and Supporting Systems	2	2
8.C2	☐	Adaptation, Renewal and Future Uses	2	2
Total Score			0	Max100

SPiRiT Sustainable Project Certification Levels

SPiRiT Bronze		25 to 34 points
SPiRiT Silver	44	35 to 49 points
SPiRiT Gold		50 to 74 points
SPiRiT Platinum		75 to 100 points

APPENDIX F

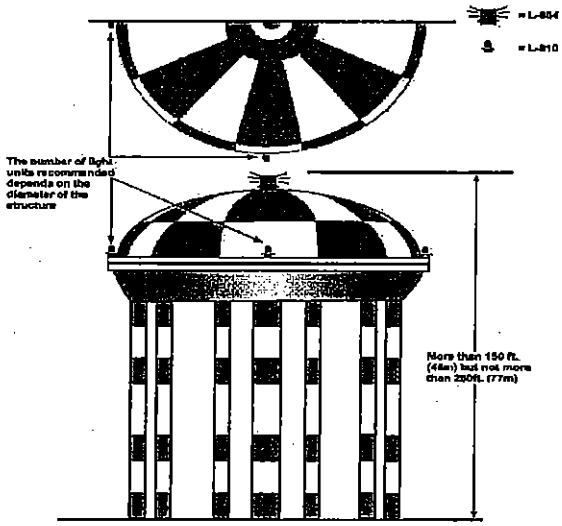
US DEPARTMENT OF TRANSPORTATION – FEDERAL AVIATION ADMINISTRATION – OBSTRUCTION MARKING AND LIGHTING

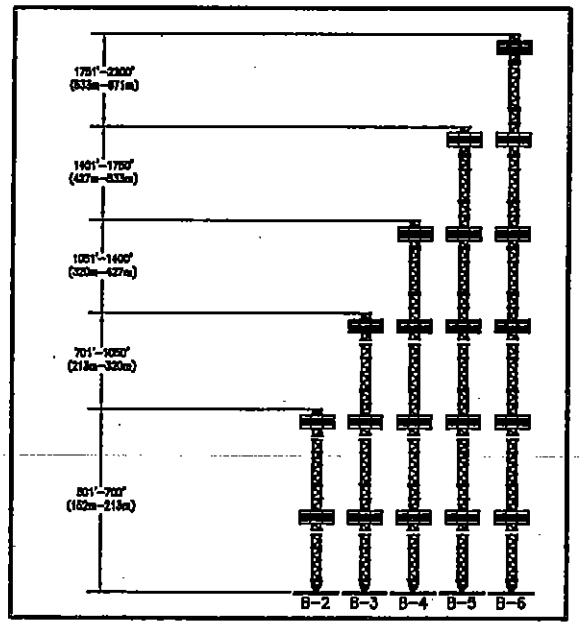
U.S. Department
of Transportation
**Federal Aviation
Administration**

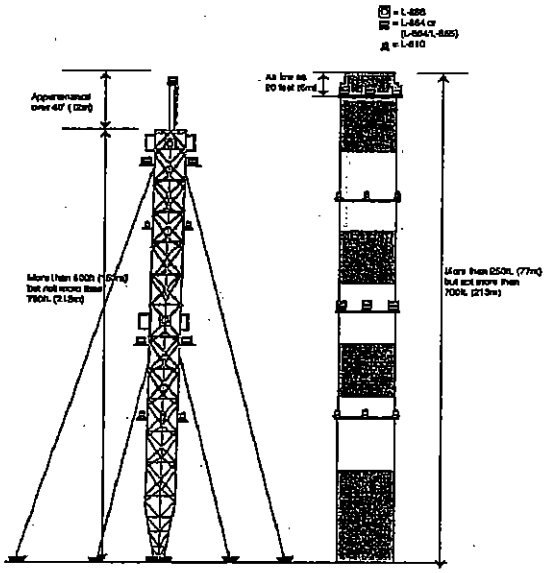
ADVISORY CIRCULAR

AC 70/7460-1K

Obstruction Marking and Lighting







U.S. Department
Of Transportation
Federal Aviation Administration

ADVISORY CIRCULAR

Subject: CHANGE 1 TO OBSTRUCTION MARKING AND LIGHTING

Date: 4/15/00
Initiated by: ATA-400

AC No: 70/7460-1K
Change: 1

1. PURPOSE. This change amends the Federal Aviation Administration's (FAA) standards for marking and lighting structures to promote aviation safety. The Change Number and date of the change material are located at the top of the page.

2. EFFECTIVE DATE. This change is effective August 1, 2000.

3. EXPLANATION OF CHANGES.

   a. Table of Contents. Change pages i through iii.

   b. Change pages 19 through 32 beginning at Chapter 7. High Intensity Flashing White Obstruction Light Systems to read 21 through 34.

   c. Page 1. Paragraph 1. **Reporting Requirements.** Owner changed to read sponsor.

   d. Page 1. Paragraph 5. **Modifications and Deviations.** Owner changed to read sponsor.

   e. Page 1. Paragraph 5.b.3. **Voluntary Marking and/or Lighting.** Owner/s changed to read sponsor.

   f. Page 2. Paragraph d. Chapter 6 changed to read Chapter 12, Table 4.

   g. Page 2. Paragraph d. Owners/proponents changed to read sponsors.

   h. Page 2. Paragraph 6. **Additional Notification.** Proponents changed to read sponsors.

   i. Page 2. Paragraph 7. **Metric Units.** Proponents changed to read sponsors.

   j. Page 3. Paragraph 23. **Light Failure Notification.** Proponents changed to read sponsors.

   k. Page 4. Paragraph 24. **Notification of Restoration.** Owner changed to read sponsor.

   l. Page 7. **Note.** Change proponents to read sponsors.

m. Page 11. Paragraph 49. **Distraction.** Owner changed to read sponsor

n. Replace Pages A1-1 through A1-19. New illustrations. In addition, mid-level lighting on structures beginning at 250 feet above ground level (AGL) has been corrected to reflect lighting beginning at 350 feet AGL.

for JOHN S. WALKER
Program Director for Air Traffic
Airspace Management

PAGE CONTROL CHART

AC 70/7460-1K, CHG. 1

Remove Pages	Dated	Insert Pages	Dated
i through iii	3/1/00	i through iii	8/1/00
1 through 4	3/1/00	1 through 4	8/1/00
7	3/1/00	7	8/1/00
11	3/1/00	11	8/1/00
A1-1 through A1-19	3/1/00	A1-1 through A1-19	8/1/00

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CHAPTER 1. ADMINISTRATIVE AND GENERAL PROCEDURES

1. REPORTING REQUIREMENTS

A sponsor proposing any type of construction or alteration of a structure that may affect the National Airspace System (NAS) is required under the provisions of 14 Code of Federal Regulations (14 CFR part 77) to notify the FAA by completing the Notice of Proposed Construction or Alteration form (FAA Form 7460-1). The form should be sent to the FAA Regional Air Traffic Division office having jurisdiction over the area where the planned construction or alteration would be located. Copies of FAA Form 7460-1 may be obtained from any FAA Regional Air Traffic Division office, Airports District Office or FAA Website at www.faa.gov/ats/ata/ata400.

2. PRECONSTRUCTION NOTICE

The notice must be submitted:

a. At least 30 days prior to the date of proposed construction or alteration is to begin.

b. On or before the date an application for a construction permit is filed with the Federal Communications Commission (FCC). (The FCC advises its applicants to file with the FAA well in advance of the 30-day period in order to expedite FCC processing.)

3. FAA ACKNOWLEDGEMENT

The FAA will acknowledge, in writing, receipt of each FAA Form 7460-1 notice received.

4. SUPPLEMENTAL NOTICE REQUIREMENT

a. If required, the FAA will include a FAA Form 7460-2, Notice of Actual Construction or Alteration, with a determination.

b. FAA Form 7460-2 Part 1 is to be completed and sent to the FAA at least 48 hours prior to starting the actual construction or alteration of a structure. Additionally, Part 2 shall be submitted no later than 5 days after the structure has reached its greatest height. The form should be sent to the Regional Air Traffic Division office having jurisdiction over the area where the construction or alteration would be located.

c. In addition, supplemental notice shall be submitted upon abandonment of construction.

d. Letters are acceptable in cases where the construction/alteration is temporary or a proposal is abandoned. This notification process is designed to permit the FAA the necessary time to change affected procedures and/or minimum flight altitudes, and to otherwise alert airmen of the structure's presence.

Note-
NOTIFICATION AS REQUIRED IN THE DETERMINATION IS CRITICAL TO AVIATION SAFETY.

5. MODIFICATIONS AND DEVIATIONS

a. Requests for modification or deviation from the standards outlined in this AC must be submitted to the FAA Regional Air Traffic Division office serving the area where the structure would be located. The sponsor is responsible for adhering to approved marking and/or lighting limitations, and/or recommendations given, and should notify the FAA and FCC (for those structures regulated by the FCC) prior to removal of marking and/or lighting. A request received after a determination is issued may require a new study and could result in a new determination.

b. ***Modifications.*** Modifications will be based on whether or not they impact aviation safety. Examples of modifications that may be considered:

1. ***Marking and/or Lighting Only a Portion of an Object.*** The object may be so located with respect to other objects or terrain that only a portion of it needs to be marked or lighted.

2. ***No Marking and/or Lighting.*** The object may be so located with respect to other objects or terrain, removed from the general flow of air traffic, or may be so conspicuous by its shape, size, or color that marking or lighting would serve no useful purpose.

3. ***Voluntary Marking and/or Lighting.*** The object may be so located with respect to other objects or terrain that the sponsor feels increased conspicuity would better serve aviation safety. Sponsors who desire to voluntarily mark and/or light their structure should request the proper marking and/or lighting from the FAA to ensure no aviation safety issues are impacted.

4. ***Marking or Lighting an Object in Accordance with the Standards for an Object of Greater Height or Size.*** The object may present such an extraordinary hazard potential that higher standards may be recommended for increased conspicuity to ensure the safety to air navigation.

c. ***Deviations.*** The FAA regional office conducts an aeronautical study of the proposed deviation(s)

and forwards its recommendation to FAA headquarters in Washington, DC, for final approval. Examples of deviations that may be considered:

1. Colors of objects.
2. Dimensions of color bands or rectangles.
3. Colors/types of lights.
4. Basic signals and intensity of lighting.
5. Night/day lighting combinations.
6. Flash rate.

d. The FAA strongly recommends that sponsors become familiar with the different types of lighting systems and to specifically request the type of lighting system desired when submitting FAA Form 7460-1. (This request should be noted in "item 2.D" of the FAA form.) Information on these systems can be found in Chapter 12, Table 4 of this AC. While the FAA will make every effort to accommodate the request, sponsors should also request information from system manufacturers. In order to determine which system best meets their needs based on purpose, installation, and maintenance costs.

6. ADDITIONAL NOTIFICATION

Sponsors are reminded that any change to the submitted information on which the FAA has based its determination, including modification, deviation or optional upgrade to white lighting on structures which are regulated by the FCC, must also be filed with the FCC prior to making the change for proper authorization and annotations of obstruction marking and lighting. These structures will be subject to inspection and enforcement of marking and lighting requirements by the FCC. FCC Forms and Bulletins can be obtained from the FCC's National Call Center at 1-888-CALL-FCC (1-888-225-5322). Upon completion of the actual change, notify the Aeronautical Charting office at:

NOAA/NOS
Aeronautical Charting Division
Station 5601, N/ACC113
1305 East-West Highway
Silver Spring, MD 20910-3233

7. METRIC UNITS

To promote an orderly transition to metric units, sponsors should include both English and metric (SI units) dimensions. The metric conversions may not be exact equivalents, and until there is an official changeover to the metric system, the English dimensions will govern.

CHAPTER 2. GENERAL

20. STRUCTURES TO BE MARKED AND LIGHTED

Any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200 feet (61m) above ground level (AGL) or exceeds any obstruction standard contained in 14 CFR part 77, should normally be marked and/or lighted. However, an FAA aeronautical study may reveal that the absence of marking and/or lighting will not impair aviation safety. Conversely, the object may present such an extraordinary hazard potential that higher standards may be recommended for increased conspicuity to ensure safety to air navigation. Normally outside commercial lighting is not considered sufficient reason to omit recommended marking and/or lighting. Recommendations on marking and/or lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design. The FAA may also recommend marking and/or lighting a structure that does not exceed 200 (61m) feet AGL or 14 CFR part 77 standards because of its particular location.

21. GUYED STRUCTURES

The guys of a 2,000-foot (610m) skeletal tower are anchored from 1,600 feet (488m) to 2,000 feet (610m) from the base of the structure. This places a portion of the guys 1,500 feet (458m) from the tower at a height of between 125 feet (38m) to 500 feet (153m) AGL. 14 CFR part 91, section 119, requires pilots, when operating over other than congested areas, to remain at least 500 feet (153m) from man-made structures. Therefore, the tower must be cleared by 2,000 feet (610m) horizontally to avoid all guy wires. Properly maintained marking and lighting are important for increased conspicuity since the guys of a structure are difficult to see until aircraft are dangerously close.

22. MARKING AND LIGHTING EQUIPMENT

Considerable effort and research have been expended in determining the minimum marking and lighting systems or quality of materials that will produce an acceptable level of safety to air navigation. The FAA will recommend the use of only those marking and lighting systems that meet established technical standards. While additional lights may be desirable to identify an obstruction to air navigation and may, on occasion be recommended, the FAA will recommend minimum standards in the interest of safety, economy, and related concerns. Therefore, to provide an adequate level of safety, obstruction lighting systems should be installed, operated, and maintained in accordance with the recommended standards herein.

23. LIGHT FAILURE NOTIFICATION

a. Sponsors should keep in mind that conspicuity is achieved only when all recommended lights are working. Partial equipment outages decrease the margin of safety. Any outage should be corrected as soon as possible. Failure of a steady burning side or intermediate light should be corrected as soon as possible, but notification is not required.

b. Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to the nearest flight service station (FSS) so a Notice to Airmen (NOTAM) can be issued. Toll-free numbers for FSS are listed in most telephone books or on the FAA's Website at www.faa.gov/ats/ata/ata400. This report should contain the following information:

1. Name of persons or organizations reporting light failures including any title, address, and telephone number.

2. The type of structure.

3. Location of structure (including latitude and longitude, if known, prominent structures, landmarks, etc.).

4. Height of structure above ground level (AGL)/above mean sea level (AMSL), if known.

5. A return to service date.

6. FCC Antenna Registration Number (for structures that are regulated by the FCC).

Note-
1. When the primary lamp in a double obstruction light fails, and the secondary lamp comes on, no report is required. However, when one of the lamps in an incandescent L-864 flashing red beacon fails, it should be reported.

2. After 15 days, the NOTAM is automatically deleted from the system. The sponsor is requested to call the nearest FSS to extend the outage date. In addition, the sponsor is required to report a return to service date.

24. NOTIFICATION OF RESTORATION

As soon as normal operation is restored, notify the same AFSS/FSS that received the notification of failure. The FCC advises that noncompliance with notification procedures could subject its sponsor to penalties or monetary forfeitures.

25. FCC REQUIREMENT

FCC licensees are required to file an environmental assessment with the Commission when seeking authorization for the use of the high intensity flashing white lighting system on structures located in residential neighborhoods, as defined by the applicable zoning law.

CHAPTER 3. MARKING GUIDLINES

30. PURPOSE

This chapter provides recommended guidelines to make certain structures conspicuous to pilots during daylight hours. One way of achieving this conspicuity is by painting and/or marking these structures. Recommendations on marking structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

31. PAINT COLORS

Alternate sections of aviation orange and white paint should be used as they provide maximum visibility of an obstruction by contrast in colors.

32. PAINT STANDARDS

The following standards should be followed. To be effective, the paint used should meet specific color requirements when freshly applied to a structure. Since, all outdoor paints deteriorate with time and it is not practical to give a maintenance schedule for all climates, surfaces should be repainted when the color changes noticeably or its effectiveness is reduced by scaling, oxidation, chipping, or layers of contamination.

a. ***Materials and Application.*** Quality paint and materials should be selected to provide extra years of service. The paint should be compatible with the surfaces to be painted, including any previous coatings, and suitable for the environmental conditions. Surface preparation and paint application should be in accordance with manufacturer's recommendations.

Note-
In-Service Aviation Orange Color Tolerance Charts are available from private suppliers for determining when repainting is required. The color should be sampled on the upper half of the structure, since weathering is greater there.

b. ***Surfaces Not Requiring Paint.*** Ladders, decks, and walkways of steel towers and similar structures need not be painted if a smooth surface presents a potential hazard to maintenance personnel. Paint may also be omitted from precision or critical surfaces if it would have an adverse effect on the transmission or radiation characteristics of a signal. However, the overall marking effect of the structure should not be reduced.

c. ***Skeletal Structures.*** Complete all marking/painting prior to or immediately upon completion of construction. This applies to catenary support structures, radio and television towers, and similar skeletal structures. To be effective, paint should be applied to all inner and outer surfaces of the framework.

33. PAINT PATTERNS

Paint patterns of various types are used to mark structures. The pattern to be used is determined by the size and shape of the structure. The following patterns are recommended.

a. ***Solid Pattern.*** Obstacles should be colored aviation orange if the structure has both horizontal and vertical dimensions not exceeding 10.5 feet (3.2m).

b. ***Checkerboard Pattern.*** Alternating rectangles of aviation orange and white are normally displayed on the following structures:

1. Water, gas, and grain storage tanks.

2. Buildings, as required.

3. Large structures exceeding 10.5 feet (3.2m) across having a horizontal dimension that is equal to or greater than the vertical dimension.

c. ***Size of Patterns.*** Sides of the checkerboard pattern should measure not less than 5 feet (1.5m) or more than 20 feet (6m) and should be as nearly square as possible. However, if it is impractical because of the size or shape of a structure, the patterns may have sides less than 5 feet (1.5m). When possible, corner surfaces should be colored orange.

d. ***Alternate Bands.*** Alternate bands of aviation orange and white are normally displayed on the following structures:

1. Communication towers and catenary support structures.

2. Poles.

3. Smokestacks.

4. Skeletal framework of storage tanks and similar structures.

5. Structures which appear narrow from a side view, that are 10.5 feet (3.2m) or more across and the horizontal dimension is less than the vertical dimension.

6. Wind turbine generator support structures including the nacelle or generator housing.

7. Coaxial cable, conduits, and other cables attached to the face of a tower.

e. ***Color Band Characteristics.*** Bands for structures of any height should be:

1. Equal in width, provided each band is not less than $1^1/_2$ feet (0.5m) or more than 100 feet (31m) wide.

2. Perpendicular to the vertical axis with the bands at the top and bottom ends colored orange.

3. An odd number of bands on the structure.

4. Approximately one-seventh the height if the structure is 700 feet (214m) AGL or less. For each additional 200 feet (61m) or fraction thereof, add one (1) additional orange and one (1) additional white band.

5. Equal and in proportion to the structure's height AGL.

Structure Height to Bandwidth Ratio

Example: If a Structure is:		
Greater Than	**But Not More Than**	**Band Width**
10.5 feet (3.2m)	700 feet (214m)	$^1/_7$ of height
701 feet (214m)	900 feet (275m)	$^1/_9$ of height
901 feet (275m)	1,100 feet (336m)	$^1/_{11}$ of height
1,100 feet (336m)	1,300 feet (397m)	$^1/_{13}$ of height

TBL 1

f. ***Structures With a Cover or Roof.*** If the structure has a cover or roof, the highest orange band should be continued to cover the entire top of the structure.

g. ***Skeletal Structures Atop Buildings.*** If a flagpole, skeletal structure, or similar object is erected on top of a building, the combined height of the object and building will determine whether marking is recommended; however, only the height of the object under study determines the width of the color bands.

h. ***Partial Marking.*** If marking is recommended for only a portion of a structure because of shielding by other objects or terrain, the width of the bands should be determined by the overall height of the structure. A minimum of three bands should be displayed on the upper portion of the structure.

i. ***Teardrop Pattern.*** Spherical water storage tanks with a single circular standpipe support may be marked in a teardrop-striped pattern. The tank should show alternate stripes of aviation orange and white. The stripes should extend from the top center of the tank to its supporting standpipe. The width of the stripes should be equal, and the width of each stripe at the greatest girth of the tank should not be less than 5 feet (1.5m) nor more than 15 feet (4.6m).

j. ***Community Names.*** If it is desirable to paint the name of the community on the side of a tank, the stripe pattern may be broken to serve this purpose. This open area should have a maximum height of 3 feet (0.9m).

k. ***Exceptions.*** Structural designs not conducive to standard markings may be marked as follows:

1. If it is not practical to color the roof of a structure in a checkerboard pattern, it may be colored solid orange.

2. If a spherical structure is not suitable for an exact checkerboard pattern, the shape of the rectangles may be modified to fit the shape of the surface.

3. Storage tanks not suitable for a checkerboard pattern may be colored by alternating bands of aviation orange and white or a limited checkerboard pattern applied to the upper one-third of the structure.

4. The skeletal framework of certain water, gas, and grain storage tanks may be excluded from the checkerboard pattern.

34. MARKERS

Markers are used to highlight structures when it is impractical to make them conspicuous by painting. Markers may also be used in addition to aviation orange and white paint when additional conspicuity is necessary for aviation safety. They should be displayed in conspicuous positions on or adjacent to the structures so as to retain the general definition of the structure. They should be recognizable in clear air from a distance of at least 4,000 feet (1219m) and in all directions from which aircraft are likely to approach. Markers should be distinctively shaped, i.e., spherical or cylindrical, so they are not mistaken for items that are used to convey other information. They should be replaced when faded or otherwise deteriorated.

a. ***Spherical Markers.*** Spherical markers are used to identify overhead wires. Markers may be of another shape, i.e., cylindrical, provided the projected area of such markers will not be less than that presented by a spherical marker.

1. ***Size and Color.***

The diameter of the markers used on extensive catenary wires across canyons, lakes, rivers, etc., should be not less than 36 inches (91cm). Smaller 20-inch (51cm) spheres are permitted on less extensive power lines or on power lines below 50 feet (15m) above the ground and within 1,500 feet (458m) of an airport runway end. Each marker should be a solid color such as aviation orange, white, or yellow.

2. ***Installations.***

(a) ***Spacing.*** Markers should be spaced equally along the wire at intervals of approximately 200 feet (61m) or a fraction thereof. Intervals between markers should be less in critical areas near runway ends (i.e., 30 to 50 feet (10m to 15m)). They should be displayed on the highest wire or by another means at the same height as the highest wire. Where there is more than one wire at the highest point, the markers may be installed alternately along each wire if the distance between adjacent markers meets the spacing standard. This method allows the weight and wind loading factors to be distributed.

(b) ***Pattern.*** An alternating color scheme provides the most conspicuity against all backgrounds. Mark overhead wires by alternating solid colored markers of aviation orange, white, and yellow. Normally, an orange sphere is placed at each end of a line and the spacing is adjusted (not to exceed 200 feet (61m)) to accommodate the rest of the markers. When less than four markers are used, they should all be aviation orange.

b. ***Flag Markers.*** Flags are used to mark certain structures or objects when it is technically impractical to use spherical markers or painting. Some examples are temporary construction equipment, cranes, derricks, oil and other drilling rigs. Catenaries should use spherical markers.

1. ***Minimum Size.*** Each side of the flag marker should be at least 2 feet (0.6m) in length.

2. ***Color Patterns.*** Flags should be colored as follows:

(a) *Solid.* Aviation orange.

(b) ***Orange and White.*** Arrange two triangular sections, one aviation orange and the other white to form a rectangle.

(c) ***Checkerboard.*** **Flags** 3 feet (0.9m) or larger should be a checkerboard pattern of aviation orange and white squares, each 1 foot (0.3m) plus or minus 10 percent.

3. ***Shape.*** Flags should be rectangular in shape and have stiffeners to keep them from drooping in calm wind.

4. ***Display.*** Flag markers should be displayed around, on top, or along the highest edge of the obstruction. When flags are used to mark extensive or closely grouped obstructions, they should be displayed approximately 50 feet (15m) apart. The flag stakes should be of such strength and height that they will support the flags above all surrounding ground, structures, and/or objects of natural growth.

35. UNUSUAL COMPLEXITIES

The FAA may also recommend appropriate marking in an area where obstructions are so grouped as to present a common obstruction to air navigation.

36. OMISSION OR ALTERNATIVES TO MARKING

There are two alternatives to marking. Either alternative requires FAA review and concurrence.

a. ***High Intensity Flashing White Lighting Systems.*** The high intensity lighting systems are more effective than aviation orange and white paint and therefore can be recommended instead of marking. This is particularly true under certain ambient light conditions involving the position of the sun relative to the direction of flight. When high intensity lighting systems are operated during daytime and twilight, other methods of marking may be omitted. When operated 24 hours a day, other methods of marking and lighting may be omitted.

b. ***Medium Intensity Flashing White Lighting Systems.*** When medium intensity lighting systems are operated during daytime and twilight on structures 500 feet (153m) AGL or less, other methods of marking may be omitted. When operated 24 hours a day on structures 500 feet (153m) AGL or less, other methods of marking and lighting may be omitted.

Note-
SPONSORS MUST ENSURE THAT ALTERNATIVES TO MARKING ARE COORDINATED WITH THE FCC FOR STRUCTURES UNDER ITS JURISDICTION PRIOR TO MAKING THE CHANGE.

CHAPTER 4. LIGHTING GUIDELINE

40. PURPOSE

This chapter describes the various obstruction lighting systems used to identify structures that an aeronautical study has determined will require added conspicuity. The lighting standards in this circular are the minimum necessary for aviation safety. Recommendations on lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

41. STANDARDS

The standards outlined in this AC are based on the use of light units that meet specified intensities, beam patterns, color, and flash rates as specified in AC 150/5345-43.

These standards may be obtained from:

Department of Transportation
TASC
Subsequent Distribution Office, SVC-121.23
Ardmore East Business Center
3341 Q 75th Avenue
Landover, MD 20785

42. LIGHTING SYSTEMS

Obstruction lighting may be displayed on structures as follows:

a. ***Aviation Red Obstruction Lights.*** Use flashing beacons and/or steady burning lights during nighttime.

b. ***Medium Intensity Flashing White Obstruction Lights.*** Medium intensity flashing white obstruction lights may be used during daytime and twilight with automatically selected reduced intensity for nighttime operation. When this system is used on structures 500 feet (153m) AGL or less in height, other methods of marking and lighting the structure may be omitted. Aviation orange and white paint is always required for daytime marking on structures exceeding 500 feet (153m) AGL. This system is not normally recommended on structures 200 feet (61m) AGL or less.

c. ***High Intensity Flashing White Obstruction Lights.*** Use high intensity flashing white obstruction lights during daytime with automatically selected reduced intensities for twilight and nighttime operations. When this system is used, other methods of marking and lighting the structure may be omitted. This system should not be recommended on structures 500 feet (153m) AGL or less, unless an FAA aeronautical study shows otherwise.

Note-
All flashing lights on a structure should flash simultaneously except for catenary support structures, which have a distinct sequence flashing between levels.

d. ***Dual Lighting.*** This system consists of red lights for nighttime and high or medium intensity flashing white lights for daytime and twilight. When a dual lighting system incorporates medium flashing intensity lights on structures 500 feet (153m) or less, or high intensity flashing white lights on structures of any height, other methods of marking the structure may be omitted.

e. ***Obstruction Lights During Construction.*** As the height of the structure exceeds each level at which permanent obstruction lights would be recommended, two or more lights of the type specified in the determination should be installed at that level. Temporary high or medium intensity flashing white lights, as recommended in the determination, should be operated 24 hours a day until all permanent lights are in operation. In either case, two or more lights should be installed on the uppermost part of the structure any time it exceeds the height of the temporary construction equipment. They may be turned off for periods when they would interfere with construction personnel. If practical, permanent obstruction lights should be installed and operated at each level as construction progresses. The lights should be positioned to ensure that a pilot has an unobstructed view of at least one light at each level.

f. ***Obstruction Lights in Urban Areas.*** When a structure is located in an urban area where there are numerous other white lights (e.g., streetlights, etc.) red obstruction lights with painting or a medium intensity dual system is recommended. Medium intensity lighting is not normally recommended on structures less than 200 feet (61m).

g. ***Temporary Construction Equipment Lighting.*** Since there is such a variance in construction cranes, derricks, oil and other drilling rigs, each case should be considered individually. Lights should be installed according to the standards given in Chapters 5, 6, 7, or 8, as they would apply to permanent structures.

43. CATENARY LIGHTING

Lighted markers are available for increased night conspicuity of high-voltage (69KV or greater) transmission line catenary wires. These markers should be used on transmission line catenary wires near airports, heliports, across rivers, canyons, lakes, etc. The lighted markers should be manufacturer certified as recognizable from a minimum distance of 4,000 feet (1219m) under nighttime conditions, minimum visual flight rules (VFR) conditions or having a minimum intensity of at least 32.5 candela. The lighting unit should emit a steady burning red light. They should be used on the highest energized line. If the lighted markers are installed on a line other than the highest catenary, then markers specified in paragraph 34 should be used in addition to the lighted markers. (The maximum distance between the line energizing the lighted markers and the highest catenary above the lighted marker should be no more than 20 feet (6m).) Markers should be distinctively shaped, i.e., spherical, cylindrical, so they are not mistaken for items that are used to convey other information. They should be visible in all directions from which aircraft are likely to approach. The area in the immediate vicinity of the supporting structure's base should be clear of all items and/or objects of natural growth that could interfere with the line-of-sight between a pilot and the structure's lights. Where a catenary wire crossing requires three or more supporting structures, the inner structures should be equipped with enough light units per level to provide a full coverage.

44. INSPECTION, REPAIR AND MAINTENANCE

To ensure the proper candela output for fixtures with incandescent lamps, the voltage provided to the lamp filament should not vary more than plus or minus 3 percent of the rated voltage of the lamp. The input voltage should be measured at the lamp socket with the lamp operating during the hours of normal operation. (For strobes, the input voltage of the power supplies should be within 10 percent of rated voltage.) Lamps should be replaced after being operated for not more than 75 percent of their rated life or immediately upon failure. Flashtubes in a light unit should be replaced immediately upon failure, when the peak effective intensity falls below specification limits or when the fixture begins skipping flashes, or at the manufacturer's recommended intervals. Due to the effects of harsh environments, beacon lenses should be visually inspected for ultraviolet damage, cracks, crazing, dirt build up, etc., to insure that the certified light output has not deteriorated. (See paragraph 23, for reporting requirements in case of failure.)

45. NONSTANDARD LIGHTS

Moored balloons, chimneys, church steeples, and similar obstructions may be floodlighted by fixed search light projectors installed at three or more equidistant points around the base of each obstruction. The searchlight projectors should provide an average illumination of at least 15 foot-candles over the top one-third of the obstruction.

46. PLACEMENT FACTORS

The height of the structure AGL determines the number of light levels. The light levels may be adjusted slightly, but not to exceed 10 feet (3m), when necessary to accommodate guy wires and personnel who replace or repair light fixtures. Except for catenary support structures, the following factors should be considered when determining the placement of obstruction lights on a structure.

a. ***Red Obstruction Lighting Systems.*** The overall height of the structure including all appurtenances such as rods, antennas, obstruction lights, etc., determines the number of light levels.

b. ***Medium Intensity Flashing White Obstruction Lighting Systems.*** The overall height of the structure including all appurtenances such as rods, antennas, obstruction lights, etc., determines the number of light levels.

c. ***High Intensity Flashing White Obstruction Lighting Systems.*** The overall height of the main structure including all appurtenances such as rods, antennas, obstruction lights, etc., determines the number of light levels.

d. ***Dual Obstruction Lighting Systems.*** The overall height of the structure including all appurtenances such as rods, antennas, obstruction lights, etc., is used to determine the number of light levels for a medium intensity white obstruction light/red obstruction dual lighting system. The overall height of the structure including all appurtenances is used to determine the number of light levels for a high intensity white obstruction light/red obstruction dual lighting system.

e. ***Adjacent Structures.*** The elevation of the tops of adjacent buildings in congested areas may be used as the equivalent of ground level to determine the proper number of light levels required.

f. ***Shielded Lights.*** If an adjacent object shields any light, horizontal placement of the lights should be adjusted or additional lights should be mounted on that object to retain or contribute to the definition of the obstruction.

47. MONITORING OBSTRUCTION LIGHTS

Obstruction lighting systems should be closely monitored by visual or automatic means. It is extremely important to visually inspect obstruction lighting in all operating intensities at least once every 24 hours on systems without automatic monitoring. In the event a structure is not readily accessible for visual observation, a properly maintained automatic monitor should be used. This monitor should be designed to register the malfunction of any light on the obstruction regardless of its position or color. When using remote monitoring devices, the communication status and operational status of the system should be confirmed at least once every 24 hours. The monitor (aural or visual) should be located in an area generally occupied by responsible personnel. In some cases, this may require a remote monitor in an attended location. For each structure, a log should be maintained in which daily operations status of the lighting system is recorded. Beacon lenses should be replaced if serious cracks, crazing, dirt build up, etc., has occurred.

48. ICE SHIELDS

Where icing is likely to occur, metal grates or similar protective ice shields should be installed directly over each light unit to prevent falling ice or accumulations from damaging the light units.

49. DISTRACTION

a. Where obstruction lights may distract operators of vessels in the proximity of a navigable waterway, the sponsor must coordinate with the Commandant, U.S. Coast Guard, to avoid interference with marine navigation.

b. The address for marine information and coordination is:

Chief, Aids to Navigation
Division (OPN)
U.S. Coast Guard Headquarters
2100 2nd Street, SW., Rm. 3610
Washington, DC 20593-0001
Telephone: (202) 267-0980

CHAPTER 5. RED OBSTRUCTION LIGHT SYSTEM

50. PURPOSE

Red Obstruction lights are used to increase conspicuity during nighttime. Daytime and twilight marking is required. Recommendations on lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

51. STANDARDS

The red obstruction lighting system is composed of flashing omnidirectional beacons (L-864) and/or steady burning (L-810) lights. When one or more levels is comprised of flashing beacon lighting, the lights should flash simultaneously.

a. ***Single Obstruction Light.*** A single (L-810) light may be used when more than one obstruction light is required either vertically or horizontally or where maintenance can be accomplished within a reasonable time.

1. ***Top Level.*** A single light may be used to identify low structures such as airport ILS buildings and long horizontal structures such as perimeter fences and building roof outlines.

2. ***Intermediate Level.*** Single lights may be used on skeletal and solid structures when more than one level of lights is installed and there are two or more single lights per level.

b. ***Double Obstruction Light.*** A double (L-810) light should be installed when used as a top light, at each end of a row of single obstruction lights, and in areas or locations where the failure of a single unit could cause an obstruction to be totally unlighted.

1. ***Top Level.*** **Structures** 150 feet (46m) AGL or less should have one or more double lights installed at the highest point and operating simultaneously.

2. ***Intermediate Level.*** Double lights should be installed at intermediate levels when a malfunction of a single light could create an unsafe condition and in remote areas where maintenance cannot be performed within a reasonable time. Both units may operate simultaneously, or a transfer relay may be used to switch to a spare unit should the active system fail.

3. ***Lowest Level.*** The lowest level of light units may be installed at a higher elevation than normal on a structure if the surrounding terrain, trees, or adjacent building(s) would obscure the lights. In certain instances, as determined by an FAA aeronautical study, the lowest level of lights may be eliminated.

52. CONTROL DEVICE

Red obstruction lights should be operated by a satisfactory control device (e.g., photo cell, timer, etc.) adjusted so the lights will be turned on when the northern sky illuminance reaching a vertical surface falls below a level of 60 foot-candles (645.8 lux) but before reaching a level of 35 foot-candles (367.7 lux). The control device should turn the lights off when the northern sky illuminance rises to a level of not more than 60 foot-candles (645.8 lux). The lights may also remain on continuously. The sensing device should, if practical, face the northern sky in the Northern Hemisphere. (See AC 150/5345-43.)

53. POLES, TOWERS, AND SIMILAR SKELETAL STRUCTURES

The following standards apply to radio and television towers, supporting structures for overhead transmission lines, and similar structures.

a. ***Top Mounted Obstruction Light.***

1. ***Structures 150 Feet (46m) AGL or Less.*** Two or more steady burning (L-810) lights should be installed in a manner to ensure an unobstructed view of one or more lights by a pilot.

2. ***Structures Exceeding 150 Feet (46m) AGL.*** At least one red flashing (L-864) beacon should be installed in a manner to ensure an unobstructed view of one or more lights by a pilot.

3. ***Appurtenances 40 Feet (12m) or Less.*** If a rod, antenna, or other appurtenance 40 feet (12m) or less in height is incapable of supporting a red flashing beacon, then it may be placed at the base of the appurtenance. If the mounting location does not allow unobstructed viewing of the beacon by a pilot, then additional beacons should be added.

4. ***Appurtenances Exceeding 40 Feet (12m).*** If a rod, antenna, or other appurtenance exceeding 40 feet (12m) in height is incapable of supporting a red flashing beacon, a supporting mast with one or more beacons should be installed adjacent to the appurtenance. Adjacent installations should not exceed the height of the appurtenance and be within 40 feet (12m) of the tip to allow the pilot an unobstructed view of at least one beacon.

b. ***Mounting Intermediate Levels.*** The number of light levels is determined by the height of the structure, including all appurtenances, and is detailed in Appendix 1. The number of lights on each level is

determined by the shape and height of the structure. These lights should be mounted so as to ensure an unobstructed view of at least one light by a pilot.

1. ***Steady Burning Lights (L-810).***

(a) ***Structures 350 Feet (107m) AGL or Less.*** Two or more steady burning (L-810) lights should be installed on diagonally or diametrically opposite positions.

(b) ***Structures Exceeding 350 Feet (107m) AGL.*** Install steady burning (L-810) lights on each outside corner of each level.

2. ***Flashing Beacons (L-864).***

(a) ***Structures 350 Feet (107m) AGL or Less.*** These structures do not require flashing (L-864) beacons at intermediate levels.

(b) ***Structure Exceeding 350 Feet (107m) AGL.*** At intermediate levels, two beacons (L-864) should be mounted outside at diagonally opposite positions of intermediate levels.

54. CHIMNEYS, FLARE STACKS, AND SIMILAR SOLID STRUCTURES

a. *Number of Light Units.*

1. The number of units recommended depends on the diameter of the structure at the top. The number of lights recommended below are the minimum.

2. When the structure diameter is:

(a) *20 Feet (6m) or Less.* Three light units per level.

(b) *Exceeding 20 Feet (6m) But Not More Than 100 Feet (31m).* Four light units per level.

(c) *Exceeding 100 Feet (31m) But Not More Than 200 Feet (61m).* Six light units per level.

(d) *Exceeding 200 Feet (61m).* Eight light units per level.

b. ***Top Mounted Obstruction Lights.***

1. *Structures 150 Feet (46m) AGL or Less.* L-810 lights should be installed horizontally at regular intervals at or near the top.

2. *Structures Exceeding 150 Feet (46m) AGL.* At least three L-864 beacons should be installed.

3. *Chimneys, Cooling Towers, and Flare Stacks.* Lights may be displayed as low as 20 feet (6m) below the top to avoid the obscuring effect of deposits and heat generally emitted by this type of structure. It is important that these lights be readily accessible for cleaning and lamp replacement. It is understood that with flare stacks, as well as any other structures associated with the petrol-chemical industry, normal lighting requirements may not be necessary. This could be due to the location of the flare stack/structure within a large well-lighted petrol-chemical plant or the fact that the flare, or working lights surrounding the flare stack/structure, is as conspicuous as obstruction lights.

c. ***Mounting Intermediate Levels.*** The number of light levels is determined by the height of the structure including all appurtenances. For cooling towers 600 feet (183m) or less, intermediate light levels are not necessary. Structures exceeding 600 feet (183m) AGL should have a second level of light units installed approximately at the midpoint of the structure and in a vertical line with the top level of lights.

1. ***Steady Burning (L-810) Lights.*** The recommended number of light levels may be obtained from Appendix 1. At least three lights should be installed on each level.

2. ***Flashing (L-864) Beacons.*** The recommended number of beacon levels may be obtained from Appendix 1. At least three lights should be installed on each level.

(a) *Structures 350 Feet (107m) AGL or Less.* These structures do not need intermediate levels of flashing beacons.

(b) *Structures Exceeding 350 Feet (107m) AGL.* At least three flashing (L-864) beacons should be installed on each level in a manner to allow an unobstructed view of at least one beacon.

55. WIND TURBINE STRUCTURES

Wind turbine structures should be lighted by mounting two flashing red beacons (L-864) on top of the generator housing. Both beacons should flash simultaneously. Lighting fixtures are to be mounted at a horizontal separation to ensure an unobstructed view of at least one fixture by a pilot approaching from **any** direction.

56. GROUP OF OBSTRUCTIONS

When individual objects, except wind turbines, within a group of obstructions are not the same height and are spaced a maximum of 150 feet (46m) apart, the prominent objects within the group should be lighted in accordance with the standards for individual obstructions of a corresponding height. If the outer structure is shorter than the prominent, the outer structure should be lighted in accordance with the standards for individual obstructions of a

corresponding height. Light units should be placed to ensure that the light is visible to a pilot approaching from **any** direction. In addition, at least one flashing beacon should be installed at the top of a prominent center obstruction or on a special tower located near the center of the group.

57. ALTERNATE METHOD OF DISPLAYING OBSTRUCTION LIGHTS

When recommended in an FAA aeronautical study, lights may be placed on poles equal to the height of the obstruction and installed on or adjacent to the structure instead of installing lights on the obstruction.

58. PROMINENT BUILDINGS, BRIDGES, AND SIMILAR EXTENSIVE OBSTRUCTIONS

When objects within a group of obstructions are approximately the same overall height above the surface and are located a maximum of 150 feet (46m) apart, the group of obstructions may be considered an extensive obstruction. Install light units on the same horizontal plane at the highest portion or edge of prominent obstructions. Light units should be placed to ensure that the light is visible to a pilot approaching from **any** direction. If the structure is a bridge and is over navigable water, the sponsor must obtain prior approval of the lighting installation from the Commander of the District Office of the United States Coast Guard to avoid interference with marine navigation. Steady burning lights should be displayed to indicate the extent of the obstruction as follows:

a. ***Structures 150 Feet (46m) or Less in Any Horizontal Direction.*** If the structure/bridge/extensive obstruction is 150 feet (46m) or less horizontally, at least one steady burning light (L-810) should be displayed on the highest point at each end of the major axis of the obstruction. If this is impractical because of the overall shape, display a double obstruction light in the center of the highest point.

b. ***Structures Exceeding 150 Feet (46m) in at Least One Horizontal Direction.*** If the structure/bridge/ extensive obstruction exceeds 150 feet (46m) horizontally, display at least one steady burning light for each 150 feet (46m), or fraction thereof, of the overall length of the major axis. At least one of these lights should be displayed on the highest point at each end of the obstruction. Additional lights should be displayed at approximately equal intervals not to exceed 150 feet (46m) on the highest points along the edge between the end lights. If an obstruction is located near a landing area and two or more edges are the same height, the edge nearest the landing area should be lighted.

c. ***Structures Exceeding 150 Feet (46m) AGL.*** Steady burning red obstruction lights should be installed on the highest point at each end. At intermediate levels, steady burning red lights should be displayed for each 150 feet (46m) or fraction thereof. The vertical position of these lights should be equidistant between the top lights and the ground level as the shape and type of obstruction will permit. One such light should be displayed at each outside corner on each level with the remaining lights evenly spaced between the corner lights.

d. ***Exceptions.*** Flashing red beacons (L-864) may be used instead of steady burning obstruction lights if early or special warning is necessary. These beacons should be displayed on the highest points of an extensive obstruction at intervals not exceeding 3,000 feet (915m). At least three beacons should be displayed on one side of the extensive obstruction to indicate a line of lights.

e. ***Ice Shields.*** Where icing is likely to occur, metal grates or similar protective ice shields should be installed directly over each light unit to prevent falling ice or accumulations from damaging the light units. The light should be mounted in a manner to ensure an unobstructed view of at least one light by a pilot approaching from any direction.

CHAPTER 6. MEDIUM INTENSITY FLASHING WHITE OBSTRUCTION LIGHT SYSTEMS

60. PURPOSE

Medium intensity flashing white (L-865) obstruction lights may provide conspicuity both day and night. Recommendations on lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

61. STANDARDS

The medium intensity flashing white light system is normally composed of flashing omnidirectional lights. Medium intensity flashing white obstruction lights may be used during daytime and twilight with automatically selected reduced intensity for nighttime operation. When this system is used on structures 500 feet (153m) AGL or less in height, other methods of marking and lighting the structure may be omitted. Aviation orange and white paint is always required for daytime marking on structures exceeding 500 feet (153m) AGL. This system is not normally recommended on structures 200 feet (61m) AGL or less.

The use of a 24-hour medium intensity flashing white light system in urban/populated areas in not normally recommended due to their tendency to merge with background lighting in these areas at night. This makes it extremely difficult for some types of aviation operations, i.e., med-evac, and police helicopters to see these structures. The use of this type of system in urban and rural areas often results in complaints. In addition, this system is not recommended on structures within 3 nautical miles of an airport.

62. RADIO AND TELEVISION TOWERS AND SIMILAR SKELETAL STRUCTURES

a. *Mounting Lights.* The number of levels recommended depends on the height of the structure, including antennas and similar appurtenances.

1. *Top Levels.* One or more lights should be installed at the highest point to provide 360-degree coverage ensuring an unobstructed view.

2. *Appurtenances 40 feet (12m) or less.* If a rod, antenna, or other appurtenance 40 feet (12m) or less in height is incapable of supporting the medium intensity flashing white light, then it may be placed at the base of the appurtenance. If the mounting location does not allow unobstructed viewing of the medium intensity flashing white light by a pilot, then additional lights should be added.

3. *Appurtenances Exceeding 40 feet (12m).* If a rod, antenna, or other appurtenance exceeds 40 feet (12m) above the tip of the main structure, a medium intensity flashing white light should be placed within 40 feet (12m) from the top of the appurtenance. If the appurtenance (such as a whip antenna) is incapable of supporting the light, one or more lights should be mounted on a pole adjacent to the appurtenance. Adjacent installations should not exceed the height of the appurtenance and be within 40 feet (12m) of the tip to allow the pilot an unobstructed view of at least one light.

b. *Intermediate Levels.* At intermediate levels, two beacons (L-865) should be mounted outside at diagonally or diametrically opposite positions of intermediate levels. The lowest light level should not be less than 200 feet (61m) AGL.

c. *Lowest Levels.* The lowest level of light units may be installed at a higher elevation than normal on a structure if the surrounding terrain, trees, or adjacent building(s) would obscure the lights. In certain instances, as determined by an FAA aeronautical study, the lowest level of lights may be eliminated.

d. *Structures 500 Feet (153m) AGL or Less.* When white lights are used during nighttime and twilight only, marking is required for daytime. When operated 24 hours a day, other methods of marking and lighting are not required.

e. *Structures Exceeding 500 Feet (153m) AGL.* The lights should be used during nighttime and twilight and may be used 24 hours a day. Marking is always required for daytime.

f. *Ice Shields.* Where icing is likely to occur, metal grates or similar protective ice shields should be installed directly over each light unit to prevent falling ice or accumulations from damaging the light units. The light should be mounted in a manner to ensure an unobstructed view of at least one light by a pilot approaching from any direction.

63. CONTROL DEVICE

The light intensity is controlled by a device that changes the intensity when the ambient light changes. The system should automatically change intensity steps when the northern sky illumination in the Northern Hemisphere on a vertical surface is as follows:

a. *Twilight-to-Night.* This should not occur before the illumination drops below five foot-candles (53.8

lux) but should occur before it drops below two foot-candles (21.5 lux).

b. ***Night-to-Day.*** The intensity changes listed in subparagraph 63a above should be reversed when changing from the night to day mode.

64. CHIMNEYS, FLARE STACKS, AND SIMILAR SOLID STRUCTURES

a. ***Number of Light Units.*** The number of units recommended depends on the diameter of the structure at the top. Normally, the top level is on the highest point of a structure. However, the top level of chimney lights may be installed as low as 20 feet (6m) below the top to minimize deposit build-up due to emissions. The number of lights recommended are the minimum. When the structure diameter is:

1. *20 Feet (6m) or Less.* Three light units per level.

2. *Exceeding 20 Feet (6m) But Not More Than 100 Feet (31m).* Four light units per level.

3. *Exceeding 100 Feet (31m) But Not More Than 200 Feet (61m).* Six light units per level.

4. *Exceeding 200 Feet (61m).* Eight light units per level.

65. WIND TURBINE STRUCTURES

Wind turbine structures should be lighted by mounting two flashing white beacons (L-865) on top of the generator housing. Both beacons should flash simultaneously. Lighting fixtures are to be mounted at a horizontal separation to ensure an unobstructed view of at least one fixture by a pilot approaching from any direction. Intermediate light levels and other marking may be omitted on these structures.

66. GROUP OF OBSTRUCTIONS

When individual objects within a group of obstructions are not the same height and are spaced a maximum of 150 feet (46m) apart, the prominent objects within the group should be lighted in accordance with the standards for individual obstructions of a corresponding height. If the outer structure is shorter than the prominent, the outer structure should be lighted in accordance with the standards for individual obstructions of a corresponding height. Light units should be placed to ensure that the light is visible to a pilot approaching from **any** direction. In addition, at least one medium intensity flashing white light should be installed at the top of a prominent center obstruction or on a special tower located near the center of the group.

67. SPECIAL CASES

Where lighting systems are installed on structures located near highways, waterways, airport approach areas, etc., caution should be exercised to ensure that the lights do not distract or otherwise cause a hazard to motorists, vessel operators, or pilots on an approach to an airport. In these cases, shielding may be necessary. This shielding should not derogate the intended purpose of the lighting system.

68. PROMINENT BUILDINGS AND SIMILAR EXTENSIVE OBSTRUCTIONS

When objects within a group of obstructions are approximately the same overall height above the surface and are located a maximum of 150 feet (46m) apart, the group of obstructions may be considered an extensive obstruction. Install light units on the same horizontal plane at the highest portion or edge of prominent obstructions. Light units should be placed to ensure that the light is visible to a pilot approaching from **any** direction. Lights should be displayed to indicate the extent of the obstruction as follows:

a. ***Structures 150 Feet (46m) or Less in Any Horizontal Direction.*** If the structure/extensive obstruction is 150 feet (46m) or less horizontally, at least one light should be displayed on the highest point at each end of the major axis of the obstruction. If this is impractical because of the overall shape, display a double obstruction light in the center of the highest point.

b. ***Structures Exceeding 150 Feet (46m) in at Least One Horizontal Direction.*** If the structure/extensive obstruction exceeds 150 feet (46m) horizontally, display at least one light for each 150 feet (46m) or fraction thereof, of the overall length of the major axis. At least one of these lights should be displayed on the highest point at each end of the obstruction. Additional lights should be displayed at approximately equal intervals not to exceed 150 feet (46m) on the highest points along the edge between the end lights. If an obstruction is located near a landing area and two or more edges are the same height, the edge nearest the landing area should be lighted.

c. ***Structures Exceeding 150 Feet (46m) AGL.*** Lights should be installed on the highest point at each end. At intermediate levels, lights should be displayed for each 150 feet (46m), or fraction thereof. The vertical position of these lights should be equidistant between the top lights and the ground level as the shape and type of obstruction will permit. One such light should be displayed at each outside corner on each level with the remaining lights evenly spaced between the corner lights.

CHAPTER 7. HIGH INTENSITY FLASHING WHITE OBSTRUCTION LIGHT SYSTEMS

70. PURPOSE

Lighting with high intensity (L-856) flashing white obstruction lights provides the highest degree of conspicuity both day and night. Recommendations on lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

71. STANDARDS

Use high intensity flashing white obstruction lights during daytime with automatically selected reduced intensities for twilight and nighttime operations. When high intensity white lights are operated 24 hours a day, other methods of marking and lighting may be omitted. This system should not be recommended on structures 500 feet (153m) AGL or less unless an FAA aeronautical study shows otherwise.

72. CONTROL DEVICE

Light intensity is controlled by a device that changes the intensity when the ambient light changes. The use of a 24-hour high intensity flashing white light system in urban/populated areas is not normally recommended due to their tendency to merge with background lighting in these areas at night. This makes it extremely difficult for some types of aviation operations, i.e., med-evac, and police helicopters to see these structures. The use of this type of system in urban and rural areas often results in complaints.

The system should automatically change intensity steps when the northern sky illumination in the Northern Hemisphere on a vertical surface is as follows:

a. ***Day-to-Twilight.*** This should not occur before the illumination drops to 60 foot-candles (645.8 lux), but should occur before it drops below 35 foot-candles (376.7 lux). The illuminance-sensing device should, if practical, face the northern sky in the Northern Hemisphere.

b. ***Twilight-to-Night.*** This should not occur before the illumination drops below five foot-candles (53.8 lux), but should occur before it drops below two foot-candles (21.5 lux).

c. ***Night-to-Day.*** The intensity changes listed in subparagraph 72 a and b above should be reversed when changing from the night to day mode.

73. UNITS PER LEVEL

One or more light units is needed to obtain the desired horizontal coverage. The number of light units recommended per level (except for the supporting structures of catenary wires and buildings) depends upon the average outside diameter of the specific structure, and the horizontal beam width of the light fixture. The light units should be installed in a manner to ensure an unobstructed view of the system by a pilot approaching from any direction. The number of lights recommended are the minimum. When the structure diameter is:

a. *20 Feet (6m) or Less.* Three light units per level.

b. *Exceeding 20 Feet (6m) But Not More Than 100 Feet (31m).* Four light units per level.

c. *Exceeding 100 Feet (31m).* Six light units per level.

74. INSTALLATION GUIDANCE

Manufacturing specifications provide for the effective peak intensity of the light beam to be adjustable from zero to 8 degrees above the horizon. Normal installation should place the top light at zero degrees to the horizontal and all other light units installed in accordance with Table 2:

Light Unit Elevation Above the Horizontal

Height of Light Unit Above Terrain	Degrees of Elevation Above the Horizontal
Exceeding 500 feet AGL	0
401 feet to 500 feet AGL	1
301 feet to 400 feet AGL	2
300 feet AGL or less	3

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a. ***Vertical Aiming.*** Where terrain, nearby residential areas, or other situations dictate, the light beam may be further elevated above the horizontal. The main beam of light at the lowest level should not strike the ground closer than 3 statute miles (5km) from the structure. If additional adjustments are necessary, the lights may be individually adjusted upward, in 1-degree increments, starting at the bottom. Excessive elevation may reduce its conspicuity by raising the beam above a collision course flight path.

b. ***Special Cases.*** Where lighting systems are installed on structures located near highways, waterways, airport approach areas, etc., caution should be exercised to ensure that the lights do not distract or otherwise cause a hazard to motorists, vessel operators,

or pilots on an approach to an airport. In these cases, shielding or an adjustment to the vertical or horizontal light aiming may be necessary. This adjustment should not derogate the intended purpose of the lighting system. Such adjustments may require review action as described in Chapter 1, paragraph 5.

c. ***Relocation or Omission of Light Units.*** Light units should not be installed in such a manner that the light pattern/output is disrupted by the structure.

1. ***Lowest Level.*** The lowest level of light units may be installed at a higher elevation than normal on a structure if the surrounding terrain, trees, or adjacent building(s) would obscure the lights. In certain instances, as determined by an FAA aeronautical study, the lowest level of lights may be eliminated.

2. ***Two Adjacent Structures.*** Where two structures are situated within 500 feet (153m) of each other and the light units are installed at the same levels, the sides of the structures facing each other need not be lighted. However, all lights on both structures must flash simultaneously, except for adjacent catenary support structures. Adjust vertical placement of the lights to either or both structures' intermediate levels to place the lights on the same horizontal plane. Where one structure is higher than the other, complete level(s) of lights should be installed on that part of the higher structure that extends above the top of the lower structure. If the structures are of such heights that the levels of lights cannot be placed in identical horizontal planes, then the light units should be placed such that the center of the horizontal beam patterns do not face toward the adjacent structure. For example, structures situated north and south of each other should have the light units on both structures installed on a northwest/southeast and northeast/southwest orientation.

3. ***Three or More Adjacent Structures.*** The treatment of a cluster of structures as an individual or a complex of structures will be determined by the FAA as the result of an aeronautical study, taking into consideration the location, heights, and spacing with other structures.

75. ANTENNA OR SIMILAR APPURTENANCE LIGHT

When a structure lighted by a high intensity flashing light system is topped with an antenna or similar appurtenance exceeding 40 feet (12m) in height, a medium intensity flashing white light (L-865) should be placed within 40 feet (12m) from the tip of the appurtenance. This light should operate 24 hours a day and flash simultaneously with the rest of the lighting system.

76. CHIMNEYS, FLARE STACKS, AND SIMILAR SOLID STRUCTURES

The number of light levels depends on the height of the structure excluding appurtenances. Three or more lights should be installed on each level in such a manner to ensure an unobstructed view by the pilot. Normally, the top level is on the highest point of a structure. However, the top level of chimney lights may be installed as low as 20 feet (6m) below the top to minimize deposit build-up due to emissions.

77. RADIO AND TELEVISION TOWERS AND SIMILAR SKELETAL STRUCTURES

a. ***Mounting Lights.*** The number of levels recommended depends on the height of the structure, excluding antennas and similar appurtenances. At least three lights should be installed on each level and mounted to ensure that the effective intensity of the full horizontal beam coverage is not impaired by the structural members.

b. ***Top Level.*** One level of lights should be installed at the highest point of the structure. If the highest point is a rod or antenna incapable of supporting a lighting system, then the top level of lights should be installed at the highest portion of the main skeletal structure. When guy wires come together at the top, it may be necessary to install this level of lights as low as 10 feet (3m) below the top. If the rod or antenna exceeds 40 feet (12m) above the main structure, a medium intensity flashing white light (L-865) should be mounted on the highest point. If the appurtenance (such as a whip antenna) is incapable of supporting a medium intensity light, one or more lights should be installed on a pole adjacent to the appurtenance. Adjacent installation should not exceed the height of the appurtenance and be within 40 feet (12m) of the top to allow an unobstructed view of at least one light.

c. ***Ice Shields.*** Where icing is likely to occur, metal grates or similar protective ice shields should be installed directly over each light unit to prevent falling ice or accumulations from damaging the light units.

78. HYPERBOLIC COOLING TOWERS

Light units should be installed in a manner to ensure an unobstructed view of at least two lights by a pilot approaching from **any** direction.

a. ***Number of Light Units.*** The number of units recommended depends on the diameter of the structure

at the top. The number of lights recommended in the following table are the minimum. When the structure diameter is:

1. *20 Feet (6m) or Less.* Three light units per level.

2. *Exceeding 20 Feet (6m) But Not More Than 100 Feet (31m).* Four light units per level.

3. *Exceeding 100 Feet (31m) But Not More Than 200 Feet (61m).* Six light units per level.

4. *Exceeding 200 Feet (61m).* Eight light units per level.

b. ***Structures Exceeding 600 Feet (183m) AGL.*** Structures exceeding 600 feet (183m) AGL should have a second level of light units installed approximately at the midpoint of the structure and in a vertical line with the top level of lights.

79. PROMINENT BUILDINGS AND SIMILAR EXTENSIVE OBSTRUCTIONS

When objects within a group of obstructions are approximately the same overall height above the surface and are located not more than 150 feet (46m) apart, the group of obstructions may be considered an extensive obstruction. Install light units on the same horizontal plane at the highest portion or edge of prominent obstructions. Light units should be placed to ensure that the light is visible to a pilot approaching from **any** direction. These lights may require shielding, such as louvers, to ensure minimum adverse impact on local communities. Extreme caution in the use of high intensity flashing white lights should be exercised.

a. ***If the Obstruction is 200 feet (61m) or Less in Either Horizontal*** *Dimension,* install three or more light units at the highest portion of the structure in a manner to ensure that at least one light is visible to a pilot approaching from **any** direction. Units may be mounted on a single pedestal at or near the center of the obstruction. If light units are placed more than 10 feet (3m) from the center point of the structure, use a minimum of four units.

b. ***If the Obstruction Exceeds 200 Feet (61m) in One Horizontal Dimension,*** but is 200 feet (61m) or less in the other, two light units should be placed on each of the shorter sides. These light units may either be installed adjacent to each other at the midpoint of the edge of the obstruction or at (near) each corner with the light unit aimed to provide 180 degrees of coverage at each edge. One or more light units should be installed along the overall length of the major axis. These lights should be installed at approximately equal intervals not to exceed a distance of 100 feet (31m) from the corners or from each other.

c. ***If the Obstruction Exceeds 200 Feet (61m) in Both Horizontal Dimensions,*** light units should be equally spaced along the overall perimeter of the obstruction at intervals of 100 feet (31m) or fraction thereof.

CHAPTER 8. DUAL LIGHTING WITH RED/MEDIUM INTENSITY FLASHING WHITE SYSTEMS

80. PURPOSE

This dual lighting system includes red lights (L-864) for nighttime and medium intensity flashing white lights (L-865) for daytime and twilight use. This lighting system may be used in lieu of operating a medium intensity flashing white lighting system at night. There may be some populated areas where the use of medium intensity at night may cause significant environmental concerns. The use of the dual lighting system should reduce/mitigate those concerns. Recommendations on lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

81. INSTALLATION

The light units should be installed as specified in the appropriate portions of Chapters 4, 5, and 6. The number of light levels needed may be obtained from Appendix 1.

82. OPERATION

Lighting systems should be operated as specified in Chapter 3. Both systems should not be operated at the same time; however, there should be no more than a 2-second delay when changing from one system to the other. Outage of one of two lamps in the uppermost red beacon (L-864 incandescent unit) or outage of any uppermost red light shall cause the white obstruction light system to operate in its specified "night" step intensity.

83. CONTROL DEVICE

The light system is controlled by a device that changes the system when the ambient light changes. The system should automatically change steps when the northern sky illumination in the Northern Hemisphere on a vertical surface is as follows:

a. *Twilight-to-Night.* This should not occur before the illumination drops below 5 foot-candles (53.8 lux) but should occur before it drops below 2 foot-candles (21.5 lux).

b. *Night-to-Day.* The intensity changes listed in subparagraph 83 a above should be reversed when changing from the night to day mode.

84. ANTENNA OR SIMILAR APPURTENANCE LIGHT

When a structure utilizing this dual lighting system is topped with an antenna or similar appurtenance exceeding 40 feet (12m) in height, a medium intensity flashing white (L-865) and a red flashing beacon (L-864) should be placed within 40 feet (12m) from the tip of the appurtenance. The white light should operate during daytime and twilight and the red light during nighttime. These lights should flash simultaneously with the rest of the lighting system.

85. WIND TURBINE STRUCTURES

Wind turbine structures should be lighted by mounting two flashing dual beacons (L-864/L-865) on top of the generator housing. Both beacons should flash simultaneously. Lighting fixtures are to be mounted at a horizontal separation to ensure an unobstructed view of at least one fixture by a pilot approaching from any direction. Intermediate light levels and other marking may be omitted on these structures.

86. OMISSION OF MARKING

When medium intensity white lights are operated on structures 500 feet (153m) AGL or less during daytime and twilight, other methods of marking may be omitted.

CHAPTER 9. DUAL LIGHTING WITH RED/HIGH INTENSITY FLASHING WHITE SYSTEMS

90. PURPOSE

This dual lighting system includes red lights (L-864) for nighttime and high intensity flashing white lights (L-856) for daytime and twilight use. This lighting system may be used in lieu of operating a flashing white lighting system at night. There may be some populated areas where the use of high intensity lights at night may cause significant environmental concerns and complaints. The use of the dual lighting system should reduce/mitigate those concerns. Recommendations on lighting structures can vary depending on terrain features, weather patterns, geographic location, and in the case of wind turbines, number of structures and overall layout of design.

91. INSTALLATION

The light units should be installed as specified in the appropriate portions of Chapters 4, 5, and 7. The number of light levels needed may be obtained from Appendix 1.

92. OPERATION

Lighting systems should be operated as specified in Chapters 4, 5, and 7. Both systems should not be operated at the same time; however, there should be no more than a 2-second delay when changing from one system to the other. Outage of one of two lamps in the uppermost red beacon (L-864 incandescent unit) or outage of any uppermost red light shall cause the white obstruction light system to operate in its specified "night" step intensity.

93. CONTROL DEVICE

The light intensity is controlled by a device that changes the intensity when the ambient light changes. The system should automatically change intensity steps when the northern sky illumination in the Northern Hemisphere on a vertical surface is as follows:

a. ***Day-to-Twilight.*** This should not occur before the illumination drops to 60 foot-candles (645.8 lux) but should occur before it drops below 35 foot-candles (376.7 lux). The illuminance-sensing device should, if practical, face the northern sky in the Northern Hemisphere.

b. ***Twilight-to-Night.*** This should not occur before the illumination drops below 5 foot-candles (53.8 lux) but should occur before it drops below 2 foot-candles (21.5 lux).

c. ***Night-to-Day.*** The intensity changes listed in subparagraph 93 a and b above should be reversed when changing from the night to day mode.

94. ANTENNA OR SIMILAR APPURTENANCE LIGHT

When a structure utilizing this dual lighting system is topped with an antenna or similar appurtenance exceeding 40 feet (12m) in height, a medium intensity flashing white light (L-865) and a red flashing beacon (L-864) should be placed within 40 feet (12m) from the tip of the appurtenance. The white light should operate during daytime and twilight and the red light during nighttime.

95. OMISSION OF MARKING

When high intensity white lights are operated during daytime and twilight, other methods of marking may be omitted.

CHAPTER 10. MARKING AND LIGHTING OF CATENARY AND CATENARY SUPPORT STRUCTURES

100. PURPOSE

This chapter provides guidelines for marking and lighting catenary and catenary support structures. The recommended marking and lighting of these structures is intended to provide day and night conspicuity and to assist pilots in identifying and avoiding catenary wires and associated support structures.

101. CATENARY MARKING STANDARDS

Lighted markers are available for increased night conspicuity of high-voltage (69KV or greater) transmission line catenary wires. These markers should be used on transmission line catenary wires near airports, heliports, across rivers, canyons, lakes, etc. The lighted markers should be manufacturer certified as recognizable from a minimum distance of 4,000 feet (1219m) under nighttime conditions, minimum VFR conditions or having a minimum intensity of at least 32.5 candela. The lighting unit should emit a steady burning red light. They should be used on the highest energized line. If the lighted markers are installed on a line other than the highest catenary, then markers specified in paragraph 34 should be used in addition to the lighted markers. (The maximum distance between the line energizing the lighted markers and the highest catenary above the lighted marker should be no more than 20 feet (6m).) Markers should be distinctively shaped, i.e., spherical, cylindrical, so they are not mistaken for items that are used to convey other information. They should be visible in all directions from which aircraft are likely to approach. The area in the immediate vicinity of the supporting structure's base should be clear of all items and/or objects of natural growth that could interfere with the line-of-sight between a pilot and the structure's lights. Where a catenary wire crossing requires three or more supporting structures, the inner structures should be equipped with enough light units per level to provide a full coverage.

a. ***Size and Color.*** The diameter of the markers used on extensive catenary wires across canyons, lakes, rivers, etc., should be not less than 36 inches (91cm). Smaller 20-inch (51cm) markers are permitted on less extensive power lines or on power lines below 50 feet (15m) above the ground and within 1,500 feet (458m) of an airport runway end. Each marker should be a solid color such as aviation orange, white, or yellow.

b. ***Installation.***

1. ***Spacing.*** Lighted markers should be spaced equally along the wire at intervals of approximately 200 feet (61m) or a fraction thereof. Intervals between markers should be less in critical areas near runway ends, i.e., 30 to 50 feet (10m to 15m). If the markers are installed on a line other than the highest catenary, then markers specified in paragraph 34 should be used in addition to the lighted markers. The maximum distance between the line energizing the lighted markers and the highest catenary above the markers can be no more than 20 feet (6m). The lighted markers may be installed alternately along each wire if the distance between adjacent markers meets the spacing standard. This method allows the weight and wind loading factors to be distributed.

2. ***Pattern.*** An alternating color scheme provides the most conspicuity against all backgrounds. Mark overhead wires by alternating solid colored markers of aviation orange, white, and yellow. Normally, an orange marker is placed at each end of a line and the spacing is adjusted (not to exceed 200 feet (61m)) to accommodate the rest of the markers. When less than four markers are used, they should all be aviation orange.

102. CATENARY LIGHTING STANDARDS

When using medium intensity flashing white (L-866), high intensity flashing white (L-857), dual medium intensity (L-866/L-885) or dual high intensity (L-857/885) lighting systems, operated 24 hours a day, other marking of the support structure is not necessary.

a. ***Levels.*** A system of three levels of sequentially flashing light units should be installed on each supporting structure or adjacent terrain. Install one level at the top of the structure, one at the height of the lowest point in the catenary and one level approximately midway between the other two light levels. The middle level should normally be at least 50 feet (15m) from the other two levels. The middle light unit may be deleted when the distance between the top and the bottom light levels is less than 100 feet (30m).

1. ***Top Levels.*** One or more lights should be installed at the top of the structure to provide 360-degree coverage ensuring an unobstructed view. If the installation presents a potential danger to maintenance personnel, or when necessary for lightning protection, the top level of lights may be mounted as low as 20 feet (6m) below the highest point of the structure.

2. ***Horizontal Coverage.*** The light units at the middle level and bottom level should be installed so as to provide a minimum of 180-degree coverage centered perpendicular to the flyway. Where a

catenary crossing is situated near a bend in a river, canyon, etc., or is not perpendicular to the flyway, the horizontal beam should be directed to provide the most effective light coverage to warn pilots approaching from either direction of the catenary wires.

3. ***Variation.*** The vertical and horizontal arrangements of the lights may be subject to the structural limits of the towers and/or adjacent terrain. A tolerance of 20 percent from uniform spacing of the bottom and middle light is allowed. If the base of the supporting structure(s) is higher than the lowest point in the catenary, such as a canyon crossing, one or more lights should be installed on the adjacent terrain at the level of the lowest point in the span. These lights should be installed on the structure or terrain at the height of the lowest point in the catenary.

b. ***Flash Sequence.*** The flash sequence should be middle, top, and bottom with all lights on the same level flashing simultaneously. The time delay between flashes of levels is designed to present a unique system display. The time delay between the start of each level of flash duration is outlined in FAA AC 150/5345-43, Specification for Obstruction Lighting Equipment.

c. ***Synchronization.*** Although desirable, the corresponding light levels on associated supporting towers of a catenary crossing need not flash simultaneously.

d. ***Structures 500 feet (153m) AGL or Less.*** When medium intensity white lights (L-866) are operated 24 hours a day, or when a dual red/medium intensity system (L-866 daytime & twilight/L-885 nighttime) is used, marking can be omitted. When using a medium intensity while light (L-866) or a flashing red light (L-885) during twilight or nighttime only, painting should be used for daytime marking.

e. *Structures Exceeding 500 Feet (153m) AGL.* When high intensity white lights (L-857) are operated 24 hours a day, or when a dual red/high intensity system (L-857 daytime and twilight/L-885 nighttime) is used, marking can be omitted. This system should not be recommended on structures 500 feet (153m) or less unless an FAA aeronautical study shows otherwise. When a flashing red obstruction light (L-885), a medium intensity (L-866) flashing white lighting system or a high intensity white lighting system (L-857) is used for nighttime and twilight only, painting should be used for daytime marking.

103. CONTROL DEVICE

The light intensity is controlled by a device (photocell) that changes the intensity when the ambient light changes. The lighting system should automatically change intensity steps when the northern sky illumination in the Northern Hemisphere on a vertical surface is as follows:

a. ***Day-to-Twilight (L-857 System).*** This should not occur before the illumination drops to 60 foot-candles (645.8 lux), but should occur before it drops below 35 foot-candles (376.7 lux). The illuminant-sensing device should, if practical, face the northern sky in the Northern Hemisphere.

b. ***Twilight-to-Night (L-857 System).*** This should not occur before the illumination drops below 5 foot-candles (53.8 lux), but should occur before it drops below 2 foot-candles (21.5 lux).

c. ***Night-to-Day.*** The intensity changes listed in subparagraph 103 a. and b. above should be reversed when changing from the night to day mode.

d. ***Day-to-Night (L-866 or L-885/L-866).*** This should not occur before the illumination drops below 5 foot-candles (563.8 lux) but should occur before it drops below 2 foot-candles (21.5 lux).

e. ***Night-to-Day.*** The intensity changes listed in subparagraph d. above should be reversed when changing from the night to day mode.

f. ***Red Obstruction (L-885).*** The red lights should not turn on until the illumination drops below 60 foot-candles (645.8 lux) but should occur before reaching a level of 35 foot-candles (367.7 lux). Lights should not turn off before the illuminance rises above 35 foot-candles (367.7 lux), but should occur before reaching 60 foot-candles (645.8 lux).

104. AREA SURROUNDING CATENARY SUPPORT STRUCTURES

The area in the immediate vicinity of the supporting structure's base should be clear of all items and/or objects of natural growth that could interfere with the line-of-sight between a pilot and the structure's lights.

105. THREE OR MORE CATENARY SUPPORT STRUCTURES

Where a catenary wire crossing requires three or more supporting structures, the inner structures should be equipped with enough light units per level to provide a full 360-degree coverage.

CHAPTER 11. MARKING AND LIGHTING MOORED BALLOONS AND KITES

110. PURPOSE

The purpose of marking and lighting moored balloons, kites, and their cables or mooring lines is to indicate the presence and general definition of these objects to pilots when converging from any normal angle of approach.

111. STANDARDS

These marking and lighting standards pertain to all moored balloons and kites that require marking and lighting under 14 CFR, part 101.

112. MARKING

Flag markers should be used on mooring lines to warn pilots of their presence during daylight hours.

a. ***Display.*** Markers should be displayed at no more than 50-foot (15m) intervals and should be visible for at least 1 statute mile.

b. ***Shape.*** Markers should be rectangular in shape and not less than 2 feet (0.6m) on a side. Stiffeners should be used in the borders so as to expose a large area, prevent drooping in calm wind, or wrapping around the cable.

c. ***Color Patterns.*** One of the following color patterns should be used:

1. ***Solid Color.*** Aviation orange.

2. ***Orange and White.*** Two triangular sections, one of aviation orange and the other white, combined to form a rectangle.

113. PURPOSE

Flashing obstruction lights should be used on moored balloons or kites and their mooring lines to warn pilots of their presence during the hours between sunset and sunrise and during periods of reduced visibility. These lights may be operated 24 hours a day.

a. ***Systems.*** Flashing red (L-864) or white beacons (L-865) may be used to light moored balloons or kites. High intensity lights (L-856) are not recommended.

b. ***Display.*** Flashing lights should be displayed on the top, nose section, tail section, and on the tether cable approximately 15 feet (4.6m) below the craft so as to define the extremes of size and shape. Additional lights should be equally spaced along the cable's overall length for each 350 feet (107m) or fraction thereof.

c. ***Exceptions.*** When the requirements of this paragraph cannot be met, floodlighting may be used.

114. OPERATIONAL CHARACTERISTICS

The light intensity is controlled by a device that changes the intensity when the ambient light changes. The system should automatically turn the lights on and change intensities as ambient light condition change. The reverse order should apply in changing from nighttime to daytime operation. The lights should flash simultaneously.

CHAPTER 12. MARKING AND LIGHTING EQUIPMENT AND INFORMATION

120. PURPOSE

This chapter lists documents relating to obstruction marking and lighting systems and where they may be obtained.

121. PAINT STANDARD

Paint and aviation colors/gloss, referred to in this publication should conform to Federal Standard FED-STD-595. Approved colors shall be formulated without the use of Lead, Zinc Chromate or other heavy metals to match International Orange, White and Yellow. All coatings shall be manufactured and labeled to meet Federal Environmental Protection Act Volatile Organic Compound(s) guidelines, including the National Volatile Organic Compound Emission Standards for architectural coatings.

a. Exterior Acrylic Waterborne Paint. Coating should be a ready mixed, 100% acrylic, exterior latex formulated for application directly to galvanized surfaces. Ferrous iron and steel or non-galvanized surfaces shall be primed with a manufacturer recommended primer compatible with the finish coat.

b. Exterior Solventborne Alkyd Based Paint. Coating should be ready mixed, alkyd-based, exterior enamel for application directly to non-galvanized surfaces such as ferrous iron and steel. Galvanized surfaces shall be primed with a manufacturer primer compatible with the finish coat.

Paint Standards Color Table

COLOR	NUMBER
Orange	12197
White	17875
Yellow	13538

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Note-

1. Federal specification T1-P-59, aviation surface paint, ready mixed international orange.

2. Federal specification T1-102, aviation surface paint, oil titanium zinc.

3. Federal specification T1-102, aviation surface paint, oil, exterior, ready mixed, white and light tints.

122. AVAILABILITY OF SPECIFICATIONS

Federal specifications describing the technical characteristics of various paints and their application techniques may be obtained from:

GSA- Specification Branch
470 L'Enfant Plaza
Suite 8214
Washington, DC 20407
Telephone: (202) 619-8925

123. LIGHTS AND ASSOCIATED EQUIPMENT

The lighting equipment referred to in this publication should conform to the latest edition of one of the following specifications, as applicable:

a. *Obstruction Lighting Equipment.*

1. AC 150/5345-43, FAA Specification for Obstruction Lighting Equipment.

2. Military Specifications MIL-L-6273, Light, Navigational, Beacon, Obstacle or Code, Type G-1.

3. Military Specifications MIL-L-7830, Light Assembly, Markers, Aircraft Obstruction.

b. *Certified Equipment.*

1. AC 150/5345-53, Airport Lighting Certification Program, lists the manufacturers that have demonstrated compliance with the specification requirements of AC 150/5345-43.

2. Other manufacturers' equipment may be used provided that equipment meets the specification requirements of AC 150/5345-43.

c. *Airport Lighting Installation and Maintenance.*

1. AC 150/5340-21, Airport Miscellaneous Lighting Visual Aids, provides guidance for the installation, maintenance, testing, and inspection of obstruction lighting for airport visual aids such as airport beacons, wind cones, etc.

2. AC 150/5340-26, Maintenance of Airport Visual Aid Facilities, provides guidance on the maintenance of airport visual aid facilities.

d. *Vehicles.*

1. AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport, contains provisions for marking vehicles principally used on airports.

2. FAA Facilities. Obstruction marking for FAA facilities shall conform to FAA Drawing Number D-5480, referenced in FAA Standard FAA-STD-003, Paint Systems for Structures.

124. AVAILABILITY

The standards and specifications listed above may be obtained free of charge from the below-indicated office:

a. *Military Specifications:*

Standardization Document Order Desk
700 Robbins Avenue
Building #4, Section D
Philadelphia, PA 19111-5094

b. *FAA Specifications:*

Manager, ASD-110
Department of Transportation
Document Control Center
Martin Marietta/Air Traffic Systems
475 School St., SW.
Washington, DC 20024
Telephone: (202) 646-2047
FAA Contractors Only

c. *FAA Advisory Circulars:*

Department of Transportation
TASC
Subsequent Distribution Office, SVC-121.23
Ardmore East Business Center
3341 Q 75th Avenue
Landover, MD 20785
Telephone: (301) 322-4961

APPENDIX 1: Specifications for Obstruction Lighting Equipment Classification

APPENDIX

Type	Description
L-810	Steady-burning Red Obstruction Light
L-856	High Intensity Flashing White Obstruction Light (40 FPM)
L-857	High Intensity Flashing White Obstruction Light (60 FPM)
L-864	Flashing Red Obstruction Light (20-40 FPM)
L-865	Medium Intensity Flashing White Obstruction Light (40-FPM)
L-866	Medium Intensity Flashing White Obstruction Light (60-FPM)
L-864/L-865	Dual: Flashing Red Obstruction Light (20-40 FPM) and Medium Intensity Flashing White Obstruction Light (40 FPM)
L-885	Red Catenary 60 FPM
FPM = Flashes Per Minute	

TBL 4

PAINTING AND/OR DUAL LIGHTING OF CHIMNEYS, POLES, TOWERS, AND SIMILAR STRUCTURES

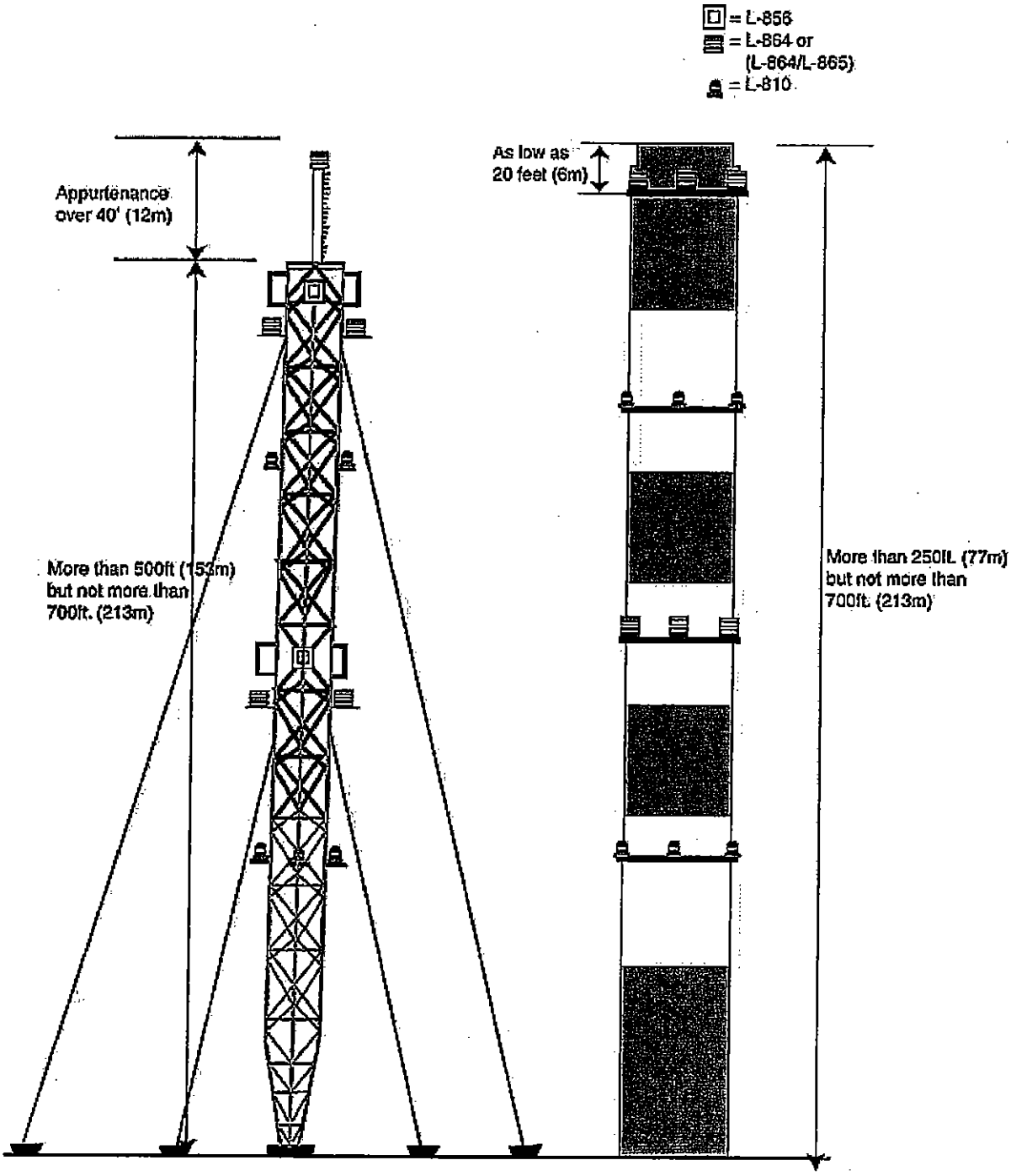
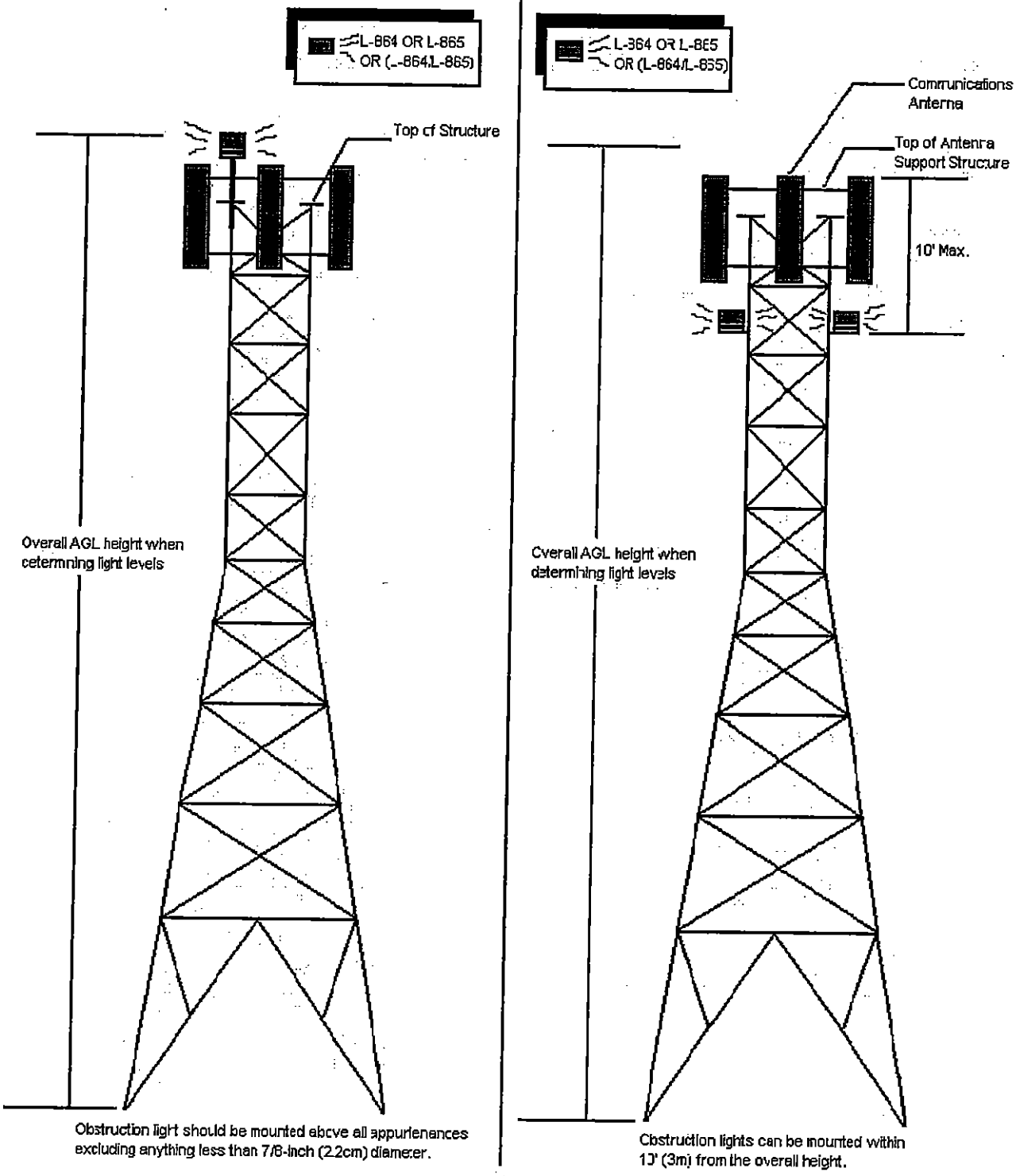


FIG 1

LIGHTING FOR TOP OF STRUCTURES



Intermediate lighting not shown. Overall AGL height if more than 200' (61m), but not more than 500' (153m).

FIG 2

PAINTING AND LIGHTING OF WATER TOWERS, STORAGE TANKS, AND SIMILAR STRUCTURES

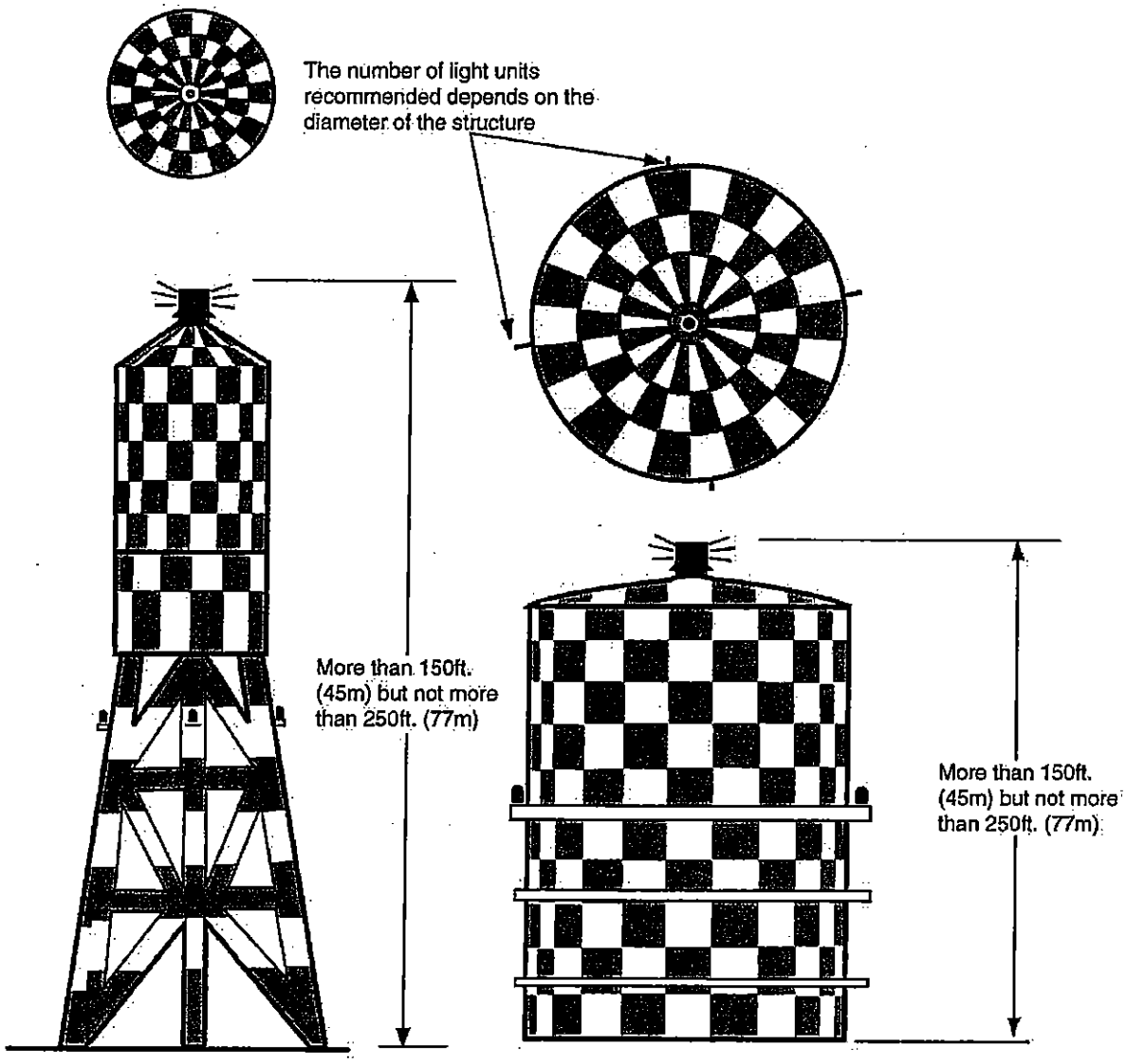


FIG 3

PAINTING AND LIGHTING OF WATER TOWERS ANDE SIMILAR STRUCTURES

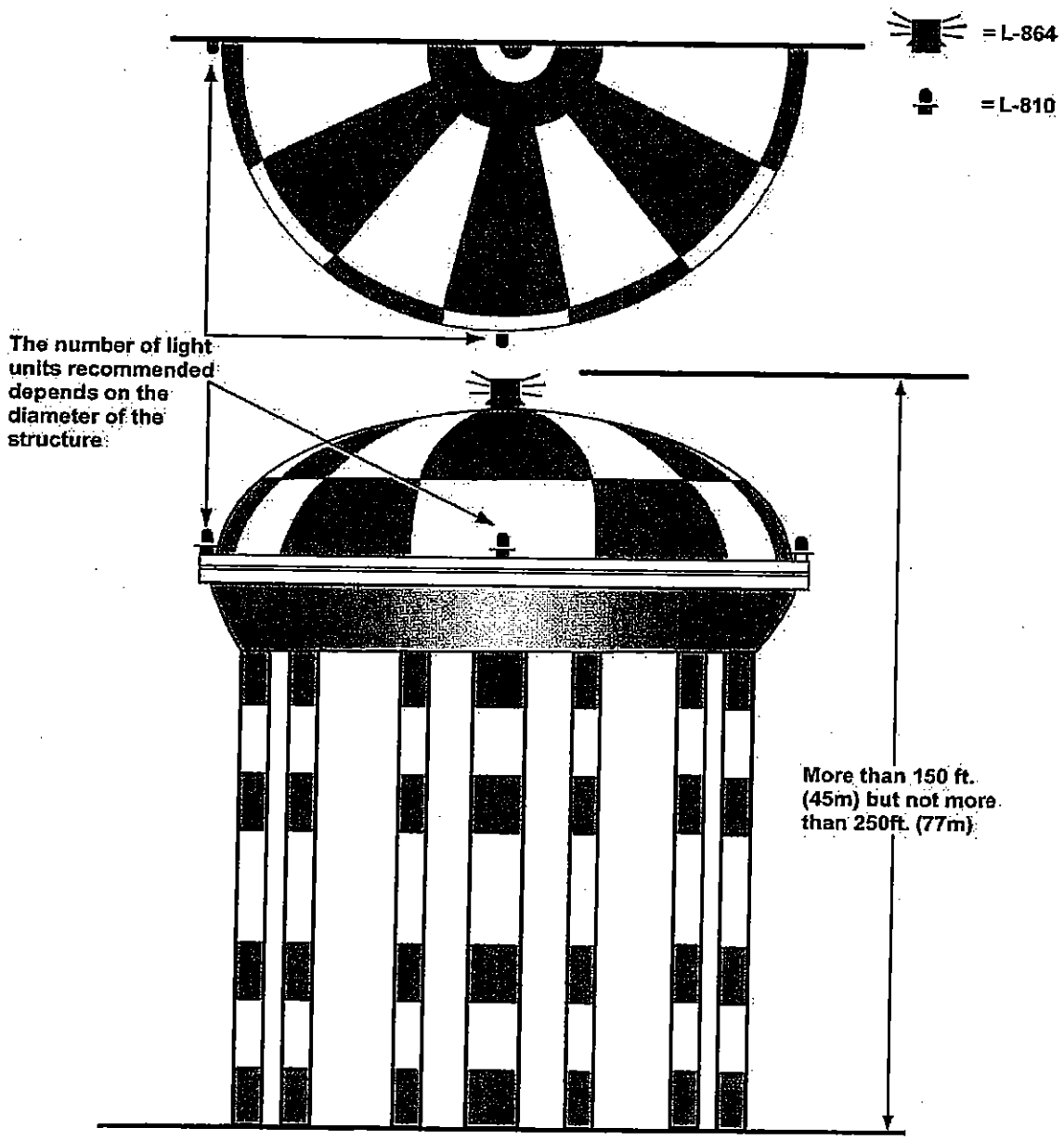


FIG 4

PAINTING OF SINGLE PEDESTAL WATER TOWER BY TEARDROP PATTERN

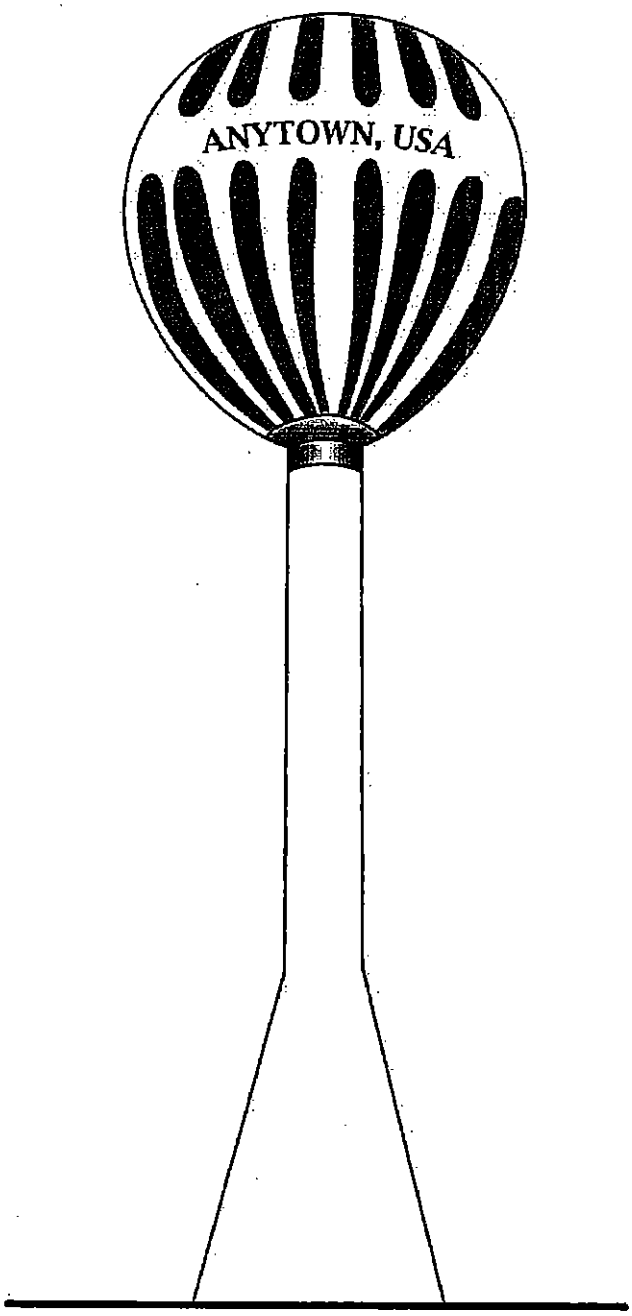
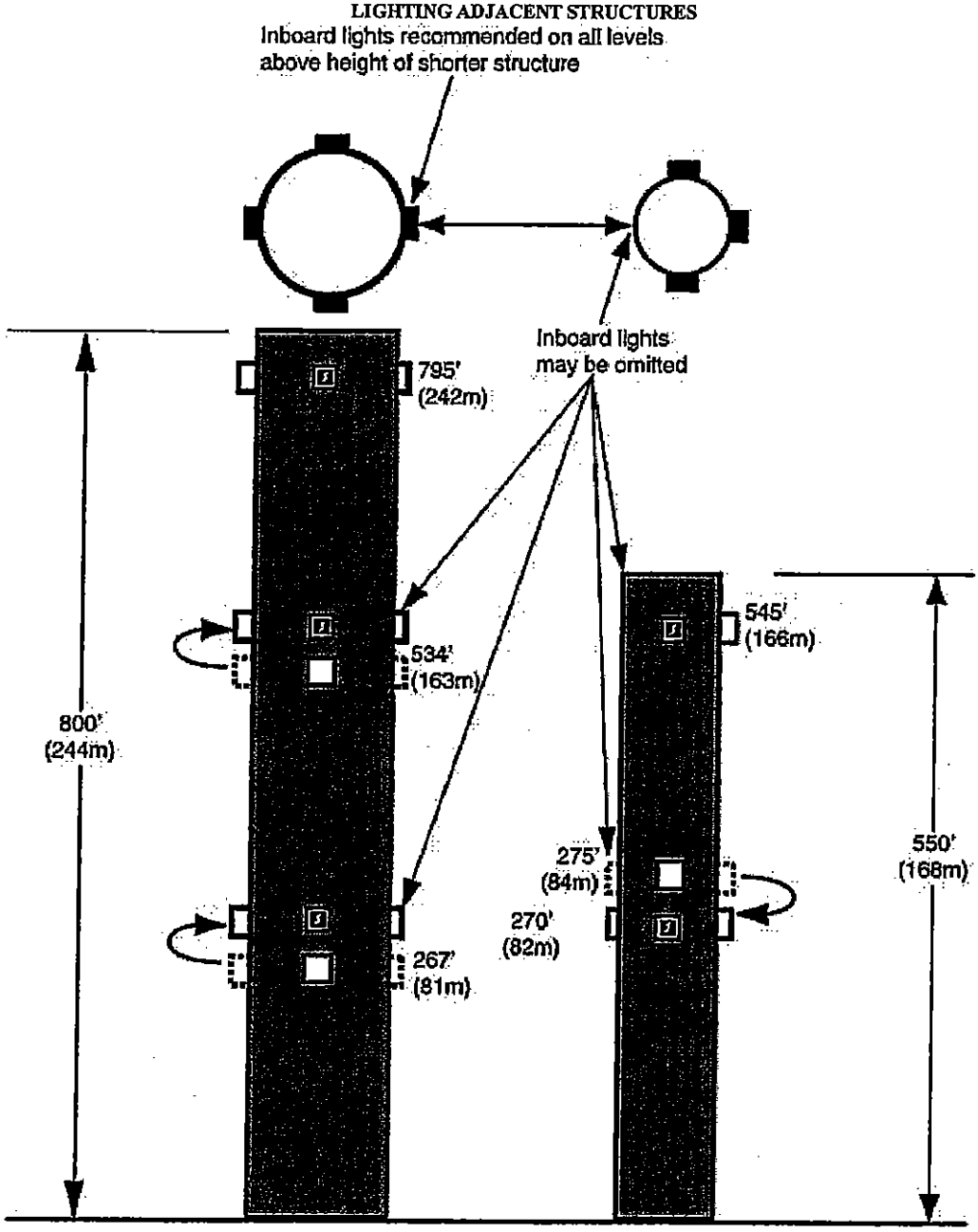


FIG 5

LIGHTING ADJACENT STRUCTURES



Minor adjustments in vertical placement may be made to place lights on same horizontal plane. Lights on both structures be synchronized

FIG 6

Lighting Adjacent Structure

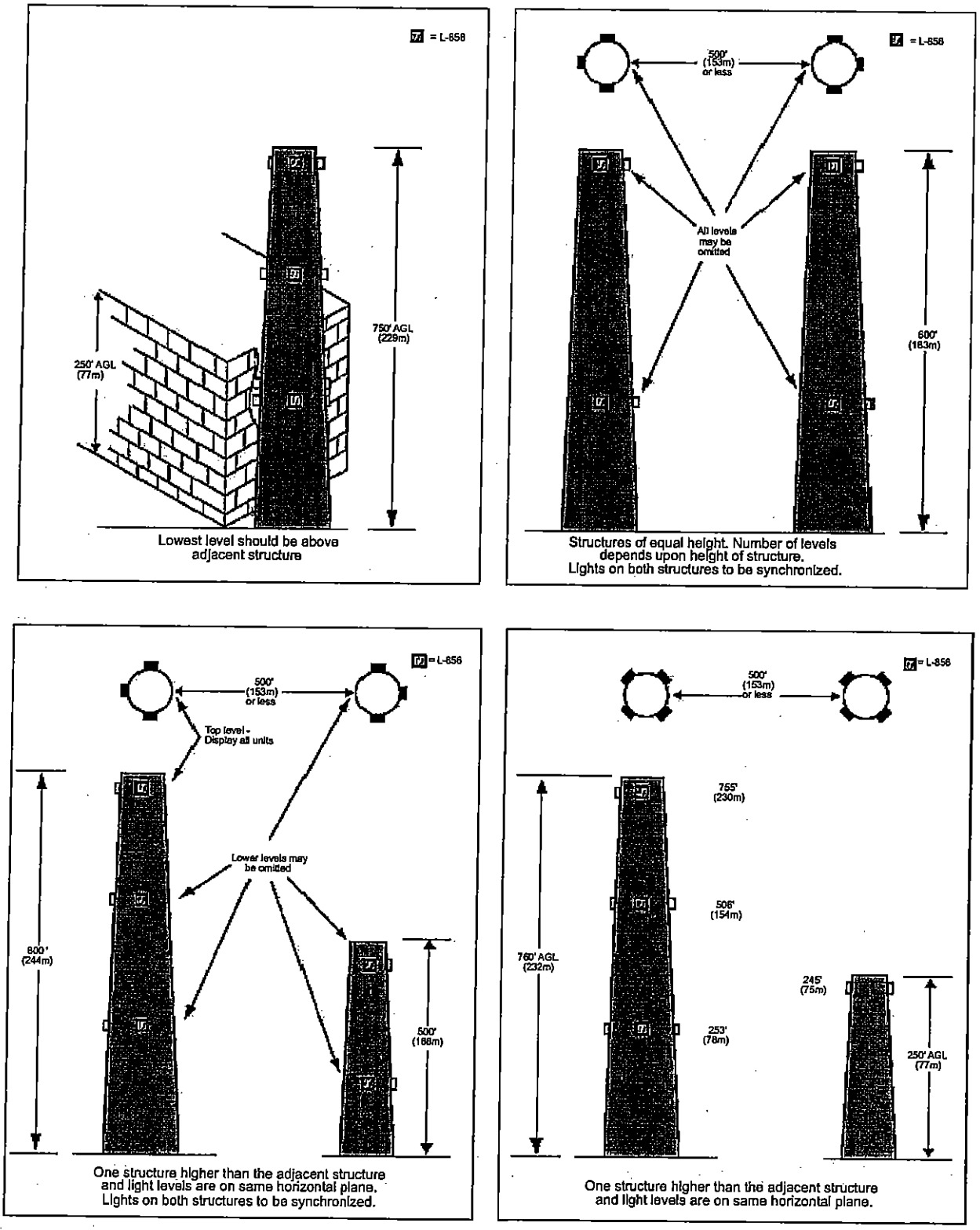


FIG 7

Lighting Adjacent Structure

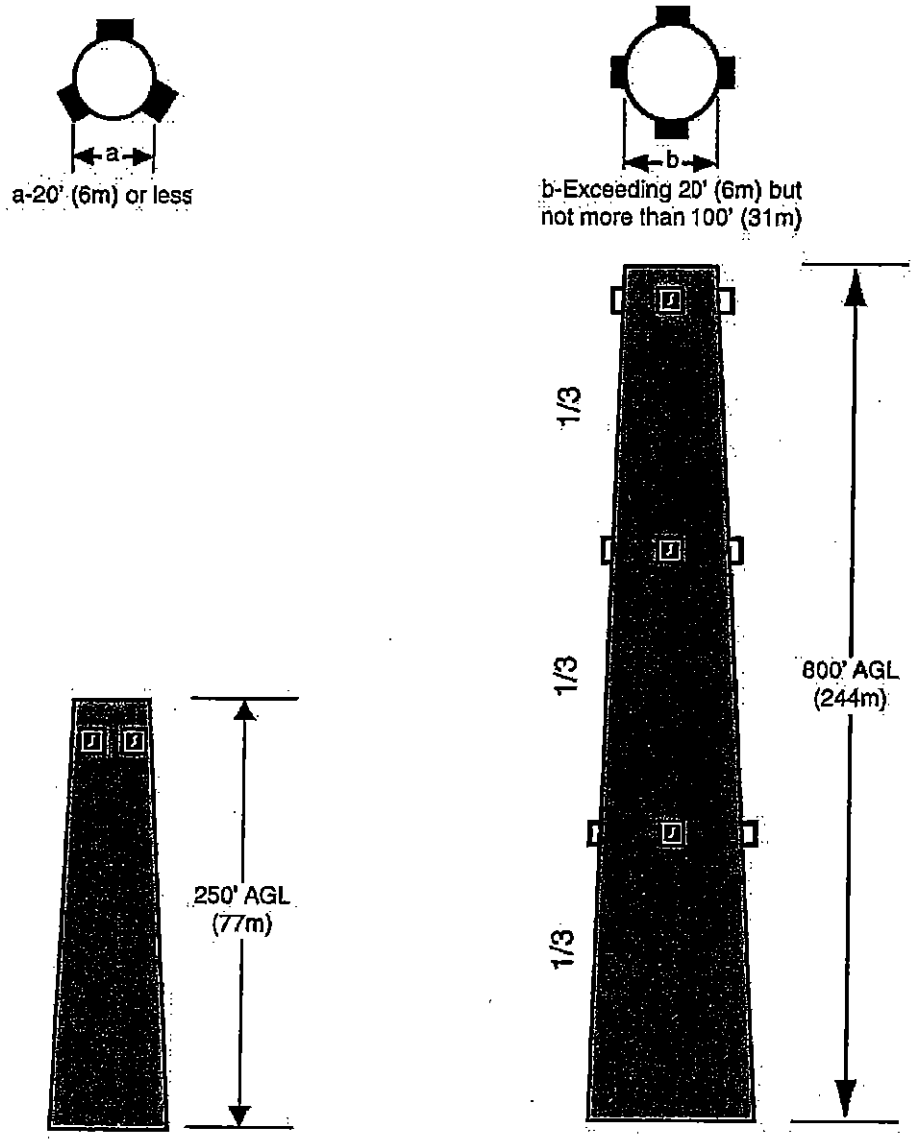


FIG 8

HYPERBOLIC COOLING TOWER

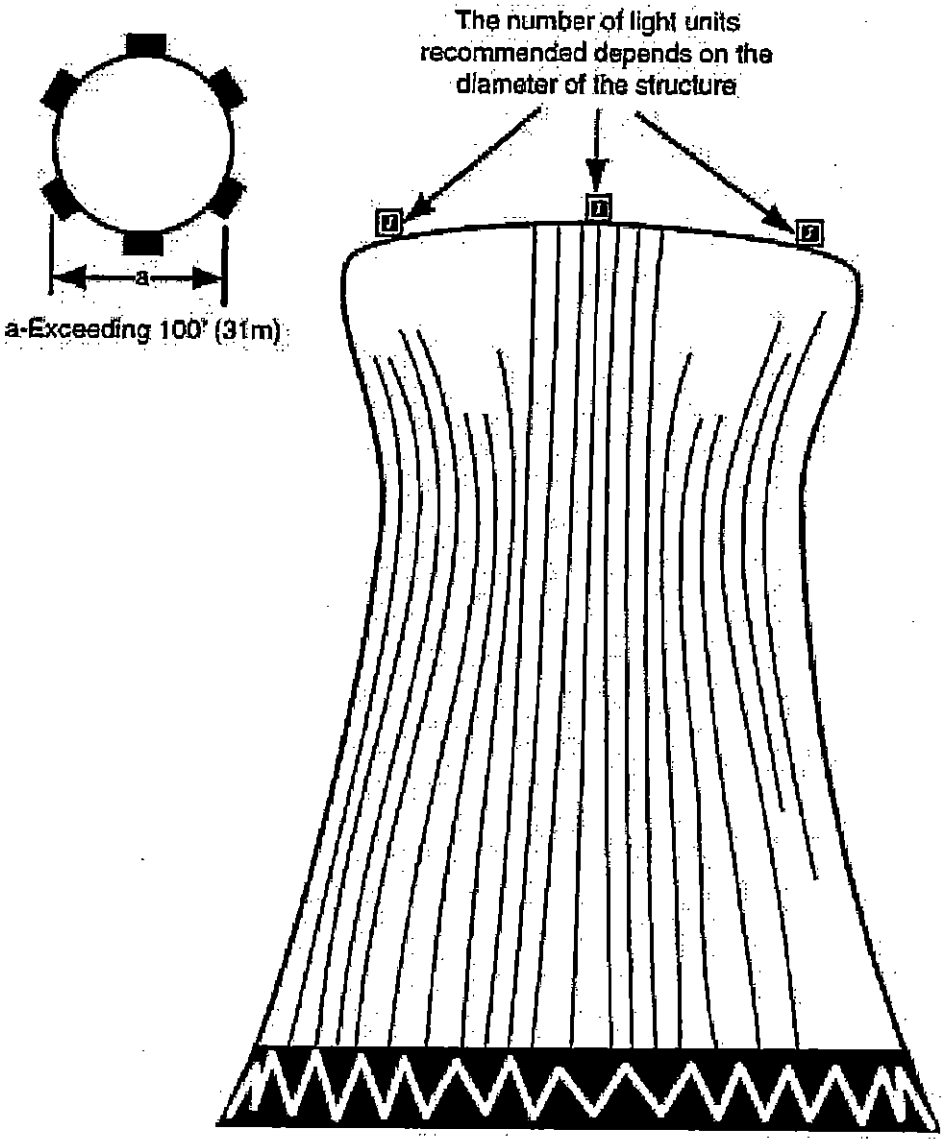


FIG 9

BRIDGE LIGHTING

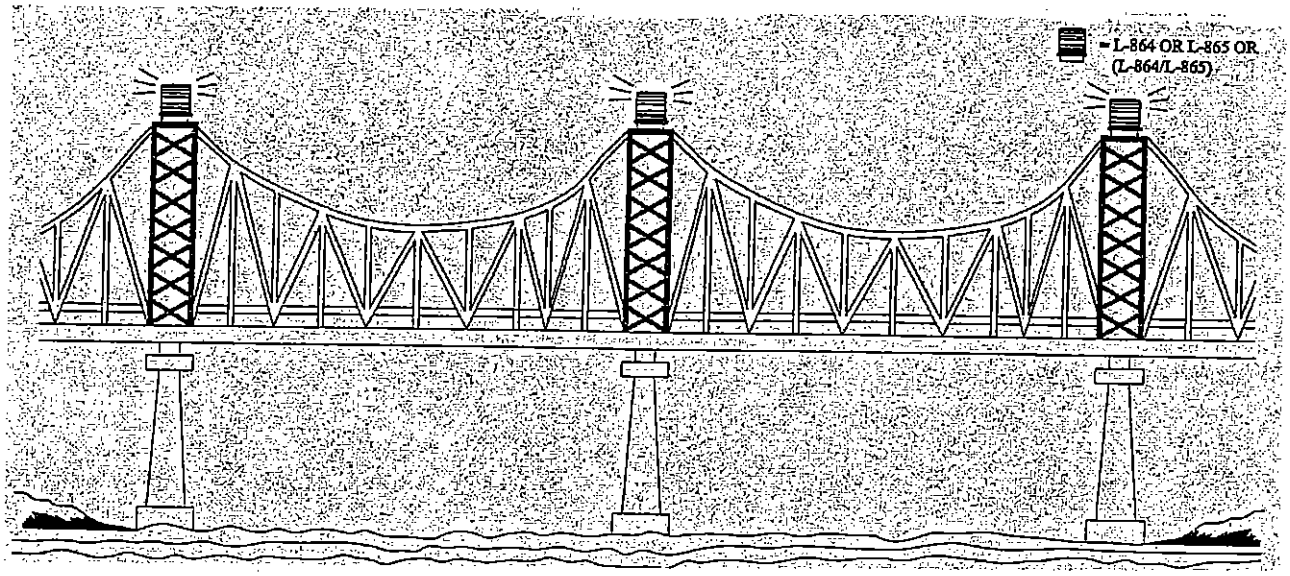
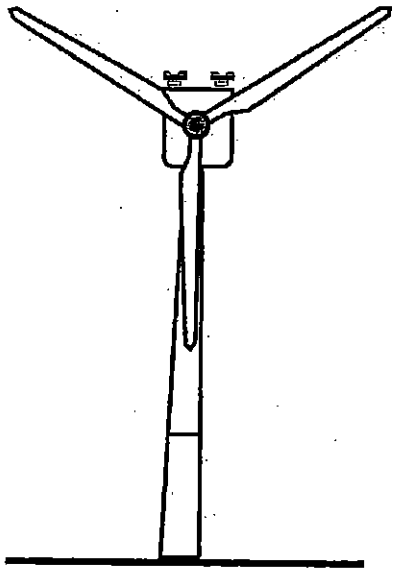
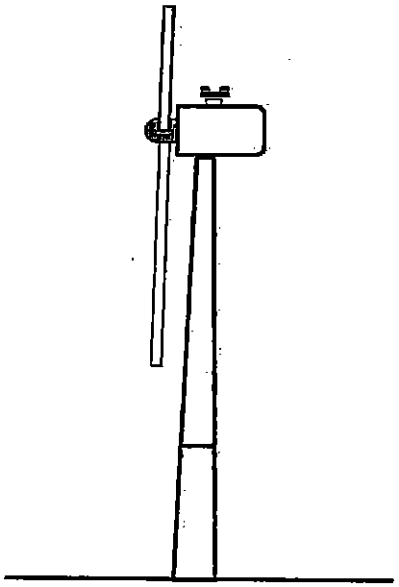


FIG 10

TYPICAL LIGHTING OF A STAND ALONE WIND TURBINE



Front View



Side View

FIG 11

WIND TURBINE GENERATOR

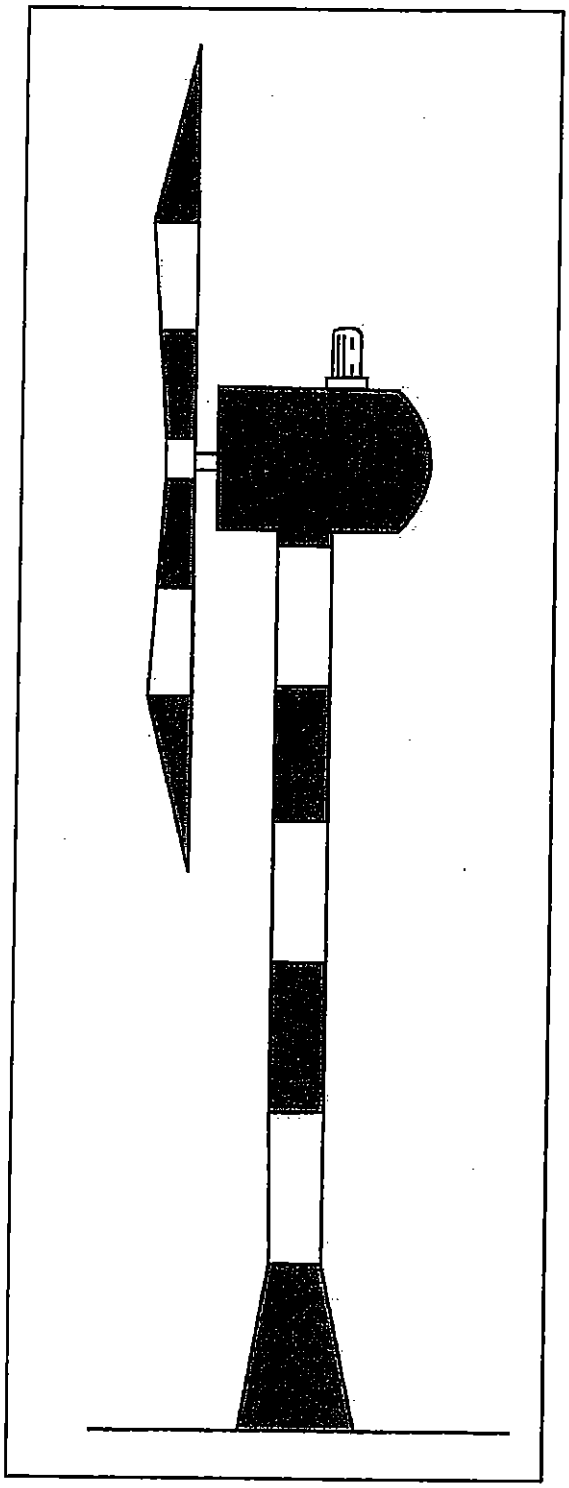
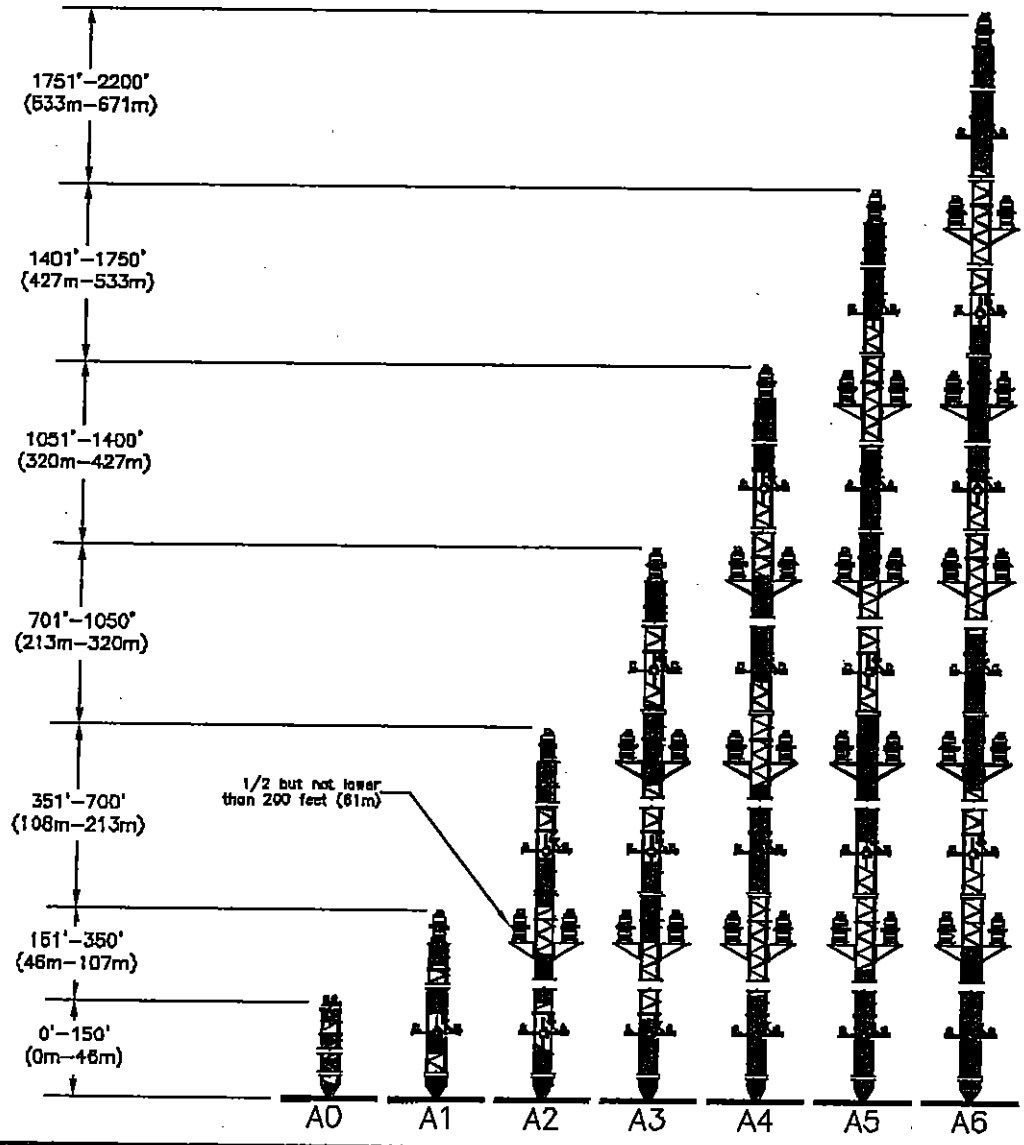


FIG 12

RED OBSTRUCTION LIGHTING STANDARDS (FAA Style A)

Day Protection = Aviation Orange/White Paint
Night Protection = 2,000cd Red Beacon and sidelights



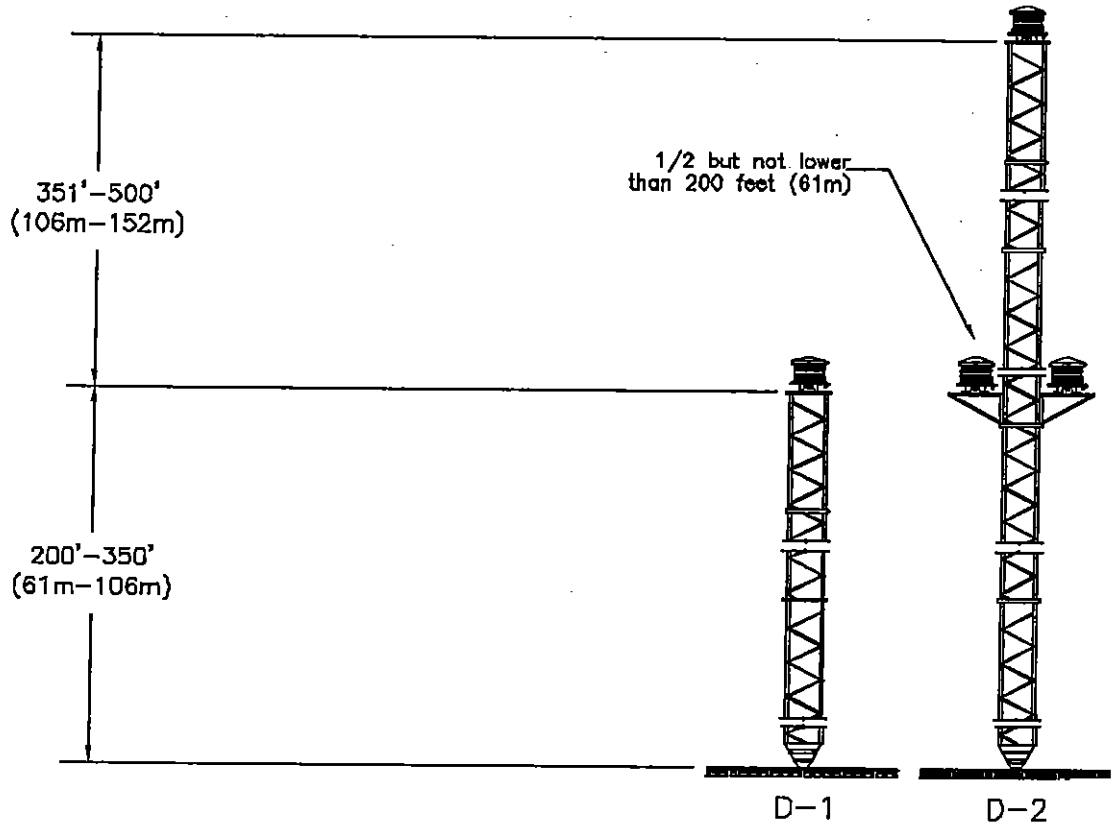
– L–864 Flashing Beacon

– L–810 Obstruction Light

FIG 13

MEDIUM INTENSITY WHITE OBSTRUCTION LIGHTING STANDARDS (FAA Style D)

Day/Twilight Protection = 20,000cd White Strobe
Night Protection = 2,000cd White Strobe
Painting of tower is typically not required.

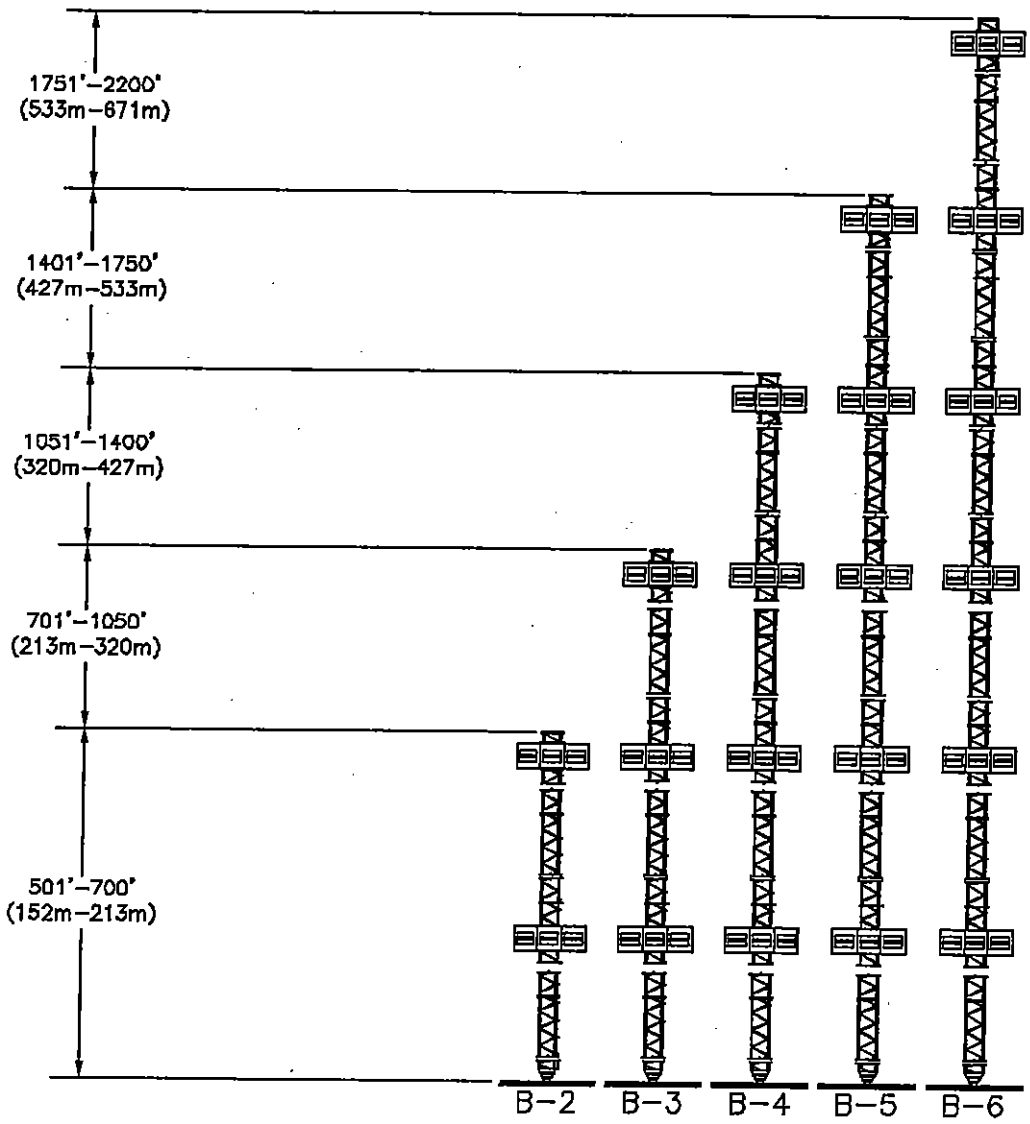


– L–885 Flashing White Strobe

FIG 14

HIGH INTENSITY OBSTRUCTION LIGHTING STANDARDS (FAA Style B)

Day Protection = 200,000cd White Strobe
Twilight Protection = 20,000cd White Strobe
Night Protection = 2,000cd White Strobe

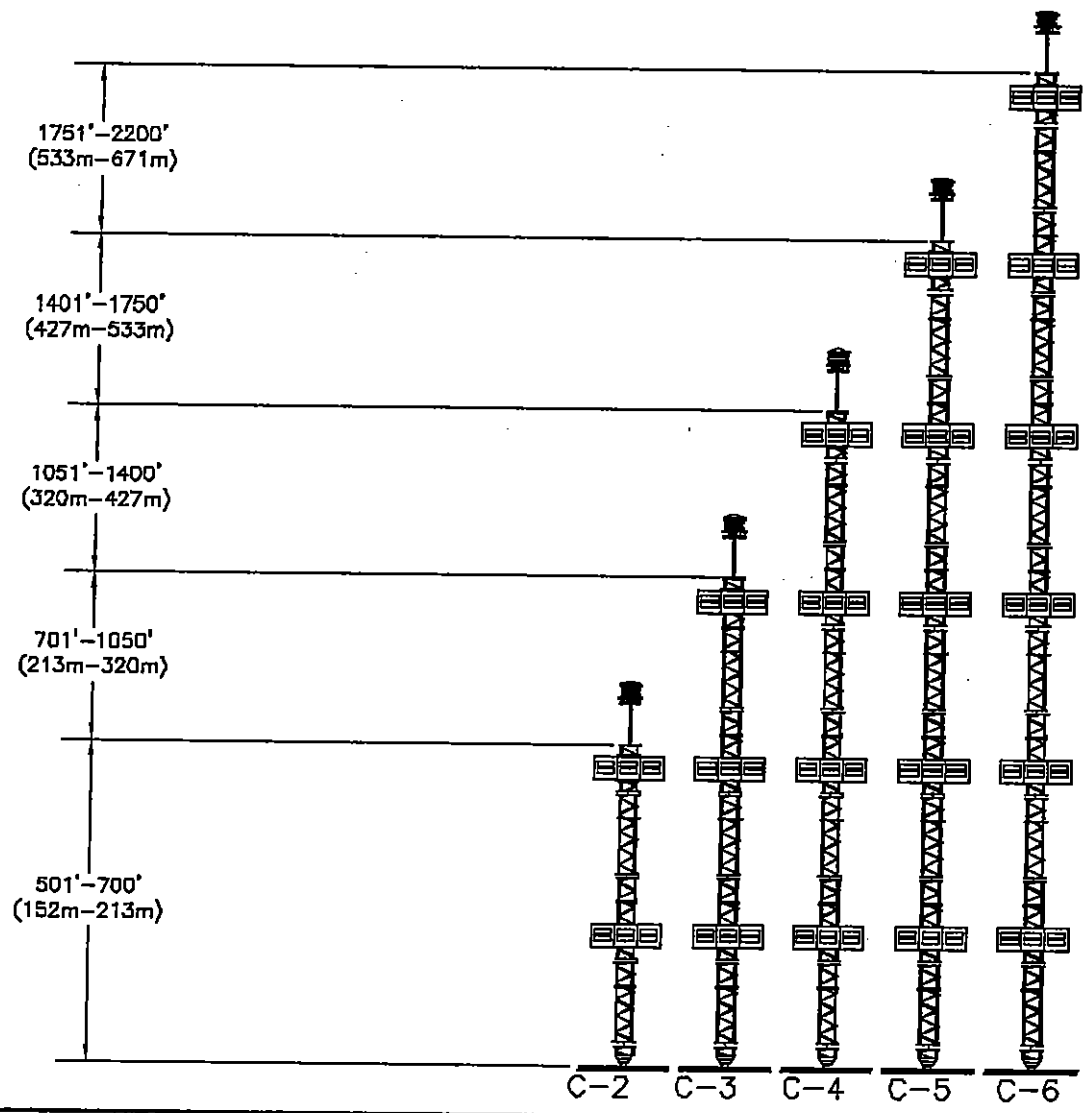


– L–856 High Intensity Strobe (3 Flashheads required per level for 360° coverage)

FIG 15

HIGH INTENSITY OBSTRUCTION LIGHTING STANDARDS (FAA Style C)

Day Protection = 200,000cd White Strobe
Twilight Protection = 20,000cd White Strobe
Night Protection = 2,000cd White Strobe



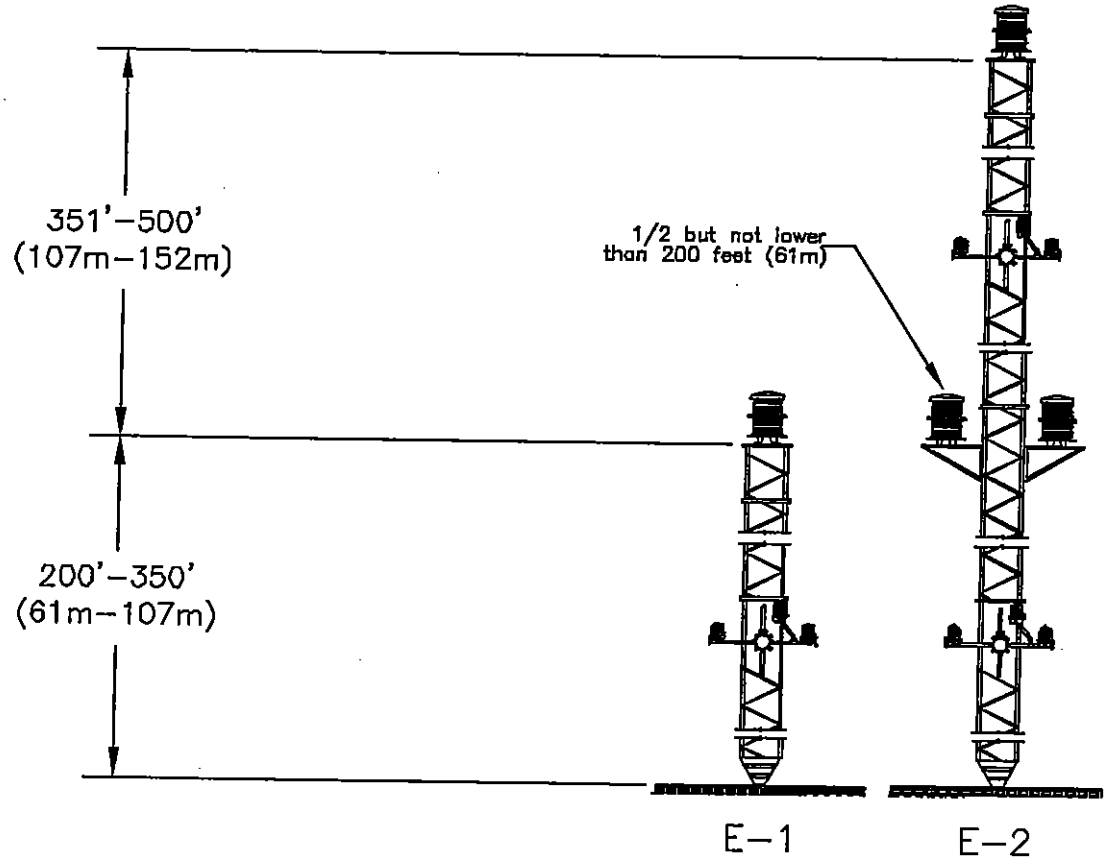
– L-856 High Intensity Strobe (3 Flashheads required per level for 360° coverage)

– L-865 Medium Intensity Strobe required for appurtenances of 40 feet or greater.

FIG 16

MEDIUM INTENSITY DUAL OBSTRUCTION LIGHTING STANDARDS (FAA Style E)

Day/Twilight Protection = 20,000cd White Strobe
Night Protection = 2,000cd Red Strobe and sidelights
Painting of tower is typically not required.



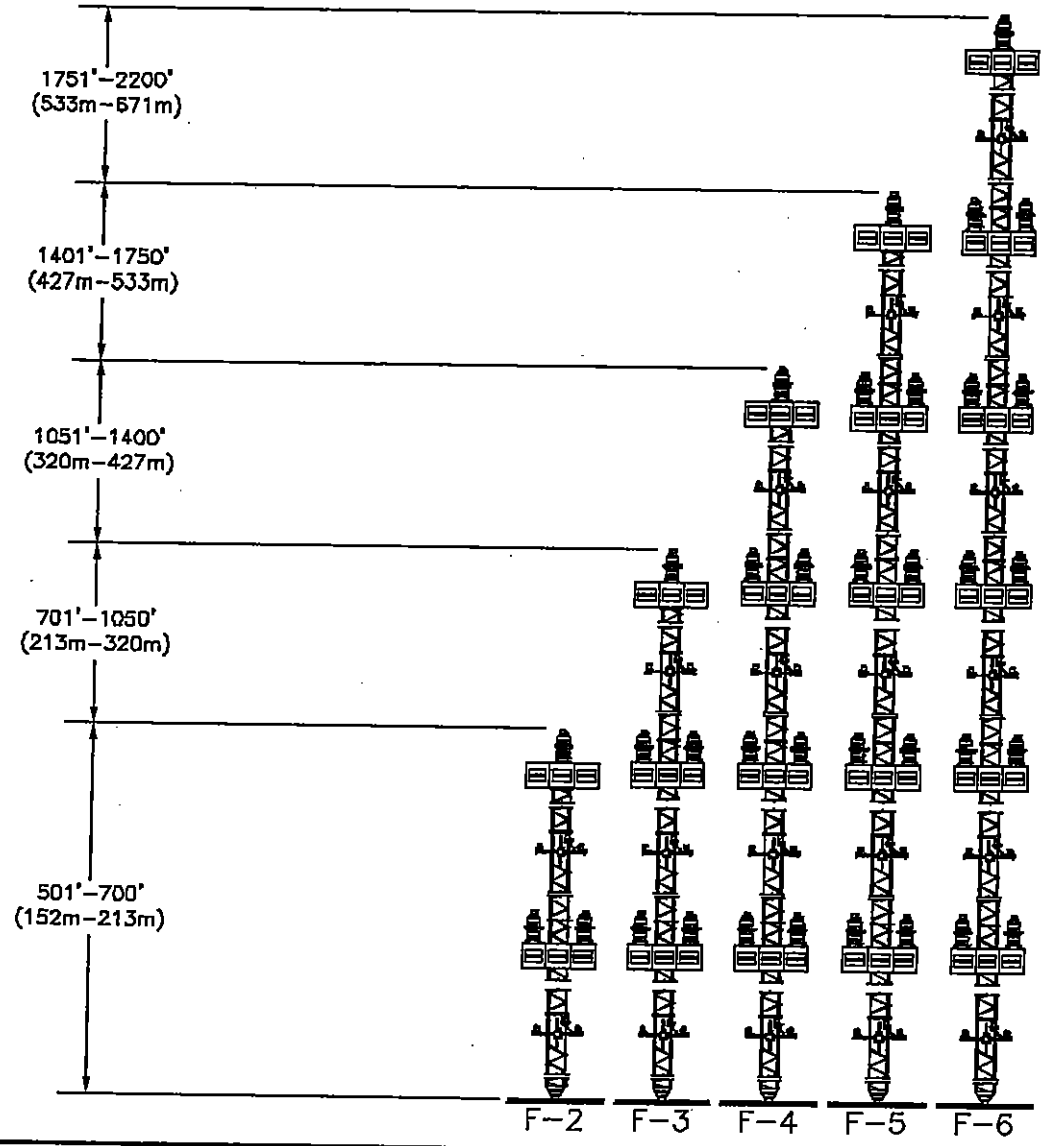
– L–864/L–865 Flashing Dual (White/Red) Strobe

– L–810 Obstruction Light

FIG 17

DUAL HIGH INTENSITY OBSTRUCTION LIGHTING STANDARDS (FAA Style F)

Day Protection = 200,000cd White Strobe
Twilight Protection = 20,000cd White Strobe
Night Protection = 2,000cd Red Beacon and sidelights



– L-864 Flashing Beacon

– L-810 Obstruction Light

– L-856 High Intensity Strobe (3 Flashheads required per level for 360° coverage)

FIG 18

APPENDIX 2. Miscellaneous

1. RATIONALE FOR OBSTRUCTION LIGHT INTENSITIES.

Sections 91.117, 91.119 and 91.155 of the FAR Part 91, General Operating and Flight Rules, prescribe aircraft speed restrictions, minimum safe altitudes, and basic visual flight rules (VFR) weather minimums for governing the operation of aircraft, including helicopters, within the United States.

2. DISTANCE VERSUS INTENSITIES.

TBL 5 depicts the distance the various intensities can be seen under 1 and 3 statute miles meteorological visibilities:

Distance/Intensity Table

Time Period	*Meteorological Visibility Statute Miles*	*Distance Statute Miles*	*Intensity Candelas*
Night		2.9 (4.7km)	1,500 (+/- 25%)
	3 (4.8km)	3.1 (4.9km)	2,000 (+/- 25%)
		1.4 (2.2km)	32
Day		1.5 (2.4km)	200,000
	1 (1.6km)	1.4 (2.2km)	100,000
		1.0 (1.6km)	20,000 (+/- 25%)
Day		3.0 (4.8km)	200,000
	3 (4.8km)	2.7 (4.3km)	100,000
		1.8 (2.9km)	20,000 (+/- 25%)
Twilight	1 (1.6km)	1.0 (1.6km) to 1.5 (2.4km)	20,000 (+/- 25%)?
Twilight	3 (4.8km)	1.8 (2.9km) to 4.2 (6.7km)	20,000 (+/- 25%)?

Note-
1. DISTANCE CALCULATED FOR NORTH SKY ILLUMINANCE.

TBL 5

3. CONCLUSION.

Pilots of aircraft travelling at 165 knots (190 mph/306kph) or less should be able to see obstruction lights in sufficient time to avoid the structure by at least 2,000 feet (610m) horizontally under all conditions of operation, provided the pilot is operating in accordance with FAR Part 91. Pilots operating between 165 knots (190 mph/303 km/h) and 250 knots (288 mph/463 kph) should be able to see the obstruction lights unless the weather deteriorates to 3 statute miles (4.8 kilometers) visibility at night, during which time period 2,000 candelas would be required to see the lights at 1.2 statute miles (1.9km). A higher intensity, with 3 statute miles (4.8 kilometers) visibility at night, could generate a residential annoyance factor. In addition, aircraft in these speed ranges can normally be expected to operate under instrument flight rules (IFR) at night when the visibility is 1 statute mile (1.6 kilometers).

4. DEFINITIONS.

a. Flight Visibility. The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.

Reference-
AIRMAN'S INFORMATION MANUAL
PILOT/CONTROLLER GLOSSARY.

b. Meteorological Visibility. A term that denotes the greatest distance, expressed in statute miles, that selected objects (visibility markers) or lights of moderate intensity (25 candelas) can be seen and identified under specified conditions of observation.

5. LIGHTING SYSTEM CONFIGURATION.

a. *Configuration A.* Red lighting system.

b. *Configuration B.* High Intensity White Obstruction Lights (including appurtenance lighting).

c. *Configuration C.* Dual Lighting System - High Intensity White & Red (including appurtenance lighting).

d. *Configuration D.* Medium Intensity White Lights (including appurtenance lighting).

e. *Configuration E.* Dual Lighting Systems - Medium Intensity White & Red (including appurtenance lighting).

Example-
"CONFIGURATION B 3" DENOTES A HIGH INTENSITY LIGHTING SYSTEM WITH THREE LEVELS OF LIGHT.

APPENDIX G

WORK PLAN FOR GAS TESTING AND PURGING

Fort Drum Contract Requirements (Clarification)
Meeting Notes 06 November 2003, 1300-1530 hours

Meeting started promptly at 1300 hours.

Directorate of Information Management (DOIM) network representative Larry Girard presented an overview of SIPR requirements. A hand out was provided and will be added to the IT tab in the Public Works requirements book. Pete Hansen is also available to discuss these requirements.

Concern was voiced reference Aviation Division needing to establish their requirements.

Larry Spencer reiterated the need to adhere to the I3A standards and confirmed that the latest cat 6 cable be provided. Currently the standard is cat 6e.
Contractor is to make all final communication connections except patch cords.
Contractor to provide all patch cords.

Design Standards, Final Draft March 2003 is up to date.

Key members with the exception of Job Order Contracting were present and introductions were made.

A guideline for discussion topics was passed out and meeting etiquette was discussed.

The Resident Office and Project Program Management and Development stated that they asked for this meeting to help problem solve and reinforce their desire to meet Public Works needs.

Topic 1, Notification for outages of service:

Occupied buildings require a minimum of 30-days after plans are approved.
Once 30-day notice is provided, date can be refined up to 2 weeks prior to the outage.
Residence will require coordination with PW Housing.
Facilities will require coordination with respective Unions when a change in work environment occurs (water, electric, sanitary, heat, etc.)
Notification for non-occupied facilities and new construction service connections will require a minimum of 14 days after plans are approved.
Additional Notification requirements will be addressed by individual topic

Topic 2, Roads:

Use New York State Department of Transportation Standards (NYSDOT)(stay current).
Require a minimum 30-day notification
Never close a whole road

Horizontal bores are preferred for all crossing of utilities (roadways, driveways-defer decision to Master Planning if and when program dollars are a concern and communicate any exceptions to Operations and Maintenance)
Always maintain traffic for current contracts and all future contracts.

Roller Compacted Concrete shall be a minimum of 6 inch thick.
Never whole road closure with out highest-level approvals and special circumstance.
Limit road cuts timeline.

Topic 3, Utilities:

For all buried utilities:
Tracer wire (THHN #12 solid) located 12 inch above installed utility per standards detail.
Marking tape with printed product identifier 6 to 18 inch below surface per standards detail.
GPS data may be provided. Readings will be required minimum every 8 meters and for valves, points of entry into facilities, changes in direction, building references, appurtenances (tees, elbows, post indicator valves, etc.) and points of connection and termination.
*Accuracy requirement for GPS data will be “cm” accuracy.
Plans timely with operation performed.

Electric:
Notification 30 day, 14 day hard after approval of plan.
Specify Class III poles or better for all utility line work.
Do not specify Oil Filled Transformers.
Specify Kearney Vacuum Pac Switches or switches that match Kearney Rough in physical dimensions.
No switches are to be installed in manholes.
Use delta primary and Y connections.

Fire Protection:
Heat and smoke detectors must work below 30 degrees Fahrenheit in attic areas.

Gas piping:
Shall be HDPE yellow stripe pipe, SDR-11 (100 psi min)
All valves shall be non-metallic poly valves, provide Nordstrom valves or approved equal.
PW does not have the resources to monitor cathodic protection.
Transitions to building service only by anode less riser.
Poly or steel casings with slip lining are required under runway pavements.
Properly reference:
Niagara Mohawk standards.

AGA Edition 3 (Jun 2001) for guidance on purging principles and practice
NFPA 54 for underground commissioning of lines and point of connection.
CFR 49, 191`-193 Operator

Part 9.0 Standards do not leave open for interpretation-edit.
Need to review all codes for new standards.
Full displacement with inert gas (current and future)
Purge by volume-push with fuel-O&M will supply Nitrogen for contracts currently not covered. Flow gas to 95%.
For VMF COE will pursue an operability change, noting impact to public safety.
Niagara Mohawk (NiMo) provides a certification program; all contractors working on the gas lines shall be so certified.
Certification for all fusion of pipe.
Fort Drum main line operating pressure is currently 15 PSI for natural gas.
You can test valve if there is no gas on the other side.
If fuel on the other side of valve, then weld cap, soap test final connection.
Be cautious of entry point to facility and or protect.
Maximum allowable pressure for interior steel pipe is 150 PSI.
Poly Gas lines will be pressure tested to 70 psi.
Protect pipes, meters and regulators. Use eaves, canopies, bollards, etc.
Resident facility shut down, each facility; Public Works Operations and Maintenance personnel will perform the shut down and relight.
During the Request for Proposal process facility shut downs and residence shut downs need to be identified.
Public Works personnel will operate existing valves for shut down and activation.
Union notification for outages require 30 days in advance.
PW Shop notification, 2 weeks hard date with alternate date, changes by exception only.
Steel casings shall be sleeved with plastic pipe
49 CFR 191-193

Water:
Piping shall be polyethylene or ductile iron.
Water system design shall be stamped.
Chlorination plan shall include a written procedure with drawings that indicate injection points, and time for each action.
Disinfection discharge requires advance 48-hour notice to Environmental need concentration and amount of water.
No chlorine pellets.
New York State Sanitary Code, New York State Department of Health
Notification for wet tap is 2 weeks to the shops.
Procedures submitted for approval 2 weeks prior to work.
AWWA guidance, C-651

Fire Sprinkler:
NFPA 25 Fire Service Main.
Chlorination of fire system and flush of system.
Do not allow schedule 10, use schedule 40.
Specify schedule 40 with Victaulic Fittings.
No wet systems in attic or unheated spaces

Sprinkler systems-Fort Drum largest population is Simplex-Grinnell
Automatic Sprinkler
Viking
Sprinkler density shall be per the UFC
PIV's will be installed before separation of service.
PIV's required to be 40 feet from facility.
RPZ backflow-double check, if used for temporary service then recent certification is required.
Backflow preventor's shall be accessible for testing.
Fire line-single check with pit at Stortz connection to building.

Sanitary
Notification same as other utilities.
6-PSI pipe, manholes, etc.

Piping:
PVC not to be used on Fort Drum
Pipe shall be readily identifiable by product. Yellow stripe for gas
And other color stripes to identify product

CATV
Cable shall be plenum rated
Lock boxes shall be provided for cable.
Only boxes with pull string for MCA projects.

Master Planning Issues:

Water storage tanks
Proposed Tank 1, elevation is proposed to be approximately 20 feet above the existing tank 1, this change in elevation of the proposed tank will reduce tank 2 capacities by approximately ½.
The rim elevation change for proposed new tank will cause a change for the whole tank system.
PW could outfit tank #2 with new pressure control equipment to prevent the tank from overflowing, but with the higher system head created by the new tank, pumping will probably be the most practical way to get the water back out.
Tank #2 is the same vintage as tank #1, therefore recommend replacement in the future with a tank of sufficient storage height to allow water to flow in and out in response to system pressure differentials

Lay down area site plan is part of the COE Environmental Plan
Construction trailer utilities connection and disconnection are part of the plan.
Directorate of Emergency Services and Public Works Utilities will review
Connection fee/MCA

Mass Notification System will need to be incorporated in all contracts.
PW does not have information for the requirement at this time.
COE has a paragraph we add for mass notification.

Minimum set back requirements
Primary building setback from Roads 150 feet
Secondary building setback from Roads 75 feet
Dumpster 25 feet

Products being requested as sole source to match existing systems:
TRANE Summit Building Management System (Siemens, Johnson, Simplex)
Advantor security systems
Monaco transmitter for Fire Reporting

Products discussed as or equal to match dimensions and architecture of the following:
Nordstrom Valves
Kearney Vacuum Pac Switches

Responses received by e-mail

11 Dec 03, Ray Rainbolt
Land clearing activities must take place after 01 August or before 15 April In Accordance with the Migratory Bird Treaty Act. The construction of installation operating support functions such as administrative offices and housing are specifically not exempt as a “military readiness activity” from the Migratory Bird Act IAW Bob Stump National Defense Authorization Act for Fiscal Year 2003.

23 Oct 03, George Hoover
Electric: make sure that all contracts include the requirements for “hi pot” tests of any medium-voltage cables (15kv) and “megger” tests for low-voltage wiring.

APPENDIX H

GUIDELINES FOR VENTILATING ATTICS AND CATHEDRAL CEILINGS TO AVOID ICINGS AT THEIR EAVES

Guidelines for Ventilating Attics and Cathedral Ceilings to Avoid Icings at Their Eaves

Wayne N. Tobiasson, P.E. **James S. Buska** **Alan R. Greatorex**

ABSTRACT

Instrumented buildings and cold room studies indicate that the outside design temperature for sizing natural or mechanical ventilation systems to avoid problematic icings at roof eaves should be 22°F (–5.6°C). When it is colder outside, ventilating with outside air is increasingly effective, and when it is warmer, icings at eaves seldom grow.

The amount of fresh air needed to minimize icings is related to the size and slope of the roof, the temperature in the heated building below, and the thermal resistance in between.

In big open attics, essentially all of the resistance to airflow is created at inlet and exhaust openings. In cathedral ceilings, the resistance to flow up the narrow airways is also an important consideration.

Design aids are developed to make the task of sizing inlet and exhaust openings and, in the case of cathedral ceilings, the airway height, quick and easy. Recommendations are presented on when and where roof ventilation is necessary to avoid icings.

INTRODUCTION

Buildings in cold regions with roofs that drain to cold eaves may experience ice damming and icicles along their eaves in winter. Water that ponds upslope of ice dams may leak into the building since most steep roofs are configured to shed water—not hold back standing water.

Figure 1 shows two roofs located near Watertown, New York. The two photos of identically constructed buildings were taken within minutes of each other. One roof contains large ice dams and icicles, but the other is ice-free. Why? The snow on top of the chimney of one roof is the clue to the difference in behavior. That building was not being heated, while the other building was at room temperature.

Figure 1 illustrates that building heat—not the sun—is the primary cause of ice dams and icicles on roofs. When the sun melts snow on roofs, it also warms the eaves, and this tends to minimize the growth of icicles. Certainly, icings can form on unheated buildings and from solar heating, but they are usually small, infrequent, and do not cause chronic problems.

CRREL studies of ice damming (Tobiasson et al. 1998, 1999) conclude that a combination of insulation and roof ventilation is the most reliable approach to eliminate chronic

Figure 1 *Two identically constructed roofs photographed at the same time. The one on the right, with no icings, was unheated.*

Wayne N. Tobiasson is a civil engineering consultant and retired volunteer at the U.S. Army Corps of Engineers' Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory (ERDC-CRREL), Hanover, N.H. **James S. Buska** is a research civil engineer and **Alan R. Greatorex** is a civil engineering technician at CRREL.

problematic ice dam formation. The importance of (1) installing insulation properly so that it is thermally effective and does not block air pathways and (2) providing a continuous air barrier between the living space and the attic are also acknowledged. By instrumenting several buildings with attics at Fort Drum in upstate New York—some with no ice dam problems and others with such problems ranging from minor to severe—guidelines for sizing attic ventilation systems to avoid such problems have been developed. The Fort Drum study (Tobiasson et al. 1998) determined that attic ventilation systems, natural or mechanical, should be sized to keep the underside of the roof below freezing when it is 22°F (–5.6°C) outside. When it is colder than that, it is easier to remove heat with outside air since that air is colder. When it is warmer than 22°F (–5.6°C), it is unlikely that meltwater will refreeze at eaves.

Fifty-seven buildings at Fort Drum were modified according to these guidelines. Those modifications essentially eliminated the chronic icing problems of the past. Since 1995, many other icing problems have been eliminated in other places using these guidelines. Buska et al. (1998) present some examples including one for a cathedral ceiling. Additional calculations for cathedral ceilings, along with cold room tests that verify those calculations, have also been reported (Tobiasson et al. 1999).

Our mathematical developments in these reports assume that all ventilation is by stack effect. We acknowledge that, at times, wind-induced ventilation can greatly exceed stack-effect ventilation. However, since winds cannot be relied on, we have based our approach on stack-induced ventilation.

Our measurements include the effects of daytime solar loading and nighttime radiational cooling, but our mathematical developments do not. Since our guidelines are solving ice damming problems, these simplifying assumptions appear to be reasonable for our purposes for snow-covered roofs.

Roofs that contain dormers, valleys, and other features that complicate ventilation are prone to ice damming in the vicinity of such features. At such locations, ventilation details deserve extra attention.

One purpose of this paper is to somewhat refine the "attic" calculations and present both the "attic" and "cathedral ceiling" findings in a simple graphical way so that they can be readily used without the need to make calculations. Another purpose is to discuss the counterpoint that insulation and tight construction alone can eliminate icings and, thus, ventilation is not needed.

DESIGN AIDS FOR ATTICS

Figure 2 shows a typical attic with insulation in the flat ceiling below. In this paper, our prior work on attic ventilation has been modified by using an average attic temperature of 27°F (–2.8°C), not 30°F (–1.0°C). This has been done to be consistent with our more recent cathedral ceiling calculations, which use an average airway temperature of 27°F (–2.8°C) based on 22°F (–5.6°C) outside air entering along the eaves and the requirement to limit the temperature of the air exhausting at the ridge to 32°F (0°C) to prevent melting of snow on the roof. We assume that enough ventilating air must pass through the attic to remove all of the building heat being added by conduction through the ceiling. Since some heat will be lost up through the snow on the roof or through the gable ends of the attic, our answer will call for somewhat more ventilating air than a more rigorous treatment of heat flows would determine.

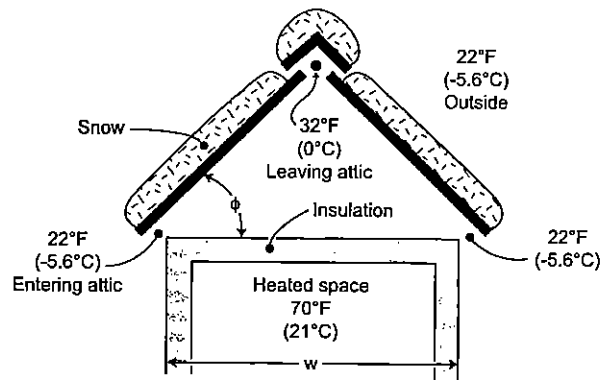


Figure 2 A typical ventilated attic at the "design" condition.

When our previous mathematical development for attics is modified to account for the above change in attic temperature, the area of inlets required along the eaves per running foot of attic to allow enough stack-effect ventilation to keep the entire attic below 32°F (0°C) is as follows:

$$A_i = 33.28(W/\tan\phi)^{0.5}/R \qquad (1)$$
$$\text{(in SI units, } A_i = 22.18(W/\tan\phi)^{0.5}/R\text{)}$$

where

A_i = net free open area of inlets along the eaves in in.^{2}/running ft (mm^2/running mm) of attic. Note that this is the *total value* for both eaves—half of this would be needed along each side of a typical gable roof. That same *total value* would also be needed for outlets along the ridge.

W = attic width, ft (m).

ϕ = roof slope in degrees. Table 1 relates slope in degrees to slope in inches per foot and provides the tangents and cosines of those slopes.

R = thermal resistance of the ceiling, ft^2·h·°F/Btu (m^2 K/W).

For example, when a roof has a 3 on 12 (14°) slope, its attic has a width of 30 ft (9.1 m), and its ceiling has a thermal resistance of 25 ft^2·h·°F/Btu (4.4 m^{2}K/W), the total net free open area of inlets along the eaves (and also the net free open area of outlets along the ridge) would be 33.28 $(30/0.25)^{0.5}/25$ = 14.6 in.^{2}/running ft (in SI units, 22.18 $[9.1/0.25]^{0.5}/4.4$ = 30.4 mm^2/mm). Along each eave

TABLE 1
Information on Roof Slope

Slope (in./ft)	Slope ϕ (degrees)	Tangent ϕ	Cosine ϕ
¼	1.2	0.021	1.000
½	2.4	0.042	0.999
1	4.8	0.083	0.997
2	9.5	0.167	0.986
3	14.0	0.250	0.970
4	18.4	0.333	0.949
5	22.6	0.417	0.923
6	26.6	0.500	0.894
8	33.7	0.667	0.832
10	39.8	0.833	0.768
12	45.0	1.000	0.707
14	49.4	1.167	0.651
16	53.1	1.333	0.600
18	56.3	1.500	0.555

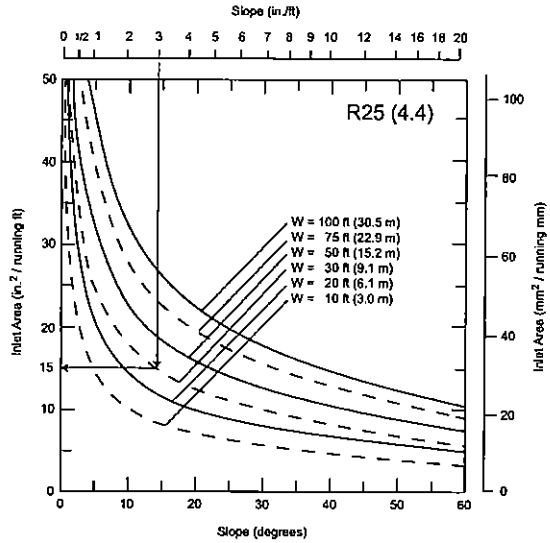


Figure 4 *Net free open area of inlets for attics with R25 (in SI units, R4.4) insulation.*

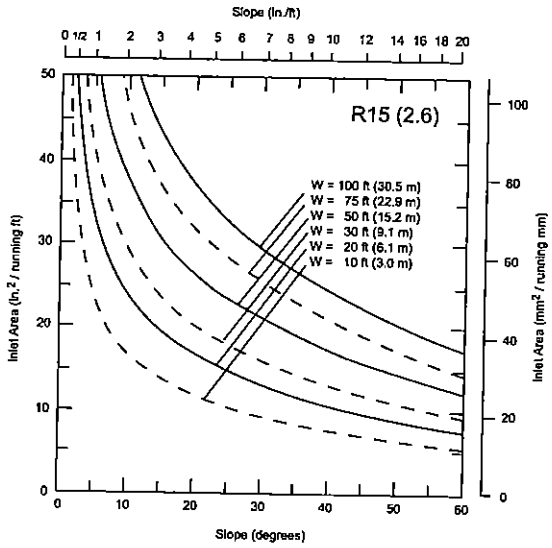


Figure 3 *Net free open area of inlets for attics with R15 (in SI units, R2.6) insulation.*

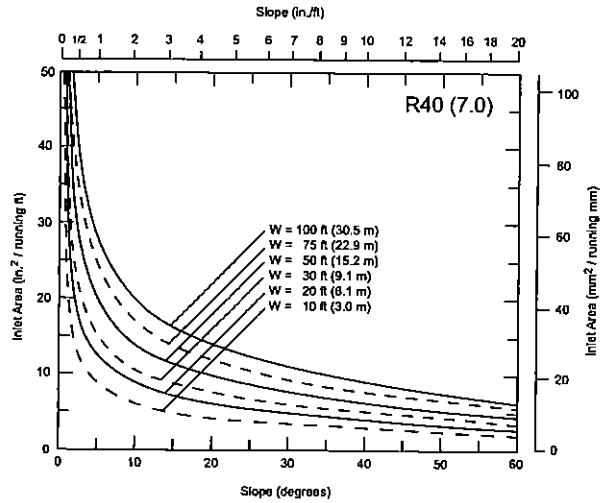


Figure 5 *Net free open area of inlets for attics with R40 (in SI units, R7.0) insulation.*

of the roof, the net free open area of inlets would need to be about 7.3 in^2/running ft (about 15.2 mm^2/mm).

In this example, the total area of inlets and outlets of about 29 in.^{2}/running ft (61 mm^2/mm) is about 1/150 of the attic area. This is double the current "1/300 rule" developed for moisture control in attics, not ice dam prevention. If this attic had more or less insulation, this ratio for ice dam avoidance would change. It would decrease to about 1/240 for R40 (in SI units, R7) and increase to about 1/90 for R15 (in SI units, R2.6). If the roof slope were to change, this ratio would also change. For flatter slopes, ventilation by stack effect diminishes, and much bigger openings are needed to achieve the ventilation necessary.

The above comparison with the current "1/300 rule" is made to indicate that it should *not* be assumed that if that rule is followed, the roof will not suffer icing problems.

Equation 1 is presented graphically in Figures 3, 4, and 5 for attics with ceiling thermal resistances of R15, R25, and R40 (in SI units, R2.6, R4.4, and R7.0), respectively. Arrows on Figure 4 illustrate the above example. For other ceiling

thermal resistances, the answer can be obtained by interpolating among the three graphs.

By way of comparison, using Equation 1, the answer is 14.6 in.^{2}/running ft (30.7 mm^2/mm). That is a better answer since the inaccuracies associated with a graphical solution are avoided, but 15 in.^{2}/ft (31 mm^2/mm) is certainly close enough for design purposes.

DESIGN AIDS FOR CATHEDRAL CEILINGS

Figure 6 shows a cathedral ceiling with slope ϕ in degrees, length L in ft (m), airway height h_a in in. (mm), and ceiling thermal resistance R in ft^2·h·°F/Btu (m^{2}K/W). Figures 7, 8, 9, and 10 present the design aids developed previously (Tobiasson et al. 1999) for roofs with cathedral ceilings. Note that the answers are for each airway; therefore, for a typical gable roof, each side would be analyzed separately. Using the roof in the example used previously to illustrate the attic design aids, the horizontal projection of the 3 on 12 sloped airway would be the "attic" width of 30 ft (9.1 m) divided by 2. The length of the airway, L, would be 15 ft (4.6 m) divided by the cosine of the slope. From Table 1, the slope is 14°, its cosine = 0.970, and, thus, L = 15/0.970 = 15.5 ft (4.6/0.970 = 4.7 m). Since the R-value in the example is 25 ft^2·h·°F/Btu (4.4 m^2 K/W), and the roof slope is very near 15°, the middle graph of Figure 7 is used to determine airway height and inlet area. A range of combinations is available. First, it is clear that an airway only 1 in. (25 mm) high will not suffice. Not enough air can flow up such a narrow airway to provide the cooling required in this case. Next, it is clear that there is very little to gain by making the airway much over 1.75 in. (44 mm) high. For airway heights of 1.25, 1.5, and 1.75 in. (32, 38, and 44 mm), the required inlet areas are about 13, 9, and 8 in.^{2}/running ft (27, 19, and 17 mm^2/mm), respectively. The final selection among these alternatives would, in all likelihood, be based on lumber sizes, net free openings of commercially available soffit and ridge vents, and similar issues.

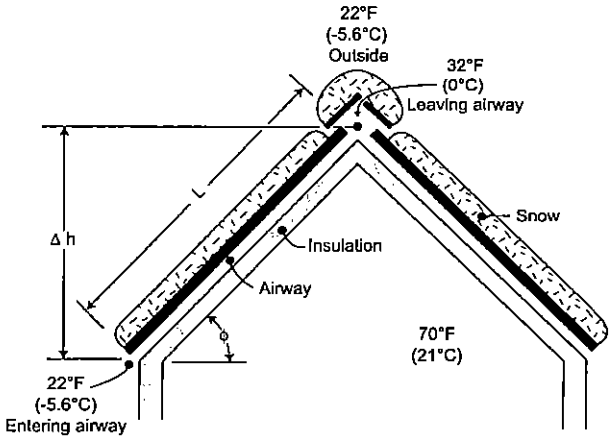


Figure 6 A typical ventilated cathedral ceiling.

Had the slope of this roof been 45°, the length of the airway would have been 21.2 ft (6.5 m) and sketching that line on the middle graph in Figure 9, between the L = 15 ft (4.6 m) and L = 30 ft (9.1 m) lines, a 1 in. (25 mm) high airway could be used, provided that the inlet area was about 9 in.^{2}/running ft (about 19 mm^2/mm).

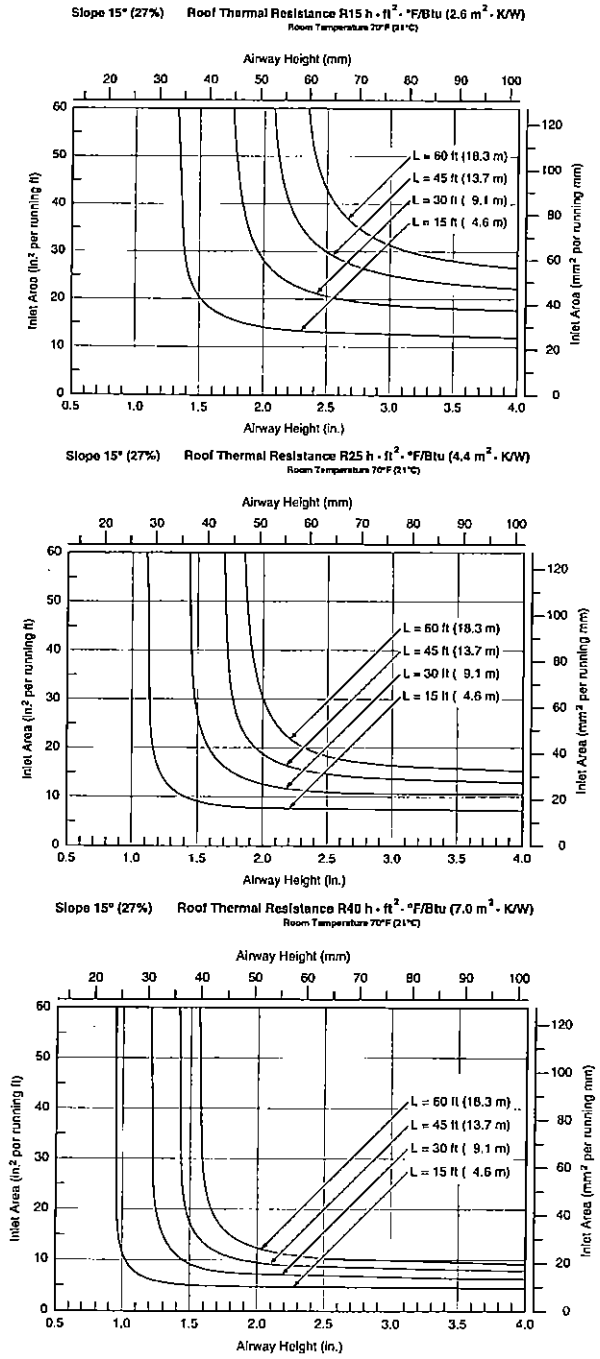


Figure 7 Airway heights and inlet areas for cathedral ceilings with a slope of 15°.

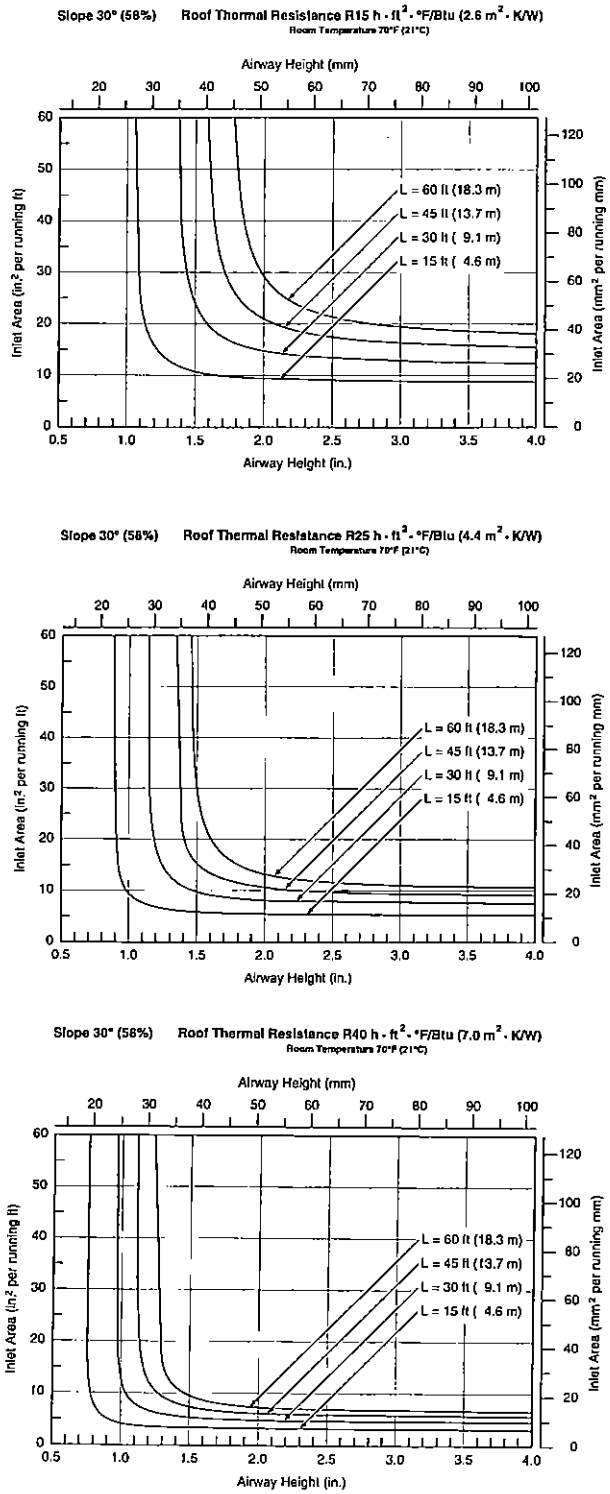


Figure 8 *Airway heights and inlet areas for cathedral ceilings with a slope of 30°.*

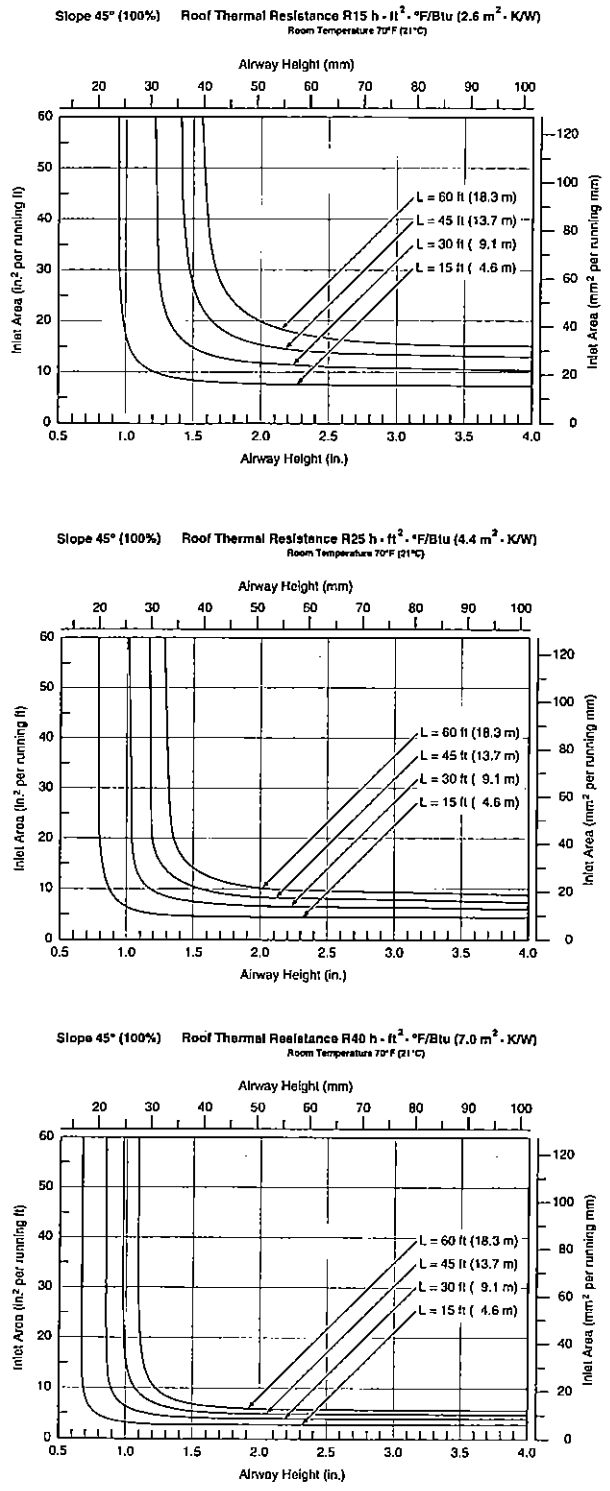


Figure 9 *Airway heights and inlet areas for cathedral ceilings with a slope of 45°.*

By studying the graphs in Figures 7 through 10, it is possible to get an appreciation for just how much the length of the airway, the slope of the roof, and its thermal resistance influence the inlet areas and airway heights needed to keep cathedral ceilings from suffering chronic icing problems.

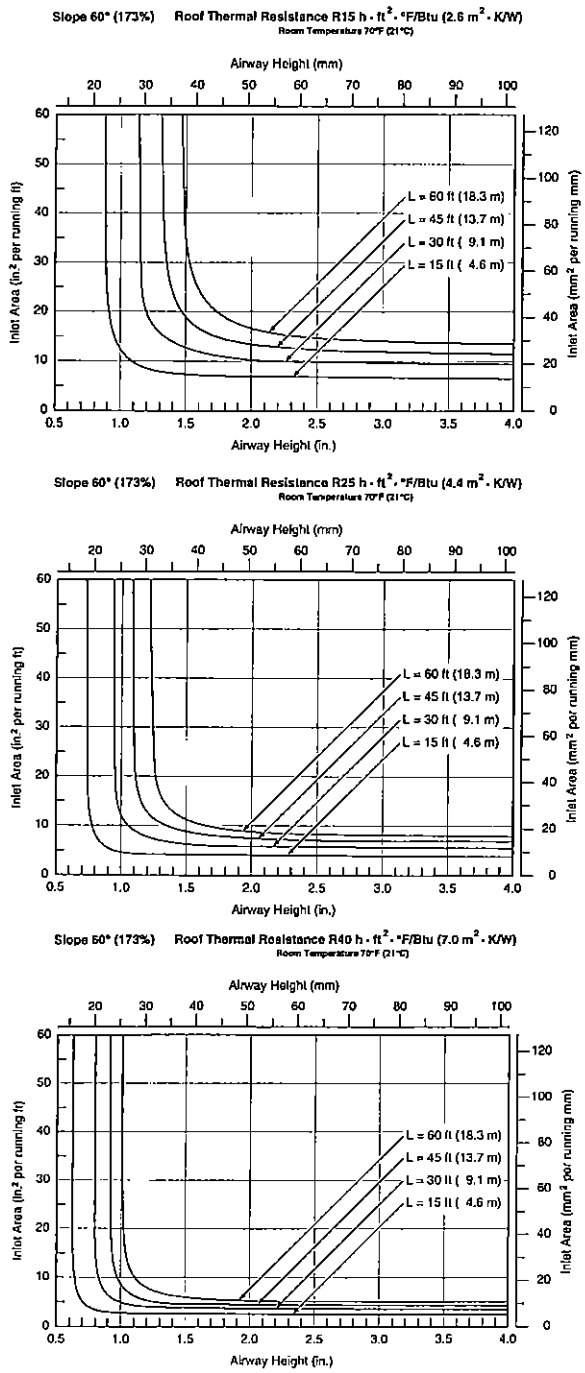


Figure 10 Airway heights and inlet areas for cathedral ceilings with a slope of 60°.

IS ROOF VENTILATION NECESSARY?

We and others at CRREL have done several studies to show that edge venting and the various commercially available breather vents are not effective in ventilating low-slope "compact" membrane roofing systems (Tobiasson et al. 1983; Tobiasson 1994). We define "compact" as a system with its insulation above its deck and having no airspaces or intermediate framing members. Those studies indicate that such roofs do not need to be ventilated and the penetrations of their waterproofing membranes needed to install such vents often do more harm than good.

"Framed" roofs have all or some of their insulation below their deck between framing members. Low-slope framed roofs have a relatively high risk of incurring condensation problems. Risks can be reduced by using, instead, a compact roof or a hybrid roof (i.e., part "compact" above the deck and part "framed" below) (Tobiasson 1994).

Air barriers and vapor retarders are the primary lines of defense against condensation problems in building envelopes in cold regions. When air exfiltration is prevented, condensation problems seldom occur. When condensation problems develop, air leakage paths are usually found to be the cause.

For decades, framed roofs have been ventilated as an acknowledgment that the elimination of air exfiltration is seldom achieved in framed construction. Vapor retarders, air barriers, foam sealants, and such have led to tighter building envelopes, and, thus, the need to ventilate away moist exfiltrating air has diminished. If framed walls built "tight" do not need to be ventilated, why use framed roofs? One argument is that the forces that promote air exfiltration are greatest at the top of buildings. Thus, large portions of walls may be subjected to air *infiltration*, which, in cold regions, is less apt to create condensation problems.

Other reasons for ventilating sloped roofs relate to thermal—not moisture—issues. By ventilating between the insulation and the roofing material (e.g., asphalt shingles), those materials remain cooler and their useful life is prolonged. However, evidence is accumulating that the expected benefits are minimal and the need to ventilate roofs for this reason is now being questioned (TenWolde and Rose 1999). Nonetheless, most manufacturers of asphalt shingles currently require ventilation below their products. Problems such as shingle splitting are often blamed on missing or inadequate ventilation. A lot of valuable findings and perspectives on this issue are not available due to their proprietary nature. However, it appears that the lack of adequate ventilation is not the primary cause of most of these problems.

Ventilation is also promoted to reduce cooling loads. Some studies support this benefit, but others do not. TenWolde and Rose (1999) acknowledge that attic ventilation may reduce cooling loads somewhat, but they indicate that there are several more direct ways of doing that. In cold regions, cooling loads are not usually a big issue. Since ventilation can somewhat increase heat losses in cold weather by removing solar heat gain on a bare roof and diminishing the insulating

benefits of snow on a snow-covered roof, there is some incentive not to ventilate roofs in cold regions. However, as previously stated, our investigations of ice dams and icicles at eaves have convinced us that ventilation is a very effective way of resolving problematic icings.

TenWolde and Rose (1999) calculate that the rate of snow melt is very slow. They conclude that at an outside temperature of 22°F (–5.6°C), it would take about 2.5 days to melt an inch of 7 lb/ft^3 (100 kg/m^3) snow. They use a thermal resistivity of 0.25 h·ft^2·°F/Btu·in. (1.7 m·K/W) obtained from the *1997 ASHRAE Handbook—Fundamentals*. Mellor (1964) discusses the thermal conductivity of snow and how it varies with snow density. He presents the results of several studies that collectively indicate that 7 lb/ft^3 (100 kg/m^3) snow has a thermal resistivity of about 1.7 h·ft^2·°F/Btu·in. (11.7 m·K/W)—about seven times the value mentioned above.

However, we do not feel that the snow density of 7 lb/ft^3 (100 kg/m^3) is realistic for most snow on most roofs. From our involvement in the development of the snow load information in the national standard used in the United States by structural engineers (ASCE 2000), we expect the density of that snow to be closer to 15 lb/ft^3 (210 kg/m^3). From Mellor (1964), the thermal resistivity of this snow would be about 0.9 h·ft^2·°F/Btu·in. (6.1 m·K/W).

Using this value, the base of the snow would begin to melt at the 22°F (–5.6°C) outside "design" temperature when there are only 9.5 in. (0.24 m) of snow on the roof, not 16 in. (0.41 m) as TenWolde and Rose (1999) determine. We conclude that significantly less snow is needed on a roof to initiate melting than their calculations indicate.

TenWolde and Rose (1999) determine the amount of heat flowing up through a ceiling with R30 (in SI units, R 5.2) insulation when the temperature in the attic above is 30°F (–1°C). Then they assume that all this heat is available to melt snow. In fact, when there is just enough snow on the roof to raise the temperature at the base of the snow to 32°F (0°C), there is *no* melting since the heat entering the snow from below equals the heat lost out of the upper surface of the snow. With 16 in. (0.41 m) of snow on the roof, the base of the snow is at 32°F (0°C) and the heat flow up into the snow from below exceeds the heat lost out of the surface of the snow. Melting then occurs. In this case, the heat flow up into the snow is about 1.19 Btu/h·ft^2 (3.8 W/m^2) and the heat flow up out of the snow is about 0.69 Btu/h·ft^2 (2.2 W/m^2). The difference of about 0.5 Btu/h·ft^2 (1.6 W/m^2) melts snow. Since it takes about 144 Btu to melt a pound (334 kJ to melt a kg) of snow, meltwater is being created at about 0.0035 lb/h over every square foot of roof (0.017 kg/h·m^2). If the upslope length of the roof is 20 ft (9.1 m), 0.07 lbs of meltwater are available to build an ice dam along each foot (0.10 kg/m) of eaves every hour. In a day that totals about 1.7 lb/running ft (2.5 kg/running m), in a week it becomes about 11.8 lb/running ft (17.6 kg/running m), and in a month it becomes about 50 lbs/running ft (74 kg/running m), which, considering that it forms within existing snow at the eaves, is about a cubic foot of ice per running foot (0.09 m^3/running m). On a 45° slope, the face of this ice dam would be about 17 in. (0.43 m) high. That is a big dam.

Since cold weather often lasts weeks or months over much of the United States, these calculations tend to support our contention that ice dams of some size can be expected to develop even on relatively well-insulated, but unventilated, roofs in cold regions. Our observations, measurements, and laboratory studies indicate the same thing.

We acknowledge the limitations of the simple calculations discussed above. For example, solar warming, diurnal temperature changes, and changes in the boundary conditions as snow is melted are not considered. Our observations and those of others (Mackinlay and Flood 1997; Gillan 1998) indicate that, without the "catalyst" of additional heat gain from a warm building below, the sun and diurnal temperature changes seldom create large icings except at very high elevations such as in the High Sierra. However, when combined with heat gain from below, they probably explain why we have observed, on occasion, even faster growth of icings than these simplified calculations predict.

We acknowledge that air exfiltration, insulation flaws, and other weaknesses in building envelopes and other heat sources under roofs can cause large chronic icings. However, our investigations indicate that large icings also can occur on well-insulated but unventilated roofs.

The perspective of TenWolde and Rose (1999) has prompted us to give thought to when and where in cold regions, roof ventilation (for the purpose of ice dam control) could be eliminated. In places that experience infrequent snowstorms, several midwinter thaws, and where the depth of snow on the roof is relatively shallow (e.g., seldom more than about 12 in. [about 0.3 m]), the mechanism for ice dam formation is limited, particularly for well-insulated roofs. In such areas, roof ventilation would not be essential for ice dam control. In places where heavy snow loads are to be expected and the climate allows such loads to remain on well-insulated roofs for many weeks or months, the need for ventilation to limit ice dam growth is much greater.

We find it convenient, relative to icings, to relate the need for ventilation in the contiguous United States to the ground snow load at a location and the amount of roof insulation. Ground snow load has been mapped for the United States (ASCE 2000). That map, which was made by two of the authors of this paper, Tobiasson and Greatorex, is also in many model codes and the new International Building Code (ICC 2000). Table 2 presents our recommendations for when and where ventilation for ice dam control is needed for residential size roofs. For bigger roofs, the potential for formation of ice dams increases and there are more situations where ventilation is required. We solicit feedback on Table 2. Table 3 presents ground snow load values for some cities across the

TABLE 2 *
To Avoid Problematic Icings, Ventilate Residential Size Roofs Under the Following Conditions

Ground Snow Load, lb/ft^2 (kN/m^2)	
Less than 10 (0.48)	No need to ventilate to avoid ice dams.
10 to 15 (0.48 to 0.72)	Ventilate if the thermal resistance of the roof is less than R10 (1.8).
16 to 30 (0.77 to 1.44)	Ventilate if the thermal resistance of the roof is less than R20 (3.5).
31 to 45 (1.48 to 2.16)	When the elevation is above 6000 ft (1830 m) ventilate all roofs. Below that elevation, ventilate if the thermal resistance of the roof is less than R30 (5.2).
46 to 60 (2.20 to 2.87)	When the elevation is above 3000 ft (920 m) ventilate all roofs. Below that elevation ventilate if the thermal resistance of the roof is less than R40 (7.0).
61 (2.92) and up	Ventilate all roofs.

* This table should be considered a work in progress at this time. Feedback on it would be appreciated.
See Table 3 for ground snow loads at some representative U.S. cities.

TABLE 3 *
Ground Snow Loads for Some Cities in the United States

Ground Snow Load lb/ft^2 (kN/m^2)	Cities
10 (0.48)	Norfolk, VA; Memphis, TN; Portland, OR; Tulsa, OK
15 (0.72)	Louisville, KY; Salt Lake City, UT
20 (0.96)	Philadelphia, PA; Detroit, MI; Cheyenne, WY
25 (1.20)	Washington, DC; Chicago, IL; Omaha, NB
30 (1.44)	Hartford, CT; Milwaukee, WI; Idaho Falls, ID
35 (1.68)	Madison, WI
40 (1.92)	Boston, MA; Albany, NY; Green Bay, WI; Sioux Falls, SD
50 (2.40)	Minneapolis, MN; Portsmouth, NH
60 (2.87)	Portland, ME; Duluth, MN
70 (3.35)	Bangor, ME; Marquette, MI

* Warning: Do *not* use these values to interpolate to other places in between.
These values are from site-specific snow load case studies conducted by W. Tobiasson and A. Greatorex of CRREL.

nation to help the reader visualize about where the boundaries in Table 2 lie.

TenWolde and Rose (1999), in spite of developing many cogent arguments against ventilation, recommend attic ventilation in cold regions and mixed climates for several reasons—not just ice dam control—"as an additional safeguard." We agree.

They feel that ventilation of cathedral ceilings in cold and mixed climates is "still a contested issue" and argue that cathedral ceilings, properly insulated and sealed against vapor diffusion and air leakage, can be built without ventilation when "measures are taken to control indoor humidity." We feel that in at least those cold places where ice damming is likely (as defined in Table 2), cathedral ceilings should meet the above requirements *and* be ventilated.

CONCLUSIONS

Our observations, measurements, and calculations indicate that there are times and places when roofs above attics and cathedral ceilings should be ventilated to eliminate the problems associated with the growth of large ice dams along their eaves. Table 2 in this paper provides recommendations as to when and where ventilation is needed for this purpose. Equation 1 or Figures 3, 4, and 5 can be used to size inlet and exhaust openings of attics. Figures 7, 8, 9, and 10 can be used to size inlet and exhaust openings and airway heights for cathedral ceilings. With these aids, these tasks are quick and easy.

ACKNOWLEDGMENTS

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Contractors Association, and by Dupont Nonwovens. CRREL colleagues Thomas Tantillo and John Bouzoun made important contributions to these studies.

REFERENCES

ASCE. 2000. *ASCE Standard 7-98.* Minimum design loads for buildings and other structures. Reston, Va.: American Society of Civil Engineers.

ASHRAE. 1997. *1997 ASHRAE handbook—Fundamentals*, p. 36.4. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

Buska, J., W. Tobiasson, and A. Greatorex. 1998. Ventilation to prevent problematic icings at eaves. *ASHRAE Transactions* 104 (2). Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

Gillan, L. 1998. Personal communication. Westminster Co.: Gillans Engineering.

ICC. 2000. *International Building Code 2000.* Falls Church, Va.: International Codes Council.

Mackinlay, I., and R. S. Flood. 1997. The impact of ice dams on buildings in snow country. *Snow Engineering, Recent Advances.* Rotterdam: A.A. Balkema.

Mellor, M. 1964. *Properties of snow, CRREL Monograph III-A1.* Hanover, N.H.: Cold Regions Research and Engineering Laboratory.

TenWolde, A., and W.B. Rose. 1999. Issues related to venting of attics and cathedral ceilings. *ASHRAE Transactions* 105 (1). Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

Tobiasson, W.N. 1994. General considerations for roofs. ASTM Manual 18. *Moisture Control in Buildings.* Philadelphia: American Society for Testing and Materials.

Tobiasson, W.N., C. Korhonen, B. Coutermarsh, and A. Greatorex. 1983. Can wet roof insulation be dried out? *Thermal insulation, materials and systems for energy conservation in the 80's.* ASTM STP 789. Philadelphia: American Society for Testing and Materials.

Tobiasson, W., J. Buska, and A. Greatorex. 1998. Attic ventilation guidelines to minimize icings at eaves. *Interface.* Raleigh, N.C.: Roof Consultants Institute.

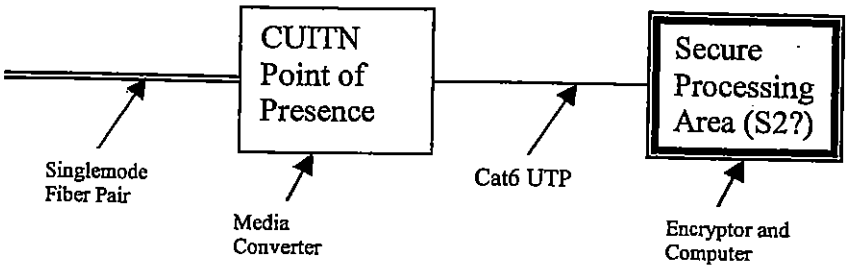
Tobiasson, W., T. Tantillo, and J. Buska. 1999. Ventilating cathedral ceilings to prevent problematic icings at their eaves. *Proceedings of the North American Conference on Roofing Technology.* Rosemont, Ill.: National Roofing Contractors Association.

APPENDIX I

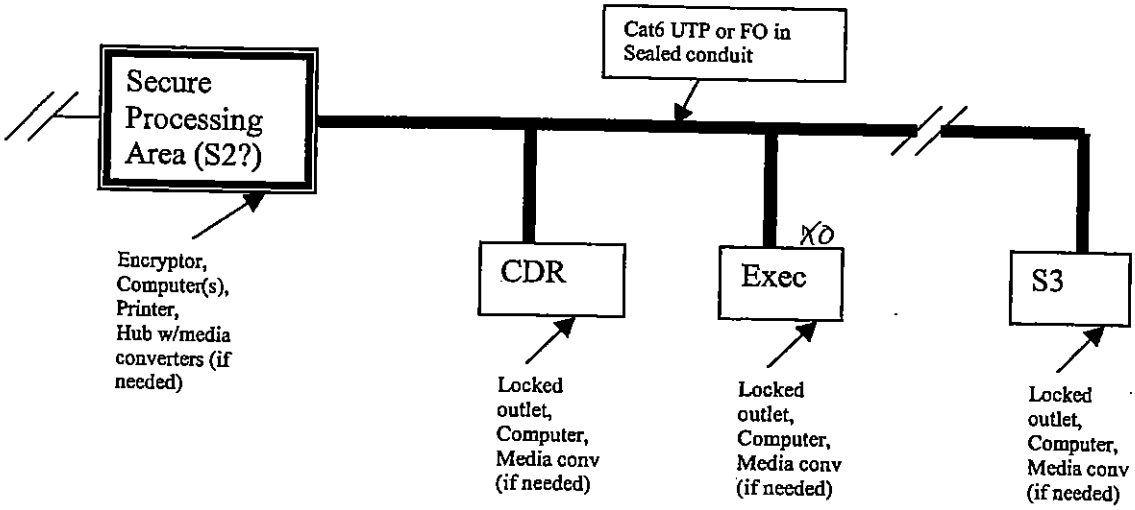
SIPRNET LOCK BOX REQUIREMENTS

SIPRNET CONNECTION OPTIONS

Single Point of Presence



Protected Distribution System (PDS)



For the single point of presence no special considerations are necessary as all traffic using the FO and UTP is encrypted.

Per current guidance, the PDS conduit must be visible except where passing through walls, and must be inspected daily once in service. All joints/boxes/etc must be sealed.

Use of lockable wall boxes on the PDS outlets will preclude disconnecting users at hub when drops are not in use.

The encryptor must be in a manned room cleared for open storage, or secured in a GSA container while it is in operation. A vault provides the best environment.

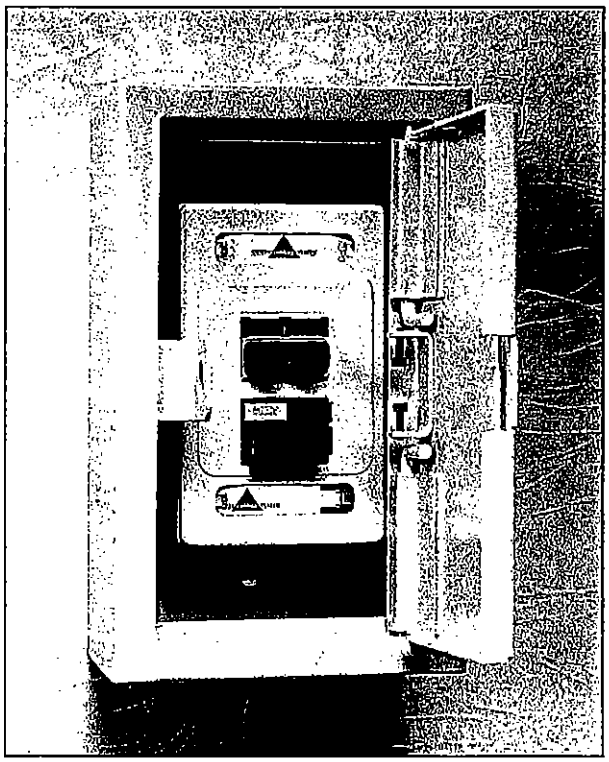
Larry Girard, DOIM Network

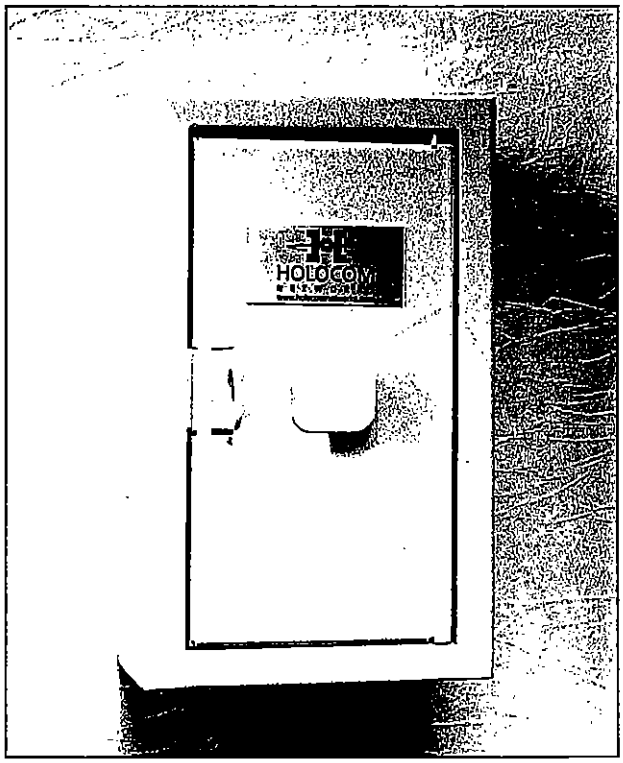
Secure Gateway SEC-WM-SM2-H1

Surface Mount Box Enclosure

Description

Enclosure securely mounts on wall or non-acoustic furniture panel and restricts access to the cable outlet kept in the surface mount box. Designed to provide physical security for surface mount boxes, single plugs or any connection point that requires a high level of physical security.





Specifications

- 16 gauge sheet metal construction with welded joints
- 12 gauge sheet metal construction available upon request
- Dimensions: Height 7.5" x Width 2.5" x Depth 3.13"
- Single door with heavy duty hasp for pad lock
- Tamper resistant, heavy duty internal spring hinges
- Customer supplied surface mount box
- Mounts to hard walls or non-acoustic systems furniture panels with standard fasteners
- Powder coat finish
- 10 year manufacturer warranty

Capacity

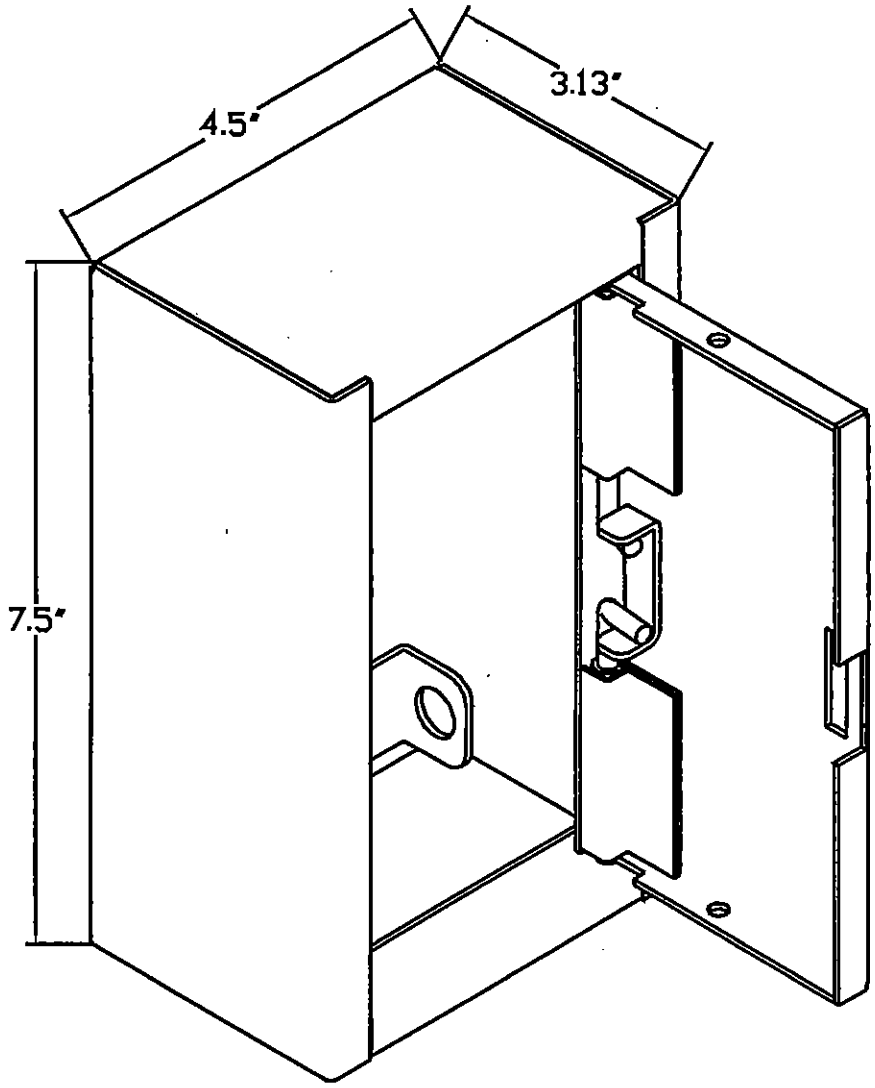
- Single gang surface mount box

Key Feature

Enclosure can be mounted either vertically or horizontally and accepts cabling from any side.

HOLOCOM® NETWORKS

1-888-465-6266
holocomnetworks.com



$90.00

HOLOCOM NETWORKS, Inc.
2131 Palomar Airport Road, Suite 150 • Carlsbad, CA 92009
Tel: (760) 804-9545 Fax:(760) 804-9149 www.holocomnetworks.com

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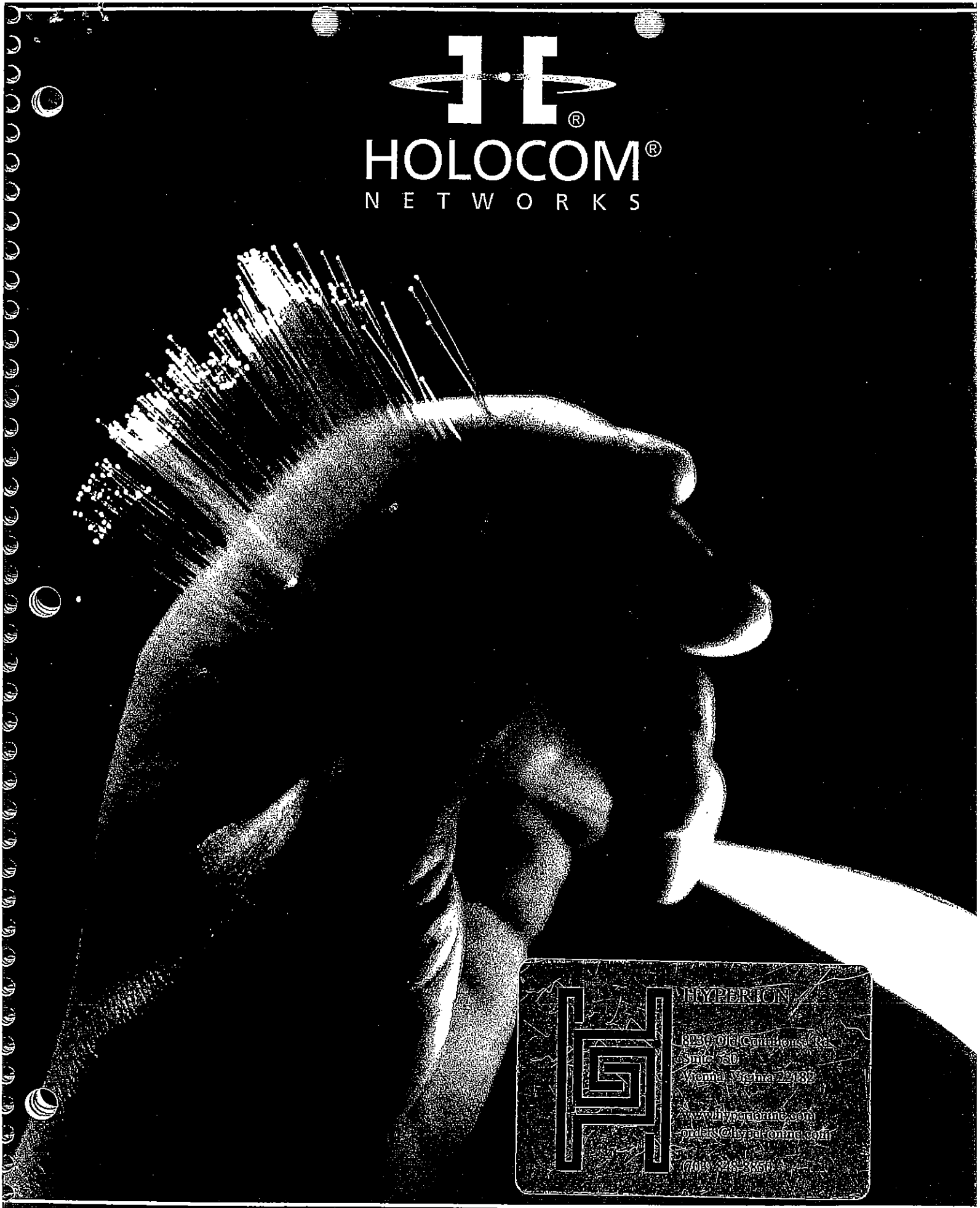
TITLE: Surface Mount Box Enclosure	MATERIAL:	SHEET NO. 1 OF 1	
	DRAWN BY:	DATE: 01/01/03	
	FINISH:	DWF. #: SEC-WM-SM2-H1	
PART #: SEC-WM-SM2-H1	ALL DIMENSIONS SHALL APPLY AFTER FINISH:	CUSTOMER APPROVED BY: DATE:	

HOLOCOM®
NETWORKS



COMPLETE CABLE MANAGEMENT SOLUTIONS

NSTISS
NATIONAL
SECURITY
TELECOMMUNICATIONS
AND
INFORMATION
SYSTEMS
SECURITY

NSTISSI No.7003
13 December 1996

PROTECTIVE DISTRIBUTION SYSTEMS (PDS)

THIS DOCUMENT PROVIDES MINIMUM STANDARDS, FURTHER IMPLEMENTATION MAY BE REQUIRED BY YOUR DEPARTMENT OR AGENCY

NSTISS NATIONAL MANAGER

NATIONAL SECURITY
TELECOMMUNICATIONS
AND INFORMATION
SYSTEMS
SECURITY

FORWARD

1. National Security Telecommunications and Information Systems Security Instruction (NSTISSI) No. 7003, Protective Distribution Systems (PDS), provides guidance for the protection of wireline and optical fiber PDS to transmit unencrypted classified National Security Information (NSI). This instruction is effective upon receipt, and supersedes NACSI No. 4009, Protected Distribution Systems, dated 30 December 19981 and Appendix K, NACSEM 5203, Guidelines for facility Design and RED/BLACK Installation, dated 30 June 1982. Please check with your agency for applicable implementing documents.

2. The major differences between this revision and the previous version are the identification of installation and physical security practices clarification of certain exempted applications from the approval process, the inclusion of government contractors in the scope of this publication, and the inclusion of detailed installation requirements.

3. Additional copies of this instruction may be obtained from:

NSTISSC SECRETARIAT
ATTN: V503 STE 6716
NATIONAL SECURITY AGENCY
FORT GEORGE G. MEADE, MD 20755-6716

SIGNED

KENNETH A. MINIHAN
Lieutenant General, USAF

PROTECTED DISTRIBUTION SYSTEMS (PDS)

SECTION

REFERENCES.....I
PURPOSE.....II
SCOPE III
GENERAL.....IV
SYSTEM APPROVAL.....V

SECTION I - REFERENCES

1. The following references are applicable to the installation and use of PDS:

a. Department of State Composite Threat List, distributed periodically
b. NSTISSI No. 4009, National Information Systems Security (INFOSEC) Glossary, dated 5 June 1992
c. NSTISSI No. 7000, TEMPEST Countermeasures for Facilities, dated 29 November 1993
d. NSTISSI No. 7001, NONSTOP Countermeasures, dated 15 June 1994
e. NSTISSAM TEMPEST/2-95, RED/BLACK Installation Guidance, dated 12 December 1995

SECTION II - PURPOSE

2. This instruction stipulates approval authority, standards, and guidance for the design, installation, and maintenance of Protected Distribution Systems (PDS). This instruction incorporates a philosophy of "risk management" in lieu of the "risk avoidance" philosophy employed in the previous document. Absent specific facts, unique to each facility, suggesting greater or lesser risks, these standards shall be applied. However, sensible risk management practice dictates each facility must be evaluated on its own risks and vulnerabilities based on factors such as location, physical security, environment, access controls, personnel security requirements, etc. The overall security afforded by PDS is the result of a layered approach incorporating various protection techniques. The emphasis is placed on "detection" of attempted penetration in lieu of "prevention" of penetration. Criteria called out are based on threat or risk analysis relative to the location of the PDS. This generally results in reduced requirements and cost savings during installation and maintenance of PDS. The decision as to what extent the guidance provided in ANNEX B is followed ultimately rests with the department or agency Approval Authority.

SECTION III -SCOPE

3. This instruction applies to U.S. Government departments and agencies and their contractors and vendors who use, or are contemplating the use of a PDS to protect the transmission of unencrypted classified National Security information (NSI). This instruction describes the requirements for PDS installed within the U.S. (including its territories and possessions) and within LOW and MEDIUM threat locations outside of the United States as described by reference a. The threat within the U.S. is low. The use of PDS within a HIGH or CRITICAL threat location (per reference a) is not recommended. If PDS are used in these locations, protection techniques are determined on a case-by-case basis by the Approval Authority (see ANNEX A).

4. The contents of this instruction should be made available to personnel involved in the planning, acquisition, installation, approval, and operation of communications systems (that process classified NSI) and PDS.

SECTION IV - GENERAL

5. PDS are used to transmit unencrypted classified NSI through an area of lesser classification or control. Inasmuch as the classified NSI in unencrypted, the PDS must provide adequate electrical, electromagnetic, and physical safeguards to deter exploitation. Since PDS can be penetrated, given the opportunity and adequate time, a philosophy of detection of attempted penetration is employed in this document. Careful consideration is given to the application before PDS is selected in preference to another INFOSEC system. There may be economic, technical, or operational factors making PDS necessary in comparison to other INFOSEC systems. Although proper design and installation of PDS are important, continued physical security integrity after installation is critical. The cost and operational impact of maintaining the security of the system should be assessed prior to acquisition and installation, since such costs can easily exceed the installation cost.

6. Incidents of tampering, penetration, or unauthorized interception must be reported immediately to the PDS Approving Authority for assessment, and local security authority for review and initiation of an investigation. Subject to law enforcement procedures, which take precedence, the PDS should not be used until the incident is assessed and its security status determined. If this is not practical, users of all PDS should be notified of the possible breach in security, and the use of the PDS should be limited to the greatest extent possible.

SECTION V - SYSTEM APPROVAL

7. The PDS should be installed in compliance with ANNEX B. For any given facility, physical and technical security safeguards for the PDS normally should not exceed the safeguards afforded to the physical space originating and processing the data carried by the PDS. However, protection controls pertinent to classification, geographical location, and types of areas through which the PDS are installed shall be evaluated and requirements applied by the Approval Authority on a case-by-case basis. The Approval Authority shall ensure the PDS are inspected prior to initial operation.

8. The heads of U.S. Government departments and agencies, or their designees, are authorized approval and recertification authority for the operation and modification of DPS. The Approval Authority for the contractor-operated PDS shall be the cognizant security office.

9. PDS approval is obtained from the Approval Authority prior to system installation, use, or modification. Prior to formal approval, the proposed PDS should be technically reviewed by the Approving Authority's technical representative to verify compliance with ANNEX B and, if appropriate, a Certified TEMPEST Technical Authority (CTTA) to determine the need for TEMPEST countermeasures in accordance with reference c. and d.

10. Requests for approval for PDS shall include the information required by ANNEX C. Requests for approval of a modification to existing PDS or for re-approval of PDS which have failed rectification may include only the items pertaining to the modification/recertification failure.

11. Temporary test configurations do not require formal approval if they: do not exceed one month duration; are confined within U.S. Government installations; and do not process higher than SECRET information. However, they must be approved by the responsible Designated Approval Authority (DAA).

12. Proposed PDS within the U.S. which do not process higher than CONFIDENTIAL information shall be approved by the responsible DAA. Technical review is required only when the proposed PDS are installed in existing PDS approved at a higher classification level.

13. Mobile systems employing inter-shelter cabling need not be re-approved for each relocation if the relocation provides security comparable to that of the original approval. Otherwise, new approval must be obtained.

14. Deactivation of approved PDS must be reported to the PDS Approving Authority.

Encls:

1. ANNEX A - DEFINITIONS
2. ANNEX B - INSTALLATION GUIDANCE
3. ANNEX C - APPROVAL REQUEST

ANNEX A

DEFINITIONS

Certain definitions contained in reference b. apply to this instruction. Some additional definitions are included to define terms not included in reference (b).

a. Approval Authority. Department or Agency having Approval Authority for the for the installation and operation of the PDS.

b. Controlled Access Area (CAA). The complete building or facility area under direct physical control within which unauthorized persons are denied unrestricted access and are either escorted by authorized persons or are under continuous physical or electronic surveillance.

c. Designated Approval Authority (DAA). Official with the authority to formally assume responsibility for approving an Information System or network at an acceptable level of risk. Responsible for issuing an accreditation statement recording the decision to accept all security risks and countermeasures.

d. Limited Controlled Area (LCA). The space surrounding a PDS within which exploitation is not considered likely or legal authority to identify or remove a potential exploitation exists.

e. Protective Distribution Systems. Wireline or fiber-optic distribution systems used to transmit unencrypted classified NSI through an area of lesser classification or control.

f. Special Category Information. See reference c. Definition is classified.

g. Uncontrolled Access Area (UAA). The area external or internal to a facility over which no personnel access controls are or can be exercised.

ANNEX B

PROTECTED DISTRIBUTION SYSTEMS (PDS) INSTALLATION GUIDANCE

1. General. This annex provides criteria for installing Protected Distribution Systems (PDS). In order to use PDS for classified NSI, adequate installation procedures must be used to ensure the PDS do not compromise information. The guidance required varies based upon classification or type of data handled and type of area through which the PDS are installed. PDS carrying SECRET (S), TOP SECRET (TS), or special category information data should be submitted for approval or reviewed to the Approval Authority. A criteria matrix is provided in Table B-1, see page B-4 of this document, as a cross reference to specific installation procedures contained in this annex.

a. Installation and Maintenance of PDS as follows:

(1)PDS terminal equipment should be installed in a CAA;

(2)Whenever possible, PDS lines should not be installed concealed (e.g., behind walls and above ceilings) from view of personnel responsible for conducting the required line route inspections and continuous surveillance;

(3)Employees in a CAA should be made aware that PDS exist and any suspicious activity should be reported;

(4)A record should be maintained in accordance with the directions from the Approval Authority relative to all PDS events, e.g., inspections, results of patrols, alarm events, or employee reports;

(5)Personnel not having the appropriate security clearance and special category access, but requiring occasional, temporary access to PDS interconnecting lines area (e.g., safety and fire inspectors) should be monitored continuously by appropriately cleared and access indoctrinated personnel preventing compromise of the processed information or the security integrity of the PDS;

(6)Those PDS subject to periodic visual inspections (Table B-2, see page B-5 of this document) and technical inspections (Table B-3, see page B-6 of this document), should be assessed for signs of penetration, tampering, and any other anomaly causing a deterioration of protection safeguards. The person(s) formally appointed to accomplish the visual inspection should be trained sufficiently to recognize physical changes in PDS including attempts at penetration and tampering. The person selected to accomplish the technical system inspection should be sufficiently trained to recognize changes in the technical aspects of PDS, e.g., by-pass circuitry, attachment or removal of devices or components, inappropriate or suspicious signal levels, and mechanical, TEMPEST. and RED/BLACK integrity of the PDS; and

(7)PDS in a tactical environment should be located within the limits of the installation and command post, or in an area directly under the commander's physical control.

2. Emanation Security. The objective is to ensure the PDS complies with the TEMPEST requirements as determined by the CTTA in accordance with reference c, through e.

3. Physical Security. The objective is to deter unauthorized personnel from gaining access to the PDS without such access being discovered. Table B-1, see page B-4 of this document, specifies guidance for different areas of control by classification level.

4. Protected Distribution Systems. There are two categories of PDS:

a. Hardened Distribution Systems. These are afforded significant physical security protection and can be implemented by the use of the following three carriers:

(1) Hardened Carrier. The following applies:

(a) The data cables must be installed in a carrier;

(b) The carrier should be constructed of electrical metallic tubing (EMT), ferrous conduit or pipe, or rigid-sheet steel ducting, utilizing elbows, couplings, nipples, and connectors of the same material;

(c) All connectors should be permanently sealed completely around all surface (e.g., welding (continuous or track), compression, epoxy, fusion, etc.). If pull boxes are used, the pull-box covers should be sealed to the pull boxes around the mating surfaces after installation or the pull box covers must not have removable hinge pins and must be secured with a General Services Administration (GSA) approved changeable combination padlock. Boxes with prepunched knockouts may not be used;

(d) If the hardened carrier is buried, it should be a minimum of 1 meter below the surface and on the property owned or leased by the U.S. Government or the contractor having control of the PDS. Manholes should be secured with a GSA-approved changeable combination padlock. If GSA locks cannot be used, then a standard locking manhole cover and approved micro-switch alarms should be used. If the carrier is buried in an installation outside the U.S. in a MEDIUM threat location, it should be encased in approximately 20 cm (8 inches) of concrete or a concrete and steel container (of sufficient size to preclude surreptitious penetration in a period less than two hours as confirmed by laboratory tests). It may be appropriate for physical protection, not security, to encase PDS in concrete or bury the PDS with more depth than that required for security reasons; and

(e) Suspended systems between buildings should be elevated a minimum of 5 meters and only used if the property transverses is owned or leased by the U.S. Government or contractor having control of the PDS. PDS should be installed to provide unimpeded inspection and cleared of any obstruction or device which encroaches upon the system to facilitate tampering. The area containing PDS should be illuminated. The carrier should be inspected in accordance with the requirements of Table B-2, see page B-5 of this document.

(2)Alarmed Carrier. To use an Alarmed Carrier as a Hardened Distribution System, the carrier should be protected by an alarm system approved by the cognizant COMSEC
and/or physical security authorities. A Standard Operating Procedure (SOP) approved by the base/facility security officer and commander, and the approval authority should be implemented to:

(a) Verify its performance at intervals as shown in Table B-4, see page B-6 of this document;

(b) Ensure response by security personnel in the area of possible attempted penetration, within 15 minutes of discovery;

(c) Provide for inspection of the PDS to determine the cause of the alarm;

(d) Define action to be taken regarding the termination of transmission;

(e) Initiate investigation of actual intrusion attempt, etc.

(3)Continuously viewed Carrier. To use this as a Hardened Distribution System, the carrier should be under continuous observation, 24 hours per day (including when operational). Such circuits may be grouped together, but should be separated from all non-continuously viewed circuits ensuring an open field of view. Standing orders should include the requirement to investigate any attempt to disturb the PDS. Appropriate security personnel should investigate the area of attempted penetration within 15 minutes of discovery. This type of hardened carrier should not be used for TS or special category information for non-U.S. UAA.

b. Simple Distribution Systems. These are afforded a reduced level of physical security protection as compared to a Hardened Distribution System. They use a Simple Carrier System (SCS) and the following means are acceptable:

(1)The data cables should be installed in a carrier;

(2)The carrier can be constructed of any material (e.g., wood, PVT, EMT, ferrous conduit). The joints and access points should be secured and be controlled by personnel cleared to the highest level of data handled by the PDS; and

(3)The carrier is to be inspected in accordance with the requirements of Table B-2 page B-5 of this document.

Table B-1 PDS Installation Matrix

(Applies to locations within a LOW Threat environment)

	Type of Area				
Type of Data	UAA	LCA	CONFIDENTIAL CAA	SECRET CAA	TOP SECRET CAA
CONFIDENTIAL	H	S			
SECRET	H	H	S		
TOP SECRET	H	H	S	S	
SPECIAL CATEGORY	H	H		S	S	S

(Applies to locations within a MEDIUM Threat Environment)

	Type of Area				
Type of Data	UAA	LCA	CONFIDENTIAL CAA	SECRET CAA	TOP SECRET CAA
CONFIDENTIAL	H	S			
SECRET	H	H	S		
TOP SECRET	H	H	H	S	
SPECIAL CATEGORY	H	H		H	S	S

NOTE: The PDS installation matrix in this table relates to use of specific installation procedures listed in paragraph B-3 of this ANNEX.

LEGEND:
UAA - Uncontrolled Access Area
LCA - Limited Controlled Area
CAA - Controlled Access Area
PDS - Protected Distribution System

5. Circuit Separation. The objective is to ensure PDS are not accessed by those without appropriate clearance and to inhibit inappropriate circuit cross connection.

a. General. Circuits of more than one classification level may use components of a single protected distribution system. Where the sharing of a single protected distribution system is feasible, considerable cost savings can be realized. In some cases, the savings will permit wider application of services which otherwise could not be achieved, if separate PDS were required. Refer to references c. and e. to determine if TEMPEST and/or RED/BLACK countermeasures are appropriate for PDS with shared circuits.

b. Access Points. Access to all points with breakouts should be restricted to personnel cleared at the highest level of the breakout. Access points containing multilevel classified circuits, but which do not have breakouts of higher level circuits, can be serviced by lower level cleared personnel, if escorted by personnel cleared for the highest level circuit.

c. Termination Boxes. All termination boxes should be located within a CAA at the highest level of data being interfaced by the box.

d. Additional Requirements. The CTTA may be contacted to ascertain whether RED/BLACK and/or TEMPEST measures are requited.

ANNEX C

PROTECTED DISTRIBUTION SYSTEMS (PDS) APPROVAL REQUEST

Requests for PDS approval shall be forwarded to the department or agency Approval Authority. It shall include the following information in each listed category:

1. Installation Site (Identify the organization where the PDS will be installed and a point-of-contact's name and phone number);
2. Installation Activity (Identify the organization responsible for the installation of the PDS, and a point-of-contact's name and phone number);
3. System Information (Provide a description of the components directly connecting to the PDS, and a summary of the type of cable used in the PDS (e.g., fiber optics, shielded twisted pair, coaxial cable) and the electrical parameters (e.g., voltage and current levels);
4. Security Profile (Identify the highest classification of NIS processed on the PDS (if special category information, identify the specific categories or compartments processed); and provide a percentage breakdown of the type of NSI processed on the PDS);
5. Facility Security (This section provides information concerning the security conditions of the facility where the PDS will be located by providing the following:);
   a. Indicate on a map of the residential and commercial area, the facility's approximate location;
   b. Indicate a fenced facility's fence location on the map and describe the type of fencing construction (also, indicate if a perimeter Intrusion Detection System (IDS) is installed);
   c. Indicate the automobile, pedestrian, and amphibious access points on the map;
   d. Are guards posted at these access points, and what hours are the access points open;
   e. Is a personnel badge recognition system used; are access lists maintained; and is an escort required for uncleared personnel;
   f. Is a registration control system used for vehicles, employees, visitors, and tradesmen;
6. Building Security (This section requests information on security conditions of the building(s) within which the PDS will be installed as follows:)
   a. Provide a floor plan of the building(s), describe the exterior and interior construction, and identify whether or not the building's perimeter has an IDS installed;
   b. Indicate on the floor plan the access points to the building(s) (all windows accessible from the ground, fire escapes, etc. should be identified and any implemented window tamper protection devices should be described);
   c. Are guards posted at the building access points, what hours are the access points open, and are cipher/simplex locks used for administrative access control to the building;
   d. Indicate what type of doors and locks secure the access points;
   e. Is a personnel badge recognition systems in use and are access lists maintained;
   f. Indicate the clearance level of personnel entering the building , and if a clearance is required for unescorted access to the building;
   g. Specify how the movement and operation of custodial, maintenance, and vending personnel is controlled, and if this requires an escort or continuous surveillance for uncleared personnel;

7. Protected Distribution Systems (PDS) (This section describes the security condition of PDS by providing the following information);

a. Provide classification level of the area controlled, and indicate if uncleared personnel are monitored?

b. Indicate on a map or floor plan the location and routing of the proposed PDS.Describe its construction;

c. Describe the inspection procedures for detection of tampering; and

d. Will the PDS be alarmed, if so, describe in detail.

APPENDIX J

ADDITIONAL BORINGS FOR USE WITH GEOTHERMAL OPTION

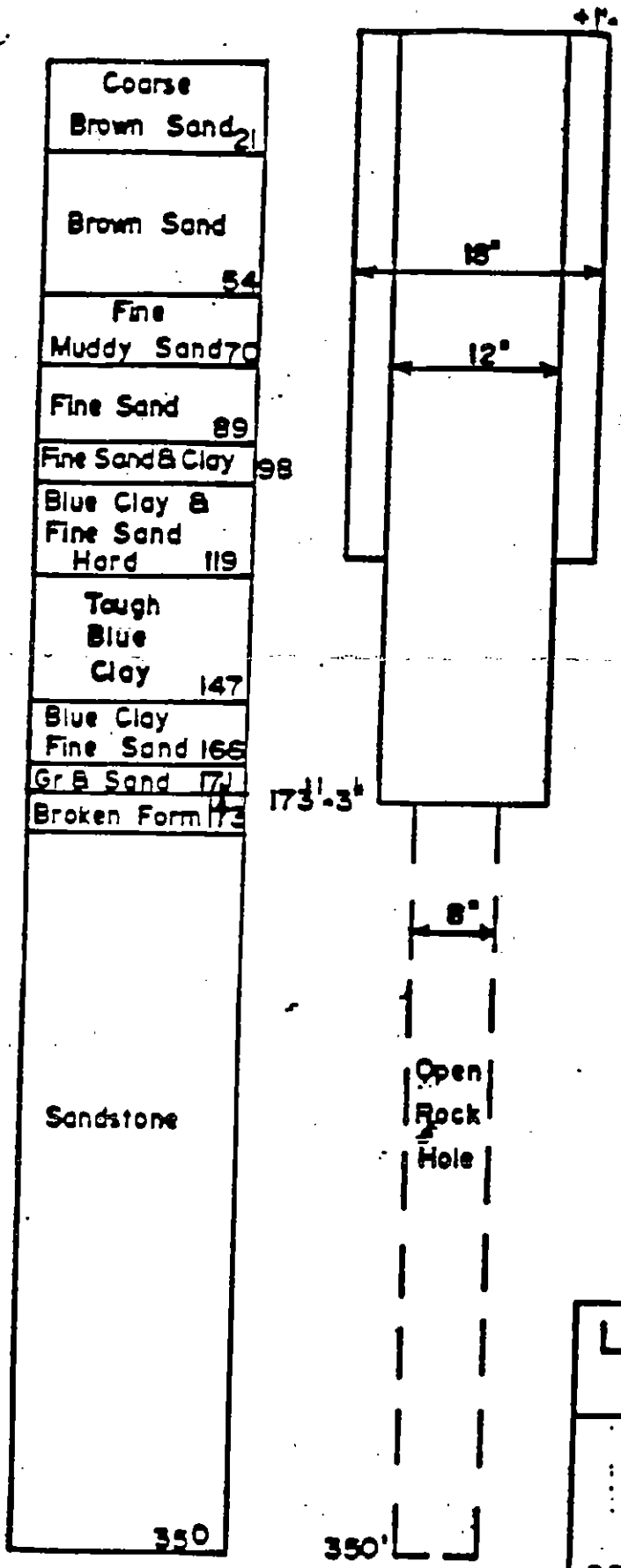
APPENDIX J

FORT DRUM SUPPLY (PRODUCTION) WELLS

FORT DRUM SUPPLY (PRODUCTION) WELLS

PIT: 116' of 18" Pipe. Welded.
174'-3" of 12" Pipe.

REFERENCE 7



SCREEN: None

CONE: None

PUMP

TYPE D.R.H.C.	SHOP NO. 10762
SETTING 15'-6"	SIZE 8
SUCTION 4' of 4"	STAGES 9
BASKET ——	IMPELLERS Bronze
DISCHARGE 6"x10' cpld	HEAD TF 618-6"
TUBING 2	PRESS BP 65#
SHAFTING 1 3/16	AIR LINE 160'

MOTOR

MAKE US	TYPE Hollow Shaft
VOLTS 220	CYCLE 60
PHASE 3	AMP 50
H.P. 20	R.P.M. 1800
FRAME 907	FORM Vertical
MODEL CFU	SERIAL 234474

WELL

STARTED	STATIC LEVEL 167'
FIRST TEST 3-25-41	PRODUCTION 141
FINAL " 8-15-41	PUMPING LEVEL 155
ACCEPTED 8-15-41	GUARANTEE 2100-10
CLEAR DEPTH 350'	PRESS 65#

DRILLER: R. Firestone-Willoughby-Gayette
INSTALLER: W.G. Chapman

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

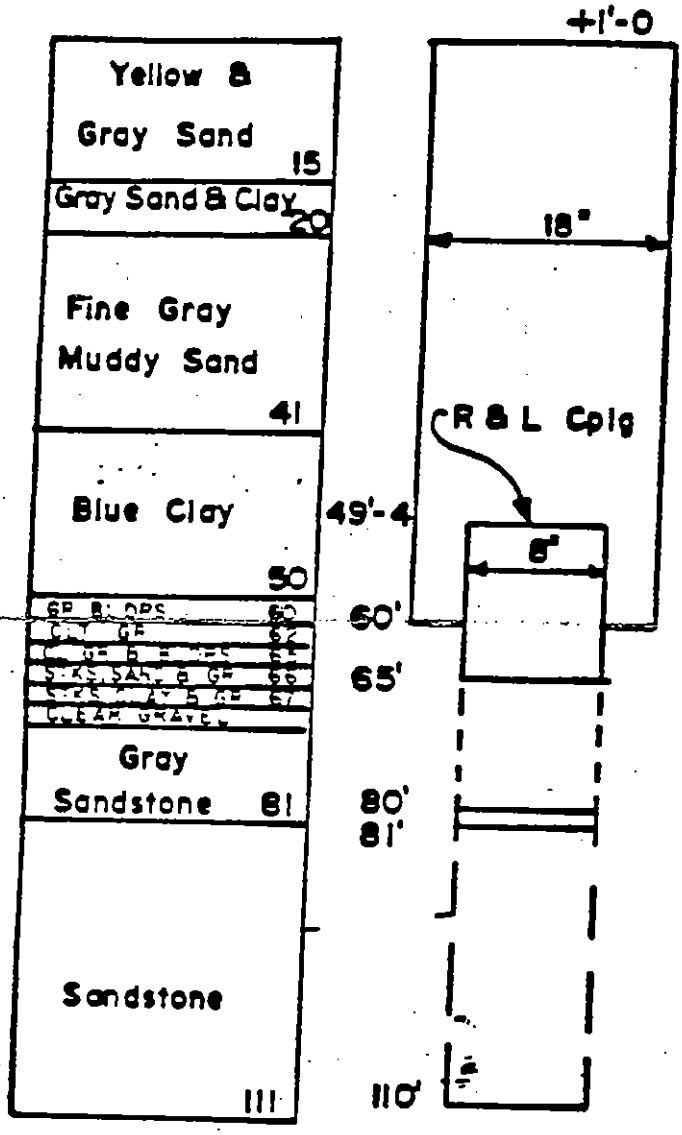
~~PINE CAMP~~, N.Y.
FORT DRUM

DRAWN BY: A Jamieson WELL #1
WELL NO. Location 8 US.1

15'-8" of 8" Pipe T & C

SCREEN: 15' of 8" Everdur

CONE: 1' of 8" Pipe



PUMP

TYPE	PMC	SHOP NO.	10638
SETTING	44'-6"	SIZE	12"
SUCTION	10' of 6"	STAGES	5
BASKET	——	IMPELLERS	Bronze
DISCHARGE	7"x10" cplg	HEAD	TF 618-6"
TUBING	2"	PRESS	BP 100#
SHAFTING	1 3/16	AIR LINE	48'

MOTOR

MAKE	U.S.	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	98
H.P.	40	R.P.M.	1800
FRAME	932	FORM	Vertical
MODEL	CFU	SERIAL	198324

WELL

STARTED	11-30-40	STATIC LEVEL	11'
FIRST TEST	2-1-41	PRODUCTION	446
FINAL "	8-15-41	PUMPING LEVEL	32
ACCEPTED	8-15-41	GUARANTEE	2100-10
CLEAR DEPTH	108" BP	PRESS	100#

DRILLER: Ed Lawrence

INSTALLER: J.O. Powell

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP~~, N.Y.
FORT DRUM

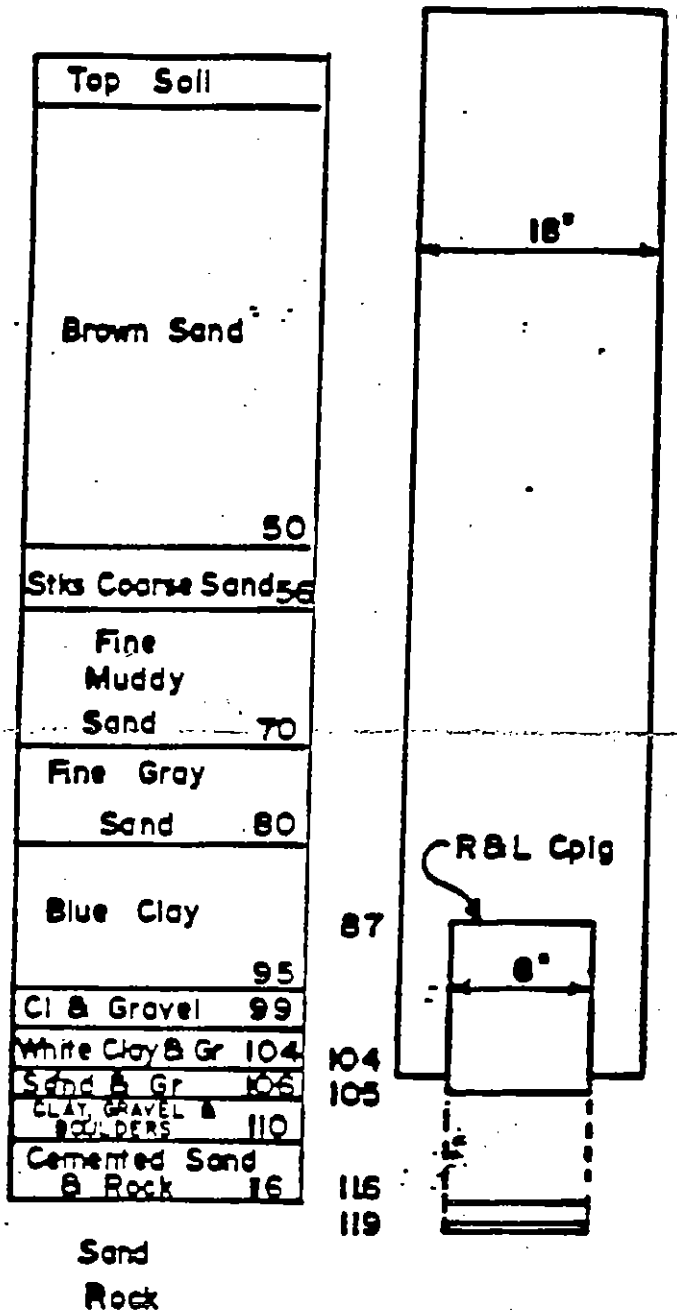
DRAWN BY: A Simmons

WELL NO. Location 16 — well #2 US.2

Elev. Floor 612.99

SCREEN: 11' of 8" Everdur Screen T & C

CONE: 3' of 8" Pipe - 1' Wooden Plug



PUMP

TYPE	D.R.H.C.	SHOP NO.	10519
SETTING	106'-6"	SIZE	8"
SUCTION	10' of 4"	STAGES	9
BASKET	F-V	IMPELLERS	Bronze
DISCHARGE	6"x10' cpld	HEAD	TF 618-6"
TUBING	2	PRESS	BP 76#
SHAFTING	1 3/16	AIR LINE	116'

MOTOR

MAKE	U.S.	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	50
H.P.	20	R.P.M.	1800
FRAME	907	FORM	Vertical
MODEL	CFU	SERIAL	248330

WELL

STARTED	12-7-40	STATIC LEVEL	49'
FIRST TEST	12-20-40	PRODUCTION	~~105~~ 88
FINAL "	8-15-41	PUMPING LEVEL	106
ACCEPTED	8-15-41	GUARANTEE	2100-10
CLEAR DEPTH	119' BP	PRESS	76#

DRILLER: Ed Lawrence

INSTALLER: C.A. Jolley J.O.P. & W.G.C.

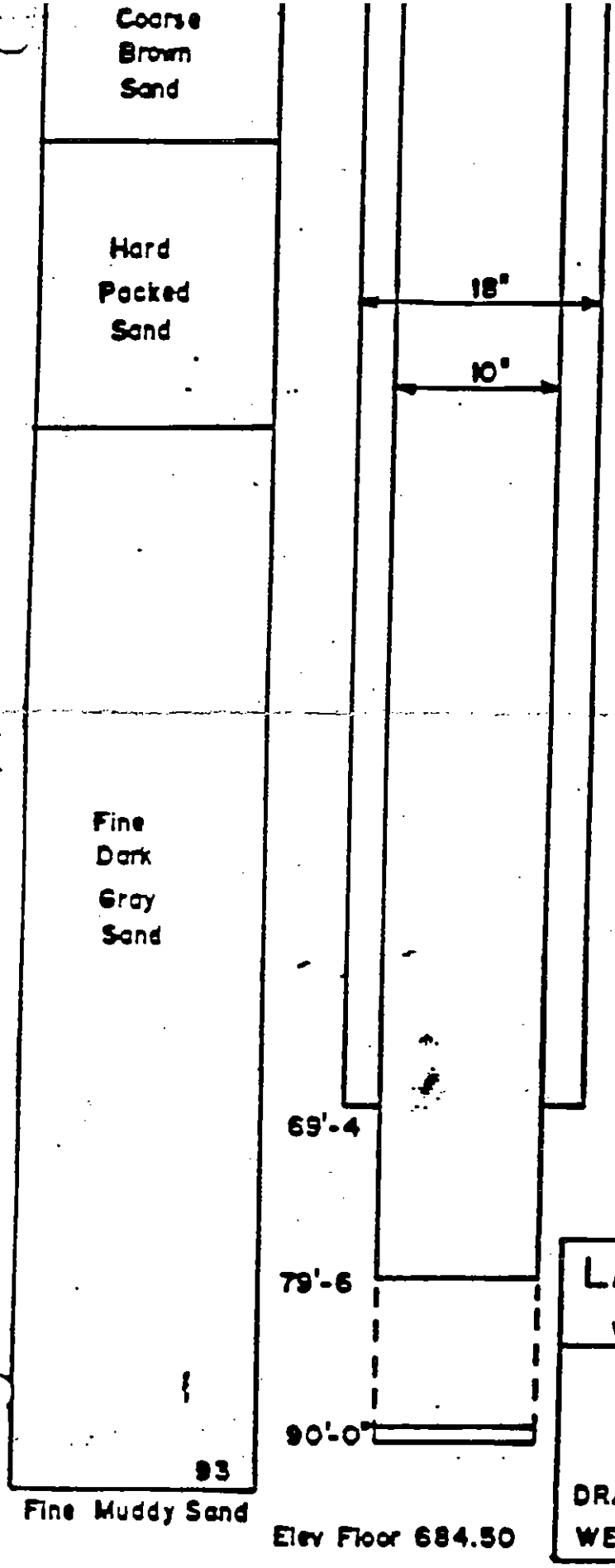
LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP, N.Y.~~
FORT DRUM

DRAWN BY: A. Yamamoto Well #3

WELL NO. Location 11 U.S. 3

Elev Floor 651.08



SCREEN: 10'-0" of 10" Everdur

CONE: 1 Steel Plate

PUMP

TYPE	UHC	SHOP NO.	10660
SETTING	80'-0	SIZE	8"
SUCTION	8' of 4"	STAGES	8
BASKET	F-V	IMPELLERS	Bronze
DISCHARGE	6"x10' cpld	HEAD	TF 618-6"
TUBING	2	PRESS	BP 63#
SHAFTING	1 3/16	AIR LINE	88'

MOTOR

MAKE	US	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	40
H.P.	15	R.P.M.	1800
FRAME	887	FORM	Vertical
MODEL	CFU	SERIAL	219798

WELL

STARTED	1-20-41	STATIC LEVEL	42
FIRST TEST	2-14-41	PRODUCTION	105
FINAL "	8-15-41	PUMPING LEVEL	82
ACCEPTED	8-15-41	GUARANTEE	2100-10
CLEAR DEPTH	90' BP	PRESS	63#

DRILLER: Gayette, Chapman, & Hatton

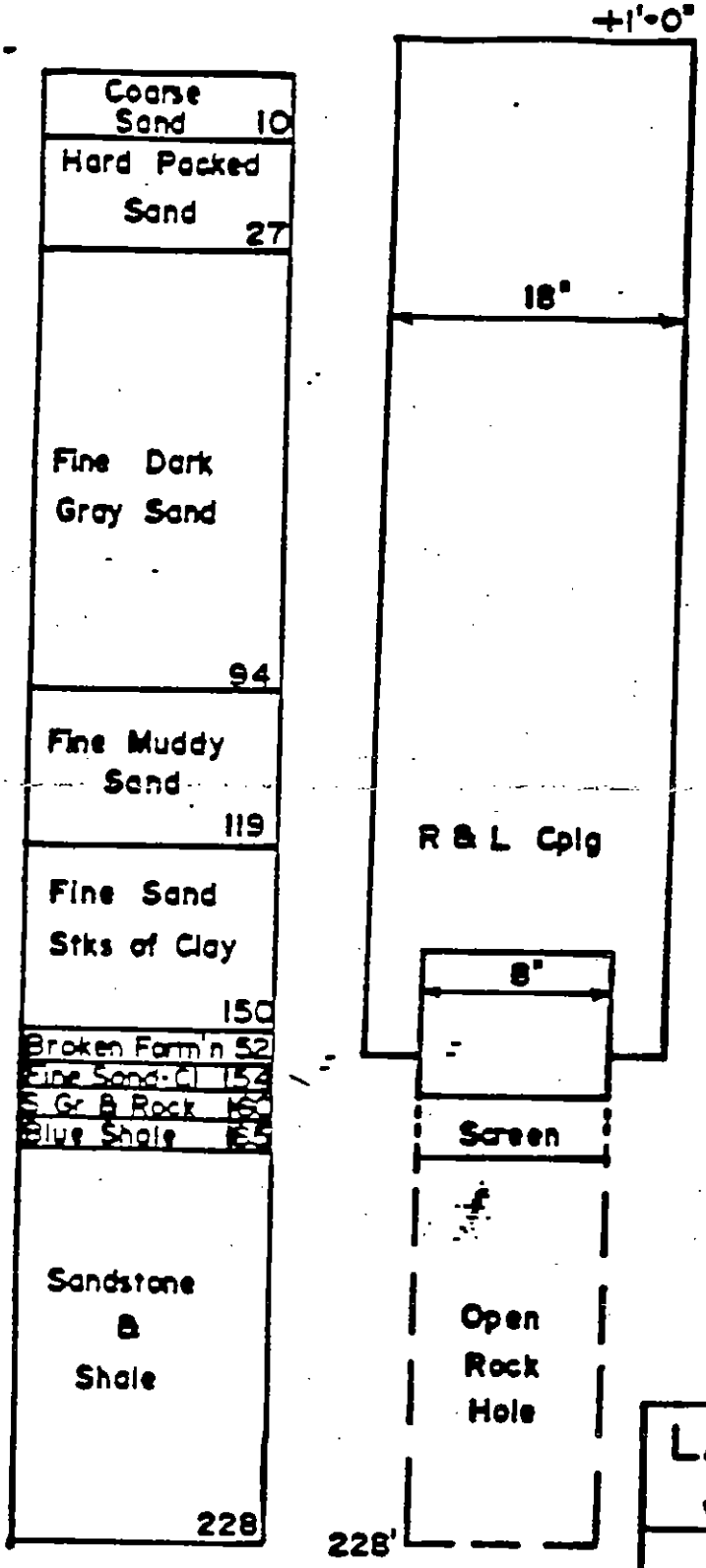
INSTALLER: J. O. Powell

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP~~, N.Y.
FORT DRUM

DRAWN BY: A Simmons well #4

WELL NO. Location 4 US.4



SCREEN: 10'-0" of 8" Everdur

CONE:

PUMP

TYPE	RKHC	SHOP NO.	10868
SETTING	125'-4"	SIZE	10"
SUCTION	1'-0" of 6"	STAGES	6
BASKET	———	IMPELLERS	Bronze
DISCHARGE	7"x10" cplg	HEAD	TF 618-6"
TUBING	2	PRESS	BP 62#
SHAFTING	1 3/16	AIR LINE	126'

MOTOR

MAKE	US	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	98
H.P.	40	R.P.M.	1800
FRAME	932	FORM	Vertical
MODEL	CFU	SERIAL	204230

WELL

STARTED	3-20-41	STATIC LEVEL	77'-
FIRST TEST	4-30-41	PRODUCTION	475
FINAL	8-15-41	PUMPING LEVEL	110'
ACCEPTED	8-15-41	GUARANTEE	2100-10
CLEAR DEPTH	227'	PRESS	62#

DRILLER: W.G. Chapman - L.E. Willoughby

INSTALLER: W.G. Chapman

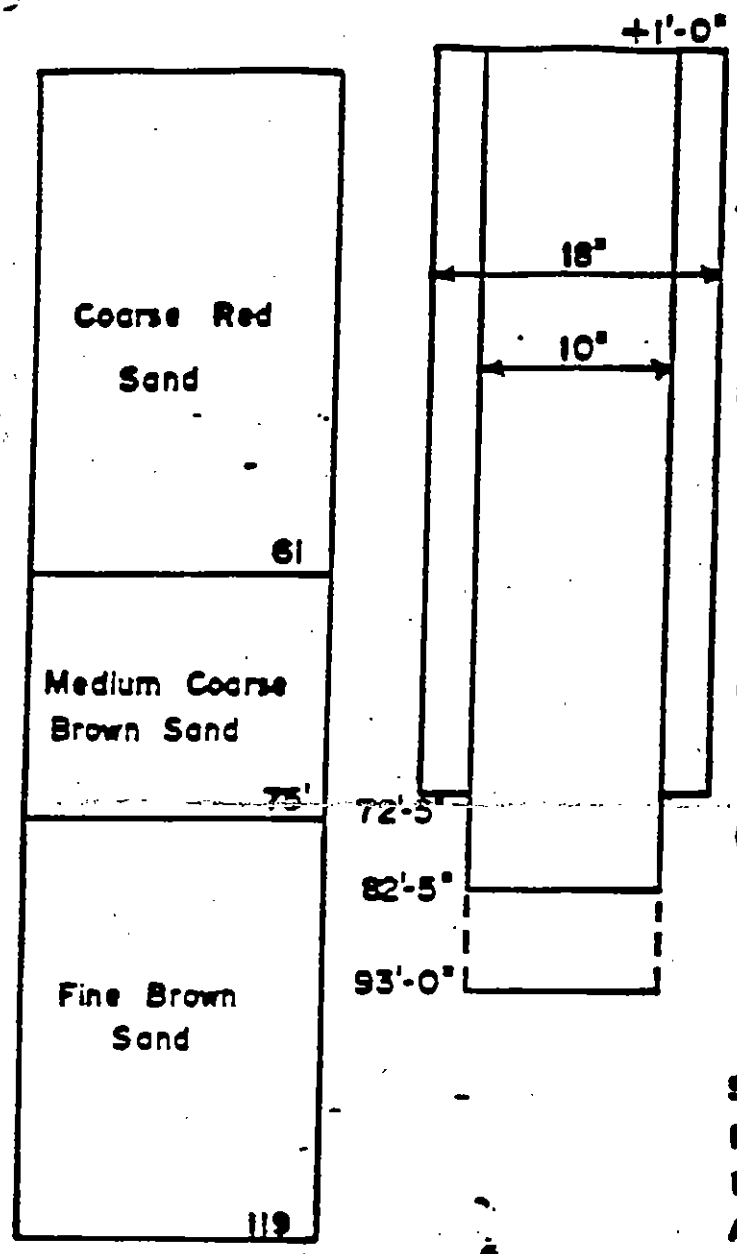
LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP~~, N.Y.
Fort Drum

DRAWN BY: A Simmons well #5

WELL NO. Location 4A US.5

Elev Floor 684.50



SCREEN: 10'-7" of 10" Everdur

CONE: 1- Steel Plate

PUMP

TYPE DRHC	SHOP NO. 10592
SETTING 85'-5"	SIZE 8"
SUCTION 5' of 4"	STAGES 8
BASKET F-V	IMPELLERS Bronze
DISCHARGE 6" of 10' cpld	HEAD TF 618-6"
TUBING 2	PRESS BP 75#
SHAFTING 1 /	AIR LINE 9d-6"

MOTOR

MAKE US	TYPE Hollow Shaft
VOLTS 220	CYCLE 60
PHASE 3	AMP 40
H.P. 15	R.P.M. 1800
FRAME 887	FORM Vertical
MODEL CFU	SERIAL 221715

WELL

STARTED 1-9-41	STATIC LEVEL 42'
FIRST TEST 1-18-41	PRODUCTION 150
FINAL " 8-15-41	PUMPING LEVEL 83
ACCEPTED 8-15-41	GUARANTEE 2100-10
CLEAR DEPTH 92'-6" BP	PRESS 75"

DRILLER: Gayette, Chapman & Hatton

INSTALLER: J.O. Powell

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

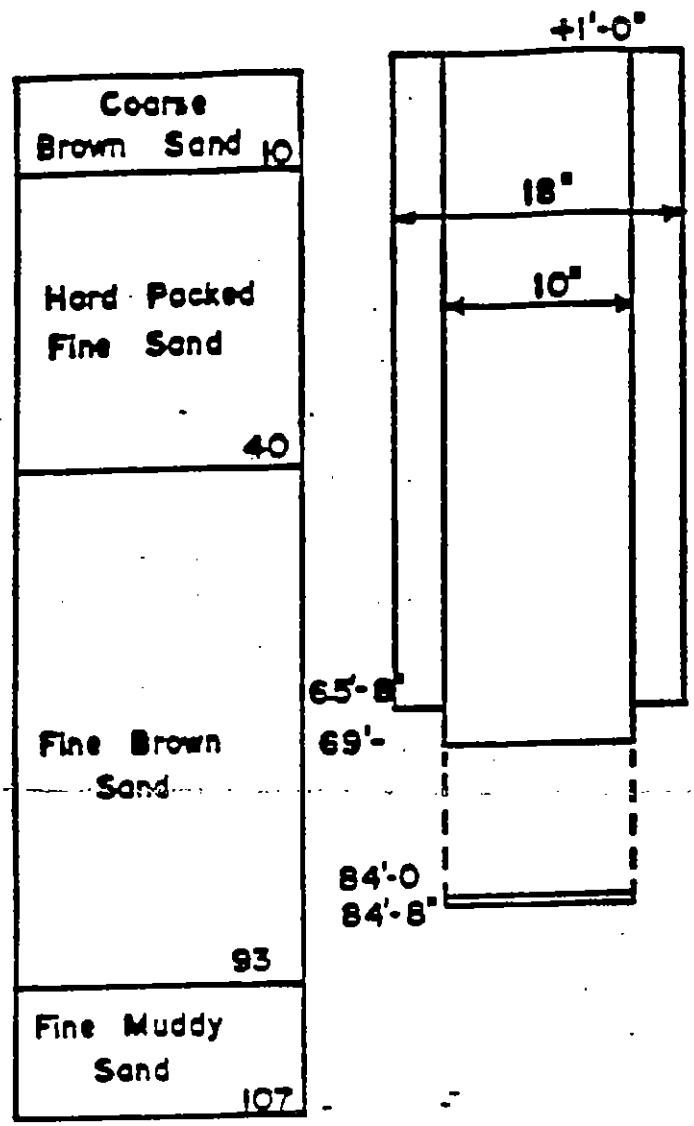
~~PINE CAMP,~~ N.Y.
Fort Drum

DRAWN BY: A Simonas well #6

WELL NO. Location 5 US.6

Elev Floor 684.26

70'-0" of 10" Pipe 1 ea



SCREEN: 15'-0" of 8" Everdur
1-8" Pipe Cplg
CONE: 1-Steel Plate

PUMP

TYPE	DRHC	SHOP NO.	10593
SETTING	70'	SIZE	8"
SUCTION	10' of 4"	STAGES	7
BASKET	F-V	IMPELLERS	Bronze
DISCHARGE	6"x10' cplg	HEAD	TF 618-6"
TUBING	2	PRESS	BP 70#
SHAFTING	1 3/16	AIR LINE	80'

MOTOR

MAKE	US	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	40
H.P.	15	R.P.M.	1800
FRAME	887	FORM	Vertical
MODEL	CFU	SERIAL	218292

WELL

STARTED	11-24-40	STATIC LEVEL	34'
FIRST TEST	1-4-41	PRODUCTION	108
FINAL "	8-15-41	PUMPING LEVEL	7[illegible]
ACCEPTED	8-15-41	GUARANTEE	2100-1[illegible]
CLEAR DEPTH	85'	PRESS	70#

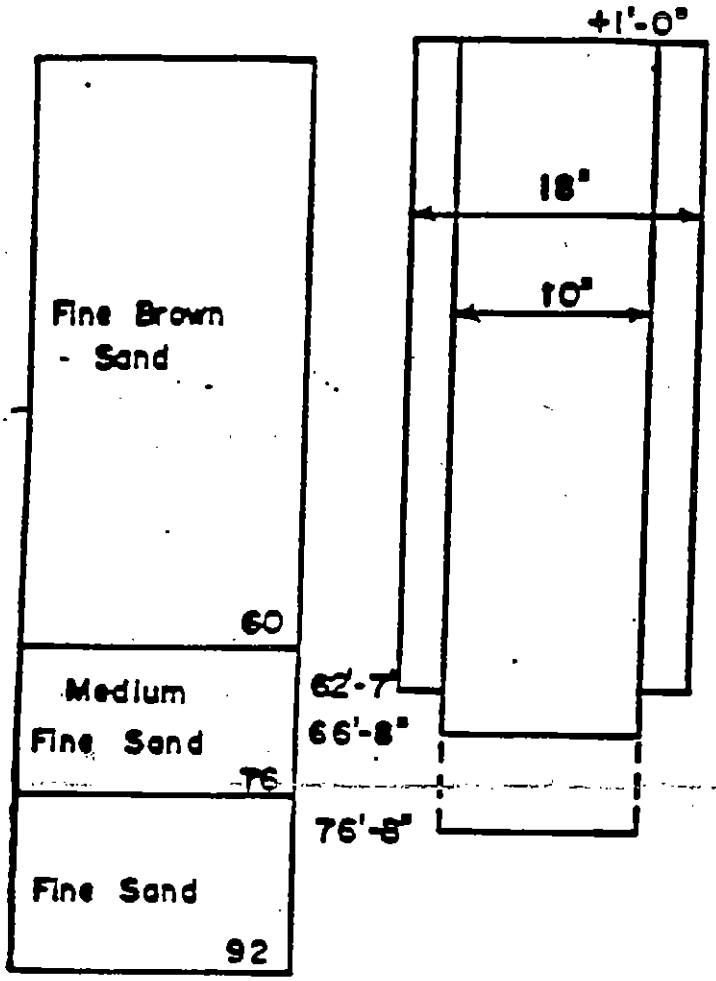
DRILLER: R.C. Hatton
INSTALLER: J.O. Powell

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP~~, N.Y.
Fort Drum

DRAWN BY: A Simmons well # 7
WELL NO. Location 6 US.7

Elev. Floor 672.60



SCREEN: 10'-0" of 10" Everdur

CONE: 1- Steel Plate

PUMP

TYPE DRHC	SHOP NO. 10518
SETTING 65'-6"	SIZE 8
SUCTION 10'-0" of 4"	STAGES 8
BASKET F-Y	IMPELLERS Bronze
DISCHARGE 6"x10" cpld	HEAD TF 618-6"
TUBING 2	PRESS HP 84#
SHAFTING 1 3/16	AIR LINE 75'-6"

MOTOR

MAKE US	TYPE Hollow Shaft
VOLTS 220	CYCLE 60
PHASE 3	AMP 40
H.P. 15	R.P.M. 1800
FRAME 887	FORM Vertical
MODEL CFU	SERIAL 218319

WELL

STARTED 12-1-40	STATIC LEVEL 37
FIRST TEST 12-16-40	PRODUCTION 137
FINAL " 8-15-41	PUMPING LEVEL 67
ACCEPTED 8-15-41	GUARANTEE 2100-10
CLEAR DEPTH 76'-8"	PRESS 84#

DRILLER: L.E. Willoughby, Chapman & RCH

INSTALLER: C.A. Jolley & W.G.C.

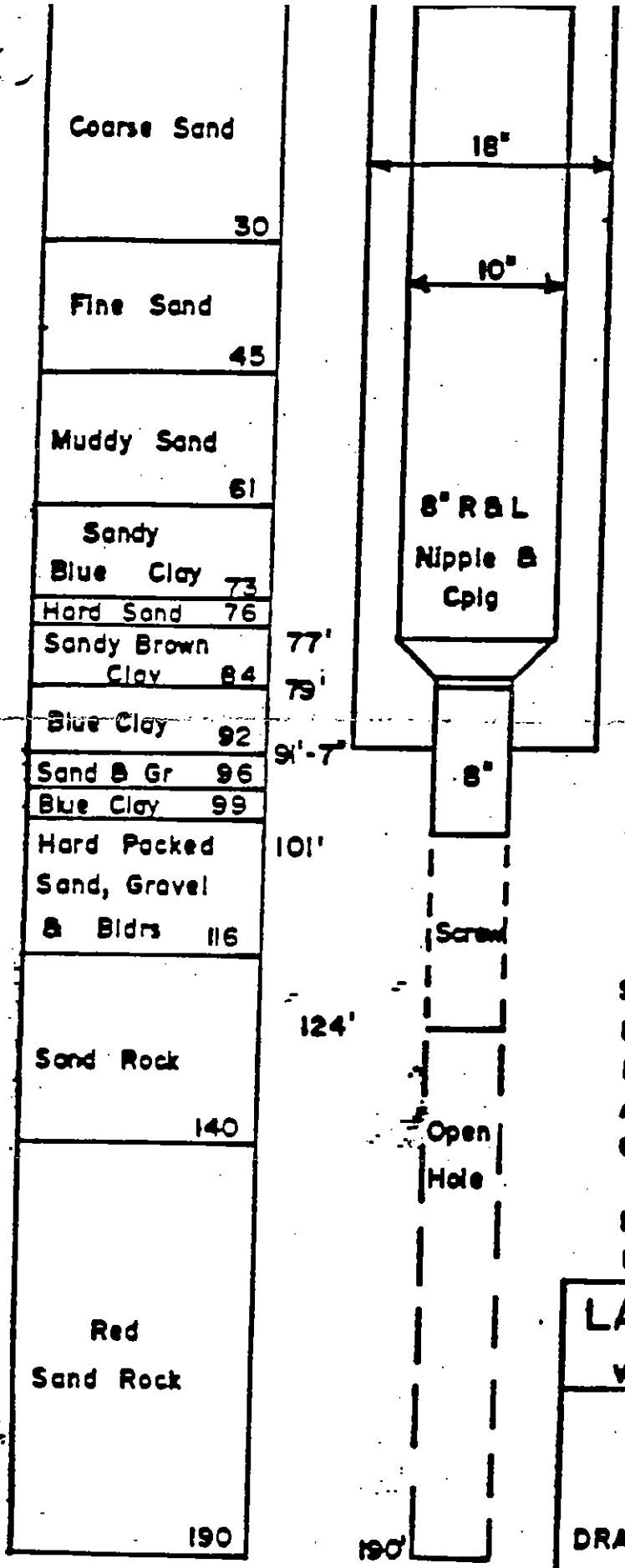
LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP,~~ N.Y.
Fort Drum

DRAWN BY: A Simmons well #8

WELL NO. Location 7 US.8

Elev. Floor 670.22



Elev Floor 649.67

77'-0" of 10" Pipe T & C. H10x8 Sw
1-8" R & L Nipple & Cplg 22' of 8" Pip
SCREEN: 23'-0" of 8" Everdur Screen T &
CONE:

PUMP

TYPE	RKLC	SHOP NO.	11077
SETTING	96'-6"	SIZE	8"
SUCTION	20'-9" of 4"	STAGES	10
BASKET	——	IMPELLERS	Bronze
DISCHARGE	6"x10 cplg	HEAD	TF 618-6
TUBING	2"	PRESS	BF 77#
SHAFTING	1 3/16	AIR LINE	117'

MOTOR

MAKE	US	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	50
H.P.	20	R.P.M.	1800
FRAME	907	FORM	Vertical
MODEL	CFU	SERIAL	240756

WELL

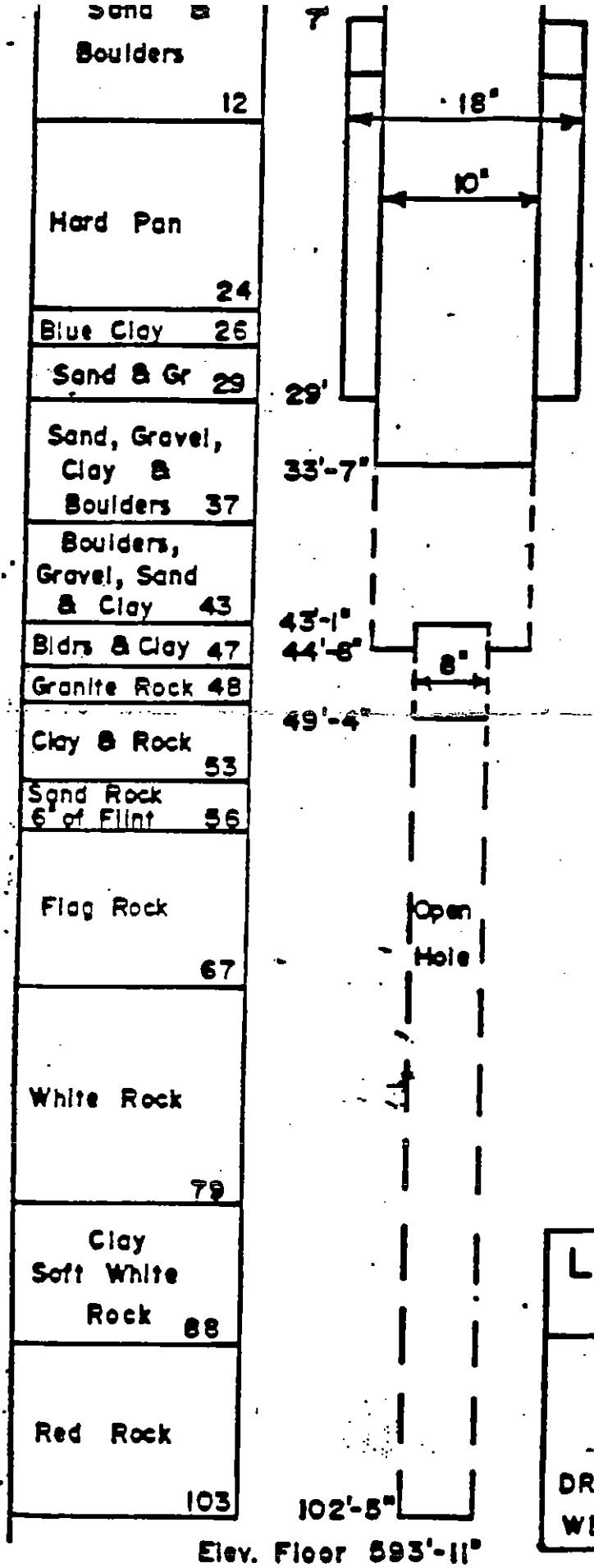
STARTED	5-10-41	STATIC LEVEL	60
FIRST TEST	6-28-41	PRODUCTION	220
FINAL "	8-15-41	PUMPING LEVEL	105
ACCEPTED	8-15-41	GUARANTEE	2100-10
CLEAR DEPTH	190'	PRESS	77#

DRILLER: L.E. Willoughby
INSTALLER: W.G. Chapman

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP,~~ N.Y.
Fort Drum

DRAWN BY: A Simmons well # 9
WELL NO. Location 21 US.9



SCREEN: 11'-1" of 10" Everdur, 6'-3" of

CONE:

PUMP

TYPE	RKLC	SHOP NO.	11011
SETTING	40'	SIZE	8"
SUCTION	2' of 6"	STAGES	12
BASKET	——	IMPELLERS	Bronze
DISCHARGE	6"x10" cpld	HEAD	TF 618-6"
TUBING	2	PRESS	BP 121#
SHAFTING	1 3/16	AIR LINE	42'

MOTOR

MAKE	US	TYPE	Hollow Shaft
VOLTS	220	CYCLE	60
PHASE	3	AMP	62
H.P.	25	R.P.M.	1800
FRAME	912	FORM	Vertical
MODEL	CFU	SERIAL	234494

WELL

STARTED	4-30-41	STATIC LEVEL	Flows
FIRST TEST	6-5-41	PRODUCTION	238
FINAL "	8-15-41	PUMPING LEVEL	35
ACCEPTED	8-15-41	GUARANTEE	2100-10
CLEAR DEPTH	100'	PRESS BP	121#

DRILLER: G. Divins

INSTALLER: W. G. Chapman

LAYNE-NEW YORK CO., INC.
NEW YORK, NEW YORK
WATER SUPPLY CONTRACTORS

~~PINE CAMP,~~ N.Y.
Fort Drum

DRAWN BY: A Simmons well # 10

WELL NO. Location 20 US. 10

Fort Drum

WELL NO. 11 and 12 DATA

#11 WELL - OLD N.G. WELL

Depth: 227 Ft.

Static Level: 66 Ft.

Casing: Not known

Soil Formation should be same as #7 Well

Location: South E-W Runway East of Hangar

#12 WELL - OLD ARMY WELL

Depth: 126 Ft.

Static Level: 64 Ft.

Casing: Not known

Soil Formation same as #7 and #11

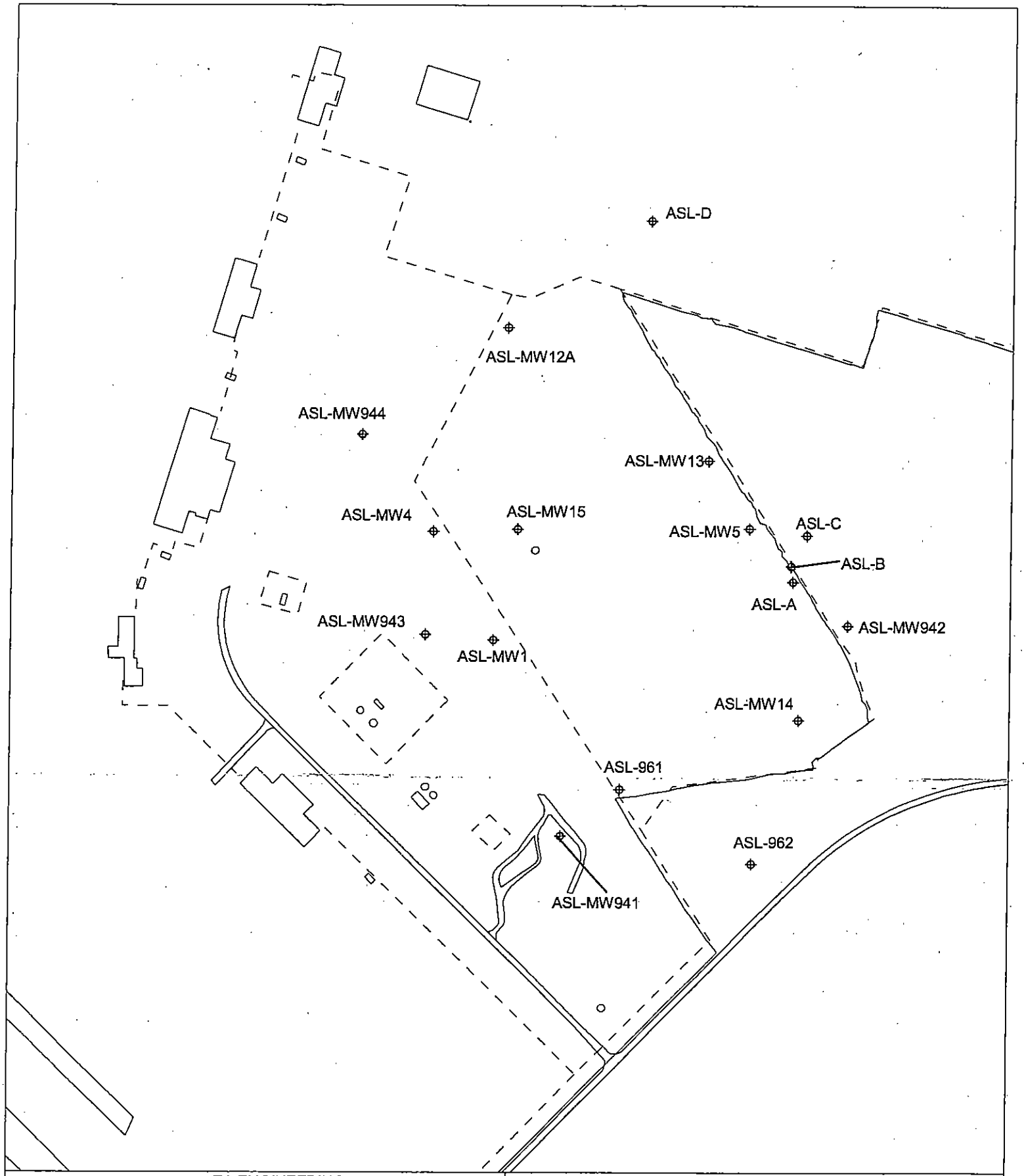
Location: South E-W Runway East of Hangar

APPENDIX J

AIRFIELD LANDFILL

formerly

(EXISTING SANITARY LANDFILL)



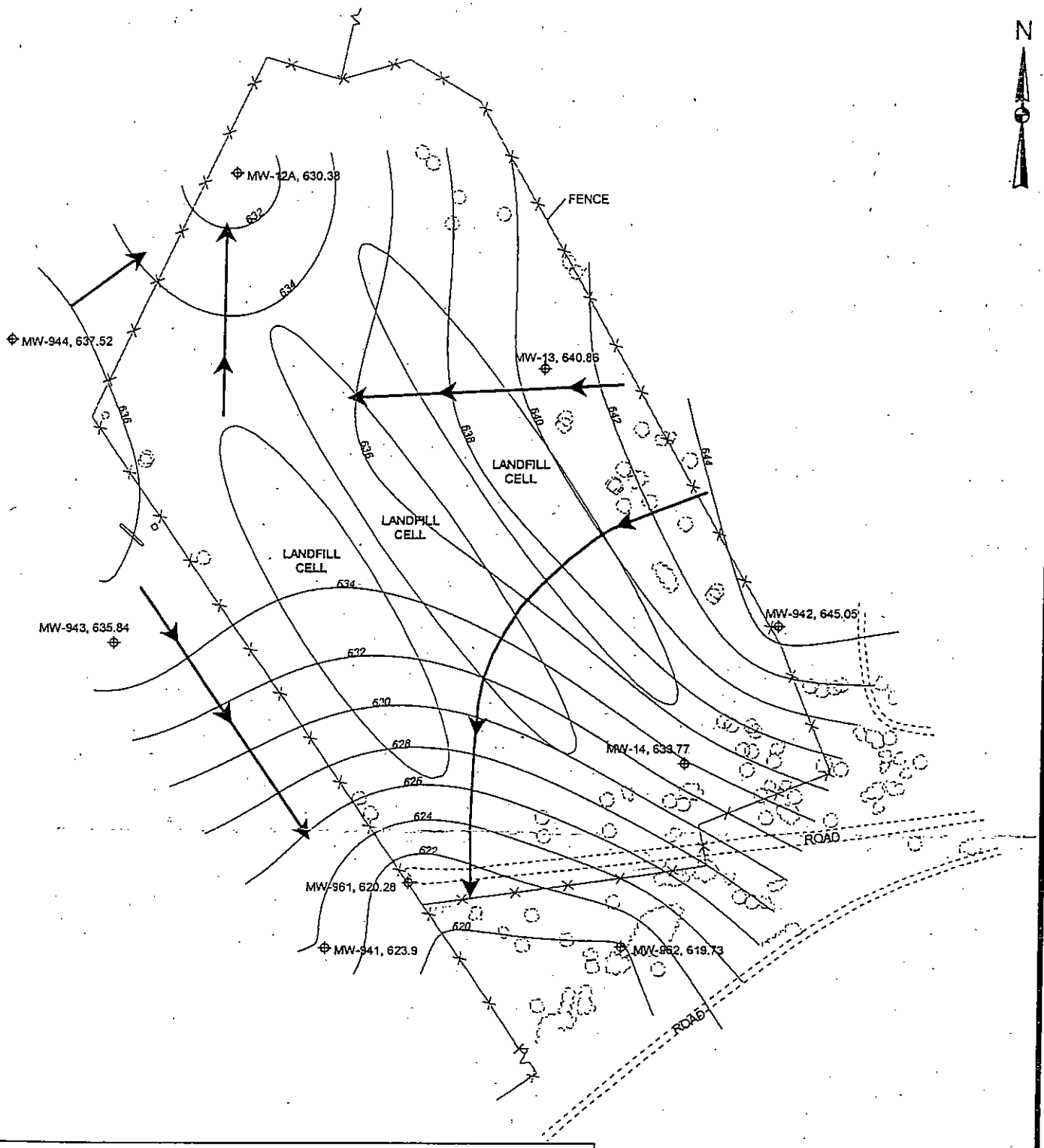
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

US ARMY CORPS OF ENGINEERS
BALTIMORE DISRICT

H.Q., 10TH MOUNTAIN DIVISION (LI) & FT DRUM
PUBLIC WORKS, ENVIRONMENTAL DIVISION
FORT DRUM, NEW YORK

AIRFIELD SANITARY LANDFILL
FORT DRUM, NEW YORK

CHECKED BY	DESIGNED BY	DRAWN BY	CONTRACT NO.	PROJECT NO.	DATE	SCALE	FILE
TWP	JAM	BLH	DACA31-94-D-0182	60957.18	02/26/02	AS SHOWN	ASL.APR



Legend

- Monitoring Well
- 620 Groundwater Elevation Contour (ft amsl)
- Groundwater Flow Line
- Tree

MW-941, 623.90
Well ID — Groundwater Elevation

400 0 400 Feet

URS	US Army Corps of Engineers	MALCOLM PIRNIE	FORT DRUM - AIRFIELD SANITARY LANDFILL GROUNDWATER POTENTIOMETRIC SURFACE (AUGUST 7, 2000)	FIGURE 1

J:\35378.20\GIS\airfield_ll.apr 08/07/00 GROUNDWATER ELEVATIONS
3/28/2001

TABLE 1
Well Inventory Information
Fort Drum, New York

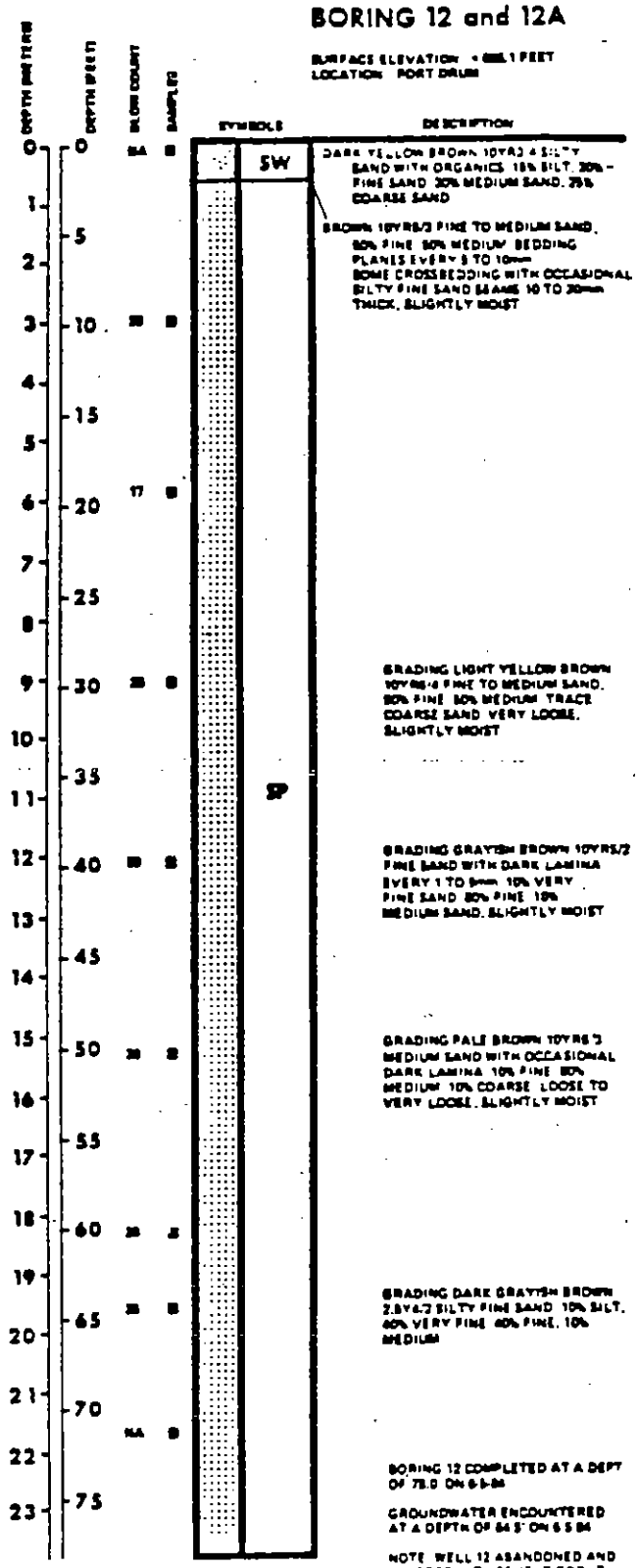
This report is comprised of information provided to CDM Federal as of October 1, 1995.

Site Name	Well Number	A/E Firm	Easting (X Coordinate)	Northing (Y Coordinate)	Ground Elevation (amsl)	Top of PVC Elevation (amsl)	Total Depth (bgs)	Screen Interval (bgs)	Screened Lithology	Condition	Drilling Logs
Old Sanitary Landfill	MW7	D&M	1042834.8962	1474919.1167	675.1	677.00	45.6	28-38	SP	Good	X
	MW8	D&M	1042900.4057	1475439.025	674.5	678.02	47.5	35.8-45.7	SP	Good	X
	MW9A	D&M	1042576.3069	1476315.8144	668.4	670.00	65	50-59.8	SP	Good	X
	MW10	D&M	1041187.91	1477401.9317	641.7	644.24	49.5	39.3-49.3	SP	Good	X
	MW11	D&M	1041169.6718	1477411.429	642.4	644.30	140	118-138	LS	Good	X
	MW2	AEHA	---	---	---	---	---	---	---	Unuseable*	---
	MW3	AEHA	---	---	---	---	---	---	---	Unuseable*	---
	MW6	AEHA	---	---	---	---	---	---	---	Unuseable*	---
	OSL-MW1	CDM	1042518.3518	1477145.1963	656.94	659.04	50	33-48	SP	Good	X
	OSL-MW2	CDM	1040917.8794	1477600.2628	637.40	639.74	50	32-47	SP	Good	X
	OSL-MW2A	CDM	1040919.7092	1477590.4502	637.30	639.45	92	74-89	ML	Good	X
	OSL-MW3	CDM	1041583.1419	1475932.3622	658.06	660.28	33	17-32	SP	Good	X
	OSL-MW4	CDM	1041599.0187	1475926.1021	658.15	661.25	127	99-124	LS	Good	X
	OSL-MW5	CDM	1042885.3113	1475438.7350	674.66	677.25	145	120-145	LS	Good	X
Airfield Landfill	MW12A ✓	D&M	1051137.2083	1481702.9687	695.1	697.25	78	66.7-76.5	SP	Good	X
	MW13 ✓	D&M	1052010.0194	1481158.417	695.9	698.52	67.5	56.3-66.2	SP	Good	X
	MW14A ✓	D&M	1052423.15	1480073.2444	696.2	698.25	75	64.5-74.5	SP	Good	X
	MW15	D&M	1051204.4599	1480853.0329	694.4	696.13	77.5	67-77.1	SP	**	X
	MW1	AEHA	1051113.0351	1480385.3335	695.34	696.82	---	---	---	Unuseable*	---
	MW4	AEHA	1050847.1724	1480837.5099	695.35	697.36	---	---	---	Unuseable*	---
	MW5	AEHA	1052192.2995	1480875.3192	696.83	699.01	---	---	---	Unuseable*	---
	A	---	1052383.6348	1480654.9748	696.55	698.47	---	---	---	Unuseable*	---
	B	---	1052373.7923	1480720.8738	696.24	699.67	---	---	---	Unuseable*	---
	C	---	1052437.6876	1480851.4594	695.45	697.55	---	---	---	Unuseable*	---
	D	---	1051736.0680	1482163.9054	694.79	697.11	---	---	---	Unuseable*	---
	94-1 ✓	CDM	1051424.6826	1479560.6792	694.07	696.40	80	65-80	SP	Good	X
	94-2 ✓	CDM	1052622.4649	1480474.9143	694.56	697.36	60	45-60	SP	Good	X
	94-3 ✓	CDM	1050825.1306	1480403.8863	695.11	697.82	70	55-70	SP	Good	X
	94-4 ✓	CDM	1050527.9724	1481239.7220	693.05	695.35	65	50-65	SP	Good	X
Fort Drum Supply (Production) Wells	FD1	---	1044669.85	1475381.11	671.17	---	350	173-350	SS	Inoperable	X
	FD2	---	1041881.42	1476945.85	612.99	---	111	65-110	SS	Good	X
	FD3	---	1042083.75	1477281.28	651.08	---	119	105-119	SS	Good	X
	FD4	---	1045914.74	1477578.12	684.50	---	93	79.6-90	SP	Good	X
	FD5	---	1046052.81	1477738.33	684.50	---	228	154-228	SS	Good	X
	FD6	---	1046592.06	1479570.54	684.26	---	119	82.5-93	SP	Good	X
	FD7	---	1048786.9412	1475532.4416	672.80	---	107	69-84	SP	Good	X
	FD8	---	1047089.36	1481910.75	670.22	---	92	66.8-76.8	SP	Good	X
	FD9	---	1047298.5912	1481921.3377	649.67	---	190	101-190	SS	Good	X
	FD10	---	1047295.5637	1482078.8446	593.92	---	103	33.7-102.5	LS	Good	X
	FD11	---	---	---	---	---	227	---	SP	Good	---
	FD12	---	---	---	---	---	126	---	SP	Good	---

* - Wells which lacked construction material information were deemed unuseable.
** - Several attempts to locate well MW15 have been unsuccessful.
--- Indicates that information for that item is not available.
Coordinates are in NAD 83 grid.

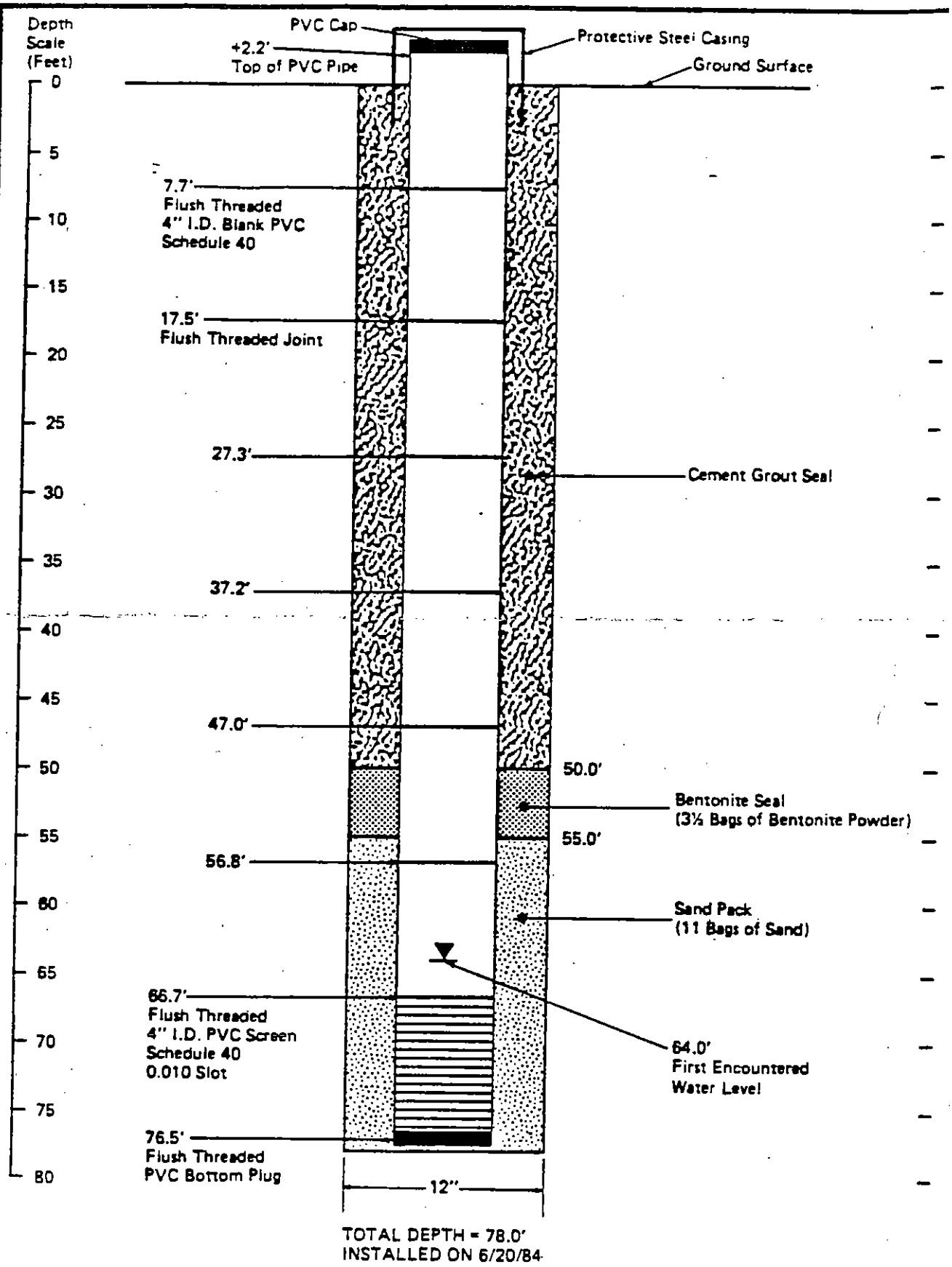
BORING 12 and 12A

SURFACE ELEVATION [illegible] FEET
LOCATION PORT DRUM



LOG OF BORINGS

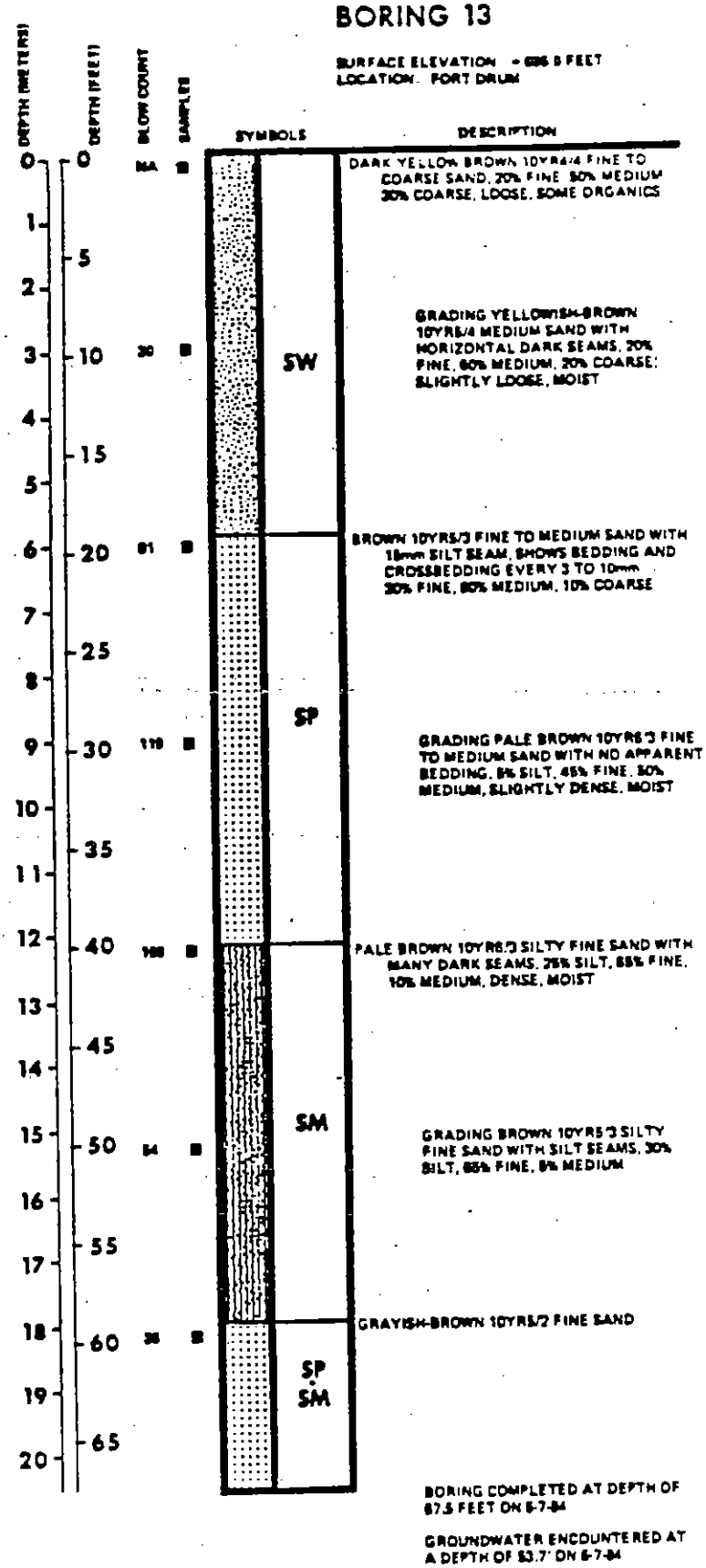
Dames & Moore



WELL DIAGRAM
WELL 12A

BORING 13

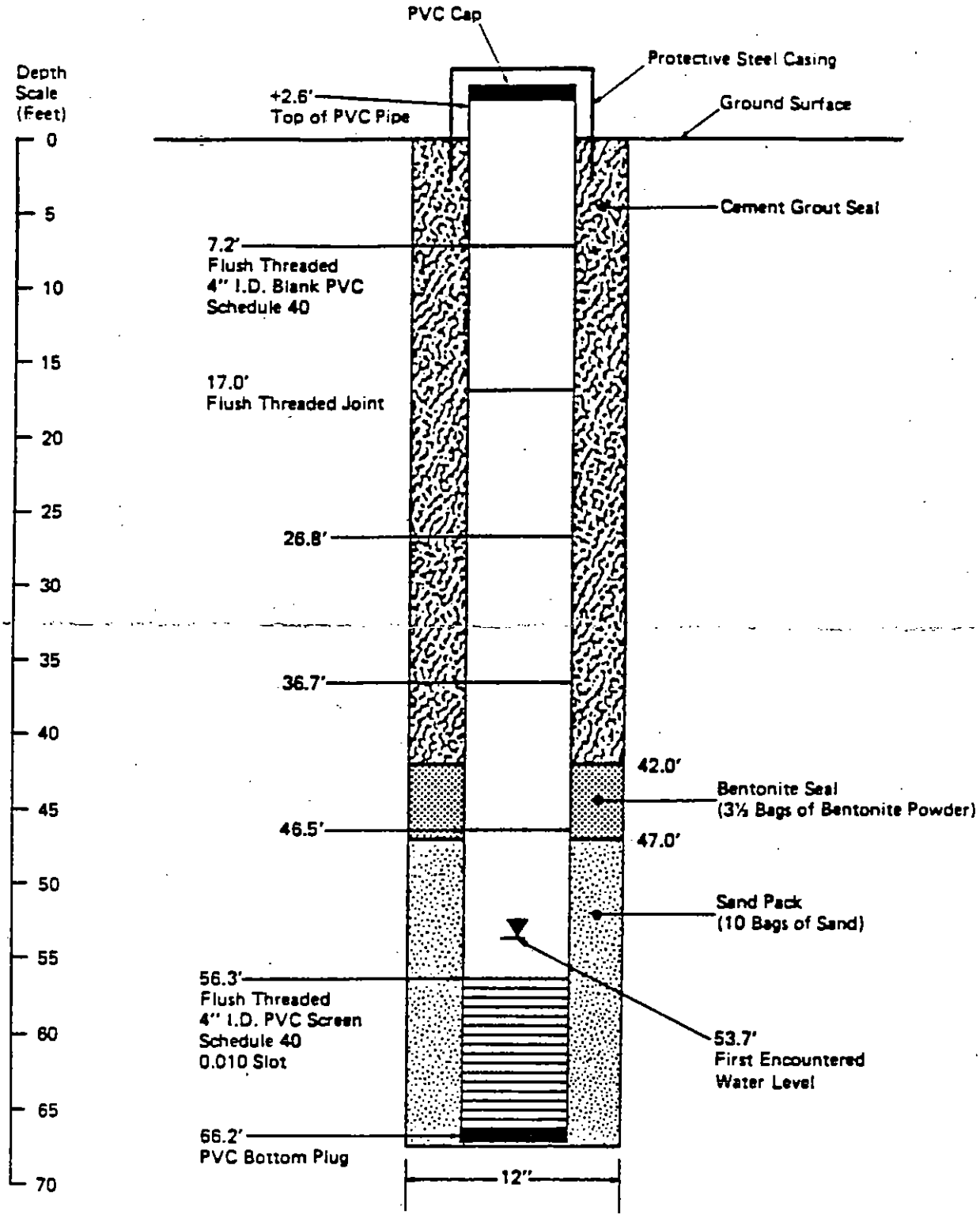
SURFACE ELEVATION = 696.8 FEET
LOCATION: FORT DRUM



BORING COMPLETED AT DEPTH OF 67.5 FEET ON 6-7-84

GROUNDWATER ENCOUNTERED AT A DEPTH OF 53.7' ON 6-7-84

LOG OF BORINGS



TOTAL DEPTH = 67.5'
INSTALLED 6/7/84

WELL DIAGRAM
WELL 13

Dames & Moore

BORING 14 and 14A

SURFACE ELEVATION [illegible] FEET
LOCATION FORT DRUM

DEPTH (METERS)	DEPTH (FEET)	BLOW COUNT	SAMPLES	SYMBOLS	DESCRIPTION
0	0	4	B		VERY DARK BROWN 10YR2/2 FINE SAND WITH ORGANICS
1					GRADES DARK YELLOWISH-BROWN 10YR4/6 FINE TO MEDIUM SAND 30% FINE, 70% MEDIUM, VERY LOOSE
2	5				GRADES YELLOWISH-BROWN 10YR5/6 10% FINE, 90% MEDIUM, MEDIUM DENSE
3	10	17	B		NOTE: SLIGHTLY DAMP
4					
5	15				
6	20	27	B		GRADES BROWN 10YR5/3 FINE TO MEDIUM SAND WITH 3% FINE GRAVEL OR COARSE SAND
7					GRADES GRAYISH-BROWN 10YR5/2, NO GRAVEL, VERY DENSE
8	25				
9	30	[illegible]	B		
10				SP	
11	35				
12	40	78	B		GRADES PALE BROWN 10YR6/3 FINE SAND, VERY DENSE
13					
14	45				NOTE DRILLED THROUGH HARD MATERIAL, GRADES VERY FINE
15	50	61	B		
16					
17	55				GRADES DARK GRAYISH-BROWN 10YR4/2
18	60	[illegible]	B		NOTE: MOIST
19					
20	65				
21	70	[illegible]	B		NOTE WET
22					
	75				

BORING 14 COMPLETED AT A DEPTH OF 75.0' ON 5-24-84

GROUNDWATER ENCOUNTERED IN BORING 14 AT A DEPTH OF 65.0' ON 5-24-84

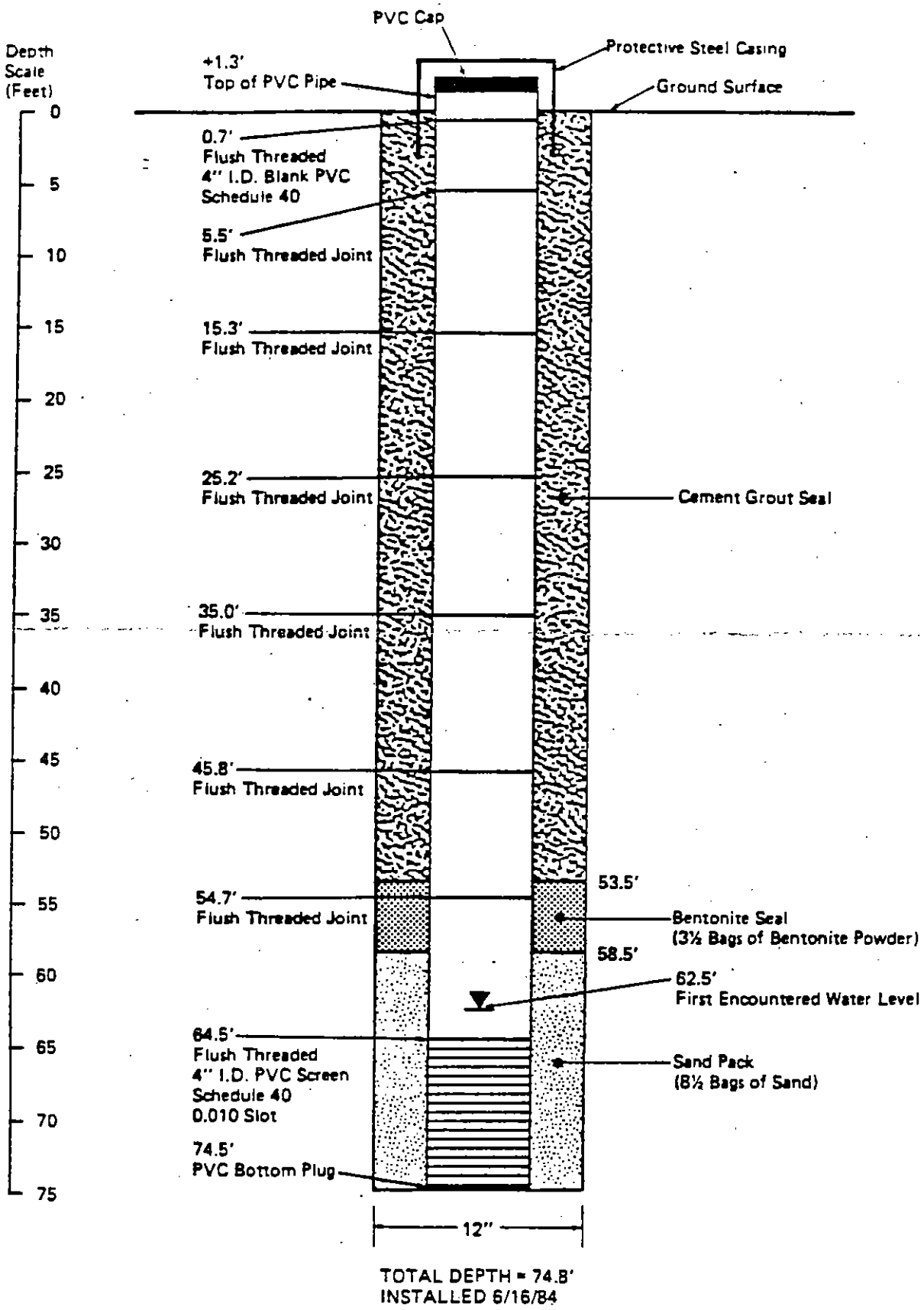
BORING/WELL 14 ABANDONED AND PLUGGED WITH CEMENT GROUT, 45' OF AUGERS REMAINING IN BOREHOLE

BORING 14A COMPLETED AT A DEPTH OF 75.0' ON 6-16-84

GROUNDWATER ENCOUNTERED IN BORING 14A AT A DEPTH OF 62.5' ON 6-16-84

LOG OF BORINGS
D-14

Dames & Moore



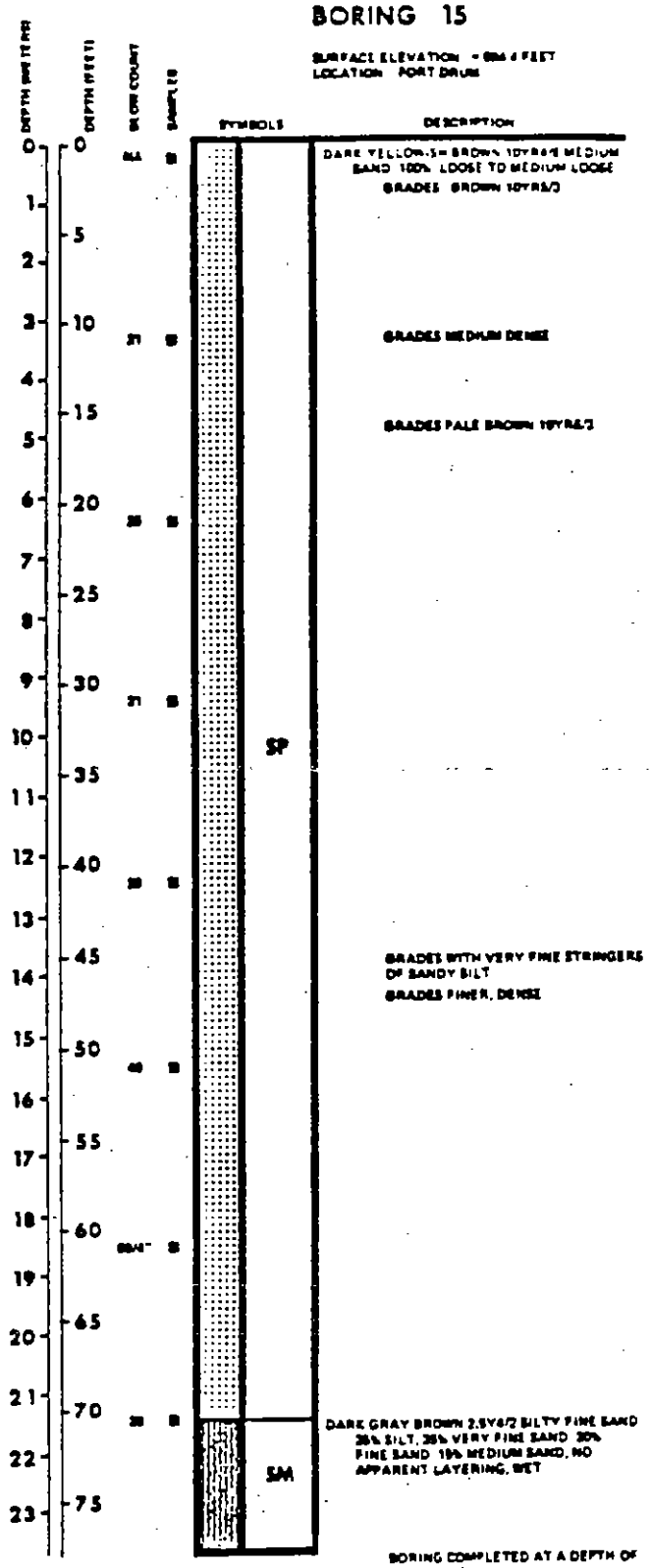
TOTAL DEPTH = 74.8'
INSTALLED 6/16/84

WELL DIAGRAM
WELL 14A
D-31

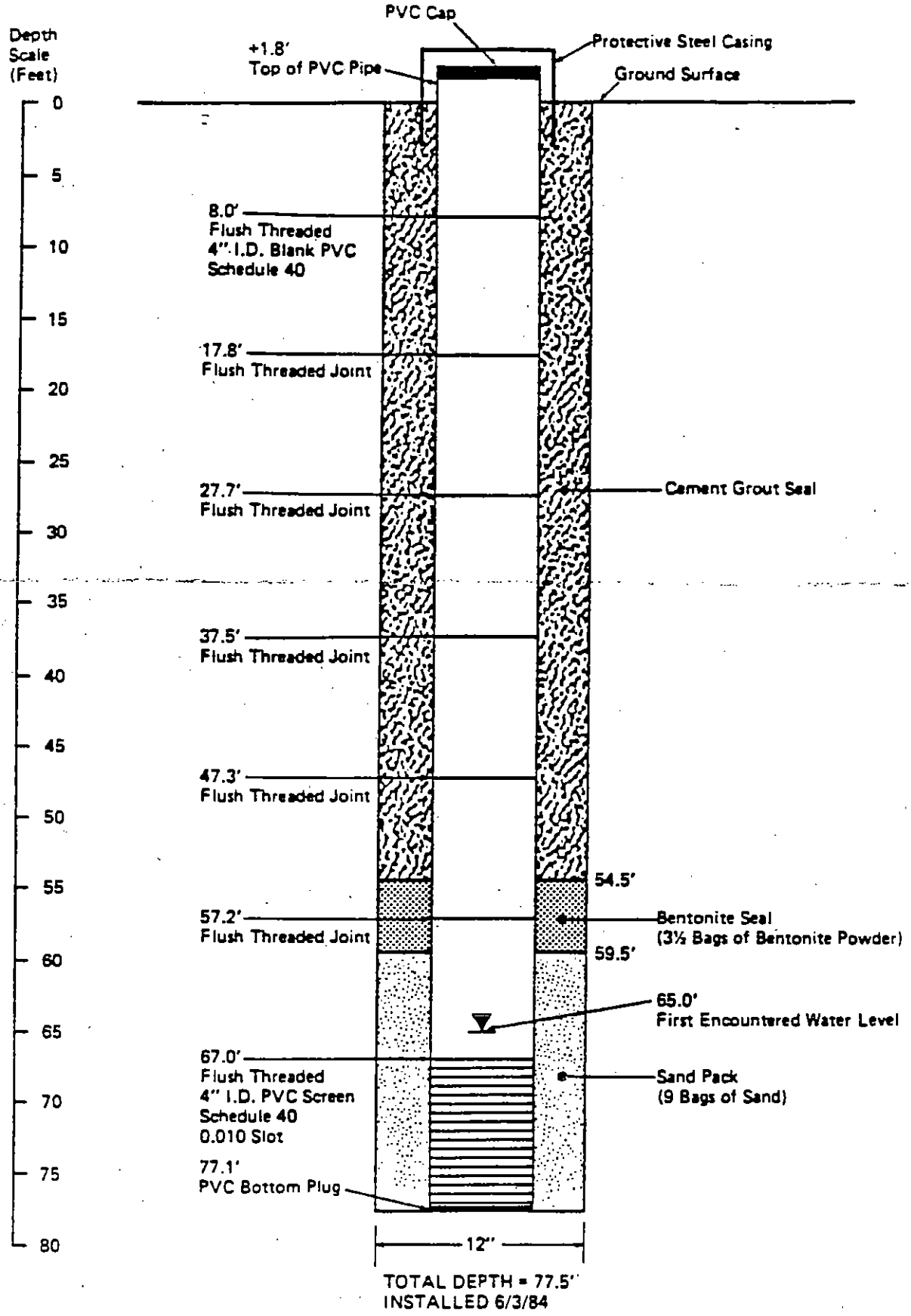
Dames & Moore

BORING 15

SURFACE ELEVATION [illegible] FEET
LOCATION PORT DRUM



LOG OF BORINGS



WELL DIAGRAM
WELL 15

Dames & Moore

MONITORING WELL CONSTRUCTION AND BORING LOG

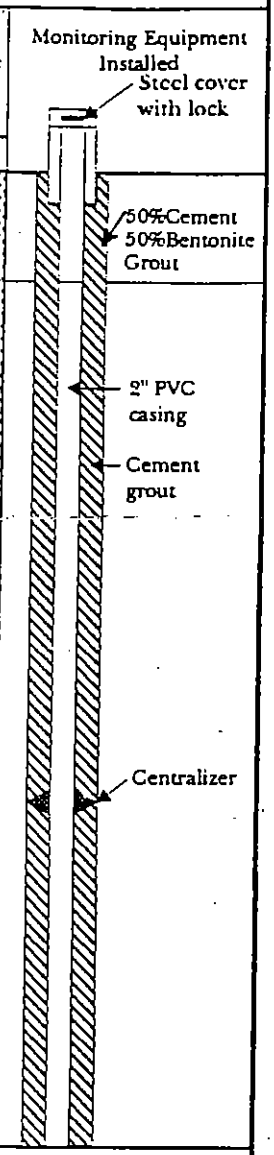
Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-1 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **80 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/20/94**

Static Water Level Depth: **72 feet**
Static Water Level Elevation: **622.07 feet**
Surveyed Elevation (PVC Casing): **696.40 feet**
Surveyed Elevation (Ground Surface): **694.07 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10;Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0	NA	0 - 5	5/3.7	0.0 ppm	SAND - Dark yellowish orange (10 YR 6/6), fine grain, dry, loose.	
5	NA	5 -10	5/3	0.0 ppm		
10	NA	10 - 15	5/3.7	0.0 ppm		
15	NA	15 - 20	5/4	0.0 ppm	Thin Black Striations at various intervals (< cm apart)	
20	NA	20 - 25	5/4.8	0.0 ppm		
25	NA	25 - 30	5/5	0.0 ppm	SAND - Moderate yellowish brown (10 YR 5/4) fine grain, dry, loose.	
30	NA	30 - 35	5/4.5	0.0 ppm		
35	NA	35 - 40	5/5	0.0 ppm	Silty SAND - Dark yellowish brown (10 YR 4/2), dry, nonplastic. SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, loose.	
40	NA	40 - 45	5/4.4	0.0 ppm		
45	NA	45 - 50	5/4.5	0.0 ppm		
50					Continued on page 2	

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-80.0 to -63.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement NY
	Interval:	-60.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-63.0 to -60.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-65.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-80.0 to -65.0 feet (bgs)

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COREL: 94-11

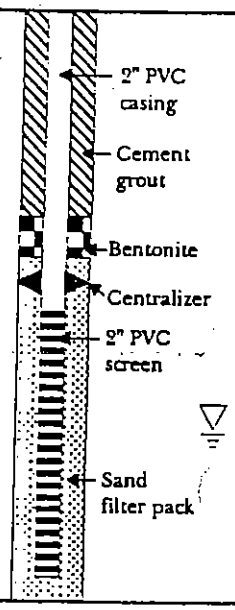
MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-1 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **80 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/19-20/94**

Static Water Level Depth: **72 feet**
Static Water Level Elevation: **622.07 feet**
Surveyed Elevation (PVC Casing): **696.40 feet**
Surveyed Elevation (Ground Surface): **694.07 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				Continued from page 1		
50							
	NA	0 - 5	5/3.7	0.0 ppm			
55							
	NA	5 -10	5/3	0.0 ppm			
60							
	NA	10 - 15	5/3.7	0.0 ppm			
65							
	NA	15 - 20	5/4	0.0 ppm			
70					Water Table		
	NA	20 - 25	5/4.8	0.0 ppm			
75							
	NA	25 - 30	5/5	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, wet, loose.		
80					Total Depth - 80.0 Feet		
85							
90							
95							
100							



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #SQ
	Interval:	-80.0 to -68.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement NY
	Interval:	-60.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-68.0 to -60.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-65.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-80.0 to -65.0 feet (bgs)

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COREL: 94-12

MONITORING WELL CONSTRUCTION AND BORING LOG

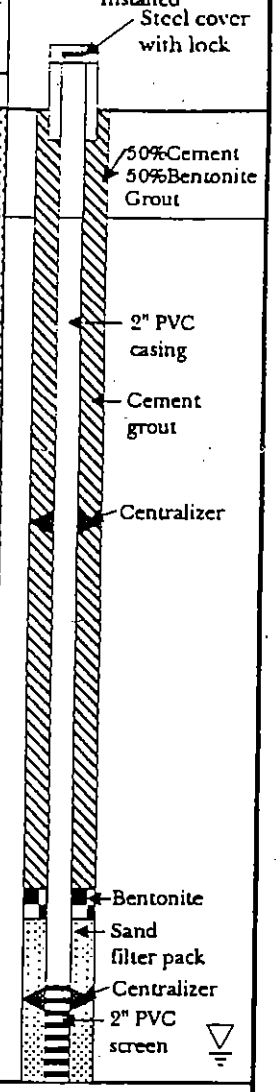
Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-2 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **60 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/20/94**

Static Water Level Depth: **50 feet**
Static Water Level Elevation: **644.56 feet**
Surveyed Elevation (PVC Casing): **697.36 feet**
Surveyed Elevation (Ground Surface): **694.56 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0	NA	0 - 5	5/1	0.0 ppm	SAND - Dark yellowish orange (10 YR 6/6), fine grain, dry, loose.	
5	NA	5 -10	5/2	0.0 ppm		
10	NA	10 - 15	5/3.5	0.0 ppm		
15	NA	15 - 20	5/3.2	0.0 ppm		
20	NA	20 - 25	5/1.5	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, loose, thin black striations present.	
25	NA	25 - 30	5/3.5	0.0 ppm		
30	NA	30 - 35	5/4.2	0.0 ppm		
35	NA	35 - 40	5/4.5	0.0 ppm	SILTY SAND - Dark yellowish brown (10 YR 4/2), very fine grain, damp, loose.	
40	NA	40 - 45	5/4.4	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, loose, thin black striations.	
45	NA	45 - 50	5/2.7	0.0 ppm		
50					Continued on page 2	

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-60.0 to -43.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-40.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-43.0 to -40.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-45.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-60.0 to -45.0 feet (bgs)

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COREL: 94-21

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-2 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **60 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/20/94**

Static Water Level Depth: **50 feet**
Static Water Level Elevation: **644.56 feet**
Surveyed Elevation (PVC Casing): **697.36 feet**
Surveyed Elevation (Ground Surface): **694.56 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				Continued from page 1		
50							
	NA	50-55	5/1	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, soft, loose, thin striation black		2" PVC screen
55							Sand filter pack
	NA	55 -60	5/2.5	0.0 ppm			
60					Total Depth - 60.0 Feet		
65							
70							
75							
80							
85							
90							
95							
100							

CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-60.0 to -43.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-40.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-43.0 to -40.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-45.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-60.0 to -45.0 feet (bgs)

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COREL: 94-22

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-3 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

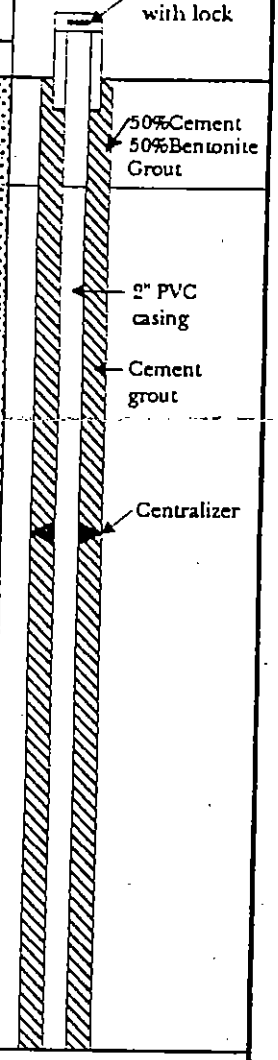
Total Depth: **70 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/21/94**

Static Water Level Depth: **59 feet**
Static Water Level Elevation: **636.11 feet**
Surveyed Elevation (PVC Casing): **697.82 feet**
Surveyed Elevation (Ground Surface): **695.11 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0						
	NA	0 - 5	5/3.7	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain dry, loose	
5						
	NA	5 -10	5/3.8	0.0 ppm		
10						
	NA	10 - 15	5/4.2	0.0 ppm		
15						
	NA	15 - 20	5/5	0.0 ppm		
20						
	NA	20 - 25	5/5	0.0 ppm		
25						
	NA	25 - 30	5/5	0.0 ppm		
30						
	NA	30 - 35	5/3.5	0.0 ppm		
35						
	NA	35 - 40	5/3.2	0.0 ppm		
40						
	NA	40 - 45	5/4	0.0 ppm		
45						
	NA	45 - 50	5/4	0.0 ppm		
50						

Continued on Page 2

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #8Q
	Interval:	-70.0 to -53.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-50.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-53.0 to -50.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-55.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-70.0 to -55.0 feet (bgs)

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COREL: 94-31

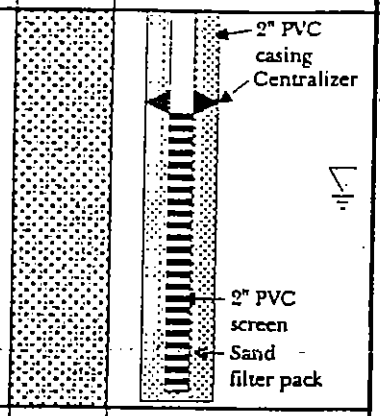
MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-8 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **70 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/21/94**

Static Water Level Depth: **59 feet**
Static Water Level Elevation: **636.11 feet**
Surveyed Elevation (PVC Casing): **697.82 feet**
Surveyed Elevation (Ground Surface): **695.11 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation				Continued from Page 1	
50	NA	50-55	5/4.5	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain, dry, loose	
55	NA	55 -60	5/3.8	0.0 ppm	Water Table	
60	NA	60-65	5/1	0.0 ppm		
65	NA	65-70	5/0.5	0.0 ppm		
70					Total Depth - 70.0 Feet	
75						
80						
85						
90						
95						
100						



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-70.0 to -53.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-50.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-53.0 to -50.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-55.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-70.0 to -55.0 feet (bgs)

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COREL: 94-32

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-4 (page 1)**
Geologist: **Mike Gague**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

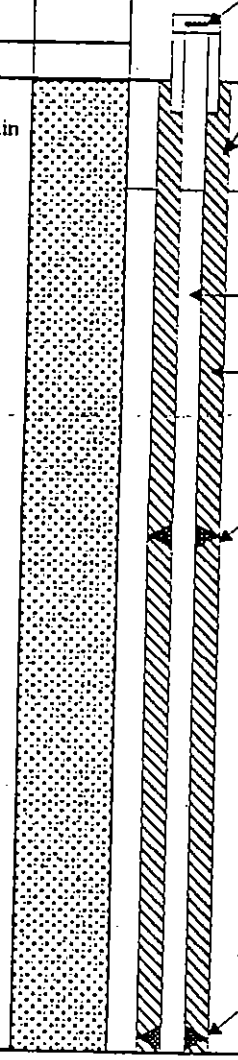
Total Depth: **65 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/22/94**

Static Water Level Depth: **56 feet**
Static Water Level Elevation: **637.05 feet**
Surveyed Elevation (PVC Casing): **695.35 feet**
Surveyed Elevation (Ground Surface): **693.05 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0						
	NA	0 - 5	5/4	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain dry, loose	
5						
	NA	5 - 10	5/3.2	0.0 ppm		
10						
	NA	10 - 15	5/3.7	0.0 ppm		
15						
	NA	15 - 20	5/4.5	0.0 ppm		
20						
	NA	20 - 25	5/4.1	0.0 ppm		
25						
	NA	25 - 30	5/5	0.0 ppm		
30						
	NA	30 - 35	5/5	0.0 ppm		
35						
	NA	35 - 40	5/5	0.0 ppm		
40						
	NA	40 - 45	5/5	0.0 ppm		
45						
	NA	45 - 50	5/4.9	0.0 ppm		
50						

Continued on page 2

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-65.0 to -48.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-43.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-48.0 to -43.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-50.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-65.0 to -50.0 feet (bgs)

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COREL: 94-41

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-4 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **65 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/22/94**

Static Water Level Depth: **56 feet**
Static Water Level Elevation: **637.05 feet**
Surveyed Elevation (PVC Casing): **695.35 feet**
Surveyed Elevation (Ground Surface): **693.05 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				Contined from Page 1		
50	NA	50-55	5/5	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain, dry, soft, loose		
55	NA	55 -60	5/1	0.0 ppm	Water Table		
60	NA	60-65	5/1	0.0 ppm			2" PVC screen; Sand filter pack
65					Total Depth - 65.0 Feet		
70							
75							
80							
85							
90							
95							
100							

CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-65.0 to -48.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-48.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-48.0 to -43.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-50.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-65.0 to -50.0 feet (bgs)

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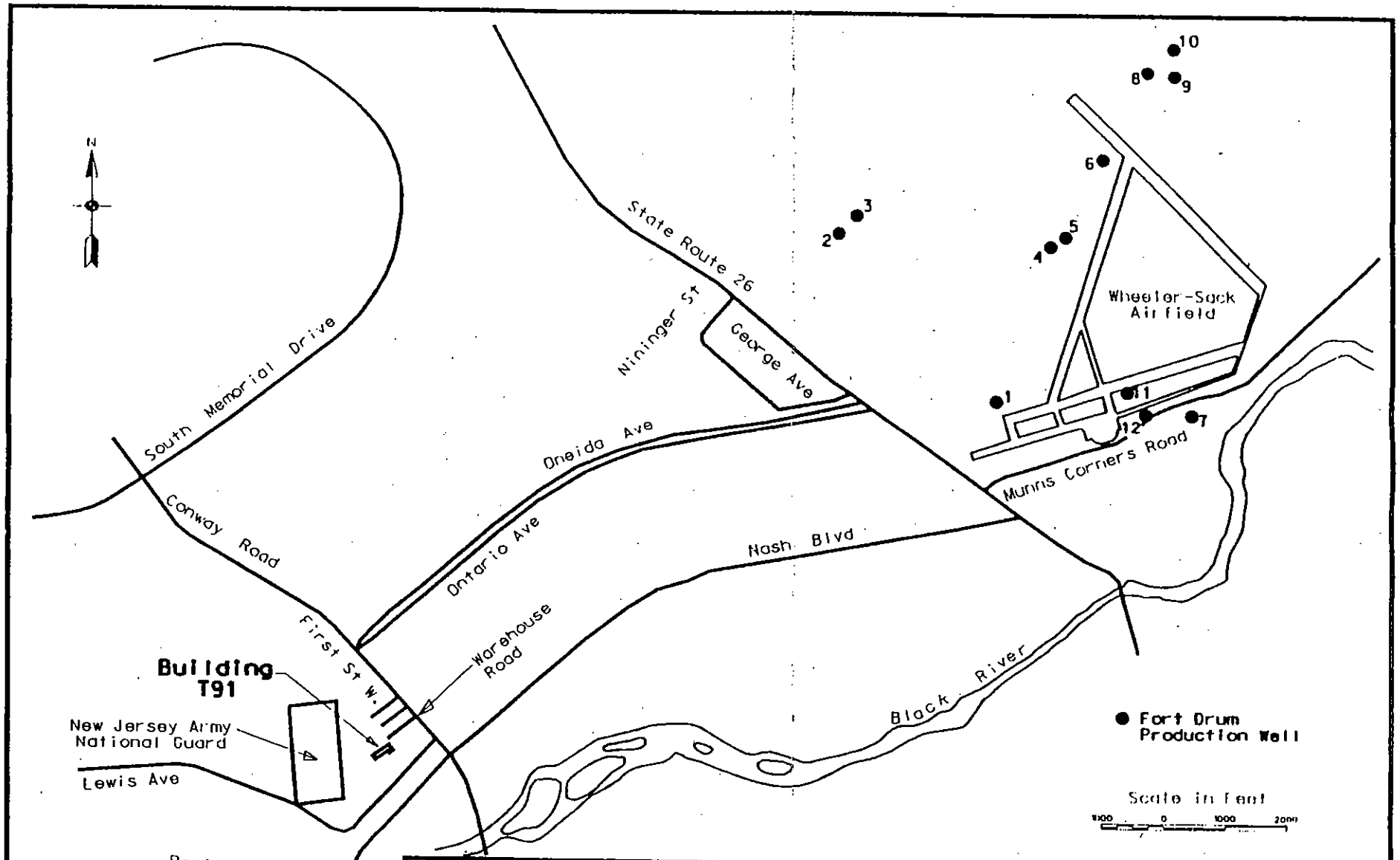
COREL: 94-42

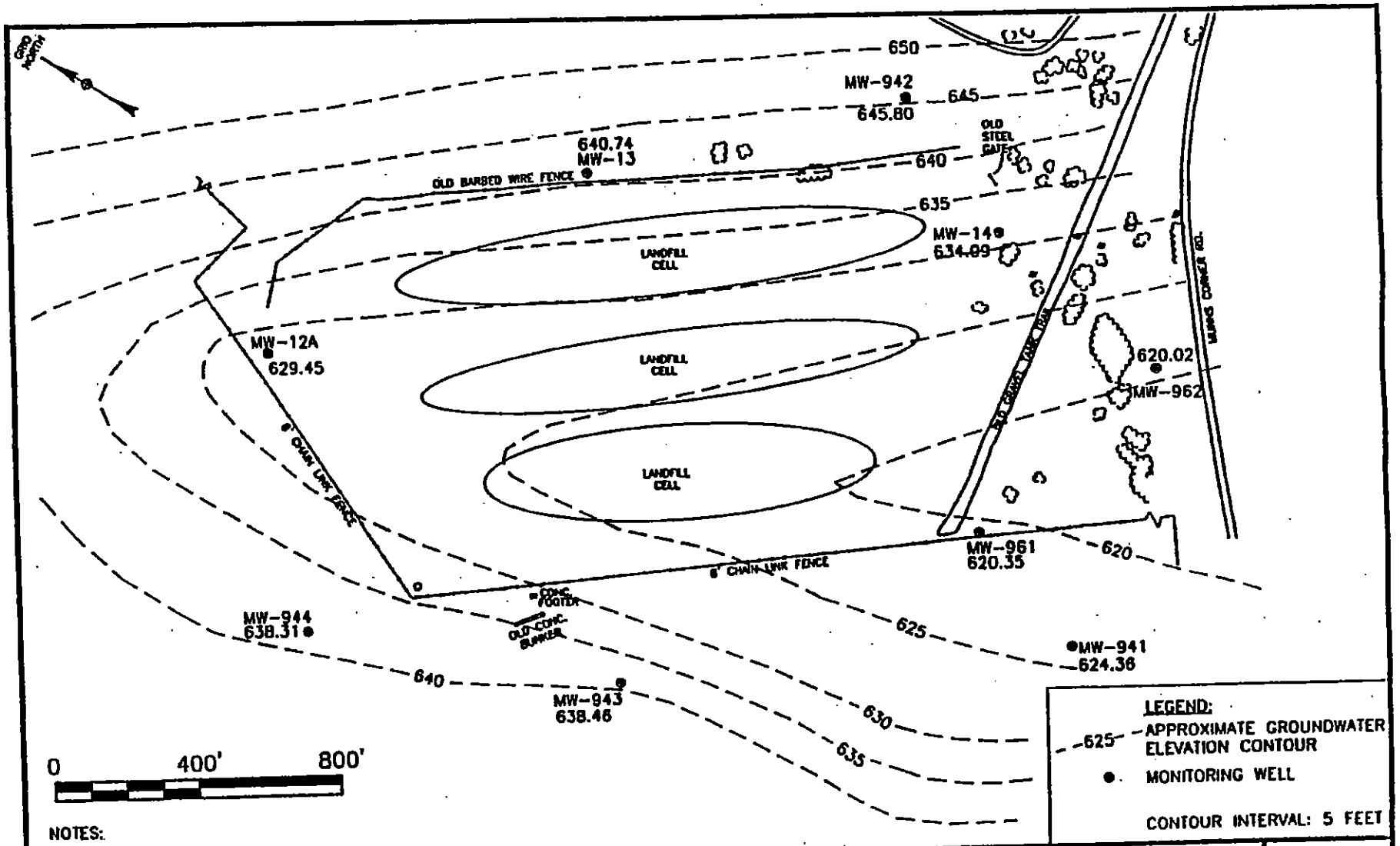
APPENDIX J

(EXISTING SANITARY LANDFILL)



Project No.:	Fort Drum, New York CDM FEDERAL PROGRAMS CORPORATION	Fort Drum Production Well Location Map	Figure No.:

PROWELL.DGN



LEGEND:

625 — APPROXIMATE GROUNDWATER ELEVATION CONTOUR

● MONITORING WELL

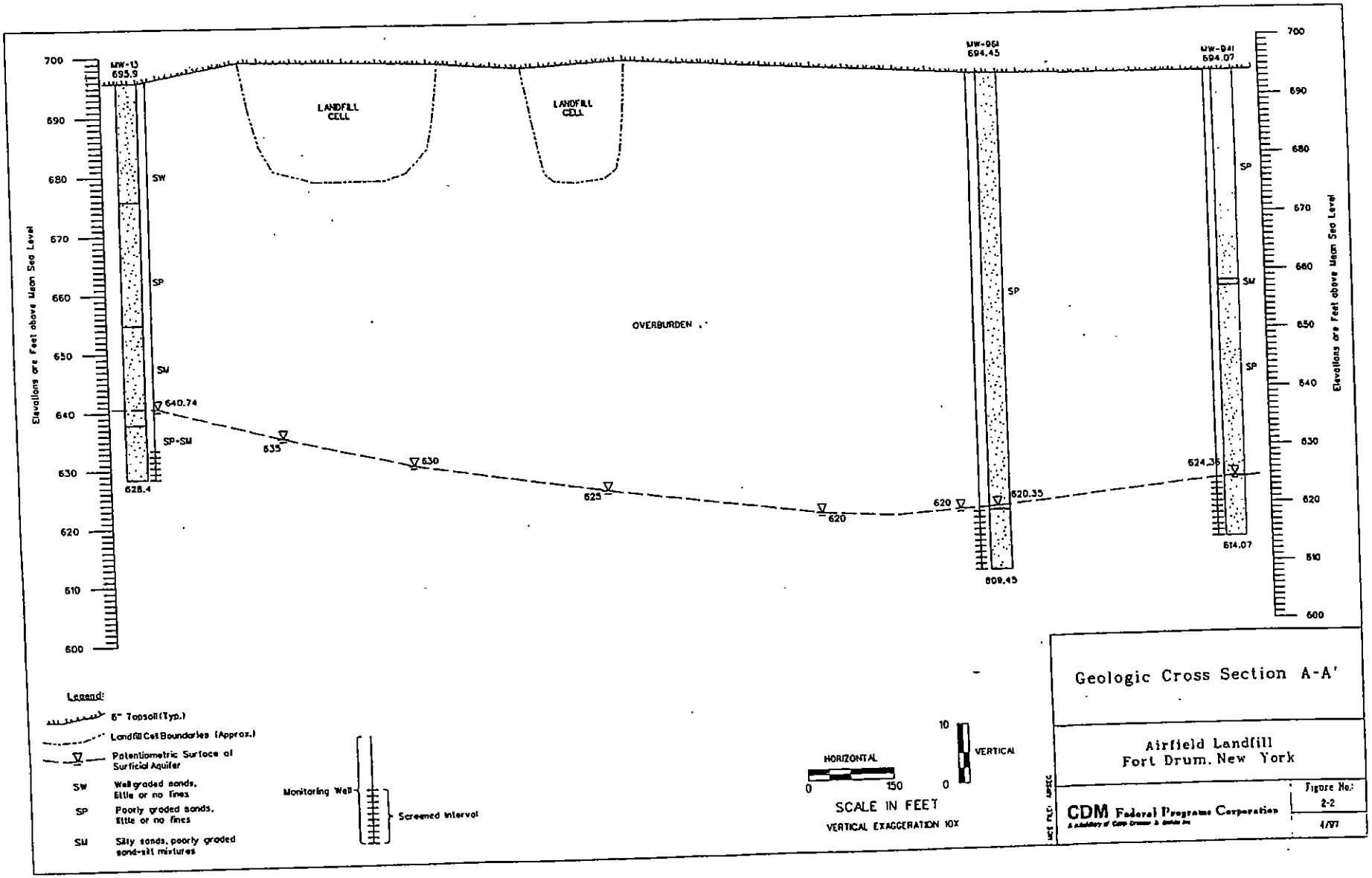
CONTOUR INTERVAL: 5 FEET

NOTES:

1. Ground survey data used as the basis for the photogrammetric mapping, was provided by Larsen Engineers of Rochester, New York in May of 1993.
2. Photogrammetry provided by Erdmon Anthony Consulting Engineers.

ACAD FILE: CONTOUR2

Project No:	Airfield Landfill Fort Drum, New York	Surficial Aquifer Contour Map June 1996	Figure No.: 1
7801-024	CDM FEDERAL PROGRAMS CORPORATION a subsidiary of Camp Dresser & McKee Inc.		8/96


MW-13
695.9
MW-06I
694.45
MW-04I
694.07
LANDFILL CELL
LANDFILL CELL
OVERBURDEN
SW
SP
SW
SP+SW
SP
SP
SM
SP
640.74
635
630
625
620
620
620.35
624.35
628.4
609.45
614.07
700
690
680
670
660
650
640
630
620
610
600
Elevations are Feet above Mean Sea Level
Legend:
6" Topsoil (Typ.)
Landfill Cell Boundaries (Approx.)
Potentiometric Surface of Surficial Aquifer
SW Well graded sands, little or no fines
SP Poorly graded sands, little or no fines
SM Silty sands, poorly graded sand-silt mixtures
Monitoring Well
Screened Interval
HORIZONTAL
0
150
VERTICAL
10
0
SCALE IN FEET
VERTICAL EXAGGERATION 10X
Geologic Cross Section A-A'
Airfield Landfill
Fort Drum, New York
CDM Federal Programs Corporation
Figure No.
2-2
4/97

WELL CONSTRUCTION SUMMARY

Project/Site: Fort Drum/Airfield Landfill

Geologist: Michael Gagne Date: 6/6/96

Checked By: Date:

Well No. MW-961

Revision No.:

Page 1 of 1

Project Name FORT DRUM Site Name AIRFIELD LF

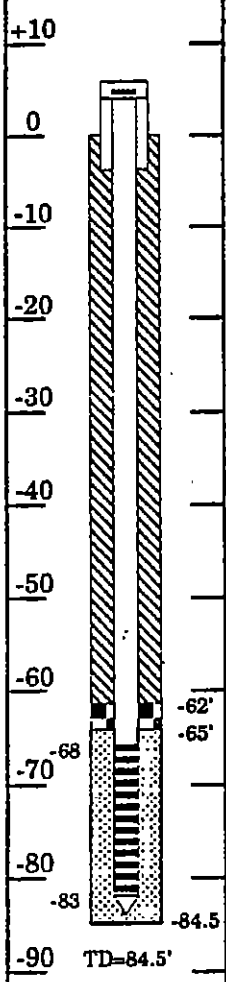
Site No. MW-961 Date 06/06/96 Time

Township Range Section 1/4 1/4 1/4

State Plane: Northing 1479703.6 Easting 731956.2

Ground Elevation 694.45 FT/M X Top of Casing Elevation 696.67 FT/M X

PERSONNEL:



DRILLING SUMMARY

Total Depth: 85 Feet

Borehole Diameter From: 0' to 85'

7 1/4" O.D.

Driller: Rod Bush / Al Reynolds

Drilling Company: Empire Drilling

Rig: Failing F-10

Bit(s):

Drilling Fluids From: N/A to

Surface Casing From: N/A to

WELL DESIGN

Basis: Geologic Log

Geophysical Log

Casing String(s):			C-Casing	S-Screen
+2'	- -68'	C_1	-	
-68'	- -83'	S_1	-	
-83'	- -84.5'	C_2	-	

CONSTRUCTION TIME LOG

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/5	1441	6/5	1555
	6/6	0720	6/6	1448
Geophysical Logging: N/A				
Casing:	6/6	1711	6/6	1715
Filter Placement:	6/6	1720	6/6	1942
Bentonite:	6/7	0815	6/7	1150
Grouting:	6/11	1320	6/11	1440
Pad/Protective Csg.:	6/6	1947	6/6	1957
Development:				
Other:				

CONSTRUCTION DESCRIPTION

Casing: C1 2" diameter PVC

C2 2" diameter PVC Sump

C3

C4

Screen: S1 2" diameter PVC

S2

S3

S4

Centralizers:

Filter Pack Material: Silica Sand

Size 10-20

Cement: Rochester Portland Cement

Type I

Slot Sizes: 0.010 in.

Other: Bentonite Hole Plug Chips

Remarks:

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COREL: 96

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Airfield Landfill**
Well No: **96-1 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

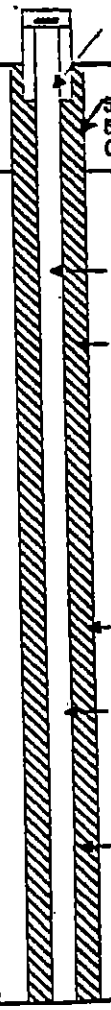
Total Depth: **85 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 feet**
Installation Date: **6/7/96**

Static Water Level Depth: **76.88 feet**
Static Water Level Elevation: **619.79 feet**
Surveyed Elevation (PVC Casing): **696.67 feet**
Surveyed Elevation (Ground Surface): **694.45 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Recov./ Adv. (feet)	Org. Vapor Readings (ppm)		
	GROUND ELEVATION					
0	NA	0 - 5	3.6/5	0.0 ppm	SAND - Fine grained, minor medium grain, dry, loose, soft, moderate yellowish brown 10 YR 6/6.	
5	NA	5 - 10	4.2/5	0.0 ppm		
10	NA	10 - 15	3.0/5	0.0 ppm		
15	NA	15 - 20	2.5/5	0.0 ppm		
20	NA	20 - 25	3.1/5	0.0 ppm		
25	NA	25 - 30	3.2/5	0.0 ppm		
30	NA	30 - 35	2.1/5	0.0 ppm		
35	NA	35 - 40	2/5	0.0 ppm		
40	NA	40 - 45	2.1/5	0.0 ppm		
45	NA	45 - 50	4/5	0.0 ppm		
50						

Continued on page 2

Monitoring Equipment Installed



Location of water encountered during drilling 6-6-96

Static Water Level 6-27-96

CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-84.5 to -65.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-65.0 to -62.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement Company, NY
	Interval:	-62.0 to 0.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-68.0 to +2.0 feet (bgs)
SCREEN -	Type:	2 inch I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-83.0 to -68.0 feet (bgs)

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COREL: 96-1

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Airfield Landfill**
Well No: **96-1 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **85 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 feet**
Installation Date: **6/7/96**

Static Water Level Depth: **76.88 feet**
Static Water Level Elevation: **619.79 feet**
Surveyed Elevation (PVC Casing): **696.67 feet**
Surveyed Elevation (Ground Surface): **694.45 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Split-Spoon Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Recov/ Adv. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				(Continued from page 1)		
50	NA	50 - 55	2.7/5	0.0 ppm	SAND - Fine grained, minor medium grain, saturated, loose, moderate yellowish brown 10 YR 6/6.		2" PVC Casing
55	NA	55 - 60	3/5	0.0 ppm			
60	NA	60 - 65	4/5	0.0 ppm			
65	NA	65 - 70	3.6/5	0.0 ppm			Centralizer
70	NA	70 - 75	3.7/5	0.0 ppm			73.0
75	NA	75 - 80	1.2/5	0.0 ppm			76.0
80	NA	80 - 85	1.5/5	0.0 ppm			2" PVC screen
85					Total Depth - 85 Feet		Sand filter pack
90							
95							

CONSTRUCTION MATERIALS

SAND - Type: U.S. Silica Sand, Size #3Q
Interval: -84.5 to -65.0 feet (bgs)

BENTONITE - Type: Peltonite, 1/4" pellets, by Roctest, Inc. NY
Interval: -65.0 to -62.0 feet (bgs)

CEMENT - Type: Type I Regular Portland Cement by Rochester Cement Company, NY
Interval: -62.0 to 0.0 feet (bgs)

CASING - Type: 2" I.D. Schedule 40 PVC
Interval: -68.0 to +2.0 feet (bgs)

SCREEN - Type: 2 inch I.D. Schedule 40 PVC, 0.010-inch slots
Interval: -83.0 to -68.0 feet (bgs)

▽ Location of water encountered during drilling 6-6-96

▽ Static Water Level 6-27-96

CDM FEDERAL PROGRAMS CORPORATION
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COREL: 96-1

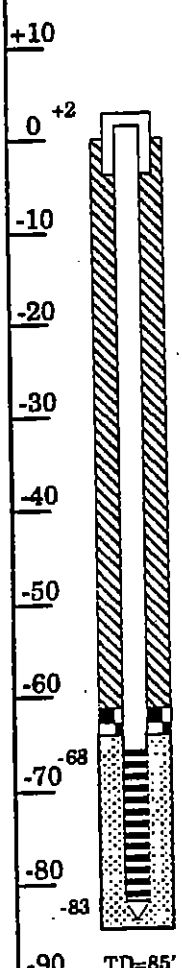
WELL CONSTRUCTION SUMMARY

Project/Site: Fort Drum/Airfield Landfill
Geologist: Michael Gagne Date: 6/8/96
Checked By: Michael Gagne Date: 6/8/96

Well No. MW-962
Revision No.:
Page 1 of 1

Project Name FORT DRUM
Site Name AIRFIELD LF
Site No. MW-962
Date 060696 Time
Township Range Section 1/4 1/4 1/4
State Plane: Northing 1479509.7 Easting 7308500.0
Ground Elevation 694.47 FT/M X Top of Casing Elevation 696.90 FT/M X

PERSONNEL:



DRILLING SUMMARY

Total Depth: 85 Feet
Borehole Diameter From: 0' to 85'
7 1/4" O.D.
Driller: Rod Bush / Al Reynolds
Drilling Company: Empire Drilling
Rig: Failing F-10
Bit(s): N/A

Drilling Fluids From: N/A to
Surface Casing From: N/A to

WELL DESIGN

Basis: Geologic Log X
Geophysical Log

Casing String(s): C-Casing			S-Screen		
+2'	-68'	C_1			
-68'	-83'	S_1			
-83'	-84.5'	C_2			

CONSTRUCTION TIME LOG

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/8	0741	6/8	1325
	6/9	1403	6/9	1635
Geophysical Logging: N/A				
Casing:	6/8	1333	6/8	1338
	6/9	1707	6/9	1711
Filter Placement:	6/9	1716	6/9	1904
Bentonite:	6/10	0830	6/10	1221
Grouting:	6/12	0719	6/12	0851
Pad/Protective Csg.:	6/9	1906	6/9	1913
Development:				
Other:				

CONSTRUCTION DESCRIPTION

Casing: C1 2" diameter PVC
C2 2" diameter PVC Sump
C3
C4
Screen: S1 2" diameter PVC
S2
S3
S4
Centralizers:

Filter Pack Material: Silica Sand
Size 10-20
Cement: Rochester Portland Cement
Type I
Slot Sizes: 0.010 in.

Other: Bentonite: Hole Plug Chips

Remarks:

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COREL 95

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: Fort Drum, New York
Site: Airfield Landfill
Well No: 96-2 (page 1)
Geologist: Mike Gagne
Client: Corps of Engineers, Kansas City District
Drilling Company: Empire Soils Investigations, Inc.

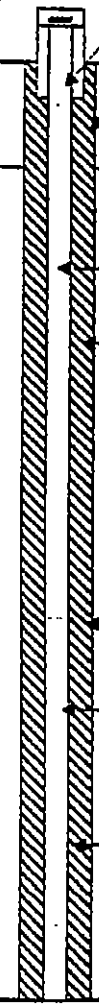
Total Depth: 85 feet
Screen Length: 15 feet
Borehole Diameter: 10.5 feet
Installation Date: 6/10/96

Static Water Level Depth: 76.32 feet
Static Water Level Elevation: 620.58 feet
Surveyed Elevation (PVC Casing): 696.90 feet
Surveyed Elevation (Ground Surface): 694.47 feet
Organic Vapor Instruments Used: OVM-580B
Boring Method Used: Failing F-10; Hollow Stem Auger

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Recov/ Adv. (feet)	Org. Vapor Readings (ppm)		
	GROUND ELEVATION					
0	NA	0 - 5	3.5/5	0.0 ppm	SAND - Fine grained, minor medium grain, dry, loose, soft, moderate yellowish brown 10 YR 5/4.	
5	NA	5 - 10	2.3/5	0.0 ppm		
10	NA	10 - 15	3.0/5	0.0 ppm		
15	NA	15 - 20	1.5/5	0.0 ppm		
20	NA	20 - 25	3.1/5	0.0 ppm		
25	NA	25 - 30	3.5/5	0.0 ppm		
30	NA	30 - 35	2.4/5	0.0 ppm		
35	NA	35 - 40	2.9/5	0.0 ppm		
40	NA	40 - 45	2.5/5	0.0 ppm		
45	NA	45 - 50	3/5	0.0 ppm		
50						

Continued on page 2

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-85.0 to -65.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-65.0 to -62.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement Company, NY
	Interval:	-62.0 to 0.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-68.0 to +2.0 feet (bgs)
SCREEN -	Type:	2 inch I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-83.0 to -68.0 feet (bgs)

▽ Location of water encountered during drilling 6-9-96

▽ Static Water Level 6-27-96

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COREL: 96-2

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Airfield Landfill**
Well No: **96-2 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **85 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 feet.**
Installation Date: **6/10/96**

Static Water Level Depth: **76.32 feet**
Static Water Level Elevation: **620.58 feet**
Surveyed Elevation (PVC Casing): **696.90 feet**
Surveyed Elevation (Ground Surface): **694.47 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Split-Spoon Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Recov./ Adv. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				(Continued from page 1)		
50	NA	50 - 55	3.4/5	0.0 ppm	SAND - Fine grained, silty sand, loose, soft, saturated, medium yellowish brown, 10 YR 5/4.		2" PVC Casing
55	NA	55 - 60	1.8/5	0.0 ppm			
60	NA	60 - 65	3.0/5	0.0 ppm			
65	NA	65 - 70	3.6/5	0.0 ppm			Centralizer
70	NA	70 - 75	2.7/5	0.0 ppm			73.0
75	NA	75 - 80	2.5/5	0.0 ppm			76.0
80	NA	80 - 85	NA	NA			2" PVC screen
							Sand filter pack
85					Total Depth - 85 Feet		No Sample Taken at 80-85'
90							
95							

CONSTRUCTION MATERIALS

SAND - Type: U.S. Silica Sand, Size #3Q
Interval: -85.0 to -65.0 feet (bgs)

BENTONITE - Type: Peltonite, 1/4" pellets, by Roctest, Inc. NY
Interval: -65.0 to -62.0 feet (bgs)

CEMENT - Type: Type I Regular Portland Cement by Rochester Cement Company, NY
Interval: -62.0 to 0.0 feet (bgs)

CASING - Type: 2" I.D. Schedule 40 PVC
Interval: -68.0 to +2.0 feet (bgs)

SCREEN - Type: 2 inch I.D. Schedule 40 PVC, 0.010-inch slots
Interval: -83.0 to -68.0 feet (bgs)

▽ Location of water encountered during drilling 6-9-96

▽ Static Water Level 6-27-96

CDM FEDERAL PROGRAMS CORPORATION
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COREL: 96-2

MONITORING WELL CONSTRUCTION AND BORING LOG

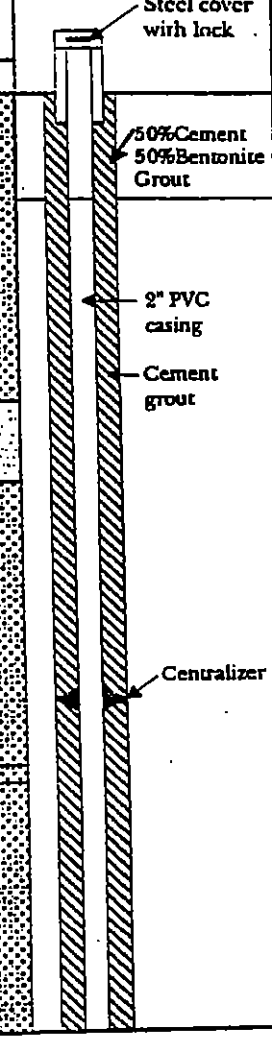
Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-1 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **80 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/20/94**

Static Water Level Depth: **72 feet**
Static Water Level Elevation: **622.07 feet**
Surveyed Elevation (PVC Casing): **696.40 feet**
Surveyed Elevation (Ground Surface): **694.07 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10;Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0	NA	0 - 5	5/3.7	0.0 ppm	SAND - Dark yellowish orange (10 YR 6/6), fine grain, dry, loose.	
5	NA	5 -10	5/3	0.0 ppm		
10	NA	10 - 15	5/3.7	0.0 ppm		
15	NA	15 - 20	5/4	0.0 ppm	Thin Black Striations at various intervals (< cm apart)	
20	NA	20 - 25	5/4.8	0.0 ppm		
25	NA	25 - 30	5/5	0.0 ppm	SAND - Moderate yellowish brown (10 YR 5/4) fine grain, dry, loose.	
30	NA	30 - 35	5/4.5	0.0 ppm	Silty SAND - Dark yellowish brown (10 YR 4/2), dry, nonplastic.	
35	NA	35 - 40	5/5	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, loose.	
40	NA	40 - 45	5/4.4	0.0 ppm		
45	NA	45 - 50	5/4.5	0.0 ppm		
50					Continued on page 2	

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-80.0 to -63.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement NY
	Interval:	-60.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-63.0 to -60.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-65.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-80.0 to -65.0 feet (bgs)

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COREL: 94-11

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-1 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **80 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/19-20/94**

Static Water Level Depth: **72 feet**
Static Water Level Elevation: **622.07 feet**
Surveyed Elevation (PVC Casing): **696.40 feet**
Surveyed Elevation (Ground Surface): **694.07 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				Continued from page 1		
50	NA	0 - 5	5/3.7	0.0 ppm			2" PVC casing
55	NA	5 -10	5/3	0.0 ppm			Cement grout
60	NA	10 - 15	5/3.7	0.0 ppm			Bentonite
65	NA	15 - 20	5/4	0.0 ppm			Centralizer
70	NA	20 - 25	5/4.8	0.0 ppm	Water Table		2" PVC screen
75	NA	25 - 30	5/5	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, wet, loose.		Sand filter pack
80					Total Depth - 80.0 Feet		
85							
90							
95							
100							

CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-80.0 to -65.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement NY
	Interval:	-60.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-65.0 to -60.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-65.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-80.0 to -65.0 feet (bgs)

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COREL: 94-12

MONITORING WELL CONSTRUCTION AND BORING LOG

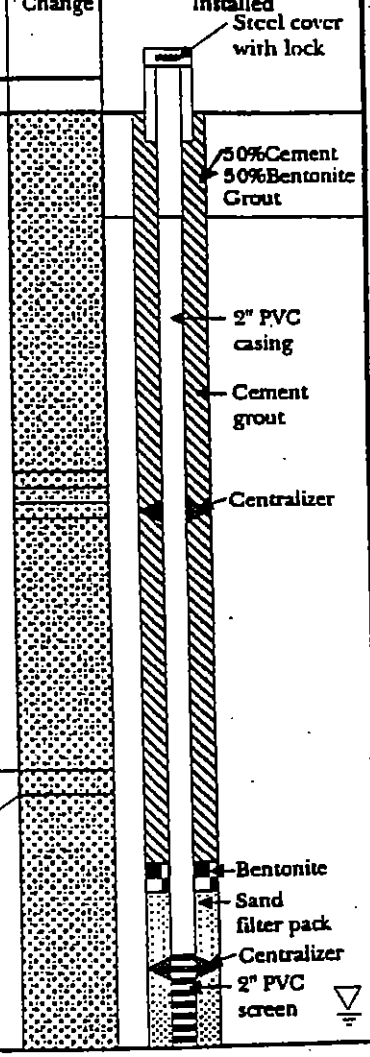
Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-2 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **60 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/20/94**

Static Water Level Depth: **50 feet**
Static Water Level Elevation: **644.56 feet**
Surveyed Elevation (PVC Casing): **697.36 feet**
Surveyed Elevation (Ground Surface): **694.56 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler — Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)	Sample Description	Strata Change
	Ground Elevation					
0	NA	0 - 5	5/1	0.0 ppm	SAND - Dark yellowish orange (10 YR 6/6), fine grain, dry, loose.	
5	NA	5 -10	5/2	0.0 ppm		
10	NA	10 - 15	5/3.5	0.0 ppm		
15	NA	15 - 20	5/3.2	0.0 ppm		
20	NA	20 - 25	5/1.5	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, loose, thin black striations present.	
25	NA	25 - 30	5/3.5	0.0 ppm		
30	NA	30 - 35	5/4.2	0.0 ppm		
35	NA	35 - 40	5/4.5	0.0 ppm	SILTY SAND - Dark yellowish brown (10 YR 4/2), very fine grain, damp, loose.	
40	NA	40 - 45	5/4.4	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, loose, thin black striations.	
45	NA	45 - 50	5/2.7	0.0 ppm	Continued on page 2	
50						

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-60.0 to -43.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-40.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc. NY
	Interval:	-43.0 to -40.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-45.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-60.0 to -45.0 feet (bgs)

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COREL: 94-21

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-2 (page 2)**
Geologist: **Mike Gague**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **60 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/20/94**

Static Water Level Depth: **50 feet**
Static Water Level Elevation: **644.56 feet**
Surveyed Elevation (PVC Casing): **697.36 feet**
Surveyed Elevation (Ground Surface): **694.56 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				Continued from page 1		
50	NA	50-55	5/1	0.0 ppm	SAND - Pale yellowish brown (10 YR 6/2), fine grain, dry, soft, loose, thin striation black		2" PVC screen; Sand filter pack
55	NA	55 -60	5/2.5	0.0 ppm			
60					Total Depth - 60.0 Feet		
65							
70							
75							
80							
85							
90							
95							
100							

CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-60.0 to -43.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-40.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-43.0 to -40.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-45.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-60.0 to -45.0 feet (bgs)

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COREL: 94-22

MONITORING WELL CONSTRUCTION AND BORING LOG

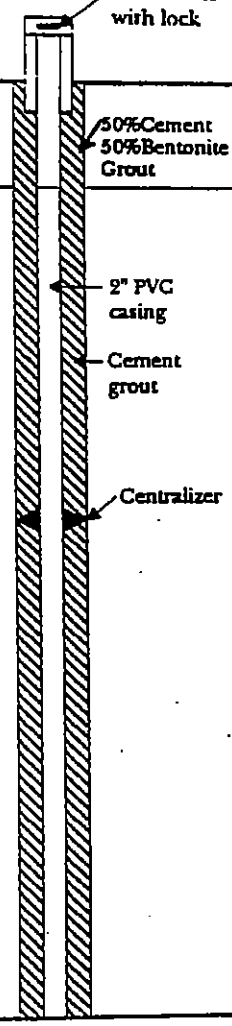
Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-3 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **70 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/21/94**

Static Water Level Depth: **59 feet**
Static Water Level Elevation: **636.11 feet**
Surveyed Elevation (PVC Casing): **697.82 feet**
Surveyed Elevation (Ground Surface): **695.11 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0	NA	0 - 5	5/3.7	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain dry, loose	
5	NA	5 -10	5/3.8	0.0 ppm		
10	NA	10 - 15	5/4.2	0.0 ppm		
15	NA	15 - 20	5/5	0.0 ppm		
20	NA	20 - 25	5/5	0.0 ppm		
25	NA	25 - 30	5/5	0.0 ppm		
30	NA	30 - 35	5/3.5	0.0 ppm		
35	NA	35 - 40	5/3.2	0.0 ppm		
40	NA	40 - 45	5/4	0.0 ppm		
45	NA	45 - 50	5/4	0.0 ppm		
50					Continued on Page 2	

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #SQ
	Interval:	-70.0 to -53.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-50.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-53.0 to -50.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-55.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-70.0 to -55.0 feet (bgs)

CDM FEDERAL PROGRAMS CORPORATION
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COREL: 94-51

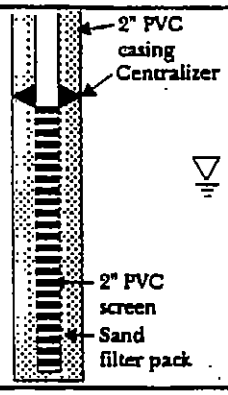
MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-3 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **70 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/21/94**

Static Water Level Depth: **59 feet**
Static Water Level Elevation: **636.11 feet**
Surveyed Elevation (PVC Casing): **697.82 feet**
Surveyed Elevation (Ground Surface): **695.11 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation				Continued from Page 1	
50	NA	50-55	5/4.5	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain, dry, loose	
55	NA	55 -60	5/3.8	0.0 ppm	Water Table	
60	NA	60-65	5/1	0.0 ppm		
65	NA	65-70	5/0.5	0.0 ppm		
70					Total Depth - 70.0 Feet	
75						
80						
85						
90						
95						
100						



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-70.0 to -53.0 feet (bgs)
CEMENT -	Type:	Type 1 Regular Portland Cement by Rochester Cement, NY
	Interval:	-50.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-53.0 to -50.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-55.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-70.0 to -55.0 feet (bgs)

CDM FEDERAL PROGRAMS CORPORATION
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COREL: 94-32

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-4 (page 1)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

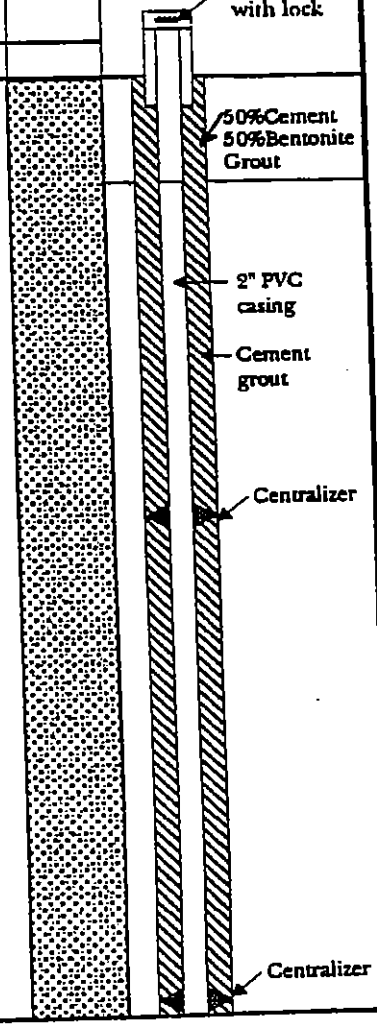
Total Depth: **65 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/22/94**

Static Water Level Depth: **56 feet**
Static Water Level Elevation: **637.05 feet**
Surveyed Elevation (PVC Casing): **695.35 feet**
Surveyed Elevation (Ground Surface): **693.05 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)		
	Ground Elevation					
0	NA	0 - 5	5/4	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain dry, loose	
5	NA	5 - 10	5/3.2	0.0 ppm		
10	NA	10 - 15	5/3.7	0.0 ppm		
15	NA	15 - 20	5/4.5	0.0 ppm		
20	NA	20 - 25	5/4.1	0.0 ppm		
25	NA	25 - 30	5/5	0.0 ppm		
30	NA	30 - 35	5/5	0.0 ppm		
35	NA	35 - 40	5/5	0.0 ppm		
40	NA	40 - 45	5/5	0.0 ppm		
45	NA	45 - 50	5/4.9	0.0 ppm		
50						

Continued on page 2

Monitoring Equipment Installed



CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-65.0 to -48.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-43.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-48.0 to -43.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-50.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-65.0 to -50.0 feet (bgs)

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COREL: 94-41

MONITORING WELL CONSTRUCTION AND BORING LOG

Project: **Fort Drum, New York**
Site: **Existing Sanitary Landfill**
Well No: **94-4 (page 2)**
Geologist: **Mike Gagne**
Client: **Corps of Engineers, Kansas City District**
Drilling Company: **Empire Soils Investigations, Inc.**

Total Depth: **65 feet**
Screen Length: **15 feet**
Borehole Diameter: **10.5 inches**
Installation Date: **6/22/94**

Static Water Level Depth: **56 feet**
Static Water Level Elevation: **637.05 feet**
Surveyed Elevation (PVC Casing): **695.35 feet**
Surveyed Elevation (Ground Surface): **693.05 feet**
Organic Vapor Instruments Used: **OVM-580B**
Boring Method Used: **Failing F-10; Hollow Stem Auger**

Depth from Ground (Feet)	Sampling Device: Continous Sampler				Sample Description	Strata Change	Monitoring Equipment Installed
	Blows per 6" 140 lbs.	Sample Interval (feet)	Adv. / Recov. (feet)	Org. Vapor Readings (ppm)			
	Ground Elevation				Contined from Page 1		
50							
	NA	50-55	5/5	0.0 ppm	SAND - Moderate brown (5 YR 4/4), fine grain, dry, soft, loose		
55					Water Table		
	NA	55 -60	5/1	0.0 ppm			
60							2" PVC screen
	NA	60-65	5/1	0.0 ppm			Sand filter pack
65					Total Depth - 65.0 Feet		
70							
75							
80							
85							
90							
95							
100							

CONSTRUCTION MATERIALS

SAND -	Type:	U.S. Silica Sand, Size #3Q
	Interval:	-65.0 to -48.0 feet (bgs)
CEMENT -	Type:	Type I Regular Portland Cement by Rochester Cement, NY
	Interval:	-43.0 to 0.0 feet (bgs)
BENTONITE -	Type:	Peltonite, 1/4" pellets, by Roctest, Inc, NY
	Interval:	-48.0 to -43.0 feet (bgs)
CASING -	Type:	2" I.D. Schedule 40 PVC
	Interval:	-50.0 to +2.5 feet (bgs)
SCREEN -	Type:	2" I.D. Schedule 40 PVC, 0.010-inch slots
	Interval:	-65.0 to -50.0 feet (bgs)

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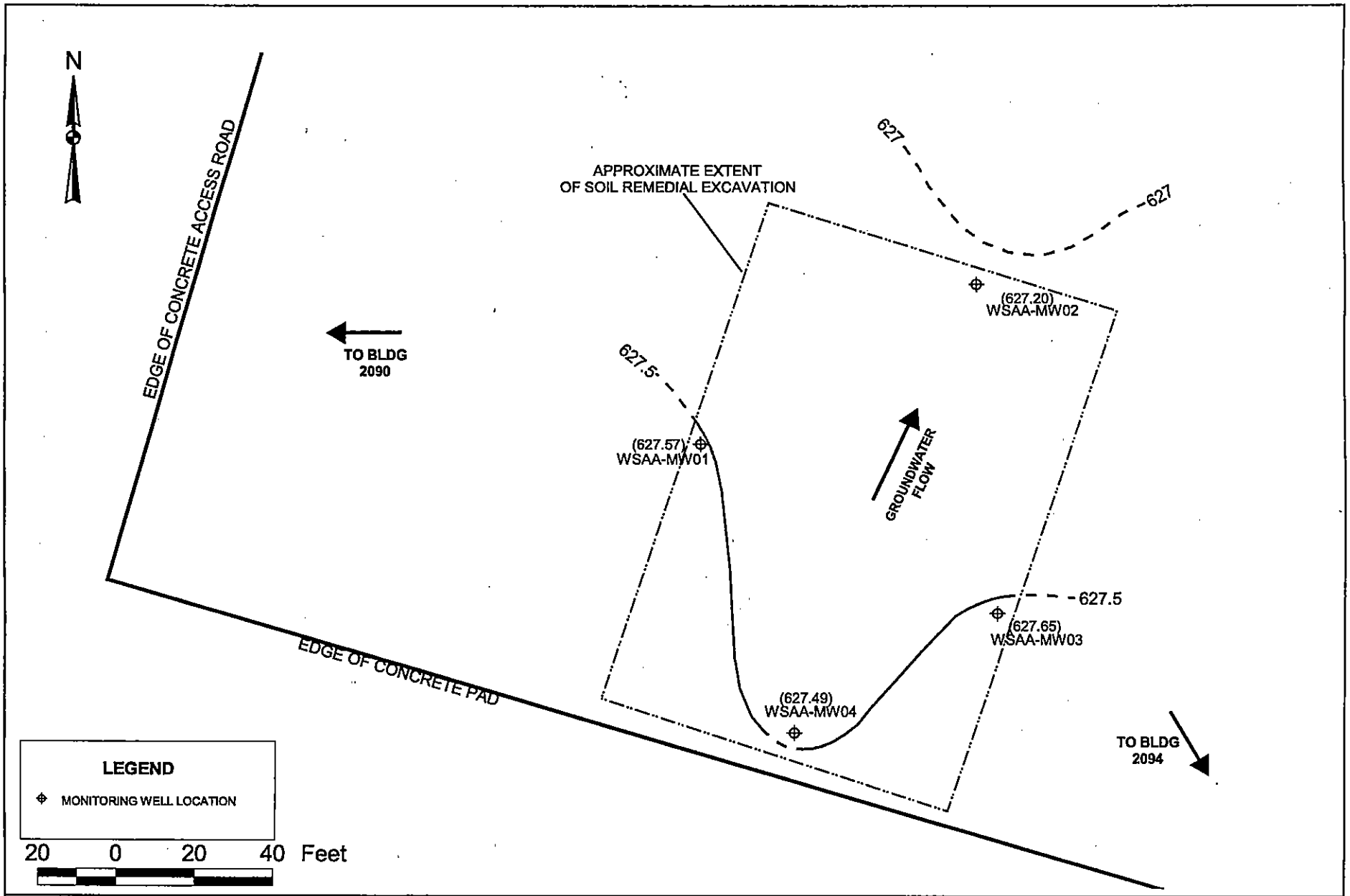
COREL: 94-42

APPENDIX J

WHEELER SACK ARMY AIRFIELD SPILL SITE



EA ENGINEERING, SCIENCE, AND TECHNOLOGY	FIGURE 1 SITE MAP AND GROUNDWATER CONTOUR MAP 18 FEBRUARY 2003	DESIGNED BY DB	DRAWN BY BLH	DATE 03/18/03	SCALE AS SHOWN
US ARMY CORPS OF ENGINEERS BALTIMORE DISTRICT / PW PUBLIC WORKS FORT DRUM, NEW YORK		CHECKED BY DB	PROJECT MGR. TWP	PROJECT NO. 60957.15	FILE ASL.APR

TABLE 1 MONITORING WELL CONSTRUCTION SUMMARY

Well No.	Completion Date	Completion Depth (ft bgs)	Screened Interval (ft bgs)	Depth to Water[a] (ft btoc)
WSAA-MW01	7/23/02	68	57.5-67.5	63.59
WSAA-MW02	7/24/02	68	58-68	63.60
WSAA-MW03	7/25/02	68	58-68	62.67
WSAA-MW04	7/26/02	72	62-72	66.40

(a) Water level gauging data was obtained on 5 August 2002.

NOTE: bgs = Below ground surface.
btoc = Below top of polyvinyl chloride casing.

Attachment B

Boring Logs

HTRW BORING/WELL LOG	District: Baltimore	Hole Number: W5AA-MW01
Company Name: EA Engineering, Science, and Technology	Drill Subcontractor: Parratt-Wolff, Inc.	
Project: Wheeler Sack Army Airfield Spill Site	Component/Site: Fort Drum Airfield, Fort Drum, NY	
Name of Driller: Mark Eaves/Bill Rice/Rod Trask	Manufacturer's Designation of Drill: CME 75	
Sizes and Types of Drilling and Sampling Equipment: 6.25-in ID hollow stem augers, 2-in. x 2-ft. split spoons	Hole Location/Grid Location: Northing: Y	Easting: X
Overburden Thickness (ft): >68 ft	Surface Elevation: SurfElev	
Depth Drilled into Rock (ft): NA	Date Started: 7/22/02	Date Completed: 7/23/02
Total Depth of Hole (ft): 68 ft	Groundwater Encountered (ft bgs): 61 ft	Sample Type: VOCs EPA 8260 STARS; SVOCs EPA 8270 STARS
Disposition of Hole: Installed 4-in. diameter PVC monitoring well	Geologist: Daniel Bishuk, Jr.	NA

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
0			UPPER BACKFILL: Excavation Backfill Material: Tan to Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive)				
2							
4							
6							
8							
10							
12							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW01
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW01
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
34							
			SW: Tan to Light Brown vf-f SAND; Little m Sand (Slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	<1		17	12,28,34,41
36							
				<1	WSAA-SB01(36-38)	12	27,37,50/0.4'
38							
				<1		18	25,32,46,50/0.4'
40							
				<1		20	14,21,27,34
42							
				<1		20	28,30,36,43
44							
				<1		22	11,12,28,38
46							
				<1		13	30,44,50/0.4'
48							
				<1		16	14,15,27,30
50							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW01
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
				<1		18	12,14,30,40
52							
				<1		17	12,25,25,36
54			SW: Light Brown to Brown Gray vf-f SAND; Trace Silt (Moist; Moist to very moist at 58 ft; Loose; Non-cohesive; Horizontal laminations accented with black streaks)				
				<1		17	20,19,20,33
56							
				<1		24	13,15,20,24
58							
				<1	WSAA-SB01(58-60)	18	12,13,18,18
60			SW: Brown Gray vf-f SAND; Little Silt (Very moist; Wet at 61 ft; Loose to semi-cohesive; Faint horizontal laminations accented with black streaks; Completion Depth = 68 ft; No bedrock encountered)				
				<1		24	6,8,8,8
62							
				<1		24	10,12,15,15
64							
				<1		24	10,15,25,21
66							
				<1		24	15,22,17,15
68							

HTRW BORING/WELL LOG	District: Baltimore	Hole Number: WSAA-MW02
Company Name: EA Engineering, Science, and Technology	Drill Subcontractor: Parratt-Wolff, Inc.	
Project: Wheeler Sack Army Airfield Spill Site	Component/Site: Fort Drum Airfield, Fort Drum, NY	
Name of Driller: Mark Eaves/Bill Rice/Rod Trask	Manufacturer's Designation of Drill: CME 75	
Sizes and Types of Drilling and Sampling Equipment: 6.25-in ID hollow stem augers, 2-in. x 2-ft. split spoons	Hole Location/Grid Location: Northing: Y Easting: X	
Overburden Thickness (ft): >68 ft	Surface Elevation: SurfElev	
Depth Drilled into Rock (ft): NA	Date Started: 7/23/02	Date Completed: 7/24/02
Total Depth of Hole (ft): 68 ft	Groundwater Encountered (ft bgs): 61.5 ft	Sample Type: VOCs EPA 8260 STARS; SVOCs EPA 8270 STARS; NA
Disposition of Hole: Installed 4-in. diameter PVC monitoring well	Geologist: Daniel Bishuk, Jr.	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
0			UPPER BACKFILL: Excavation Backfill Material: Tan to Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive)				
2							
4							
6							
8							
10							
12							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW02
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW02
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
34			SP: Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	7.8	WSAA-SD02(34-36)	12	10,14,25,43
36				6.3		11	24,19,28,30
38				2.8		14	11,16,26,33
40			SW: Tan to Light Brown vf-f SAND; Little m Sand (Dry to slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	6.1		22	20,27,27,34
42				3.2		11	17,21,28,30
44				1.9		22	46,50/0.3'
46				3.9		18	43,50/0.5'
48				3.8		18	11,17,28,28
50							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW02
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
				1.6		24	10,19,32,34
52							
				2.6		18	19,39,50/0.4'
54			SW: Tan to Light Gray vf-f SAND; Trace Silt (Moist; Very moist at 60 ft; Wet at 61.5 ft; Loose; Non-cohesive; Horizonal laminations accented with black streaks)	<1		20	12,17,21,24
56				1.3		12	19,19,28,34
58				1.4	WSAA-SB02(58-60)	18	10,12,12,17
60				2.7		19	10,11,11,14
62				2.8		20	10,8,10,8
64							
66			SW: Light Gray to Gray vf-f SAND; Little Silt (Wet; Loose to semi-cohesive; Faint horizontal laminations accented with black streaks; Completion Depth = 68 ft; No bedrock encountered)	1.1		24	7,10,14,30
68				1.4		24	8,9,12,15

HTRW BORING/WELL LOG	District: Baltimore	Hole Number: WSAA-MW03
Company Name: EA Engineering, Science, and Technology	Drill Subcontractor: Parratt-Wolff, Inc.	
Project: Wheeler Sack Army Airfield Spill Site	Component/Site: Fort Drum Airfield, Fort Drum, NY	
Name of Driller: Mark Eaves/Bill Rice/Rod Trask	Manufacturer's Designation of Drill: CME 75	
Sizes and Types of Drilling and Sampling Equipment: 6.25-in ID hollow stem augers, 2-in. x 2-ft. split spoons	Hole Location/Grid Location: Northing: Y Easting: X	
Overburden Thickness (ft): >68 ft	Surface Elevation: SurfElev	
Depth Drilled into Rock (ft): NA	Date Started: 7/24/02	Date Completed: 7/25/02
Total Depth of Hole (ft): 68 ft	Groundwater Encountered (ft bgs): 62 ft	Sample Type: VOCs EPA 8260 STARS SVOCs EPA 8270 STARS NA
Disposition of Hole: Installed 4-in. diameter PVC monitoring well	Geologist: Daniel Bishuk, Jr.	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
0			UPPER BACKFILL: Excavation Backfill Material: Tan to Light Brown vf-m SAND (Dry to slightly moist: Loose: Non-cohesive)				
2							
4							
6							
8							
10							
12							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW03
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW03
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishok, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
34							
36			SP: Tan to Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	3.6		24	6,10,19,26
38				8.0		12	7,9,11,14
40				14.2	WSAA-SB03(38-40)	13	6,11,14,14
42				6.1		18	8,14,19,27
44				6.5		12	14,17,11,14
46				2.8		20	6,8,15,16
48				3.4		14	11,12,13,18
50				1.6		24	6,8,10,16

SW: Tan to Light Brown vf-f SAND; Little m Sand

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW03
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
			(Moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	1.2		12	12,12,14,17
52							
				1.9		11	17,17,25,30
54							
			SW: Light Gray Brown vf-f SAND; Little Silt (Moist to very moist; Loose to semi-cohesive; Horizontal laminations accented with black streaks)	1.7		24	10,11,17,20
56							
			SW: Tan to Light Brown vf-f SAND (Moist; Very moist at 61 ft; Wet at 62 ft; Loose; Non-cohesive)	1.9		24	15,17,17,24
58							
				2.0		24	10,24,24,30
60							
				4.8	WSAA-SB03(60-62)	22	10,10-17,21
62							
			SW: Light Brown Gray vf-f SAND; Little Silt (Wet; Semi-cohesive; Horizontal laminations accented with black streaks)	4.9		24	14,15,19,24
64							
			SW: Light Brown Gray vf-f SAND; Trace Silt (Wet; Loose; Non-cohesive; Horizontal laminations accented with black streaks; Completion Depth = 68 ft; No bedrock encountered)	2.7		24	8,10,9,10
66							
				1.7		24	7,7,8,8
68							

HTRW BORING/WELL LOG	District: Baltimore	Hole Number: WSAA-MW04
Company Name: EA Engineering, Science, and Technology	Drill Subcontractor: Parratt-Wolff, Inc.	
Project: Wheeler Sack Army Airfield Spill Site	Component/Site: Fort Drum Airfield, Fort Drum, NY	
Name of Driller: Mark Eaves/Bill Rice/Rod Trask	Manufacturer's Designation of Drill: CME 75	
Sizes and Types of Drilling and Sampling Equipment: 6.25-in ID hollow stem augers, 2-in. x 2-ft. split spoons	Hole Location/Grid Location: Northing: Y Easting: X	
Overburden Thickness (ft): >72 ft	Surface Elevation: SurfElev	
Depth Drilled into Rock (ft): NA	Date Started: 7/25/02	Date Completed: 7/26/02
Total Depth of Hole (ft): 72 ft	Groundwater Encountered (ft bgs): 65 ft	Sample Type: VOCs EPA 8260 STARS SVOCs EPA 8270 STARS NA
Disposition of Hole: Installed 4-in. diameter PVC monitoring well	Geologist: Daniel Bishuk, Jr.	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
0			UPPER BACKFILL: Excavation Backfill Material: Tan to Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive)				
2							
4							
6							
8							
10							
12							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW04
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW04
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
34				2.7		12	6,10,19,26
36			SP: Tan to Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	1.6		11	7,9,11,14
38				17.2	WSAA-SB04(38-40), WSAA-DUP	14	6,11,14,14
40			SW: Tan to Light Brown vf-f SAND; Little m Sand (Dry to slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	12.7		22	8,14,19,27
42				14.6		11	14,17,11,14
44			SP: Tan to Light Brown vf-m SAND (Dry to slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	9.4		22	6,8,15,16
46				14.6		18	11,12,13,18
48				12.3		18	6,8,10,16
50			SW: Tan to Light Brown vf-f SAND; Little m Sand				

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW04
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
			(Slightly moist; Loose; Non-cohesive; Horizontal laminations accented with black streaks)	10.4		24	12,12,14,17
52				3.8		18	17,17,25,30
54			SW: Tan to Light Brown vf-f SAND; Little Silt (Slightly moist to moist; Semi-cohesive; Horizontal laminations accented with black streaks)	9.8		20	10,11,17,20
56			SW: Tan to Light Brown vf-f SAND (Slightly moist; Moist at 60 ft; Very moist at 64 ft; Wet at 65 ft; Loose; Non-cohesive)	2.8		12	15,17,17,24
58				6.8		18	10,24,24,30
60				3.0		19	10,10-17,21
62				3.9	WSAA-SB04(62-64)	20	14,15,19,24
64				1.5		24	8,10,9,10
66				1.5		24	7,7,8,8
68			SW: Light Brown Gray vf-f SAND; Little Silt (Wet; Semi-cohesive; Horizontal laminations				

HTRW BORING/WELL LOG	District Baltimore	Hole Number WSAA-MW04
Company Name EA Engineering, Science, and Technology	Geologist Daniel Bishuk, Jr.	
Project Wheeler Sack Army Airfield Spill Site	Component/Site Fort Drum Airfield, Fort Drum, NY	

Depth (ft)	PID curve (ppm)	Stratigraphy	Description of Materials	Screening VOC (ppm)	Analytical Sample No.	Recovery (in)	Blow Counts
			accented with black streaks)				
				1.2		24	
70							
				1.2		24	
72							

APPENDIX K

FORT DRUM LANDSCAPE CRITERIA

LANDSCAPE

General

a. Fort Drum requires low or no maintenance on all landscape items and plantings, except for turf.

b. Government approval is required for all submittals.

Turf

Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Where such certification requires a laboratory test, the test shall be certified and reported as part of the certificate of compliance. Testing shall be performed by an approved, independent laboratory within 60 days of submittal of reports. Test reports of a previously tested material shall be accompanied by certificates from the manufacturer certifying that the previously tested material is identical in all respects to that proposed for this project. Certified copies of the reports for the following materials shall be included:

a. Seed: For mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested and state certification.

b. Sod: For species, mixture percentage, percent purity, field location and state certification.

c. Fertilizer: For chemical analysis, composition percent.

d. Agricultural Limestone: For calcium carbonate equivalent and sieve analysis.

e. Topsoil: A soil test shall be made on a submitted sample for pH, particle size (texture), organic content, chemical analysis (magnesium, phosphorus potassium and soluble salt levels) and mechanical analysis. Recommendations on type and quantity of soil amendments and fertilizer to establish specified pH range, minimum organic content and supply of nutrients to bring nutrients to an acceptable level for planting shall be determined by soil test. Acceptable soil test results shall be specified and as follows: Magnesium = 35 pounds per acre, Phosphorus = 100 pounds per acre and Potassium = 85 pounds per acre; Soluble Salts not to exceed 900 ppm.

Seed Mixture Types

a. Seed mixtures can vary and shall be carefully designed on a case-by-case basis, depending on project site conditions, soil test results, argonomy, and research. Only State-certified seed of the latest season's crop shall be provided in original sealed

packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material.

b. Seed shall conform to AMS-01. Weed seed shall not exceed 1% by weight of total mixture.

Soils

Most existing WSAAF soils have previously tested very poorly with very low to no organic content. It may be necessary to boost existing soil organic content by application of liquid cow or horse manure slurry.

Soil Amendments and pH Adjusters

Soil amendments shall consist of lime and iron or aluminum sulfate (pH adjusters), fertilizer, organic soil amendments and soil conditioners meeting the following requirements:

a. Lime: shall be agricultural limestone and shall have a minimum calcium carbonate equivalent of 90% and shall be ground to such a fineness that at least 90% will pass a 10-mesh sieve and at least 50% will pass a 60-mesh sieve.

b. Iron or Aluminum Sulfate: commercial grade

c. Fertilizer: shall be commercial grade, free flowing, uniform in composition and conforming to CID A-A-1909.

d. Special Organic Boosters (WSAAF area): All Go, Liquid horse or cow manure slurry.

Organic Soil Amendments

a. Topsoil:

1. Existing surface soil within the contract limits is normally not of sufficient quality to support a healthy stand of turf or planting. The existing surface soil shall be replaced, properly amended or supplemented, as required based on soil tests.

2. Topsoil shall be obtained from well-drained areas and shall be clean, free from subsoil, clay lumps, stones, weeds, sod lumps, stumps, roots, toxic substances, and debris or similar substances 1 inch or more in greatest dimension.

3. The pH of topsoil shall be between 5.5 and 7.0, and the organic content shall not be less than 5 percent nor more than 20 percent as determined by loss of ignition of moisture-free samples dried at 100 degrees centigrade. Gradation shall be:

Sieve Size	Percent Passing

1 inch	100
¼ inch	65 to 100
No. 200 mesh	20 to 80

b. Peat: Peat humus derived from a bog, swampland or march shall conform to ASTM D 2607, except otherwise specified. Peat shall be shredded and granulated to pass a ½-inch mesh screen and conditioned in storage piles for at least 6 months after excavation.

c. Rotted Manure: well rotted horse or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials, free of stones, sticks, soil and containing no chemicals or ingredients harmful to plants.

d. Soil Conditioner: shall be for single use or in combination to meet requirements for topsoil. Gypsum shall be commercially packaged, free flowing, minimum 95 percent calcium sulfate by volume.

Mulch

a. Mulch shall be free from weeks, mold, and other deleterious materials. Mulch shall be straw mulch, tacked with non-asphaltic liquid tackifier (mulch binder) or cellulose fiber.

b. Straw mulch shall be spread uniformly in a continuous blanket, at the rate of 2 tons / acre.

c. Wood cellulose fiber mulch, for use with the hydraulic application of grass seed and fertilizer, shall consist of specially prepared wood cellulose fiber, or a combination of wood cellulose and recycled shredded newsprint paper fibers, processed to contain no growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate visual metering during application. Composition of this mulch shall contain on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

Seeding and Sodding Times and Conditions

a. Seed shall be sown from April 1 to May 15 for spring planting, and from September 1 to October 15 for fall planting.

b. Sod shall be laid from April 1 to June 15 for Spring planting and from August 15 to October 15 for fall planting.

c. Turf operations may or may not be practical during dryer summer season (May 15/June15 – August 15), unless weather conditions permit. Also, Contractor shall agree to irrigate seed or sod or sod bed and guarantee establishment of a healthy stand of turf.

d. Turf operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, ground is frozen, snow covered, or other unsatisfactory conditions prevail, the work shall not be performed and other proposed times shall be determined.

e. Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rain, traffic or other cause, shall be reworked to restore the ground conditions.

f. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution and are above 10 mph.

Seed Application

a. Broadcast Seeding - Seed shall be uniformly broadcast at the rate of 2 (two) pounds and 5 (five) ounces per 1000 square feet or 100 lbs / acre using broadcast seeders.

b. Rolling – Immediately after seeding, exvept for slopes 2.5:1 and greater, the entire area shall be firmed with a roller not exceeding 90 lbs for each foot of roller width.

c. Hydroseeding – Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Wood cellulose or combination wood cellulose/paper fiber mulch shall be added at the rates specified below after the seed, fertilizer and water have been thoroughly mixed, to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area at the rates and mixed quantities specified below. The hydroseeded area shall not be rolled. Lime, when applied hydraulically, shall be a single separate operation.

Hydroseed Mix Quantities (dry weight) shall be as follows:

Seed: Type 1	100 lbs / acre
Fertilizer:	800 lbs / acre
Mulch:	750 lbs / acre

d. Water shall not contain any contaminants or elements toxic to plant life.

e. Watering shall begin within 3 days after completing the seeded area. Water shall be applied at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. Run-off and ponding shall be prevented.

TYPE 1 – General Lawn Use (Mountain View, Pine Plains, AFH/ACH (Housing))

Botanical Name Seed	Common Name	Variety	% Mix by Wt.	%Pure Live
Poa pratensis	Kentucky Blugrass	"Baron" or equal	40%	68%
Festuca rubra L. Ssp.commutata Gaud.	Chewings Fescue	"Jamestown II" or equal	25%	78%
Festuca rubra	Creeping Red Fescue	"Jasper" or equal	20%	78%
Lolium perenne	Perennial Ryegrass	"Manhattan III" or equal	15%	88%

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SECTION 01012

DESIGN AFTER AWARD

1.0 GENERAL

1.1 Compliance and Certification

Contractor shall certify that all items submitted in the design documents (after contract award) comply with all the stated RFP requirements. The criteria specified in this RFP are binding contract criteria. In case of any conflict between the RFP criteria and Contractor's submittals, the RFP criteria will govern unless there is a written and signed agreement between Contracting Officer and Contractor waiving a specific requirement.

1.2 Key Personnel, Subcontractors and Outside Associates or Consultants

In connection with the services covered by this contract, any in-house personnel, subcontractors, and outside associates or consultants will be limited to individuals or firms that were specifically identified and agreed to during proposal evaluation and if required during negotiations. The contractor shall obtain the Contracting Officers written consent before making any substitution for these designated in-house personnel, subcontractors, associates, or consultants.

a. Substitution of key personnel will not be permitted unless approved in writing by the Contracting Officer/Source Selection Authority and then issued as an administrative modification to the contract to incorporate the change. The authority for substitution of key personnel lies solely with the Contracting Officer and will not be delegated to the ACO or COR.

b. Substitution of key personnel will only be allowed under the following Conditions:

- Change of Employment

- Would pose hardship upon the employee which was not known at the time the proposal was submitted

- Sickness

c. A bait and switch of team members from proposal to execution phase is not allowed

d. Any proposed team member replacement shall meet or exceed the qualifications noted in the specifications for their specialty.

1.3 Responsibility of the Contractor for Design

a. The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all designs, drawings, specifications, and any other non-construction services furnished under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiency in its designs, drawings, specifications, and other non-construction services.

b. Neither the Government's review, approval or acceptance of, nor payment for, the services required under this contract shall be construed to operate as a waiver of any rights under this contract or of any cause of action arising out of the performance of this contract, and the Contractor shall be and remain liable to the Government in accordance with applicable law for all damages to the Government caused by the Contractor's negligent performance of any of the services described in paragraph (a) furnished under this contract.

c. The rights and remedies of the Government provided for under this contract are in addition to any other rights and remedies provided by law.

d. Independent Technical Review (ITR) shall be preformed as follows, all design submissions are reviewed by a qualified team, not affiliated with the development of a project/product, for the purpose of confirming the proper application of clearly established criteria, regulations, laws, codes, principles and professional procedures. It includes the verification of assumptions, methods, and level of complexity of the analysis. It also verifies the alternatives evaluated, appropriateness of data used, reasonableness of the results and functionality of the product relative to the customer’s requirements.

1.4 Sequence of Design-Construction

a. After receipt of the Contract Notice to Proceed (NTP) the Contractor shall initiate design, comply with all design submission requirements as covered under Division 01 General Requirements, and obtain Government review of each submission. No construction may be started, until the Government reviews the Final Design submission and determines it satisfactory for purposes of beginning construction. The ACO or COR will notify the Contractor when the design is cleared for construction. The Government will not grant any time extension for any design resubmittal required when, in the opinion of the ACO or COR, the initial submission failed to meet the minimum quality requirements as set forth in the Contract.

b. If the Government allows the Contractor to proceed with limited construction based on pending minor revisions to the reviewed Final Design submission, no payment will be made for any in-place construction related to the pending revisions until they are completed, resubmitted and are satisfactory to the Government.

c. As part of the proposal the Contractor will submit 90% site specific plans and specifications for the water tower. Within fifteen days of receipt of a Notice to Proceed, the Contractor will begin final design of the water tower plans and specifications. Also within fifteen days of receipt of a Notice to Proceed, the Contractor will begin final design of Anaconda Road. Only 95% and 100% design submissions are required for these packages when submitted separately from the remainder of the design. This work shall meet all review requirements and all other contract requirements. The Contractor will be required to complete the construction of the water tower no later than 3 June 2005 without liquidated damages described in Section 00800 being incurred.

d. At Contractor’s option, the design for site work, foundation work (including structural load calculations) and/or utilities may be submitted as a package separate from the remaining facilities. This separate design package can be submitted on a faster schedule to allow for an early start to construction of this work. Only 95% and 100% design

submissions are required for this package when submitted separately for this option. This work shall meet all review requirements and all other contract requirements.

e. At the Contractor's option, the design of the hanger COF's may be submitted as a package separate from the water tower, site work, foundation work, utilities, and all remaining facilities. This separate design package can be submitted on a faster schedule to allow for an early start to construction of this work. This work shall meet all review requirements and all other contract requirements. Contractor will be required to make 75%, 95% and 100% submissions unless the Contracting Officer directs otherwise.

f. The design must be completed not later than 5 May 2005, or any extension.

5.1.1.1 The final design for all remaining facilities not previously submitted must be completed not later than 5 May 2005. Locksets and Latchsets: Shall comply with ANSI A156.13 Series 1000 Security Grade 1, and meet Accessibility Code A117.1, NFPA 101 Fire Safety, NFPA 80 Life Safety and ULC-UL10C Positive Pressure. Mortise locksets to have escutcheon trim with lever handles that are ADA compliant. The locks shall be supplied with Best Mortise Cylinders to continue the Base Master Key System. The existing Fort Drum system is equal to Schlage Heavy Duty Commercial Lever Type with removable, 7 pin, Type L keyway, interchangeable core locks to be compatible with existing Fort Drum "Best" manufactured locks. Building entrance doors shall be keyed alike.

g.

1.5 Contractor's Role During Process

The Contractors construction management key personnel shall be actively involved during the design process to effectively integrate the design and construction requirements of this contract. In addition to the typical required construction activities, the Contractor's involvement includes, but is not limited to actions such as: integrating the design schedule into the Master Schedule to maximize the effectiveness of fast-tracking design and construction (within the limits allowed in the contract), ensuring constructability and economy of the design, integrating the shop drawing and installation drawing process into the design, executing the material and equipment acquisition programs to meet critical schedules, effectively interfacing the construction QC program with the design QC program, and maintaining and providing the design team with accurate, up-to-date redline and as-built documentation. The Contractor shall require and manage the active involvement of key trade subcontractors in the above activities.

1.6 Contract Drawings, Maps, and Specifications

a The Government under this contract, will provide the Contractor, without charge, five (5) sets of Request for Proposal (RFP) packages except publications incorporated into the technical provisions by reference.

1.7 Design-Build Contract - Order of Precedence

Section 01010 is intended to identify specific project requirements. In cases of criteria conflict, Section 01010 holds precedence over all other criteria mentioned or referenced.

a. The contract includes the standard contract clauses and schedules current at the time of contract award. It entails (1) the solicitation in its entirety, including all drawings, cuts, and illustrations, and any amendments, and (2) the successful offeror's accepted proposal. The contract constitutes and defines the entire agreement between the Contractor and the Government. No documentation shall be omitted which in any way bears upon the terms of that agreement.

b. In the event of conflict or inconsistency between any of the provisions of this contract, precedence shall be given in the following order:

(1) Betterments: Any portions of the accepted proposal which both conform to and exceed the provisions of the solicitation.

(2) The provisions of the solicitation. (See also Section 00700 Contract Clauses: SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION.)

(3) All other provisions of the accepted proposal.

(4) Any design products including, but not limited to, plans, specifications, engineering studies and analyses, shop drawings, equipment installation drawings, etc.. These are "deliverables" under the contract and are not part of the contract itself. Design products must conform with all provisions of the contract, in order of precedence herein.

1.7.1 Field Verification

The Contractor shall verify field conditions which are required for final design. The information shall be reflected in the design documents.

1.7.2 Topographical Information

Government has supplied available topographic and existing utility information for the project. Any additional topographic and existing utility information required for design after award of the contract shall be provided by Contractor.

2.0 DESIGNER OF RECORD

The Contractor shall identify the Designer of Record for each area of work. One Designer of Record may be responsible for more than one area. All areas of design disciplines shall be accounted for by a licensed Architect or Licensed Engineer of Record registered in New York State. All architects and engineers shall be licensed and possess current registration. The Designer(s) of Record shall stamp, sign, and date all design drawings under their responsible discipline at 100% design stage only. The Designer(s) of record shall have a current New York State PE registration. One of the Designers of Record may sign all drawings but only after the Designer of Record for each discipline has certified in writing that their area of work has been reviewed and meets all contract requirements. Each written certification shall be submitted to the government with the final package.

3.0 DESIGN CONFERENCES PRE-WORK

As part of the Pre-work Conference conducted after contract award, key representatives of the Government and the Contractor will review the design submission and review procedures specified herein, discuss the preliminary design schedule and provisions for phase completion of the D/B documents with construction activities (fast tracking), as appropriate, meet with the Corps of Engineers Design Review personnel and key Using Agency points of contact and any other appropriate pre-design discussion items.

4.0 STAGES OF DESIGN SUBMITTALS

Design submittals are required at the intermediate (75%) design stage and at the pre-final (95%) design stage unless otherwise specified. The requirements of each design stage are listed hereinafter. The Contractor shall reflect the number and contents of the design submittals, to include review periods in the progress chart. The 75%, 95% and 100% complete design submittals shall be made in one package each.

As part of the proposal the Contractor will submit 90% site specific plans and specifications for the water tower. Upon receipt of a Notice to Proceed, the Contractor will begin final design of the water tower plans and specifications. Only 95% and 100% design submissions are required for this package when submitted separately for this option. This work shall meet all review requirements and all other contract requirements. The Contractor will be required to complete the construction of the water tower no later than 3 June 2005 without liquidated damages described in Section 00800 being incurred.

At Contractor's option, the design for site work, foundation work and/or utilities may be submitted as a package separate from the remaining facilities. This design package can be submitted on a faster schedule to allow for an early start to construction of this work. Only 95% and 100% design submissions are required for this package when submitted separately for this option. This work shall meet all review requirements and all other contract requirements.

At the Contractor's option, the design of the hanger COF's may be submitted as a package separate from the water tower, site work, foundation work, utilities, and all remaining facilities. This separate design package can be submitted on a faster schedule to allow for an early start to construction of this work. This work shall meet all review requirements and all other contract requirements. Contractor will be required to make 75%, 95% and 100% submissions unless the Contracting Officer directs otherwise.

4.1 Review Submittal (75%)

The review of this submittal is primarily to insure that the contract documents are proceeding in a timely manner and that the design criteria are being correctly included. The submittal shall consist of the following:

1. Design analysis, in support of the submitted documents.

2. 75% complete drawings.

3. Draft specifications shall show all lined out (edited) portions of the specification sections on all items of work.

4. Environmental permit applications which are to be submitted to Corps for processing. When environmental permits are not required, the Contractor shall provide a statement with justification to that effect.

5. Colorboard(s) depicting all color/finish/material selections submitted for government approval.

4.2 Prefinal Design Review Submittal (95%)

The review of this submittal is to insure that the design is in accordance with the Contractor's proposal and the Contract during the design process. The Contractor shall submit the following documents for review:

1. Complete design analysis

2. Complete coordinated drawings between all disciplines

3. Complete specifications, without showing lined out (edited) portions.

4. Colorboard(s) depicting all proposed color/finish/material samples.

5. Annotated 75% comments

4.2.1 The Design Analysis submitted for Prefinal Design Review (95%) shall be in its final form. The Design Analysis shall include all backup material previously submitted and revised as necessary. All design calculations shall be included. The Design Analysis shall contain all explanatory material giving the design rationale for any design decisions which would not be obvious to an engineer reviewing the Final Drawings and Specifications.

4.2.2 The Contract Drawings submitted for Prefinal Design Review (95%) shall include the drawings previously submitted which have been revised and completed as necessary. The Contractor is expected to have completed all of his coordination checks and have the drawings in a design complete condition. The drawings shall be complete at this time including the incorporation of any design review comments generated by previous design reviews. The drawings shall contain all the details necessary to assure a clear understanding of the work throughout construction. Shop drawings will not be considered as design drawings. All design shall be shown on design drawings prior to submittal of shop drawings.

4.3 Design Complete Submittal (100%)

The Contractor shall revise the Contract Documents by incorporating any comments generated during the Prefinal Design Review (95%) and shall prepare final hard copy Contract Specifications. The Contractor shall submit the following documents for the Design Complete Submittal:

1. Design analysis, in final 100% complete form

2. Complete coordinated drawings between all disciplines

3. Complete specifications

4. Colorboard(s) depicting all final color/finish/material selections approved by Ft. Drum.

5. Annotated 95% review comments

6. DD FORM 1354 “Transfer and Acceptance of Military Real Property.

7. 100% close out of all Dr. Checks comments

4.3.1 The Contractor shall submit the Design Complete Submittal (100%) not later than 30 calendar days after the Government returns the annotated Prefinal Design Review Submittal (95%).

4.3.2 Corrected Final Submittal. If a sufficient number of comments are generated by the Government during the review of the Final Design Submittal (100%), and at the option of the Contracting Officer, Contractor shall submit corrected drawings, specifications, and DD Form 1354 for compliance check of the accepted review comments of the Final Design Submittal. The Corrected Final Submittal shall be appropriately stamped to describe the submittal package as follows: "For Review Only - Corrected Final Site, Foundation and/or Utility" or "For Review Only - Correct Final Facility". Each sheet of the drawings shall be so stamped accordingly.

5.0 QUANTITY OF DESIGN SUBMITTALS

5.1 General

The documents which the Contractor shall submit to the Government for each submittal are listed and generally described hereinafter. Unless otherwise indicated, the Contractor shall submit thirty (30) copies of each item required to be submitted at the 75%, and 95% Review Submittal stages. All drawings for review submittals shall be full-size blue/black lines. At the Design Complete Submittal, the Contractor shall also submit five (5) complete full size sets and two (2) half size sets of drawings and two copies of CADD files on CD’s in MicroStation format version 8.0, five (5) sets of the specifications and two (2) copies on CD’s in Microsoft Word 7.0.

6.0 MAILING OF DESIGN SUBMITTALS

6.1 Mail all design submittals to the Government during design and construction, using an overnight mailing service. The Government will furnish the Contractor addresses where each copy shall be mailed to after award of contract. The submittals shall be mailed to not more than (6) different addresses.

6.2 Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

7.0 COORDINATION

7.1 Written Records

Prepare a written record of each design site visit, meeting, or conference, either telephonic or personal, and furnish within five (5) working days copies to the Contracting Officer and all

parties involved. The written record shall include subject, names of participants, outline of discussion, and recommendation or conclusions. Number each written record for the particular project under design in consecutive order.

7.2 Design Request for Information (RFI) List

Throughout the life of this contract the Contractor shall furnish a biweekly "RFI" list for design related items. This list shall itemize in an orderly fashion design data required by the Contractor to advance the design in a timely manner. Each list shall include a sequence number, description of action item, name of the individual or agency responsible for satisfying the action item and remarks. The list will be maintained on a continuous basis with satisfied action items checked off and new action items added as required. Once a request for information is initiated, that item shall remain on the list until the requested information has been furnished or otherwise resolved. Copies of the list will be mailed to both the Administrative Contracting Officer and the agencies tasked with supplying the information.

8.0 GOVERNMENT REVIEW COMMENTS

8.1 Within 21 calendar days after Notice to Proceed, the Contractor shall submit for approval, a complete design schedule with all submittals and review times indicated in calendar dates. The Contractor shall update this schedule monthly.

8.2 After receipt, the Government will be allowed twenty-one (30) calendar days to review and comment on the 75% design submittal, twenty-one (30) calendar days to review and comment on the 95% design submittal, and twenty-one (30) calendar days to review and comment on the 100% design. For each design review submittal, Contracting Officer will furnish the Contractor comments from the various design sections and from other concerned agencies involved in the review process. The review will be for the conformance with the technical requirements of the solicitation and the Successful Offeror’s Proposal. A system called Dr. Checks will be used to track all comments during the design phase.

8.3 Prior to each submission (75%, 95% and 100%) the contractor shall submit two (2) copies of the complete package requirements to the Contracting Officers Representative for review to check if the package meets the requirements for that submission. The government shall have 3 working days to review and comment on the package. The contractor shall receive the comments at the end of the third day and shall have three additional days to incorporate all comments. The review and comment period as stated above shall begin only after the contractor incorporates all comments and sends the required number of sets to the reviewers for that review submission.

8.4 If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he must clearly outline, with ample justification, the reasons for noncompliance within five (5) calendar days after receipt of these comments in order to resolve the comment between all parties. The Contractor shall furnish disposition of all comments, in writing, with the next scheduled submittal. The Contractor is cautioned in that if he believes the action required by a comment exceeds the requirements of this contract, that he should take no action and notify the Contracting office in writing immediately. Review conferences will be held for each design submittal at Fort Drum. The Contractor shall bring the personnel that developed the design submittal to the review conference. These conferences will take place the week after the review period.

8.5 If a design submittal is over one (1) calendar day late in accordance with the latest design schedule, the Government review period will be extended 7 calendar days. The review conference will be held the week after the new review period. Submittal date revisions must be made in writing at least one (1) week prior to the latest submittal date.

8.6 Review of submittals will not occur during period of December 22, 2003 through January 6, 2004. Submittals which override on this period will have review period extended to reflect this down time.

8.7 Government will have up to 30 days to issue construction NTP after review period of the 100% back check ends.

9.0 DESIGN ANALYSIS

9.1 Media and Format

Present the design analysis on 8½ inch by 11-inch paper except that larger sheets may be used when required for graphs or for other special calculation forms. All sheets shall be in reproducible form. The material may be typewritten, hand lettered, handwritten, or a combination thereof, provided it is legible. Side margins shall be 1-inch minimum to permit side binding and head-to-head printing. Bottom margins shall be 1-1/4 inches, with page numbers centered 1 inch from the bottom.

9.2 Organization

Assign the several parts and sheets of the design analysis a sequential binding number and bind them under a cover indicating the name of the facility and project number, if applicable. The title page shall carry the designation of the submittal being made. The complete design analysis presented for final review with the final drawings and specifications shall carry the designation "FINAL DESIGN ANALYSIS" on the title page.

9.3 Design Calculations

Design calculations are a part of the design analysis. Design calculations for the civil design (storm water, sanitary sewer, water, etc.) shall be in US customary units. When they are voluminous, bind them separately from the narrative part of the design analysis. Present the design calculations in a clean and legible form incorporating a title page and index for each volume. Furnish a table of contents, which shall be an index of the indices, when there is more than one volume. Identify the source of loading conditions, supplementary sketches, graphs, formulae, and references. Explain all assumptions and conclusions. Calculation sheets shall carry the names or initials of the designer and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person.

10.0 DRAWINGS

10.1 Prepare all drawings on Computer-Aided Design and Drafting (CADD) so they are well arranged and placed for ready reference and so that they present complete information. Drawings shall be complete. Unnecessary work such as duplicate views, notes and lettering, and repetition of details shall not be permitted. Do not show standard details not applicable to the project. Minimize unnecessary wasted space. Do not include details of standard products

or items on the drawings which are adequately covered by specifications. Detail the drawings such that conformance with the RFP can be checked and to the extent that shop drawings can be checked. Do not use shop drawings as design drawings. The design drawings shall consist of drawing on an 840 mm x 1200 mm format. The Contractor shall use standard Corps of Engineers title blocks and borders on all drawings. Submit an index of drawings with each submittal. The Contracting Officer will furnish the Contractor file, drawing and specification numbers and CADD file names for inclusion in the title blocks of the drawings.

10.2 Create all drawings using CADD methods in MicroStation or AutoCAD format. Save all Design Complete CADD files as MicroStation 8.0. The Contractor shall use A/E/C CADD Standards Release 2.0, available at http://tsc.wes.army.mil/intro.asp. When a project is started the designer must contact the New York District Project Engineer, to obtain the project's CADD code. The sheet reference number (e.g., A-3) and the CADD code (e.g., E123) are combined to create the CADD file name (e.g., A3E123). This shall insure proper naming of files and tracking of the project within the New York District.

10.3 Only standard fonts provided by MicroStation or AutoCAD are to be used in the creation of CADD files. No fonts created by third parties or the designer are permitted.

10.4 The uses of Reference files and Xrefs during the design stage is up to the discretion of the designers. All CADD files at Design Complete submittal shall be free-standing, independent files, and not supported by reference files. All Reference files (MicroStation) and all Xrefs files (AutoCAD) shall be removed at Design Complete submittal.

10.5 Submit all Design Complete files including drawings and specifications on CD ROM with "Read Me" file. Submit (3) copies of all disks.

10.6 All drawings shall be prepared in hard metric scale.

10.6.1 The building drawings shall consist of 1:100 scale minimum floor plans. Draw elevations to a 1:100 scale and other visual information as required. Draw building wall sections at a minimum of 1:20 scale.

10.6.2 Use a minimum scale of 1:500 for the site and exterior utility drawings, unless otherwise indicated.

11.0 SPECIFICATIONS

11.1 Technical Specifications for Construction shall be prepared using UFGS guide specifications which establish the minimum basis for quality and product selection. The Contractor shall edit the guide specifications, but edits shall conform to the specific minimum requirements of this RFP and are subject to approval by the Government. Specifications for items not identified in the RFP or UFGS guide specifications shall be written by the Contractor. If the design is based on a specific product, the specification shall consist of the important features of the product. The specification shall be detailed enough such that another product meeting the specification could be substituted and it would not adversely impact the project. The following listing of technical specifications is provided to indicate, as a minimum, those guide specifications which should be utilized for design and construction of the project. The list may not be all inclusive of every section required:

01330 Submittal Procedures

01525	Safety Requirements
01670	Recycled/Recovered Materials
02230	Clearing and Grubbing
02300	Earthwork
02315	Excavation, Filling and Backfilling for Buildings
02316	Excavation, Trenching and Backfilling for Utilities Systems
02510	Water Distribution System
02530	Sanitary Sewerage
02551	Natural Gas Distribution
02630	Storm Drainage
02722	Graded Crushed Aggregate Base Course for Flexible Pavement
02742	Hot Mix Bituminous Pavement
02748	Bituminous Tack and Prime Coats
02761	Pavement Markings
02770	Concrete Sidewalks and Curbs and Gutters
02921	Seeding
03100	Structural Concrete Formwork
03150	Expansion Joints, Contraction Joints and Waterstops
03200	Concrete Reinforcement
03300	Cast-in-Place Concrete
03410	Plant-Precast Structural Concrete
04200	Masonry
05090	Welding, Structural
05120	Structural Steel
05210	Steel Joists
05300	Steel Decking
05400	Cold Formed Metal Framing
05500	Miscellaneous Metal
06100	Rough Carpentry
06200	Finish Carpentry
06410	Laminate Clad Architectural Casework
06650	Solid Polymer (Solid Surfacing) Fabrications
07110	Bituminuous Dampproofing
07214	Board and Block Insulation
07600	Sheet Metalwork, General
07611	Steel Standing Seam Roofing
07840	Firestopping
07900	Joint Sealing
08110	Steel Doors and Frames
08120	Aluminum Doors and Frames
08210	Wood Doors
08390	Blast Resistant Doors
08520	Aluminum Windows
08581	Blast Resistant Tempered Glass Windows
08710	Door Hardware
08810	Glass and Glazing
08850	Fragment Retention Film for Glass
09250	Gypsum Wallboard
09310	Ceramic Tile, Quarry Tile and Paver Tile
09510	Acoustical Ceilings
09650	Resilient Flooring

09900	Paints and Coatings
10201	Metal Wall and Door Louvers
10800	Toilet Accessories
12301	Manufactured Vanities
12320	Cabinets and Countertops
12490	Window Treatment
13080	Seismic Protection for Miscellaneous Equipment
13100	Lighting Protection System
13851	Fire Detection and Alarm System, Addressable
13930	Wet-Pipe Fire Suppression Sprinklers
15050	Basic Mechanical Materials and Methods
15070	Seismic Protection for Mechanical Equipment
15080	Thermal Insulation for Mechanical Systems
15181	Hot Water and Glycol Piping and Accessories
15182	Refrigerant Piping
15190	Gas Supply Systems
15286	HVAC Pumps
15400	Plumbing, General Purpose
15556	Forced Hot Water Heating Systems Using Propylene Glycol Solution
15569	Low Pressure Water Heating Boilers
15700	Unitary Heating and Cooling Equipment
15708	Air Handling Units
15713	Room Fan Coil Units (4-Pipe Vertical)
15720	Water Chillers
15760	Terminal Heating and Cooling Units
15895	Air Supply, Distribution, Ventilation and Exhaust System
15951	Direct Digital Control for HVAC
15990	Testing, Adjusting and Balancing of HVAC Systems
15995	Commissioning of HVAC Systems
16050	Basic Electrical Materials and Methods
16070	Seismic Protection for Electrical Equipment
16375	Electrical Distribution System, Underground
16415	Electrical Work, Interior
16528	Exterior Lighting
16710	Premises Distribution System
16711	Telephone System, Outside Plant
16815	Cable Television Premises Distribution System

11.2 Submittal Register

The Contractor shall develop the submittal requirements for construction during the design phase of the contract, by producing a Contractor Submittal Register during design. Attach the submittal register for the submittal requirements of the entire project. Prepare the Submittal Register on ENG Form 4288. The Contractor shall be responsible for listing all required submittals necessary to insure the project requirements are complied with. The Register shall identify submittal items such as shop drawing, manufacturer’s literature, certificates of compliance, material samples, guarantees, test results, etc. that the Contractor shall submit for review and/or approval action during the life of the construction contract. The Contractor shall place all the Submittal Register pages in an appendix to Section 01330 SUBMITTAL PROCEDURES of the final specifications.

12.0 SURVEYING AND MAPPING

12.1 Survey Data

A site survey has been conducted and mapping prepared for the project site. The mapping is included in the information drawings provided with the RFP and is also available in MicroStation (3D File) electronic form.

12.1.1 The Contractor shall obtain any additional survey data and mapping required, as an extension of the provided mapping. A Digital Terrain Model (DTM) is not available.

13.0 CONTENTS OF DESIGN SUBMITTALS

13.1 The 75% Design Submittals

Submittals shall contain, as a minimum, the following:

13.1.1 Paving, Grading and Drainage:

1. The designer is required to contact Fort Drum Field Office to verify the correct procedure to follow to obtain construction permits. The designer shall prepare all permit applications required to a "READY FOR SIGNATURE" condition and forward them to the Contracting Officer for appropriate signatures and submittal to the state. All contacts with state agencies shall be documented in writing and furnished to the Corps of Engineers at the 95% submittal.

2. Pavement design calculations, details of pavement sections, paving plan layout and limits, jointing diagrams, joint types and details, striping details, and entrance locations and details.

3. Typical cross section for grading, paving, and excavation of ditches and backslopes and fill sections.

4. Grading plans with site drainage system, low points and culverts located, drainage ditches identified, pipe sizes, types, and inverts shown. Provide erosion control details as required.

13.1.2 Geotechnical

1. Additional geotechnical investigation if required.

2. Confirmation of final design parameters.

3. Foundation design analysis

13.1.3 Water Supply and Sanitary Sewage

1. Details of utility systems, appurtances and detailed calculations.

2. Utility plans fully coordinated with other disciplines and checked for clearances at all utility crossings.

13.1.4 Landscaping and Fencing

1. Permanent seeding requirements, species types and mixtures, conditioners and soil amendments as required for final site turf establishment.

2. Temporary seeding plan to be coordinated with site grading and drainage. Provide erosion control measures and specific seed mixtures for each condition.

3. Fencing plan, installation details, and typical sections.

4. Gate locations, types, and sizes, installation details and sections.

13.1.5 Architectural

1. Design development plans indicating dimensions, column lines, major detail references, door numbers, etc.

2. Exterior elevations indicating materials, finishes, colors, etc.

3. Building sections indicating construction, materials, etc.

4. Wall sections and stair sections indicating construction, materials, dimensions, etc.

5. Finish schedules. Colorboards showing all color selections (50 mm x 75 mm samples minimum) for Government approval.

6. Door and window schedules.

7. Detail plans including:

   a. Room names.
   b. Door numbers.
   c. Equipment.
   d. Toilet accessories.
   e. Dimensions.
   f. Stair layouts.
   g. Trench and service pit.

13.1.6 Structural Design

1. Description of the method of providing lateral stability for the structural system to meet seismic, wind and other load requirements as stated in Section 01010. Include sufficient calculations to verify the adequacy of the method.

2. Calculations for all principal roof, floor and foundation members.

3. Drawings showing roof and floor framing plans as applicable. Structural members will be shown on the plans. A foundation plan shall also be furnished showing main footings and grade beams. Where beam, column, and footing schedules are used, show schedules and fill in sufficient items to indicate method to be used. Show typical bar bending diagrams.

Typical sections shall be furnished for roof, floor, and foundation conditions. Structural drawings shall be separate from architectural drawings.

4. Include anchor bolt locations and details on foundation drawings.

5. Computer analyses used shall be widely accepted, commercially available programs, or complete documentation shall be provided.

13.1.7 Plumbing

1. List of all references used in the design including Government design documents and industry standards.

2. Justification and brief description of the types of plumbing fixtures, piping materials and equipment proposed for use.

3. Detail calculations for systems such as sizing of domestic hot water heater and piping and natural gas piping.

4. Locations and general arrangement of plumbing fixtures and major equipment.

5. Plan and riser diagrams of all areas including hot water, cold water, waste and vent piping. Piping layouts and risers should also include natural gas and meter as required.

6. Equipment and fixture schedules with descriptions, capacities, locations, connection sizes and other information as required.

13.1.8 Fire Suppression System

1. List of all references used in the design including Government design documents and industry standards.

2. Classification of each building in accordance with fire zone, building floor areas and height and number of stories.

3. Provide description of required fire protection including extinguishing equipment, detection equipment, alarm equipment and water supply. Alarm and detection equipment shall interface to requirements of Electronic System.

4. Plan and riser diagram of the sprinkler system.

5. Hydraulic calculations based on water flow test for each sprinkler system to insure that flow and pressure requirements can be met with current water supply. See Water Supply and Sanitary Sewage.

13.1.9 Heating Ventilation and Air Conditioning (HVAC)

1. Energy conservation shall be in accordance with UFC 3-400-01 Design: Energy Conservation.

2. Expanded and updated computerized heating and cooling load calculations and energy consumption performance calculations to be comprehensive with the progression of the design, as necessary.

3. HVAC legend.

4. Complete HVAC and plumbing equipment schedules with manufacturer's name and model number.

5. HVAC equipment plans and elevations, complete with ductwork, piping, control panels and control devices.

6. Boiler Room and Mechanical Room part plans and elevations indicating all equipment, tube pull clearances, piping, ductwork, control panels and devices, dampers, breechings, foundations pads, access doors, maintenance clearances, vents, drain piping, blowdown piping, chimneys, access doors, emergency break glass stations, maintenance platforms and ladders as may be required.

7. Plans of underground trench water and/or refrigerant piping with details of pipe sizes, insulation, weather protection covering, pipe supports and sleeves and seals at penetrations of foundation walls, fully coordinated with the concrete trench design provisions of the Site/Civil Division of the Work.

8. HVAC details, complete, including but not limited to details for vibration isolation, seismic restraints and sway bracing, breeching and chimney, roof penetrations, and underground concrete trench water and/or refrigerant piping supports.

9. Direct digital automatic temperature control and energy management control system points schedules. Points schedules shall be complete and fully coordinated with the existing Base Trane Tracer Summit remote central DDC EMCS, via telephone modem and portable operator terminal workstation, to provide complete remote central control, monitoring and alarm capability, in addition to local stand-alone DDC monitoring, control and alarm functions.

10. Schematic airflow diagrams for all air handling systems, indicating all duct sizes, automatic dampers and main air flow rates.

11. Schematic piping diagrams for all condensate, boiler feed, boiler water chemical treatment, glycol/water make-up and storage, hot glycol/water, refrigerant piping, boiler blowdown, boiler gas train and gas vent piping. Schematic piping diagrams shall be complete with all pipe sizes, main flow rates, control valves, vacuum breakers and automatic air vents, where applicable and as required.

12. HVAC controls, including automatic temperature controls sequences of operation, fully detailed and consistent with the DDC system points schedules drawings.

13.1.10 Interior Electrical System

1. A narrative describing the electrical distribution system.

2. Floor plans developing the branch circuit wiring design for lighting, power, mechanical, and miscellaneous equipment.

3. Grounding system plan and related details.

4. Switchboard and panel schedules developed to this design level.

5. An upgraded power riser or one-line diagram.

6. Floor plans indicating the major components of the power distribution system, including service switchboard, panelboards, dimming control units, motor starter banks, etc. and the main HVAC equipment.

7. An upgraded lighting fixture schedule.

8. A symbol list.

9. Coordinated power systems analysis study.

13.1.11 Exterior Electrical System

1. A site electrical plan indicating the service requirements; connection details for splicing into medium voltage loop; primary feeder routing including manholes; underground branch circuit routing for grade mounted electrical equipment, parking lot lighting; telephone service routing including manholes.

13.1.12 Electronic Systems

1. Riser diagrams and details of the low voltage systems: fire alarm, telephone, which have been coordinated with the base requirements.

2. Floor plans indicating the low voltage system services.

3. Complete system construction and point to point writing schematic drawings, including all component values and showing complete letter and number identification of all wire and cable as well as jacks, terminals, and connectors.

4. All panels, plates, and designation strips, including details relating to terminology, engraving, finish, and color.

5. All custom designed consoles, tables, carts, support bases, and shelves.

6. Schematic drawings of all custom components, assemblies, and circuitry.

7. All equipment modifications.

8. Run sheets or field wiring details.

9. Patch panel assignment layout drawing.

10. Front elevation drawings of each equipment rack.

11. All items of equipment whether a stock manufactured item or custom built shall be supported by complete and detailed schematic drawings and replacement parts lists. No "black boxes" or unidentified components shall be acceptable.

13.1.13 Project Score

Project score for sustainable design using the Sustainable Project Rating Tool. Also submit a detailed description of points received for each category.

13.1.14 Draft edit of all specification sections.

13.2 The 95% Design Submittals

Submittals shall contain, as a minimum, the following:

13.2.1 Incorporate any changes required by comments on 75% Design Submittal.

13.2.2 Construction Permits:

The designer is required to contact Fort Drum Field Office to verify the correct procedure to follow to obtain construction permits. The designer shall prepare all permit applications required to a "READY FOR SIGNATURE" condition and forward them to the Contracting Officer for appropriate signatures and submittal to the state. All contacts with state agencies shall be documented in writing and furnished to the Corps of Engineers at the 95% submittal.

13.2.3 Civil:

Complete site and utility drawings which are coordinated with the specifications and the other engineering disciplines. Ensure that the plans are incompliance with the applicable codes and permits. Final checked calculations for pavement design and all other civil work. It will be the Contractor’s responsibility to implement the comments generated from any design review submittal as well as verify the consistency between plans and specification. The evaluation of the Contractor’s submittals shall be based on the degree to which the submittal meets the requirements set forth in this document and the specifications.

13.2.4 Turfing:

1. Complete seeding specifications for establishing permanent and temporary turf on site areas not paved.

2. Topsoil and soil amendment specifications shall be responsive to existing soil (pH, texture, organic content) as established by soil tests.

13.2.5 Architectural

1. Complete architectural drawings which are coordinated with the other engineering disciplines. Ensure that the plans are in compliance with the applicable codes. It will be the Contractor’s responsibility to implement the comments generated from any design review submittal as well as verify the consistency between plans and specification. The

evaluation of the Contractor's submittals shall be based on the degree to which the submittal meets the requirements set forth in this document and the specifications.

13.2.6 Structural Design

1. Final checked calculations for all structural members.

2. Final structural drawings coordinated with all other design disciplines.

3. The final structural drawings shall contain the following information as a set of general notes:

   The allowable soil bearing value.

   Frost depth.

   The design stresses of structural materials used.

   The design live loads used in the design of various portions of the structures.

   The design wind speed, exposure, and importance factor.

   The seismic values used in design.

4. All structural drawings and calculations shall be checked.

13.2.7 Plumbing

1. Final design drawings and calculations

2. Shop drawings

13.2.8 Fire Suppression System

1. A file of the input data used in the computer program to design the fire suppression system.

2. Final design drawings and calculations

3. Shop drawings

13.2.9 Heating, Ventilation and Air Conditioning (HVAC)

1. All HVAC calculations developed through the 75% submittals updated, expanded, finalized and completed.

2. All HVAC drawings completed and finalized.

3. Shop drawings of all equipment and accessories as scheduled and as specified, complete with both "point-to-point" and "ladder type schematic" wiring diagrams for power and

automatic controls, fully coordinated and combined into a complete coherent system, in accordance with the specified requirements of Section 15951.

13.2.10 Interior Electrical System

1. A coordination study with appropriate curves to show that all protective devices have been fully coordinated. Completed short circuit calculations for the entire electrical system shall also be provided. All equipment shall be identified by manufacturer's name and catalog number.

2. Complete voltage drop and lighting calculations. The voltage drop calculations shall use the same single line diagram as the short circuit calculations and shall show drops at the same locations as short circuit currents are shown. Lighting calculations (zonal cavity method for interior and point-to-point for exterior) shall be provided for all rooms and spaces and all exterior locations requiring illumination.

3. A completed version of the 75% design narrative submittal reflecting the design as submitted. The aforementioned calculations shall be included with the narrative. The calculations and coordination study shall have the seal of the registered engineer who performed the same affixed to the cover sheet.

4. All details completed. Congested areas which cannot be clearly shown at the drawing scale, shall be shown by expanded scale drawings.

5. Completed drawings thoroughly checked for discipline conflicts to insure that the proper electrical connections are provided for equipment of other disciplines and that there are no conflicts between the location of electrical equipment and equipment of other disciplines.

6. Completed drawings also checked for intradiscipline conflicts.

13.2.11 Exterior Electrical Distribution System

1. A coordination study with appropriate curves to show that ALL protective devices have been fully coordinated. Completed short circuit calculations for the entire electrical system shall also be provided. All equipment shall be identified by manufacturer's name and catalog number.

2. Complete voltage drop and lighting calculations. The voltage drop calculations shall use the same single line diagram as the short circuit calculations and shall show drops at the same locations as short circuit currents are shown. Lighting calculations (zonal cavity method for interior and point-to-point for exterior) shall be provided for all rooms and spaces and all exterior locations requiring illumination.

3. A completed version of the 75% design narrative submittal reflecting the design as submitted. The aforementioned calculations shall be included with the narrative. The calculations and coordination study shall have the seal of the registered engineer who performed the same affixed to the cover sheet.

4. Completed drawings with all comments and any other changes incorporated.

5. All details completed. Congested areas which cannot be clearly shown at the drawing scale, shall be shown by expanded scale drawings.

6. Completed drawings thoroughly checked for discipline conflicts to insure that the proper electrical connections are provided for equipment of other disciplines that there are no conflicts between the location of electrical equipment and equipment of other disciplines.

7. Completed drawings also checked for intradiscipline conflicts.

13.2.12 Electronic Systems

1. Submit completed version of the 75% design drawings indicating low voltage systems, user diagrams, floor plans and details.

13.2.13 Project Score

Project score for sustainable design using the Sustainable Project Rating Tool. Also submit a detailed description of points received for each category.

13.2.14 Complete specifications for all sections

13.3 Design Complete Submittal (100%)

13.3.1 Submit complete drawings, specifications, calculations, and all other materials prepared during design, with New York State Architect/Engineer professional seal and signature.

13.3.2 **DESIGN CHANGES, <u>AFTER</u> 100% DESIGN ACCEPTANCE & COE AUTHORIZATION TO PROCEED TO CONSTRUCTION:** Any change to the accepted 100% design MUST be requested by the Contractor in writing (provide PE stamped drawings) at least 30 days prior to the desired implementation of the proposed change. The Contractor must provide compelling evidence the proposed change is in conformance with the contract documents. The Government reserves the right to reject the changes and will give a positive or negative response with in 30 days of receipt. If the Government decides to proceed with the proposed change a bilateral contract modification will be prepared or a letter of agreement to alter the 100% design will be issued. **Changes made to the accepted 100% design without prior approval will be considered deficient work and no payment will be made for this deficient work.**

14.0 DD FORM 1354 "TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY"

14.1 This document is a detailed listing of all real property by category description for the designed facility. It shall be accomplished at the completion of design and furnished with the Final Design Submittal.

15.0 RESIDENT MANAGEMENT SYSTEM (RMS)

15.1 The Contractor shall use the Government furnished software module entitled "Resident Management System (RMS)" to create the Submittal Register and the DD Form 1354 during the design phase of this contract. The data generated by the Contractor during the design phase will be used by the Contractor Quality Control Manager in the construction phase of the project. See Section 01312 QUALITY CONTROL SYSTEM (QCS) for a more detailed description of RMS.

16.0 DESIGN REVIEW COMMENT SUBMISSION

16.1 All design review comments shall be electronically submitted for each phase through an electronic system called Dr Checks. The contractor through the same system shall evaluate all comments. This system provides the ability for all reviewers and contractors to track all comments and evaluations.

16.2 All comments shall be evaluated by the contractor and closed by the person who inputted the comment prior to the start of construction.

-- End of Section --

SECTION 01320

PROJECT SCHEDULE:
NETWORK ANALYSIS SYSTEM
(NYD Rev. 2/03)

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

SD-07 Schedules

Initial Project Schedule; GA. Preliminary Project Schedule;
GA. Periodic Schedule Updates; GA.

Four copies of the schedules showing codes, values, categories, numbers, items, etc., as required.

SD-08 Statements

Qualifications; FIO.

Documentation showing qualifications of personnel preparing schedule reports.

SD-09 Reports

Narrative Report; FIO. Schedule Reports; FIO.

Four copies of the reports showing numbers, descriptions, dates, float, starts, finishes, durations, sequences, etc., as required.

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports. This person shall have previously created and reviewed computerized schedules. Qualifications of this individual shall be submitted to the Contracting Officer for review with the Preliminary Project Schedule submission.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS a Project Schedule as described below shall be prepared. The Contractor shall be responsible for scheduling of all procurement and construction activities as well as design activities if applicable to the project. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project should also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel shall result in an inability of the Contracting Officer to evaluate Contractor progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, then the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

3.3.2 Level of Detail Required

With the exception of the initial and preliminary schedule submission, the Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule.

3.3.2.1 Activity Durations

Contractor submissions shall be required to follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods. A rule of thumb, that the Contractor should use, is that less than 2 percent of all non-procurement activities' Original Durations shall be greater than 20 days.

3.3.2.2 Design and Permit Activities

The Contractor shall integrate design and permitting activities, including necessary conferences and follow-up actions and design package submission dates into the schedule if these items are applicable to the project.

3.3.2.3 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing.

3.3.2.4 Government Activities

Government and other agencies activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government Furnished Equipment (GFE) and notice to proceed for phasing requirements.

3.3.2.5 Workers Per Day

All activities shall have an estimate of the average number of workers per day that are expected to be used during the execution of the activity to produce the expected completion date. If no workers are required for an activity, in the case of activities related to procurement, for example, then the activity shall be identified as using zero workers per day. The workers per day information for each activity shall be identified by the Workers Per Day Code.

3.3.2.6 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.7 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

3.3.2.8 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number.

3.3.2.9 Bid Item

All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

3.3.2.10 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not be allowed to contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

3.3.2.11 Category of Work

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited to, the procurement chain of activities including such items as submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

3.3.2.12 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.2.13 Critical Activities.

In addition to other activities as required to complete the project, the Progress schedule shall include the following as separate line activities:

a. Submission and approval of mechanical/electrical layout drawings.
b. Submission and approval of O & M Manuals.
c. Submission and approval of as-built drawings.
d. Submission and approval of 1354 data and installed equipment lists.
e. Submission and approval of HVAC Testing and Balancing plan.
f. HVAC Testing and Balancing and submission and approval of report.
g. Submission and approval of HVAC Commissioning plan.
h. HVAC Commissioning.
i. Other Systems testing as required.
j. Warranty Action Preparation
k. Pre-final inspection.
l. Correction of punchlist for pre-final inspection.

m. Final inspection.

3.3.2.14. HVAC Testing, Balancing and Commissioning.

If this contract contains requirements for Heating, Ventilation and Air Conditioning Testing and Balancing and Commissioning, these activities must be allocated sufficient time and personnel resources by the Contractor so that they can be accomplished within time allowed for project completion. These activities are necessary to assure detection of any deficiencies in the HVAC Systems and avoid warranty callbacks.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from notice-to-proceed to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date that the Notice to Proceed (NTP) was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have: a "ES" constraint, a constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity call "End Project". The "End Project" activity shall have: a "LF" constraint, a constraint date equal to the completion date for the project, and a zero day duration.

3.3.3.3 Early Project Completion

In the event the project schedule shows completion, the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted at every project schedule update period to assist the Contracting Officer to evaluate the Contractor's ability to actually complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X"

where "X" refers to the phase of work. The "Start Phase X" activity shall have: a "ES" constraint, a constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have: a "LF" constraint, a constraint date equal to the completion date for the project, and a zero day duration.

3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X:" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in progress or completed activity and insure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes.

3.3.6 Out-of-Sequence Progress

Activities that have posted progress without predecessors being completed (Out-of-Sequence Progress) shall be allowed only by the case-by-case approval of the Contracting Officer. The Contracting Officer may direct that changes in schedule logic be made to correct any or all out-of-sequence work.

3.3.7 Extended Non-Work Periods

Designation of Holidays to account for non-work periods of over 5 days shall not be allowed. Non-work periods of over 5 days shall be identified by addition of activities that represent the delays. Modifications to the logic of the project schedule shall be made to link those activities that may have been impacted by the delays to the newly added delay activities.

3.3.8 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 60 calendar days shall be submitted for approval within 10 calendar days after Notice to Proceed is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after Notice to Proceed.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after Notice to Proceed. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer or to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Contracting Officer or authorized representative, is necessary for verifying the contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.4.4 Standard Activity Coding Dictionary

The Contractor shall submit, with the Initial Project Schedule, a coding scheme that shall be used throughout the project for all activity codes contained in the schedule. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. For example, a Responsibility Code Value, "ELE", may be identified as "Electrical Subcontractor." Activity code values shall represent the same information throughout the duration of the contract. Once approved with the Initial Project Schedule submission, changes to the activity coding scheme must be approved by the Contracting Officer's Representative.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the initial submission, and every periodic project schedule update throughout the life of the project:

3.5.1 Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall be in the format specified in Appendix A, " Standard Data Exchange Format".

3.5.1.1 File Medium

Required data shall be submitted on CD’s, formatted to hold 700 MB of data, under the word

operating system.

3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule.

3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will insure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

3.5.2 Narrative Report

A Narrative Report shall be provided with each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 4 most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken.

3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in-progress or completed.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number or "I-NODE" AND "J-NODE" and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be

used as the secondary sort.

3.5.4.3 Total Float Report

A list of all activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates.

3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Notice to Proceed until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: [Activity Number] [or] ["i-node" and "j-node"], Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), Earnings to Date.

3.5.4.5 Labor Loading.

For each activity shown on the logic report list the total amount of work required for the activity in man-hours, the number of workers assigned to the activity, the expected production rate for a worker, and the length of time (in work days) required to render the expected completion date for the activity. Completion dates on this report must agree with those on the logic report.

3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on bi-monthly (60 days) schedule update submissions. In addition to other submission requirements, a single mylar reproduceable 20 inch by 30 inch size shall be submitted. The diagram shall also The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram.

3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

The critical path shall be clearly shown.

3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly on- site meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor will describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost to Date shall be subject to the approval of the Contracting Officer. The following minimum set of items which the Contractor shall address, on an activity by activity basis, during each progress meeting.

3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed activities.

3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations must be based on Remaining Duration for each activity.

3.6.3.3 Cost Completion

The earnings for each activity started. Payment shall be based on earnings for each in-progress or completed activity. Payment for individual activities shall not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

3.6.3.4 Logic Changes

All logic changes pertaining to Notice to Proceed on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities are those delays beyond the Contractors control such as strikes and unusual weather. Also included are delays encountered due to submittals, Government Activities, deliveries or work stoppage which makes re-planning the work necessary, and when the schedule does not represent the actual prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, he shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

3.7.1 Justification of Delay

The project schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of contract extension, shall be based upon the project schedule updates in effect for the time period in question and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, shall not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under two weeks based upon the most recent schedule update at the time of the Notice to Proceed or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

a. A list of affected activities, with their associated project schedule activity number.

b. A brief explanation of the causes of the change.

c. An analysis of the overall impact of the changes proposed.

d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

3.7.3 Additional Submission Requirements

For any request for time extension for over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

3.8 DIRECTED CHANGES

If Notice to Proceed (NTP) is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until the Contractor submits revisions, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, then the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor will continue to update their schedule with the Contracting Officer's revisions until a mutual agreement in the revisions may be made. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

---End of Section---

SECTION 01355

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U.S. AIR FORCE (USAF)

AFI 32-1053	Pest Management Program

U.S. ARMY (DA)

AR 200-5	Pest Management

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 152 - 186	Pesticide Programs
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(1996) U.S. Army Corps on Engineers Safety and Health Requirements Manual
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.5 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual that resides at a Civil Works Project office and that is responsible for oversight of pesticide application on Project grounds.

1.2.6 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate that allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.7 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.8 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.9 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.10 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.11 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan; G,
The environmental protection plan.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.

b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

d. Description of the Contractor's environmental protection personnel training program.

e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.

g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow and spoil areas.

j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and Facility Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers. Only the Fort Drum Environmental Branch will contact NRC for spills on Fort Drum.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic meters or tons along with the percent that was diverted.

l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the wastewater, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the wastewater. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge. Disposal to the sanitary sewer shall be coordinated with Fort Drum Environmental Branch 48 hours prior to discharge. Fort Drum Environmental will obtain approval from the local waste treatment plant.

p. A historical, archaeological, cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural

resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

q. A pesticide treatment plan shall be included and updated, as information becomes available. The plan shall include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation Project Office specific requirements. The Contractor shall follow AR 200-5 Pest Management, Chapter 2, Section III "Pest Management Records and Reports" for data required to be reported to the Installation.

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached, as an appendix, to the Environmental Protection Plan.

1.8 PROTECTION FEATURES

Prior to start of any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with the special environmental requirements listed here and included at the end of this section.

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting

Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

This paragraph supplements the Contractor's responsibility under the Section 00700 Contract Clauses "PERMITS AND RESPONSIBILITIES". The Contractor shall comply with the terms and conditions of this RFP.

The Contractor shall be responsible for contacting the appropriate regulatory authorities and preparing the permit applications for submission to the contracting officer to obtain and comply with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted

during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) as specified in Section 01356 STORM WATER POLLUTION PREVENTION MEASURES. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. The Contractor's best management practices shall also be in accordance with the State Pollutant Discharge Elimination System (SPDES) Storm Water Pollution Prevention Plan (SWPPP), which shall be reviewed at the Fort Drum Environmental Office. Any temporary measures shall be removed after the area has been stabilized.

3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site stockpile storage, borrow areas and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.3.1 Dewatering Operations

Construction operations for dewatering shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body.

The Contractor shall comply with the State of New York water quality standards and anti-degradation provisions and the Clean Water Act Section 404, Nation Wide Permit.

3.3.2 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands.

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations. Permits shall be required for any industrial operation (Batch Plant and Rock Crushing).

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of New York rules.

3.4.4 Burning

Burning shall be prohibited on the Government premises.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

All solid wastes generated in conjunction with this project (including all C&D debris) shall be tracked and recorded by weight. Total weights for solid waste disposal shall be forwarded to the PW-Environmental Division, ATTN. Mark W Clarke, at the end of each fiscal quarter or upon project completion, which ever occurs first.

Work sites shall be policed daily to ensure C&D debris and litter are properly containered. Dumpsters and roll-offs shall be covered at the end of each workday to prevent blow-away litter and debris. Solid wastes (excluding clearing debris) shall be placed in containers that are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate.

3.5.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 150 mm of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.6.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262 and shall manage and store hazardous waste in accordance with the Installation hazardous waste management plan. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within 60 calendar days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer and the Fort Drum Environmental Office. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility. The contractor shall be

responsible to prepare the Waste Profiles and Land Fill Disposal Restriction Forms and also sign them. Also, in accordance with the Waste Profiles the Contractor shall prepare the Manifests for shipment of the Hazardous Wastes/Excess Hazardous Materials and the authorized Government Representative shall sign the Manifests having as authorization letter from the Using Agency and the CENAN District Engineer and shall be certified by being trained in the USEPA (RCRA) and USDOT regulations for signing Manifests of Hazardous Wastes/Excess Materials. In case the Using Agency requires the Using Agency's Officer to sign the Manifests he/she mist also satisfy the above noted training requirements. The contractor shall provide the E.R phone number manned 24-hours.

The Contractor shall be responsible to prepare the waste profiles/waste analysis and land fill disposal restrictions forms and also sign them.
In accordance with the waste profiles/waste analysis and landfill disposal restrictions forms the contractor shall prepare the Manifests for the shipments of hazardous wastes/excess hazardous materials. The EN Project Manager shall discuss with the Using Agency if they have on board a properly trained and authorized person to sign the Manifests as the Generator. If not, the Construction Field Engineer or other CENAN person shall be required to sign the Manifests and he will be required to have the proper training in EPA/RCRA and DOT regulations and the required letter from the CENAN NY District Engineer authorizing to sign the Manifests. Closing, the Contractor shall provide the 24 Hours 7 Days a week Emergency Response Telephone Number manned day and night and at all times during the shipment.

3.6.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.

3.6.5 Waste Water

Disposal of waste water shall be as specified below.

a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.

b. For discharge of ground water, the Contractor shall surface discharge in accordance with the requirements of the NPDES or State STORM WATER DISCHARGES FROM CONSTRUCTION SITES permit.

c. Water generated from the flushing of lines after disinfection or disinfection in conjunction with hydrostatic testing shall be discharged into the sanitary sewer with prior approval

and/or notification through the Fort Drum Environmental Office to the Waste Water Treatment Plant's Operator.

3.7 RECYCLING AND WASTE MINIMIZATION

All Federal, State and Local recycling rules and initiatives will be strictly observed. The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.8 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. The Contractor shall submit a report through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

a. Construction and Demolition (C&D) Debris Disposed = _____ in cubic meters, as appropriate.

b. Construction and Demolition (C&D) Debris Recycled = _____ in cubic meters, as appropriate.

c. Total C&D Debris Generated = _____ in cubic meters, as appropriate.

d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = _____ in cubic meters, as appropriate.

3.9 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.10 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.11 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor, through the Contracting Officer, shall coordinate with the Installation Pest Management Coordinator (IPMC) at the earliest possible time prior to pesticide application. The Contractor shall discuss integrated pest management strategies with the IPMC and receive concurrence from the IPMC through the COR prior to the application of any pesticide associated with these specifications. Installation Project Office Pest Management personnel shall be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.11.1 Pesticide Delivery and Storage

Pesticides shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses. Pesticides shall be stored according to manufacturer's instructions and under lock and key when unattended.

3.11.2 Qualifications

For the application of pesticides, the Contractor shall use the services of a subcontractor whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

3.11.3 Pesticide Handling Requirements

The Contractor shall formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and shall use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Material Safety Data Sheets (MSDS)shall be available for all pesticide products.

3.11.4 Application

Pesticides shall be applied by a State Certified Pesticide Applicator in accordance with EPA label restrictions and recommendation. The Certified Applicator shall wear clothing and personal protective equipment as specified on the pesticide label. Water used for formulating shall only come from locations designated by the Contracting Officer. The Contractor shall not allow the equipment to overflow. Prior to application of pesticide, all equipment shall be inspected for leaks, clogging, wear, or damage and shall be repaired prior to being used.

3.12 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.13 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.14 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

3.15 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.16 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Section 00800 Special Contract Requirements paragraph "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

-- End Of Section --

SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4439	(1997) Standard Terminology for Geosynthetics
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996)) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01355 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES). In New York, which is a NPDES-delegated state, this is accomplished through the administration of the State Pollutant Discharge Elimination System (SPDES) program.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Certificates

Mill Certificate or Affidavit; G

Certificate attesting that the Contractor has met all specified requirements.

1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

1.4.1 Stabilization Practices

The stabilization practices to be implemented shall include temporary seeding, erosion control matts, protection of trees, preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 CALENDAR DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 calendar days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity temporarily or permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

1.4.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 calendar days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 calendar days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Location and details of installation and construction are shown on the drawings.

1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the contract drawings. Final removal of silt fence barriers shall be upon approval by the Contracting Officer.

1.4.2.2 Straw Bales

The Contractor shall provide bales of straw as a temporary structural practice to minimize erosion and sediment runoff. Bales shall be properly placed to effectively retain sediment

immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area (e.g., after clearing and grubbing in a area between a ridge and drain, bales shall be placed as work progresses, bales shall be removed/replaced/relocated as needed for work to progress in the drainage area). Areas where straw bales are to be used are shown on the contract drawings. Final removal of straw bale barriers shall be upon approval by the Contracting Officer. Rows of bales of straw shall be provided as follows:

a. Along the downhill perimeter edge of all areas disturbed.

b. Along the top of the slope or top bank of drainage ditches, channels, swales, etc. that traverse disturbed areas.

c. Along the toe of all cut slopes and fill slopes of the construction areas.

d. Perpendicular to the flow in the bottom of existing drainage ditches, channels, swales, etc. that traverse disturbed areas or carry runoff from disturbed areas. Rows shall be spaced as shown on the drawings.

e. Perpendicular to the flow in the bottom of new drainage ditches, channels, and swales. Rows shall be spaced as shown on the contract drawings.

f. At the entrance to culverts that receive runoff from disturbed areas.

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of -18 to 49 degrees C. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	445 N min.
Elongation (%)		30 % max.

Trapezoid Tear	ASTM D 4533	245 N min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 50 mm by 50 mm when oak is used and 100 mm by 100 mm when pine is used, and shall have a minimum length of 1.5 m. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum mass of 1.98 kg per linear meter and a minimum length of 1.5 m.

2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

2.2 COMPONENTS FOR STRAW BALES

The straw in the bales shall be stalks from oats, wheat, rye, barley, rice, or from grasses such as byhalia, bermuda, etc., furnished in air dry condition. The bales shall have a standard cross section of 350 mm by 450 mm. All bales shall be either wire-bound or string-tied. The Contractor may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose, shall have a minimum dimensions of 50 mm by 50 mm in cross section and shall have a minimum length of 1 m. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum mass of 1.98 kg per linear meter and a minimum length of 1m.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 400 mm above the ground surface and shall not exceed 860 mm above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall

be spliced together at a support post, with a minimum 150 mm overlap, and securely sealed. A trench shall be excavated approximately 100 mm wide and 100 mm deep on the upslope side of the location of the silt fence. The 100 mm by 100 mm trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

3.2 INSTALLATION OF STRAW BALES

Straw bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 100 mm. After the bales are staked and chinked (gaps filled by wedging with straw), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 100 mm against the uphill side of the barrier. Loose straw shall be scattered over the area immediately uphill from a straw bale barrier to increase barrier efficiency. Each bale shall be securely anchored by at least two stakes driven through the bale. The first stake or steel post in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or steel pickets shall be driven a minimum 450 mm deep into the ground to securely anchor the bales.

3.3 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

3.3.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded.

3.3.2 Straw Bale Maintenance

Straw bale barriers shall be inspected in accordance with paragraph INSPECTIONS. Close attention shall be paid to the repair of damaged bales, end runs and undercutting beneath bales. Necessary repairs to barriers or replacement of bales shall be accomplished promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. Bale rows used to retain sediment shall be turned uphill at each end of each row. When a straw bale barrier is no longer required, it shall be removed. The immediate area occupied by

the bales and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded.

3.4 INSPECTIONS

3.4.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every seven (7) calendar days and within 24 hours of the end of any storm that produces 13 mm or more rainfall at the site. Where sites have been finally stabilized, such inspections shall be conducted at least once every month.

3.4.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

3.4.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

-- End Of Section --

SECTION 01415

METRIC MEASUREMENTS
05/2002

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 380	(1993) Practice for use of the International System of Units (SI)
ASTM E 621	(1994; R 1999el) Practice for Use of Metric (SI) Units in Building Design and Construction

1.2 GENERAL

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes.

1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. When only SI or I-P measurements are specified for a product, the product shall be procured in the specified units (SI or I-P) unless otherwise authorized by the Contracting Officer. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor. Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric designation.

1.3.2 Soft Metric

a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.

b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parenthesis (e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8 inches)).

1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI or I-P).

1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

--End of Section--

SECTION 01420

SAFETY

1.0 **SAFETY:** The contractor shall comply with all applicable Federal, State, and local safety and occupational health laws and regulations. Applicable provisions of the Corps of Engineers manual entitled Safety and Health Requirements Manual EM 385-1-1, dated 3 September 1996 will be applied to all work under this contract. The referenced manual may be purchased from the Contracting Officer's Representative (COR) at the job site, from the U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328, or via the internet at www.USACE.army.mil.

1.1 **U.S. ARMY CORPS OF ENGINEERS SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 385—1-1:** This paragraph applies to contracts and purchase orders that require the Contractor to comply with EM 385-1-1 (e.g. contracts that include the Accident Prevention Clause at FAR 52.236-13 and/or safety provisions). EM 385-1-1 and its changes are available at http://www.hq.usace.army.mil (at the HQ homepage, select Safety and Occupational Health and then select Changes to EM). The Contractor shall be responsible for complying with the current edition and all changes posted on the web as set in this solicitation.

2.0 **ACCIDENT PREVENTION PROGRAM**: Within fifteen (15) calendar days after receipt of Notice to Proceed, and at least ten (10) calendar days prior to the Pre-construction Safety Conference, four (4) copies of the Accident Prevention Plan shall be submitted for review and acceptance by the Contracting Officer or the Contracting Officers Representative (COR). The accident prevention program shall be prepared in the format outlined in Appendix A of EM 385-1-1, "Minimum Basic Requirements for Accident Prevention Plan".

3.0 **HAZARD ANALYSIS**: Submit one time with the Accident Prevention Program for each major phase of work, an Activity Hazard Analysis that shall be prepared by the Contractor performing that work, and submitted for review and acceptance. The format shall be in accordance with EM 385-1-1, figure 1-1. A major phase of work is defined as a operation involving a type of work presenting hazards not experienced in previous operations or where a new contractor or work crew is to perform. (See Contractor Quality Control specification for further guidance regarding coordination of “Activities” and “Principal Steps” indicated in the Activity Hazard Analysis with Contractor Quality Control activities). The analysis shall define the activities to be performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Work shall not proceed on that phase until the activity hazard analysis has been accepted and a preparatory meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activities, including the government on-site representative(s). The activity hazard analyses shall be continuously reviewed and when appropriate modified to address changing site conditions or operations, with the concurrence of the site safety representative, the site superintendent, and the Contracting Officer. Activity hazard analyses shall be attached to and become part of the accident prevention plan.

3.1 Hazard analysis shall be used to identify and evaluate all substances, agents, or environments that present hazards and recommend control measures. Engineering and administrative controls shall be used to control hazards; in cases where engineering or administrative controls are not feasible, personal protective equipment may be used.

3.2 Information contained in MSDS (Material Safety Data Sheets) shall be incorporated in the hazard analysis for the activities in which hazardous or toxic materials will be used, or generated (e.g. fiberglass, crystalline silica, metal dust or fume, etc.).

4.0 **SITE SAFETY OFFICER**: The contractor shall identify an individual directly employed by the contractor as Site Safety Officer responsible to the Contractor to implement and continually enforce the Accident Prevention Plan. The site safety officer shall not be the same individual as the Quality Control System Manager if the CQC System Manager is required to have no duties other than Quality Control. The site safety officer shall have the authority to suspend operational activities if the health and safety of personnel are endangered, and to suspend an individual from operational activities for infractions of the Accident Prevention Plan.

4.1 Qualifications: The name, qualifications (training and experience) of the designated Site Safety Officer shall be included in the Accident Prevention Plan. The Site safety officer shall have the following qualifications:

a. A minimum of 5 years construction experience with at least 2 years experience in implementing safety programs at construction work sites for projects of comparable scope and complexity.
b. Documented experience in construction techniques and construction safety procedures.
c. Working knowledge of Federal and state occupational health and safety regulations.
d. Specific training in excavation safety, fall protection, and confined space.
e. CPR/First Aid certification (current)
f. Familiarity with and ability to use and implement the Corps of Engineers Safety Manual EM 385-1-1.

4.2 Other Requirements: Other sections of the contract documents may also require separate specially qualified individuals in such areas a chemical data acquisition, sampling and analysis, medical monitoring, industrial hygiene, quality control, etc.

5.0 **SITE INSPECTIONS**: The site safety officer shall perform daily inspections of the job sites and the work in progress to ensure compliance with EM 385-1-1 and to determine the effectiveness of the accident prevention plan. Daily inspection logs shall be used to document inspections noting safety and health deficiencies, deficiencies in the effectiveness of the accident prevention plan, and corrective actions including timetable and responsibilities. The daily inspection logs will be attached to and submitted with the Daily Quality Control Reports or may be incorporated in the daily CQC report. Each entry shall include date, work area checked, employees present in work area, protective equipment and work equipment in use, special safety and health issues and notes, and signature of the preparer.

6.0 **HIGHLIGHTED PROVISIONS**: In addition to those items contained in EM 385-1-1, Appendix A, include the following items in the accident prevention plan:

6.1 Hard Hat Area. A statement that the jobsite is classified a "hard hat" area from start to finish.

6.2 Sanitation and Medical Requirements. Estimate the greatest number of employees, supervisors, etc., to be working at peak construction period, including subcontractor personnel. Include sanitation requirements and medical facilities identified for the job site. If a medical facility or physician is not accessible within five minutes of an injury to a group of two or more employees for the treatment of injuries, identify at least two or more employees on each shift who are qualified to administer first aid and CPR.

6.3 Equipment Inspection. The type of inspection program on cranes, trucks, and other types of construction equipment the Contractor plans to implement. Who will be responsible for the inspection and how the Contractor will control equipment of sub-contractors and equipment bought to the site by rental companies. Types of records to be kept.

6.3.1 Copies of records of all equipment inspections will be kept at the job site for review by the designated authority.

6.4 Crane & Derrick Operators: Written proof of qualification for all crane and derrick operators in accordance with EM 385-1-1, 16.C.04. Qualification shall be by written (or oral) examination and practical operating examination unless the operator is licensed by a state or city-licensing agency for the particular type of crane or derrick. Proof of qualification shall be provided by the qualifying source.

7.0 **ACCIDENT REPORTS**: The contractor shall immediately report all accidents by telephone to the COR.

7.1 The Contractor will provide an initial written report of the accident to the COR within 24 hours. The Contractor shall complete and submit ENG Form 3394 for all accidents involving lost work time, medical treatment, and/or property damage in excess of $2000.00 within 48 hours of the accident. The report shall accurately represent the circumstances of the accident, cause of the accident, extent of medical treatment, extent of injuries and steps to prevent occurrence of similar accidents. The hazard analysis covering the work activity being undertaken during the accident shall be attached to the report.

7.2 Daily records of all first aid treatment not otherwise reportable shall be maintained at the job site and furnished to the designated authority upon request. Records shall also be maintained of all exposure and accident experience incidental to the work (OSHA Form 300 or equivalent as prescribed by 29 CFR 1904).

8.0 **MONTHLY EXPOSURE REPORTS**: The Contractor shall submit to the COR no later than the 1st day of each month, a compilation of manhours worked each month by the prime contractor and each subcontractor. In addition ,the contractor shall report the number of accidents, severity, class of accidents, and lost time work days for each month.

9.0 **CLEAN-UP**: The Contractor's Accident Prevention Plan shall identify the individual's responsible for cleanup and shall establish a regular housekeeping procedure and schedule. If the COR determines that cleanup is not being performed satisfactorily, the Contractor shall establish a work crew to perform the continuous cleanup required by the contract clause titled: CLEANING UP: The number of individuals appointed to the cleanup work crew shall be increased as required in order to render adequate cleanup.

10.0 **FOCUS AREAS**: To supplement and emphasize the requirements of EM 385-1-1, the following is provided and shall be met as applicable.

10.1 Electrical Work: Electrical work shall not be performed on or near energized lines or equipment unless specified in the plans and specifications and approved by the COR. Plan and layout of proposed temporary power to the construction site shall be submitted and approved by the COR before work will be permitted.

10.1.1 Upon request by the Contractor, arrangements will be made for de-energizing lines and equipment so that work may be performed. All outages shall be requested through the COR a minimum of 14 days, unless otherwise specified, prior to the beginning of the specified outages. Dates and duration will be specified.

10.2 If approved by the COR, the following work may be performed with the lines energized using certified hot line equipment on lines above 600 volts, when the following conditions have been met:

a. Work below the conductors no closer than the clearance required in EM 385-1-1 from the energized conductors.

b. Setting and connection of new pre-trimmed poles in energized lines which do not replace an existing pole.

c. Setting and removing transformers or other equipment on poles.

d. Installation or removal of hot line connectors, jumpers, dead-end insulators for temporary isolation, etc., which are accomplished with hot line equipment from an insulated bucket truck.

10.3 Energized Line Work Plan: The Contractor shall submit a plan, in writing, describing his/her method of operation and the equipment to be used on energized lines. Proper certification from an approved source of the safe condition of all tools and equipment will be provided with the plan. The work will be planned and scheduled so that proper supervision is maintained. Emergency procedures, including communication, for disconnecting power in the event of an accident will be outlined in the plan. The Contractor will review his/her plan with the COR prior to being granted permission to perform the work.

10.4. No work on lines greater than 600 volts will be performed from the pole or without the use of an insulated bucket truck.

10.5 No work will be done on overbuilt lines while underbuilt lines are energized, except for temporary isolation and switching.

10.6 Electrical Tools and Cords: Hand held electrical tools shall be used only on circuits protected by ground fault circuit interrupters for protection of personnel. All general use extension cords shall be hard usage or extra hard usage as specified in Table 11-1 of EM 385-1-1. Damaged or repaired cords shall not be permitted.

10.7 Temporary Power: Temporary electrical distribution systems and devices shall be checked and found acceptable for polarity, ground continuity, and ground resistance before initial use and after modification. GFI outlets shall be installed and tested with a GFI circuit tester (tripping device) prior to use. Portable and vehicle mounted generators shall be inspected for compliance with EM 385-1-1 and NFPA 70. All electrical equipment located outdoors or in wet locations shall be enclosed in weatherproof enclosures in accordance with EM 385-1-1. Records of all tests and inspections will be kept by the contractor and made available on site for review by the designated authority. Submit sketch of proposed temporary power for acceptance.

10.8 Rollover Protective Structures (ROPS): Seat belts and ROPS shall be installed on all construction equipment as required by paragraph 16.B.12 of EM 385-1-1. The operating authority will furnish proof from the manufacturer or licensed engineer that ROPS meets the applicable SAE standards cited in EM 385-1-1, pg. 257.

10.9 Radiation Permits or Authorizations: Contractors contemplating the use of a licensed or DOD regulated radiological device or radioactive material on a DOD installation will secure appropriate permit or authorization from the Department of Army or Department of the Air Force, as applicable. A 45-day lead-time should be programmed for obtaining the necessary authorization or permit. When requested, the COR will assist the Contractor in obtaining the required permit or authorization.

10.9.1 The Contractor shall develop and implement a radiation safety program to comply with EM 385-1-1, Section 06.E. Provisions for leak tests, authorized personnel, transport certificates, etc. will be addressed in the radiation safety program.

10.10 Elevating Work Platforms: All elevating work platforms shall be designed, constructed, maintained, used, and operated in accordance with ANSI A92.3, ANSI A92.6, ANSI A92.5 and EM 385-1-1, Sections 22.J and 16.A.

10.10.1 Only personnel trained in the use of elevating work platforms shall be authorized to use them. A list of authorized users will be maintained by the contractor at the job site. The list will be updated to remain current and made available for review on site by the designated authority. Personnel safety belts must be worn.

10.11 Fall Protection: Fall protection in the form of standard guardrails, nets, or personal fall arrest systems will be provided for all work conducted over 1.8 meters (6 feet) in height The contractor will submit his/her proposed method of fall protection to the COR as part of the Job Hazard Analysis for acceptance. If the contractor deems that conventional fall protection as described above is not feasible, or creates a greater hazard, the Contractor will prepare a written fall protection plan in accordance with OSHA 29 CFR 1926.502(k). The plan will demonstrate the reasons that conventional fall protection is unfeasible or constitutes a greater hazard and will provide alternative safety measures for review and acceptance by the COR.

10.12 Excavations: All open excavations made in the earth's surface four (4) foot or greater will be under the supervision of a competent person trained in, and knowledgeable about, soils analysis, the use of protective systems, and the requirements of OSHA 29 CFR 1926, Subpart P and EM 385-1-1, Section 25. The competent person shall be designated in writing by the Contractor and a resume of their training and experience submitted to the COR for acceptance.

10.12.1 Excavations hazards and methods for their control will be specified in the job hazard analysis.

10.12.2 Sloping and benching: The design of sloping and benching shall be selected from and in accordance with written tabulated data, such as charts and tables. At least one copy of the tabulated data will be maintained at the job site.

10.12..3 Support Systems: shall be in accordance with one of the systems outlined in a through c below:

a. Designs drawn from manufacturer's specifications and in accordance with all specifications, limitations, and recommendations issued or made by the manufacturer. A copy of the manufacture's specifications, recommendations, and limitations will be in written form and maintained at the job site.

b. Designs selected from and in accordance with tabulated data (such as tables and charts). At least one copy of the design shall be maintained at the job site during excavation.

c. Designed by a registered engineer. At least one copy of the design shall be maintained at the job site during excavation.

10.12.4 Excavations Greater than 20 Feet in Height: Sloping and benching or support systems shall be designed by a registered professional engineer. Designs shall be in writing and at least one copy of the design shall be maintained at the job site during excavation. The contractor will ensure that the registered

professional engineer is working within a discipline applicable to the excavation work; i.e. it would be inappropriate for an electrical engineer to approve shoring designed for an excavation.

10.13 Confined Space: Entry into and work in a confined space will not be allowed when oxygen readings are less than 19.5% or greater than 23.5% or if the lower explosive limit (LEL) reading is greater than 10%, unless these conditions are adequately addressed in the confined space entry plan. In addition, action levels for toxic atmospheres shall be determined and any other known or potential hazards eliminated prior to entry.

11.0 **LANGUAGE**: For each group that has employees that do not speak English, the Contractor will provide a bilingual foreman that is fluent in the language of the workers. The contractor will implement the requirements of EM 385-1-1, 01.B through these foremen.

12.0 **CONTRACTOR SAFETY MEETINGS AND DOCUMENTATION:** Contractor shall conduct and document safety meetings among its personnel as required by EM 385-1-1 and as indicated herein. Monthly meetings shall be held among all supervisors, and weekly meetings shall be conducted by supervisors or foreman for all workers. The agenda of the meeting shall include specific safety items pertinent to work being performed. Documentation shall include a summary of items discussed as well as other items required by the EM 385-1-1. Documentation shall be submitted to the Government monthly.

13.0 **COORDINATION WITH OTHER SPECIFICATION SECTIONS**:

The requirements of this section are meant to supplement requirements of other sections. In cases of discrepancies the most stringent requirements shall apply . Other safety-related requirements can be found in the following specification sections:

a. Specification Section 00800, Special Contract Requirements
b. Specification Section 00700, Contract Clauses, paragraph entitled “accident Prevention”
c. Specification Section 01451“Contractor Quality Control Design/Build Construction”
d. Other specifications or contract requirements relating to site safety or health requirement or medical monitoring.

14.0 **CONTRACTOR PERFORMANCE APPRAISAL**: The occurrence of accidents and near misses due to negligence are strong indications that there has been insufficient emphasis on effective implementation and/or commitment to the accident prevention program. Should it become obvious that only lip service is being given to this program, an interim unsatisfactory performance appraisal rating will be issued. If safety continues to be unsatisfactory or marginal, the unsatisfactory rating will become final. The contractor should be aware that this appraisal will be stored in a national computer database which can be accessed by a multitude of agencies or municipalities desiring information on prospective contractors. An unsatisfactory rating in this database may affect the contractor's ability to obtain future Government work.

-End of Section-

SECTION 01451

CONTRACTOR QUALITY CONTROL
DESIGN-BUILD CONSTRUCTION
FORT DRUM COE REV. 5/2003

PART 1 – GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

U. S. ARMY CORPS OF ENGINEERS

ER 1110-1-12	Engineering and Design QUALITY MANAGEMENT

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740 (1996)	Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329 (1995b)	Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

No separate payment will be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Section 00700 Contract Clause titled "Inspection of Construction and shall implement the requirements of Appendix D, E, F, and G of ER 1110-1-12, Engineering and Design QUALITY MANAGEMENT. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. Other sections of the contract documents may also require separate specially-qualified individuals. The CQC organization will coordinate the activities of

these individuals. The project QC Manager will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The CQC Manager in this context shall mean the on-site individual with the responsibility for the overall management of the project including logistics and production.

QUALITY CONTROL ORGANIZATION

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan (Design and Construction) proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan to cover design operations for the first 60 days. The complete CQC plan must then be submitted no later than 60 days after Notice to Proceed. Design and Construction will be permitted to begin only after acceptance of the CQC Plan or interim plan. The Contractor shall provide a CQC organization, which shall have complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.2.2.1 Contractor's Quality Control Manager: (Manager of Field and Office Quality Control Personnel)

(1) Performs all quality control management duties required of the Contractor.

(2) Serves as the Governments' primary point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures.

(3) The Contractor shall identify the CQC System Manager as an individual within his organization that is completely responsible for all Quality Issues and shall perform overall management of CQC system and have the authority to act in all CQC matters for the Contractor. This person shall at a minimum perform a monthly site visit and attend all partnering meetings to discuss, address quality issues during both design and construction and be on site during critical construction activities. This person shall be directly employed by the prime contractor (not a subcontractor) and shall have complete authority in all aspects of Quality Control. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

The Contractors Quality Control Manager shall meet the following requirement:

Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 4 years construction experience and a minimum of 4 years of design experience, at a minimum one of the years experience must have been as a Quality Control or Quality Assurance Representative.

(4) Has no other duties except Quality Control.

(5) Attends all job meetings.

(6) Reports all deficiencies to the Government and the Contractor's Project Manager for correction.

(7) Works directly under, and is responsible to the Project Manager.

(8) An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager. The CQC systems manager may serve as the Design/Construction Liaison, but if he/she takes on this additional duty than they must visit construction site three times a week.

3.2.2.2 Design Quality Control Manager: (Principal in Charge of Design Quality Issues and Coordination of Design Quality Control)

(1) The Contractor shall identify the Design Quality Control Representative as an individual employed by the design firm or by the prime contractor that is completely responsible for all Design Quality Issues and shall perform coordination between the contractor, subcontractors, and the designer and have the authority to act in all design quality control matters for the prime contractor. During design this person shall at a minimum perform a bi-monthly coordination meeting to discuss coordination and quality issues concerning the design of the project. During construction this person shall at a minimum perform a monthly site visit and attend all partnering meetings to discuss and address design quality issues. This person shall be employed by the design firm or by the prime contractor and shall have complete authority in all aspects design coordination and design quality control for the Prime contractor. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

(2) Attends during the design phase a bi-monthly coordination meeting to discuss coordination and quality issues. Hold a current state Professional Engineer's license. Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 6 years experience in design or design coordination.

(3) Has no other duties except Design Quality Control.

(4) Have complete authority in all aspects of design coordination and design quality control for the prime contractor.

(5) An alternate for the Design Quality Control Representative will be identified in the plan to serve in the event of the Representative 's absence. The requirements for the alternate will be the same as for the designated Design Quality Control Representative**.**

3.2.2.3 Construction Quality Control Manager: (Principal in Charge of Construction Quality Issues and Coordination of Construction Quality Control)

(1) The Contractor shall identify the Construction Quality Control Manager as an individual within his organization that is completely responsible for all Construction Quality Issues and shall perform coordination between the contractor, subcontractors, and any Independent Testing Labs and have the authority to act in all construction quality control matters for the prime contractor. During design this person shall at a minimum attend the bi-monthly coordination meeting to discuss coordination and quality issues concerning the design of the project. During construction this person shall be onsite at all times performing Construction Quality Control duties to include, but not limited to, implementation of the three-phase inspection system for all aspects of the construction work specified. This person shall have complete authority in all aspects of

Construction Quality control. The prime contractor shall provide a letter to designate the duties and responsibilities of this person.

(2) The Construction Quality Control Manager shall meet one of the following requirements:

a) Have a Bachelors of Science from an accredited engineering, architecture, or a construction management college and a minimum of 4 years experience in construction.

b) Shall have a minimum of 6 years of construction experience at a minimum level of a project superintendent.

(3) Attends a bi-monthly coordination meeting during the construction phase to discuss coordination and quality issues.

(4) On site at all times during construction performing construction quality control duties.

(5) Has no other duties except construction Quality Control.

(6) Directly employed by the prime contractor.

(7) An alternate for the Construction Quality Control Representative will be identified in the plan to serve in the event of the Representative's absence. The requirements for the alternate will be the same as for the designated Construction Quality Control Representative.

3.2.2.4 Design/Construction Liaison:

(1) Coordinates design activities throughout the life of the project for construction document development and construction activities.

` (2) Must meet one of the following:

BS in engineering with a minimum of 4 years design experience; or

Four (4) years construction experience and a minimum of two (2) years experience in technical design coordination.

(3) Is allowable to perform the function of a Site Safety Officer, provided he/she meets the qualifications.

(4) Supervises the commissioning phase of the contract.

3.2.2.5 Design Team Leader:

(1) An individual having the leadership role in the production of the product.

(2) For engineering products this individual is the project engineer/architect (PE/A).

(3) For all projects the PE/A must be a registered professional.

(4) This person is responsible for coordination between all disciplines, and ensures excellent integration of trades in both drawings and specifications.

3.2.2.6 **ITR Team:**

(1) Independent Technical Review (ITR) shall be preformed as follows, all design submissions are reviewed by a qualified team, not affiliated with the development of a project/product, for the purpose of confirming the proper application of clearly established criteria in the RFP, regulations, laws, codes, principles and professional procedures. It includes the verification of assumptions, methods, and level of complexity of the analysis. It also verifies the alternatives evaluated, appropriateness of data used, reasonableness of the results and functionality of the product relative to the customer's requirements.

Independent Technical Review Team (ITRT): An interdisciplinary group formed to perform the ITR.

ITRT Leader - The ITRT Leader is responsible for coordinating all activities associated with the technical review. This coordination includes receipt of review documents from the PE/A, distributing these documents to the ITRT members which may require coordinating the sharing of documents if there are not adequate copies for each member to have their own. The leader must also assure that the reviews are completed on schedule, collect the review comments from the various members and compile all comments into a single package. This package will then be provided to the PE/A. Additional responsibilities include:

• Assist the PE/A (when requested) in the development of the QCP Plan

• Attend the pre-design conference Determine the need for attendance at all major planning/design team meetings. • Select review team members who will attend the selected planning/design team meetings for in-progress reviews

• Conduct a team meeting early in the QC process to assure an understanding by the ITRT of the role and responsibility of each member

• Assure that ITR comments have been incorporated into the certified final design

• Obtaining signatures of ITRT members for the ITR certification and providing certification to PE/A

ITRT Members - The ITRT Member is responsible for performing an Independent Technical Review of the assigned planning/design component. Whenever the review calls for a level of specialized knowledge, experience, or training not possessed by ITRT members, the ITRT leader and the ITRT members will seek assistance from district functional chiefs in finding appropriate sources of review expertise within or outside the district. In addition are responsible for:

• Signing ITR certification

- Assuring his/her ITR comments have been incorporated into the certified final design
- ITR members must have minimum 5 years experience in their field of review and be a senior engineer in their field

3.2.2.7 The proposed design team shall, as a minimum, be comprised of the following disciplines: Architect, Civil Engineer, Structural Engineer, Mechanical Engineer, Electrical Engineer, Fire Protection and Geotechnical Engineer. At least one person in a lead role of each discipline must be registered to practice in their professional field of engineering in the United States or its possessions (52.236-0025).

3.2.3 Additional Requirement for CQC System Manager, Design Quality Control Manager, Construction Quality Control Manager and Design/Construction Liaison

In addition to the above experience and education requirements the CQC System Manager and the Construction Quality Control Representative shall have completed within the last five years the course entitled "Construction Quality Management for Contractors". This course is given by Government personnel and is of two-day duration. The Government will provide one instruction manual for the course.

3.2.4 Organizational Expertise

The CQC organization, which includes the CQC System Manager and additional qualified personnel, must as a minimum possess general corporate technical knowledge of all aspects of the project, and must successfully execute the CQC System on all aspects of the project. Individuals possessing experience in specialized areas shall be added to the organization as required during periods when such specialty areas are being executed. Examples of such specialized areas would include but are not limited to Designers of Record, Independent Technical Reviewers, Electrical design, Structural design, Seismic design, Environmental design, Mechanical design, Communications design, Fire protection design, HVAC, electrical distribution and substations, roofing, tele-communication systems, fire protection and alarm systems, computer installations, specialized welding, specialized finishes, precast concrete installation, modular housing, specialized geotech work, dredging, sand placement and surveying, chemical data acquisition, hazardous material removal and disposal, medical monitoring, etc., depending on the nature of the particular project. The Contractor must demonstrate that such additional qualified personnel have received sufficient training and indoctrination into the CQC system, and that these personnel properly execute the requirements of the CQC System within their areas of expertise.

3.2.5 Project Specific Organization

3.2.5.1 Contractor’s Quality Control Organization shall meet at a minimum one of the following:

a) The contractor shall employ a minimum of four people 1) CQC Systems Manager (Overall Manager), 2) A Construction Quality Control Manager, 3) a Design Quality Control Manager reports to the CQC Systems Manager. These people shall be assigned no duties other than Quality Control, 4) Design/Construction Liaison reports to the CQC Systems Manager. These people shall be assigned no duties other than Quality Control.

3.2.6 Organizational Changes

The Contractor shall maintain the CQC Organization at full strength at all times. When it is necessary to make changes to the organization, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

i. The Offerors are advised that substitution of proposed key personnel will not be permitted unless approved by the Contracting Officer/ Source Selection Authority and an administrative modification to the contract is issued to incorporate the change. The authority for substitution of key personnel lies solely with the Contracting Officer and will not be delegated to the ACO or COR.

ii. Substitution of key personnel will only be allowed under the following conditions:

- Change of Employment
- Would pose hardship upon the employee which was not known at the time the proposal was submitted
- Sickness or death
- A bait and switch of team members from proposal to execution phase is not allowed

iii. Any proposed team member replacement shall meet or exceed the qualifications noted in the specifications for their specialty.

3.3 QUALITY CONTROL

3.3.1 General

The Contractor shall furnish for review by the Government, not later than 10 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." and shall implement the requirements of Appendix D, E, F, and G of ER 1110-1-12, Engineering and Design QUALITY MANAGEMENT. The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan to cover design operations for the first 60 days. The complete CQC plan must then be submitted no later than 60 days after Notice to Proceed. Design and Construction will be permitted to begin only after acceptance of the CQC Plan or interim plan.

3.3.2 Design Quality Control (DQC) System

The Contractor shall provide and maintain an effective quality control program which will assure that all design services and products required for construction of this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards and the requirements of the contract. The Contractor shall include elements and details of the DQC program in the CQC Plan.

As a minimum, all design documents shall be technically reviewed by competent (Min 5 years experience one person per discipline) independent reviewers identified in the DQC Plan. The same element that produced the product shall not perform the independent technical review (ITR). In the DQC section of the CQC Plan the contractor shall cross-reference the Lessons Learned Databases provided by the Government. As a part of the ITR the team shall hold a coordination meeting for purposes of back check and review, all designers and Independent technical reviewers shall attend.

The Contractor shall correct errors and deficiencies in the design documents prior to submitting them to the Government.

Design Schedule: The procedure for design schedule shall be included in the DQC portion of the CQC Plan. The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project monitoring tool. The schedule must reflect calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within seven calendar days. Design schedule shall be coordinated with specification section "Project Schedule".

The Contractor shall include in the DQC portion of the CQC Plan the discipline-specific checklists to be used during the design and quality control of each design submittal. These completed checklists shall also be submitted at each design phase as part of the project documentation. Sample checklists can be found in Corps of Engineers Engineering Regulations ER 1110-1-12, available on the internet.

DQC shall be implemented by an assigned person with the A/E Firm who has the responsibility of being present during the times design work is in progress shall be cognizant of and assure that all documents on the project have been coordinated and that appropriate submittals of design products are current. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. Contractor shall indicate the name qualifications and responsibility and notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

Construction Contractor shall have an Engineer Design liaison to coordinate design activities throughout the life of the project for construction document development and construction activities. The Design Liaison will be a 4-year degreed engineer with a minimum of 4 years of design experience OR 4 years of construction experience, and have at a minimum at least two of the years of experience must be technical design coordination. In addition to performing the functions of a Engineer Design liaison it is allowable for this person to perform the function of a Site Safety Officer provided he/she meets the qualifications.

Design Quality Control is the processes used to assure performance meets agreed upon customer requirements that are consistent with law, regulations, policies, sound technical criteria, schedules, budget and RFP requirements. Quality Control consists of a multitude of processes and procedures to ensure quality products are produced. It begins with the selection of a highly qualified design team, the preparation of a Quality Control plan, appropriate supervisory guidance, and continuous/seamless independent review. One of the more visible processes is the Independent Technical Review (ITR).

a. Design Quality Control Plan (QCP) is a written plan prepared for each product which establishes the agreed upon requirements of the customer. The plan identifies the ITRT (including technical area of responsibility of each member) and its responsibilities, and the procedures that will be employed to ensure compliance with appropriate laws, regulations, policies and technical criteria.

b. Design Accountability - Quality control must begin with design team members and therefore design accountability becomes an integral part of design execution. The level of accountability placed on design team members is as defined by NYS PE Registration.

c. Design Team Leader is an individual having the leadership role in the production of the product. For engineering products this individual is the project engineer/architect (PE/A). For all projects the PE/A must be a registered professional. This person is responsible for coordination between all disciplines.

d. Independent Technical Review (ITR) shall be performed as follows, all design submissions are reviewed by a qualified person or team, not affiliated with the development of a project/product, for the

purpose of confirming the proper application of clearly established criteria, regulations, laws, codes, principles and professional procedures. It includes the verification of assumptions, methods, and level of complexity of the analysis. It also verifies the alternatives evaluated, appropriateness of data used, reasonableness of the results and functionality of the product relative to the customer's requirements.

Independent Technical Review Team (ITRT): An interdisciplinary group formed to perform the ITR.

e. ITRT Leader - The ITRT Leader is responsible for coordinating all activities associated with the technical review. This coordination includes receipt of review documents from the PE/A, distributing these documents to the ITRT members which may require coordinating the sharing of documents if there are not adequate copies for each member to have their own. The leader must also assure that the reviews are completed on schedule, collect the review comments from the various members and compile all comments into a single package. This package will then be provided to the PE/A. Additional responsibilities include:

• Assist the PE/A (when requested) in the development of the QCP

• Attend the pre-design conference Determine the need for attendance at all major planning/design team meetings.

• Select review team members who will attend the selected planning/design team meetings for in-progress reviews

• Conduct a team meeting early in the QC process to assure an understanding by the ITRT of the role and responsibility of each member

• Assure that ITR comments have been incorporated into the certified final design

• Obtaining signatures of ITRT members for the ITR certification (Appendix B) and providing certification to PE/A

f. ITRT Members - The ITRT Member is responsible for performing an Independent Technical Review of the assigned planning/design component. Whenever the review calls for a level of specialized knowledge, experience, or training not possessed by ITRT members, the ITRT leader and the ITRT members will seek assistance from a qualified engineer in this area.

• Signing ITR certification

• Assuring his/her ITR comments have been incorporated into the certified final design

• ITR members must have minimum 5 years experience in their field of review and be a senior engineer in their field

g. Independent Technical Reviews (ITR) The A/E shall perform an ITR during each phase of the design development. These ITRs will be conducted by qualified engineers (one Per discipline) who are not part of the design team or a supervisor of a design team member. Formal written comments will be generated by each member of the ITR team and annotated by the designers to indicate the intended corrective action. These corrective actions will be incorporated into the design during the same phase in which the review is conducted, prior to submission to the Government. Copies of annotated ITR review comments

and certification statements shall be furnished as an appendix to the Design Analysis. ITR certifications shall be certified by one of the firm's principles or authorized representatives.

h. Internal Review Process (Technical Check): Detailed review and design checks, which must be carried out as routine management practice. Such review includes checking basic assumptions and calculations. These checks are performed by staff responsible for the work, such as supervisors, work leaders, team leaders, or designated individuals from the senior staff and shall be performed prior to ITR of the deliverable. A design check should include a comprehensive evaluation of:

• the correct application of methods,

• adequacy of basic data,

• correctness of calculations (error free),

• completeness of documentation,

• compliance with guidance and standards, and RFP

• biddability, constructibility, and operability

i. Professional Accountability: This is a term specifically developed for this policy statement which represents a level of demonstrated design competency which would be expected of a registered design professional (engineer or architect) operating within acceptable standards as set forth by applicable state registration authority. The definition does not include the concept of design responsibility from a legal standpoint (civil or criminal liability) or design liability from a financial standpoint but does include the concept of design acceptability from a state licensing board's perspective. The concept of professional accountability is used as a measurement of adequate performance for those individuals providing architectural or engineering design functions. This standard does not require professional registration (except for the PE/A) but does require performance that is equivalent to that required of a registered professional.

j. Quality Certification: Formally signed certification document attesting to completion of the so-specified QC or QA activities and responsibilities. These will vary depending on how the design is accomplished as described below:

k. QC Certification For Contractor (AE) Certification – The A/E's Design Team and the ITRT sign a certificate verifying that the QC process for that product has been completed as described in the QCP. The process also includes the requirement for the Principal of the AE firm, to certify that an independent technical review has been conducted.

l. QA Audit: The evaluation of the quality control process and procedures through selective inspection of products, meetings, or production related activities. QA audits of products will not duplicate the technical review. Audits of meetings and inspections will be for the purpose of process improvement and technical oversight.

m. Seamless Review: Continual interaction and in-progress reviews made by members of the ITRT during product preparation.

3.3.3 CQC Plan

The CQC plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, designers of record, consultants, architect/engineer's (A/E's), fabricators, suppliers, and purchasing agents:

a. Details of the DQC system indicated above in Section 3.3.2.

b. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three-phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.

c. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. A clear indication that CQC System Manager, Design Quality Control Manager, and the Construction Quality Control Manager will have no duties other than Quality Control.

d. A copy of the letter to the CQC System Manager, Design Quality Control Manager, Design/Construction Liaison, and Construction Quality Control Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of particular title, including authority to stop work, which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will also be furnished to the Government.

e. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, designers of record, consultants, A/E's, off-site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES

f. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.) The Contractor shall incorporate all tests required by the contract (including systems commissioning and operating tests) to derive the above list of testing information, which shall be presented in matrix form as part of the CQC Plan. This matrix shall be suitable for use by the Contractor and the Government as a checklist to control testing to be done on the contract. Coordinate any additional test submission or plan requirements for Mechanical and Electrical Systems with appropriate specialized specification section if applicable.

g. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation. Provide matrix of Preparatory and Initial inspections including specification reference paragraph, name of the Definable Feature of Work, and spaces for date performed, results and names of attendees.

h. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

i. Reporting procedures, including proposed reporting formats. The Contractor shall utilize a Government-furnished software program titled "QCS" (Quality Control System). See specification section QUALITY CONTROL SYSTEM for additional details. Sample forms from QCS will be submitted with CQC Plan.

j. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there is frequently more than one definable feature under a particular section. This list will cover all features of work on the project, and will be agreed upon during the coordination meeting.

k. A brief explanation of the duties of the CQC organization with respect to safety. Note that separate Accident Prevention Plan and Hazards Analysis is required for submission and acceptance.

l. Contractor’s plan for training all CQC personnel in the CQC System.

3.3.4 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of design and/or construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction phases. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.3.5 Notification of Changes

After acceptance of the CQC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.4 COORDINATION MEETING

After the Pre-design Conference, before start of design and/or construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 calendar days prior to the Coordination Meeting. The initial plan submitted must be found acceptable by the Government before the Coordination Meeting can be held. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.5 SUBMITTALS

For purposes of this contract, the term submittals refers to both design submittals and shop-drawing type submittals. Submittals shall be made as specified in Section 01330 SUBMITTAL PROCEDURES and as specified in Section 01012 Design after Award. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements and are submitted in accordance with the schedule. CQC personnel shall also make physical checks of materials and equipment before installation to insure compliance with approved shop drawings.

3.6 CONSTRUCTION QUALITY CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the Construction and Design, to include that of the designers, subcontractors, and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the Construction Quality Control Representative for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work after all required plans/documents/materials are approved/accepted, and after copies are at the worksite, and shall include:

a. A review of each paragraph of applicable specifications.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met per EM 385-1-1, "Safety and Health Requirements Manual".

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase meeting. This phase shall include a meeting conducted by the Construction Quality Control Representative and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the Construction Quality Control Representative and attached to the daily CQC report. The Contractor shall clearly indicate its intent and plan for communication of the results of the preparatory phase to applicable workers, to include materials, construction methods, workmanship standards, safety considerations and procedures, and preparatory phase meeting minutes.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work (DFW) when the accomplishment of a representative sample of the work is impending. The following shall be accomplished:

a. A check of the portion of work done to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 48 hours in advance of beginning the initial phase meeting. This phase shall include a meeting conducted by the Construction Quality Control Representative and attended by the superintendent, other CQC personnel (as applicable), the foreman responsible for the definable feature and the work crew(s) for the appropriate DFW. Separate minutes of this phase shall be prepared by the Construction Quality Control Representative and attached to the daily CQC report. Exact location (i.e. CQC Report number) of initial phase shall be indicated for future reference and comparison with follow-up phases.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.6.5 Definable Feature of Work: Definition and Discussion

A Definable Feature of Work (DFW) is a portion of work consisting of materials, equipment, supplies and procedures which are closely related to each other, have the same control and will be accomplished by the same work crew to completion. A DFW must be sufficiently small so that control of the work (i.e. communication of requirements to workers, inspection of materials and workmanship and correction of deficiencies) will be easily accomplished. Some examples for various types of projects are:

* Rough-in of electrical boxes and wiring methods

* Lighting fixtures, receptacles, and accessories

* Panelboards, circuit breakers and motors.

* Water supply piping, fittings and supports

* DWV piping, fittings and supports for plumbing

* Concrete reinforcement and formwork

* Concrete mixing, placement, curing and finishing

* Testing Procedure for contaminated soil, materials and storage tank contents

* Storage Tank disassembly and removal

* Setting up of decontamination area, exclusion zones and standard safety procedures for asbestos removal

* Asbestos removal and disposal procedures

* Chemical Data Acquisition

* Preparation, removal and disposal of contaminated material

* Dredging and placement.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a laboratory which has been assurance inspected by the Corps of Engineers within the last two years. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, will be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control

number identifying the test will be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an off site or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract. The Contractor shall maintain a test log of all tests performed, by type, date, and specification section.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment and calibration in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, aggregate and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329. The Government requires a Corps of Engineers capability check of the laboratory which the contractor proposes to perform tests on soils, concrete, asphalt, aggregate and steel. If the laboratory proposed has not had the required Corps of Engineers capability check within the last two years, it will be performed by the Corps of Engineers at a cost of $7200 to the Contractor. This cost will be paid by the Contractor via check directly to the Corps of Engineers Laboratory performing the inspection and report.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $7200 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, as designated by the Government Representative. Coordination for each specific test, exact delivery location and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the Construction Quality Control Representative shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The Construction Quality Control Representative or staff shall make a second

inspection to ascertain that all deficiencies have been corrected. Once this is accomplished the Contractor shall notify the Government that the facility is ready for the Government's "Pre-final" inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied. A Government “Pre-Final Punch List” may be developed as a result of this inspection. The Contractor's Construction Quality Control Representative shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or an particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.8.4 Post Completion Feedback Meeting and Preparation of Written Minutes

At the completion of this project, the Construction Quality Control Representative will host a meeting to review the project and to discuss lessons learned during the construction of the project. This meeting should be scheduled for 4 hours on-site and should be attended by the Project Manager and representatives of the major subcontractors, including mechanical and electrical. The Contracting Officer and Project Manager will invite members of the government, design and construction team to participate in this meeting.

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

f. Submittals reviewed, with contract reference, by whom, and action taken.

g. Offsite surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of Personnel working; weather conditions encountered; and any delays encountered. “N/A” shall be entered into any field for which no entry is intended. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 16 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the Construction Quality Control Representative. The report from the Construction Quality Control Representative shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel. All documentation is expected to be literate, legible and complete.

3.9.1 Correspondence

The Contractor shall establish and implement a serialized numbering system for letters sent to the Government. The numbering system shall identify the contract number and shall progress sequentially starting with the number one (1) and continuing thereafter without break in numbering. All letters sent to the Government shall include a subject heading which identifies the Contract Clause Number, Special Clause Number, or Technical Provision Number, and the particular subject item addressed by the letter.

3.10. SAMPLE FORMS

(Note: If the Quality Control System (QCS) is required to be used by the contractor for the QC System as indicated elsewhere in this contract, Contractor will generate all reports in the QCS System, and attached forms will serve as guidance only. Otherwise forms contained herein will be used by the by CQC Staff for CQC System reporting

a. The 2-page form at the end of the section will be used for the basic CQC Report. CQC personnel shall attach continuation sheets as required for any entries which cannot fit on the basic form. Preparatory and

Initial Inspections, when performed, shall be indicated on the basic CQC report and minutes for each inspection shall be attached. Minutes will consist of a list of specific requirements for materials, procedures or equipment to be employed and shall also include any understandings reached or items of special importance discussed.

b. In addition, outstanding deficiencies shall be listed on the form "List of Outstanding Deficiencies" at the end of this section and shall be attached to each CQC report. As deficiencies are corrected, they are to be acknowledged on the basic CQC report and shall be deleted from the list.

c. Form at the end of this section entitled "CQC Test Report List" shall be used by the Contractor to track testing to be done as the project progresses, and also to summarize the Contractor's Quality Control testing to be reported on the CQC Plan.

d. Form "Record of Preparatory and Initial Inspections" at the end of this section shall be used by the Contractor to track Preparatory and Initial inspections as the project progresses and also to summarize these required inspections as part of the CQC Plan.

e. Additional reporting forms pertaining to specialized activities may be included herein or elsewhere in the contract, and shall be used for reporting as indicated.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor. Deficiencies cited and verbal instruction instructions given to the Contractor by the Government Representative shall be entered into that day’s CQC report.

(FORMS FOLLOW)

--- End of Section ---

CQC TEST REPORT LIST

CQC REPORT#_____ SH_____ OF _____ DATE:_____

CONTRACTOR:_____ CONTRACT #:_____

PROJECT TITLE:_____ LOCATION:_____

SPEC REF OR DWG#	TYPE OF TEST	DATE PERFORMED	RESULTS	REMARKS

NOTE: THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK CQC TESTING.PROVIDE ATTACHMENTS AS REQUIRED.

LIST OF OUTSTANDING DEFICIENCIES

SH_____ OF _____ DATE:_____

PROJECT TITLE:_____ CONTRACTOR:_____

LOCATION:_____ CQC REPORT#_____ CONTRACT #:_____

SPEC REF OR DWG#	LOCATION ON PROJECT	DESCRIPTION OF DEFICIENCY	DATE FOUND	DATE TO BE CORRECTED	DATE CORRECTED	REMARKS

NOTE: THIS FORM SHALL BE USED BY THE CONTRACTOR TO TRACK OUTSTANDING CONSTRUCTION DEFICIENCIES

CQC REPORT #_____ Date_____

1. Project Title:_____

Location: _____Contract No.:_____

2. List Contractors and Subs Working This Day and Areas of responsibility of each

3. Weather:

4.Description and Location of Work of the Project (Also indicate days of no work and reasons for delay

5. Labor and Equipment Breakdown by Trade (Attach Continuation)

6. Preparatory Phase Inspections Held (See Attached Minutes)

7. Initial Phase Inspections Held (See attached minutes)

8. Follow-Up Phase Inspections Performed, Results and Corrective Actions Taken

9. Job Safety. Indicate What Was Checked, Results,Instructions Received and Corrective Actions:

10. Additional Activities and Remarks (Check Appropriate Box)

[ ] a. Testing Performed. Attach Results.
[ ] b. Verbal Instructions Received.
[ ] c. Submittal Actions.
[ ] d. Outstanding Deficiencies. See Attached List
[ ] e. Delivery of Equipment and Materials.
[ ] f. Misc/Remarks.

(Use Space Below To Discribe Checked Items)

11. Contractor's Verification: "The above report and attachments are complete and all supplies, Materials, Equipment and Workmanship incorporated into the work are in full compliance with the contract except as noted".

Signed_____ Date_____

CQC Representative

SECTION 01525

SAFETY REQUIREMENTS
09/00

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.14	(1991) Construction and Demolition Operations - Requirements for Safety Belts, Harnesses, Lanyards and Lifelines for Construction and Demolition Use
ANSI Z359.1	(1992) Safety Requirements for Personal Fall Arrest Systems

ASME INTERNATIONAL (ASME)

ASME B30.5	(1994) Mobile Cranes
ASME B30.22	(1993) Articulating Boom Cranes

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.94	Ventilation
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.502(f)	Warning Line Systems

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM-385-1-1	(1996) Safety and Health Requirements Manual http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/toc.htm

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(1995) Portable Fire Extinguishers
NFPA 70	(1999) National Electrical Code
NFPA 241	(1996) Safeguarding Construction, Alteration, and Demolition Operations

1.2 DEFINITIONS

a. Competent Person. A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

b. Confined Space. A space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include, but are not limited to storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.

c. First Aid. First aid is any one-time treatment, and any follow-up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, and so forth, which do not ordinarily require medical care, even though provided by a physician or registered professional personnel.

d. Lost Workdays. The number of days (consecutive or not) after, but not including, the day of injury or illness during which the employee would have worked but could not do so; that is, could not perform all or part of his normal assignment during all or any part of the workday or shift; because of the occupational injury or illness.

e. Medical Treatment. Medical treatment includes treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

f. Multi-employer work site (MEWS). A multi-employer work site, as defined by OSHA, is one in which many employers occupy the same site. The Government considers the prime contractor to be the "controlling authority" for all work site safety and health of the subcontractors.

g. Operating Envelope. There is an "operating envelope" around any crane, and inside the envelope are the operator, riggers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).

h. Qualified Person. One who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work or the project.

i. Recordable Occupational Injuries or Illnesses. Any occupational injuries or illnesses which result in:

(1) Fatalities, regardless of the time between the injury and death, or the length of the illness; or

(2) Lost Workday Cases, other than fatalities, that result in lost workdays, or

(3) Non-Fatal Cases without lost workdays which result in transfer to another job or termination of employment, or require medical treatment (other than first aid) or involve: loss of consciousness or restriction of work or motion. This category also includes any diagnosed occupational illnesses which are reported to the employer but are not classified as facilities or lost workday cases.

j. Safety Officer. The superintendent or other qualified or competent person who is responsible for the on-site safety required for the project. The contractor quality control person cannot be the safety officer, even through the QC has safety inspection responsibilities as part of the QC duties.

k. Serious Accidents. Any work-related incident, which results in, a fatality, in-patient hospitalization of three or more employees, or property damage in excess of $200,000.

l. Significant Accident. Any contractor accident which involves falls of 1.2 m or more, electrical accidents, confined space accidents, diving accidents, equipment accidents, crane accident or fire accidents, which, result in property damage of $10,000 or more, but less than $200,000; or when fire department or emergency medical treatment (EMT) assistance is required.

m. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).

1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-07 Certificates

Accident Prevention Plan (APP); G

Activity Hazard Analysis (AHA); G

Health and Safety Plan (HASP); G

SD-11 Closeout Submittals

Daily Confined Space Entry Permit
Submit one copy of each permit attached to each Daily Production Report.

Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph 1.4.4 entitled, "Reports."

Crane Reports

Crane Critical Lift Plan

Certificate of Compliance

1.4 QUALITY ASSURANCE

1.4.1 Qualifications

a. Qualifications of Safety Officer:

(1) Ability to manage the on-site contractor safety program through appropriate management controls.

(2) Ability to identify hazards and have the capability to expend resources necessary to abate the hazards.

(3) Must have worked on similar types of projects that are equal to or exceed the scope of the project assigned with the same responsibilities.

(4) Shall, as a minimum, have attended an OSHA training qualification class including at least 10 hours of classroom instruction.

b. Qualifications of Qualified Person, Confined Space Entry. The qualified person shall be capable (by education and specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety.

c. Qualification of Crane Operators. Crane operators shall meet the requirements in COE EM-385-1-1, Appendix G.

1.4.2 Meetings

1.4.2.1 Prework Conference

The safety officer shall attend the prework conference.

1.4.2.2 Weekly Safety Meetings

Hold weekly at the project site. Attach minutes showing contract title, signatures of attendees and a list of topics discussed to the QC Contractor Quality Control daily report.

1.4.2.3 Work Phase Meetings

The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection.

1.4.2.4 New Employee Indoctrination

New employees will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

1.4.3 Certifications

1.4.3.1 Accident Prevention Plan (APP)

Submit the APP at least 15 calendar days prior to start of work at the job site, following Appendix A of COE EM-385-1-1. Make the APP site specific. Notice of approval to start work will be given after Government finds the APP acceptable.

1.4.3.2 Activity Hazard Analysis (AHA)

The AHA Shall be submitted and accepted as part of the APP at least 15 calendar days prior to the start of each phase. Format subsequent AHA as amendments to the APP. In accordance with contract quality control requirements each AHA will be reviewed during an on-site preparatory inspection.

1.4.4 Reports

1.4.4.1 Crane Reports

Submit crane inspection reports required in accordance with COE EM-385-1-1 and as specified herein with Daily Reports of Inspections.

1.4.4.2 Crane Critical Lift Plan

Submit crane critical lift plan COE EM-385-1-1 section 16 when crane loads meet or exceed 75 percent of the crane load capacity in any configuration.

1.4.4.3 Certificate of Compliance

The Contractor shall provide a Certificate of Compliance for each crane under this contract (see ROICC for a blank certificate). Certificate shall state that the crane and rigging gear meet applicable OSHA regulations (with the contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. The Contractor shall also certify that all of its crane operators working on the base have been trained not to bypass safety device (e.g., anti-two block devices) during lifting operations. These certifications shall be posted on the crane.

1.5 ACCIDENT PREVENTION PLAN (APP)

Prepare the APP in accordance with the required and advisory provisions of COE EM-385-1-1 including Appendix A, "Minimum Basic Outline for Preparation of Accident Prevention Plan," and as modified herein. Include the associated AHA and other specific plans, programs and procedures listed on Pages A-3 and A-4 of COE EM-385-1-1, some of which are listed below.

1.5.1 Contents of the Accident Prevention Plan

a. Name and safety related qualifications of safety officer (including training and any certifications).

b. Qualifications of competent and of qualified persons.

c. Identity of the individual who will complete exposure data (hours worked); accident investigations, reports and logs; and immediate notification of accidents to include subcontractors.

d. Emergency response plan. Conform to COE EM-385-1-1, paragraph 01.E and include a map denoting the route to the nearest emergency care facility with emergency phone numbers. Contractor may be required to demonstrate emergency response.

e. Confined Space Entry Plan. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

f. Hazardous Energy Control Plan. For hazardous energy sources, comply with COE EM-385-1-1, paragraph 12.A.07.

g. Alcohol and Drug Abuse Plan

(1) Describe plan for random checks and testing with pre-employment screening in accordance with the DFAR Clause subpart 252.223-7004, "Drug Free Work Force."

(2) Description of the on-site prevention program

h. Fall Protection and Prevention (FP&P) Plan. The plan shall be site specific and address all fall hazards in the work place. It shall address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 1.8 m. A qualified person shall prepare the plan. The plan shall include fall protection and prevention systems, equipment and methods employed, responsibilities, rescue and escape equipment and operations, training requirements, and monitoring methods. FP&P Plan shall be revised for lengthy projects, to reflect any new changes during the course of construction, due to changes of personnel, equipment, systems or work habits.

i. Silica Exposure Reduction. The plan shall include specific procedures to prevent employee silica inhalation exposures.

j. Excavation Plan. The safety and health aspects prepared in accordance with Section 02316, "Excavation, Backfilling, and Compacting for Utilities".

k. Training Records and Requirements. List of mandatory training and certifications which are applicable to this project (e.g. explosive actuated tools, confined space entry, fall protection, crane operation, vehicle operator, forklift operators, personal protective equipment); list of requirements for periodic retraining/certification; outline requirements for supervisory and employee safety meetings.

l. Severe Weather Plan. Procedures of ceasing on-site operations during lightning or upon reaching maximum allowed wind velocities.

m. Emergency Lighting and Power Systems Plan (e.g. periodic testing of batteries for emergency lighting.)

n. All personnel shall attend a OE safety briefing at Range Control prior to starting work on the jobsite. It is not anticipated you will encounter OE at this location, however should you find something, do not touch or relocate the item. Stop work in the area immediately and call Range Control at ph: 772-7152 or EOD at ph:772-5909.

1.5.2 Hazardous Material Use

Each hazardous material must receive approval prior to bringing onto the job site or prior to any other use in connection with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material. Any work or storage involving hazardous chemicals or materials must be done in a manner that will not expose government employees to any unsafe or unhealthful conditions. Adequate protective measures must be taken to prevent government employees from being exposed to any hazardous condition that could result from the work or storage. Approval by the Contracting Officer of protective measures and storage area is required prior to the start of the work.

1.6 ACTIVITY HAZARD ANALYSIS (AHA)

Prepare for each phase of the work. As a minimum, define activity being performed, sequence of work, specific hazards anticipated, control measures to eliminate or reduce each hazard to acceptable levels, training requirements for all involved, and the competent person in charge of that phase of work. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall arrest systems. For work with materials handling equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include excavation safeguarding requirements. The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection.

1.7 DRUG PREVENTION PROGRAM

Conduct a proactive drug and alcohol use prevention program for all workers, prime and subcontractor, on the site. Ensure that no employees either use illegal drugs or consume alcohol during work hours. Ensure there are no employees under the influence of drugs or alcohol during work hours. After accidents, collect blood, urine or saliva specimens and test injured employee's influence. A copy of the test shall be made available to the Contracting Officer upon request.

1.8 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

1.8.1 Scaffolds

Delineate the fall protection requirements necessary during the erection and dismantling operation of scaffolds used on the project in the Fall Protection and Prevention (FP&P) plan and activity hazard analysis for the phase of work.

1.8.2 Training

Institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, Contractor shall provide training for each employee who might be exposed to fall hazards.

1.9 DUTIES OF THE SAFETY OFFICER

a. Ensure construction hazards are identified and corrected.

b. Maintain applicable safety reference material on the job site.

c. Maintain a log of safety inspections performed.

d. Attend the pre-construction conference as required.

e. Identify hazardous work conditions and take corrective action. Failure to do so will result in a dismissal from the site, with a work stoppage pending approval of suitable replacement personnel.

1.10 DISPLAY OF SAFETY INFORMATION

Display the following information in clear view of the on-site construction personnel:

a. Map denoting the route to the nearest emergency care facility with emergency phone numbers.

b. AHA

c. Confined space entry permit.

d. A sign indicating the number of hours worked since last lost workday accident.

1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturers' manuals.

1.12 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment. However, if emergency medical care is rendered by Army medical services, charges may be billed to Contractor at prevailing rates established in BUMED Instruction 6320.4 series. Reimbursement shall be made by Contractor upon receipt of monthly statement.

1.13 REPORTS

1.13.1 Accident Reports

a. For recordable occupational injuries and illnesses, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the Army Contractor Significant Incident Report (CSIR) form and provide to the Contracting Officer within 5 calendar days of the accident. The Contracting Officer will provide a copy of the CSIR form.

b. For a weight handling equipment accident the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the WHE Accident Report form and provide to the Contracting Officer within 30 calendar days of the accident. The Contracting Officer will provide a blank copy of the WHE accident report form.

1.13.2 Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, of any accident meeting the definition of Recordable Occupational Injuries or Illnesses or Significant Accidents. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; and brief description of accident (to include type of construction equipment used, PPE used, etc.).

1.13.3 Monthly Exposure Report

Monthly exposure reporting, to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor.

1.13.4 OSHA Citations and Violations

Provide the Contracting Officer with a copy of each OSHA citation, OSHA report and contractor response. Correct violations and citations promptly and provide written corrective actions to the Contracting Officer.

1.13.5 Crane Notification

Notify Contracting Officer at least 15 days prior to bringing any crane equipment on-site so that the contracting officer may arrange for any additional quality assurance spot checks necessary by the government.

1.14 HOT WORK

Prior to performing "Hot Work" (welding, etc.) or operating other flame-producing devices, the Contractor shall request a written permit from the Fire Division. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity.

a. Oil painting materials (paint, brushes, empty paint cans, etc.), and all flammable liquids shall be removed from the building at quitting time. All painting materials and flammable liquids shall be stored outside in a suitable metal locker or box and will require re-submittal with non-hazardous materials.

b. Accumulation of trays, paper, shavings, sawdust, boxes and other packing materials shall be removed from the building at the close of each workday and such material disposed of in the proper containers located away from the building.

c. The storage of combustible supplies shall be a safe distance from structures.

d. Area outside of building undergoing work shall be cleaned of trash, paper, or other discarded combustibles at the close of each workday.

e. All portable electric devices (saws, sanders, compressors, extension chord, lights, etc.) shall be disconnected at the close of each workday. When possible, the main electric switch in the building shall be deactivated.

f. When starting work in building or areas, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED TO THE ROICC/BASE FIRE DIVISION IMMEDIATELY.

PART 2 PRODUCTS

2.1 CONFINED SPACE SIGNAGE

Provide permanent signs integral to or securely attached to access covers for new permit required confined spaces. Signs wording: "DANGER--PERMIT REQUIRED CONFINED SPACE - DO NOT ENTER -" on bold letters a minimum of 25 mm in height and constructed to be clearly legible with all paint removed. The signal word "DANGER" shall be red and readable from 1.52 m.

PART 3 EXECUTION

3.1 CONSTRUCTION

Comply with COE EM-385-1-1, NFPA 241, the accident prevention plan, the activity hazard analysis and other related submittals and activity fire and safety regulations.

3.1.1 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, lead-based paint are prohibited. Exceptions to the use of any of the above excluded materials may be considered by Contracting Officer upon written request by Contractor.

3.1.2 Unforeseen Hazardous Material

The design should have identified materials such as PCB, lead paint, and friable and nonfriable asbestos. If material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Contracting Officer

immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to "FAR 52.243-4, Changes" and "FAR 52.236-2, Differing Site Conditions."

3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages a minimum of 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting with the ROICC and the Station Utilities Department to review the scope of work and the lock out/tag out procedures for worker protection. No work will be performed on energized electrical equipment unless proven impassable. Working equipment "hot" must be considered the last option.

3.3 PERSONNEL PROTECTION

3.3.1 Hazardous Noise

Provide hazardous noise signs, and hearing protection, wherever equipment and work procedures produce sound-pressure levels greater than 85 dBA steady state or 140 dBA impulse, regardless of the duration of the exposure.

3.3.2 Fall Protection

Enforce use of the fall protection device designated for each specific work activity in the FP&P plan and/or AHA all times when an employee is on a surface 1.8 m or more above lower levels. Personal fall arrest systems are required when working from an articulating or extendible boom, scissor lifts, swing stages, or suspended platform. Fall protection must comply with ANSI A10.14.

3.3.2.1 Personal Fall Arrest Device

Personal fall arrest device equipment, systems, subsystems, and components shall meet ANSI Z359.1, "Safety Requirements for Personal Fall Arrest Systems". Only a full-body harness with a shock absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest device. Body belts may only be used as a positioning device system such as steel reinforcing assembly and in conjunction with another fall arrest system. Harnesses shall have a fall arrest attachment, which is a connector, affixed to the body support (usually a D-ring) and specifically designated for attachment to the rest of the system. Only double locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber.

3.3.2.2 Fall Protection for Roofing Work

Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 1.8 m of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets. Safety monitoring system is not adequate fall protection and is not authorized.

(2) For work greater than 1.8 m from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.502(f).

b. Steep Roofs: Work on steep roofs requires personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

3.3.2.3 Safety Nets

If safety nets are used as the selected fall protection system on the project, they shall be provided at unguarded workplaces, over water, machinery, dangerous operations and leading edge work.

3.3.2.4 Existing Anchorage

Existing anchorages, used for attachment of personal fall arrest equipment, if to be used by the Contractor, shall be re-certified by the contractor's fall protection engineer (QP).

3.4 SCAFFOLDING

Employees shall be provided with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Stair towers or ladders built into scaffold systems in accordance with USACE EM 385-1-1 Appendix J are required for work platforms greater than 6 m in height. Contractor shall ensure that employees that are qualified perform scaffold erection. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection plan. Minimum platform size shall be based on the platform not being greater in height than three times the dimension of the smallest width dimension for rolling scaffold. Some Baker type scaffolding has been found not to meet these requirements. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Special care shall be given to ensure scaffold systems are not overloaded. Outrigger brackets used to extend scaffold platforms on self supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

3.5 EQUIPMENT

3.5.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturers printed instructions.

3.5.2 Weight Handling Equipment

a. Cranes must be equipped with:

(1) Load Indicating Devices (LIDs) and a Boom Angle or Radius Indicator,

(2) or Load-Moment Indicating Devices (LMIs).

(3) Anti-two-block prevention devices.

(4) Boom Hoist Hydraulic Relief Valve, Disconnect, or Shutoff (stops hoist when boom reaches a predetermined high angle).

(5) Boom Length Indicator (for telescoping booms).

(6) Device to prevent uncontrolled lowering of a telescoping hydraulic boom.

(7) Device to prevent uncontrolled retraction of a telescoping hydraulic boom.

b. The Contractor shall notify the Contracting Officer, in advance, of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated.

c. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturers recommended procedures.

d. The Contractor shall comply with ASME B30.5 for mobile cranes, and ASME B30.22 for articulating boom cranes.

e. The presence of the government safety and health inspectors does not relieve the Contractor of an obligation to comply with all applicable safety regulations. The Government will investigate all complaints of unsafe or unhealthful working conditions received in writing from contractor employees, federal civilian employees, or military personnel.

f. Each load shall be rigged/attached independently to the hook/master-link in such a fashion that the load cannot slide or otherwise become detached. Christmas-tree lifting (multiple rigged materials) is not allowed.

g. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of ASME B30.5 or ASME B30.22 as applicable.

h. Crane supported work platforms shall only be used in extreme conditions if the Contractor proves that using any other access to the work location would provide a greater hazard to the workers. Personnel shall not be lifted with a live hoist or friction crane.

i. A fire extinguisher having a minimum rating of 10BC and a minimum nominal capacity of 5lb of extinguishing agent shall be available at all operator stations or cabs of cranes. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.

j. All employees shall be kept clear of loads about to be lifted and of suspended loads.

k. A weight handling equipment operator shall not leave his position at the controls while a load is suspended.

l. A Contractor Crane Operation Checklist shall be used by the CQC representative during oversight of contractor crane operations (refer to COE EM-385-1-1 Appendix H and ROICC for copies).

m. Only contractor crane operators who have met the requirements of 29 CFR 1910.94, 29 CFR 1910.120, 29 CFR 1926.65, 29 CFR 1926.502(f), COE EM-385-1-1, ASME B30.5, and ASME B30.22 and other local and state requirements shall be authorized to operate the crane.

n. Cribbing shall be utilized by the Contractor when performing lifts on outriggers.

o. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

p. A physical barricade must be positioned to prevent personnel from entering the tailswing area of the crane.

q. A substantial and durable rating chart containing legible letters and figures shall be provided with each crane and securely mounted onto the crane cab in a location allowing easy reading by the operator while seated in the control station.

r. Certification records which include the date of inspection, signature of the person performing the inspection along with the serial number or other identifier of the crane which was inspected. This record will always be available for review by contracting officer personnel.

s. Written reports listing the load test procedures utilized along with any repairs or alterations performed on the crane will be available for review by the contracting officer personnel.

t. Contractor shall certify that all of the crane operators have been trained not to bypass safety devices (e.g. anti-two block devices) during lifting operations.

3.6 EXCAVATIONS

The competent person for excavation performed as a result of contract work shall be on-site when work is being performed in excavation, and shall inspect excavations prior to entry by workers. The competent person must evaluate for all hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly. Prior to digging the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a utility locating service and coordinated with the Fort Drum Public Works Utility Branch. The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass-handled tools when any adjacent construction work is expected to come within three feet of the underground system. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 30 m (100 feet) if parallel within 1500 m of the excavation. Trench and shoring systems must be identified in the accepted safety plan and activity hazard analysis. Extreme care must be used when excavating near direct burial electric underground cables. Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view

of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file in the project site office or trailer.

3.7 ELECTRICAL

3.7.1 Conduct of Electrical Work

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cable intended to be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Fort Drum Public Works Utility Branch for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cutting remotely. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. Insulating blankets, hearing protection, and switching suits may be required, depending on the specific job and as delineated in the Contractor AHA.

3.7.2 Portable Extension Cords

Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered.

3.8 WORK IN CONFINED SPACES

Comply with the requirements in Section 06.I of COE EM-385-1-1. Any potential for a hazard in the confined space requires a permit system to be used.

a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See Section 06.I.05 of COE EM-385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.

b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained.

c. Ensure the use of rescue and retrieval devices in confined spaces greater than 1.5 m in depth. Conform to Sections 06.I.09, 06.I.10 and 06.I.11 of COE EM-385-1-1.

d. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

e. Include training information for employees who will be involved as entrant attendants for the work. Conform to Section 06.I.06 of COE EM-385-1-1.

f. Entry Permit. Use ENGFORM 5044-R or other form with the same minimum information for the Daily Confined Space Entry Permit, completed by the qualified person. Post the permit in a conspicuous place close to the confined space entrance.

3.9 CRYSTALLINE SILICA

Grinding, abrasive blasting, and foundry operations of construction materials containing crystalline silica, shall comply with OSHA regulations, such as 29 CFR 1910.94, and COE EM-385-1-1, (Appendix C). The Contractor shall develop and implement effective exposure control and elimination procedures to include dust control systems, engineering controls, and establishment of work area boundaries, as well as medical surveillance, training, air monitoring, and personal protective equipment.

3.10 HOUSEKEEPING

3.10.1 Clean-up

All debris in work areas shall be cleaned up daily or more frequently as necessary. Construction debris may be temporarily located in an approved location, however garbage accumulation must be removed each day.

3.10.2 Dust Control

In addition to the dust control measures required elsewhere in the contract documents dry cutting of brick or masonry shall be prohibited. Wet cutting must address control of water run off.

3.11 ACCIDENT SCENE PRESERVATION

For serious accidents, and accidents involving weight handling equipment, ensure the accident site is secured and evidence is protected remaining undisturbed until released by the Contracting Officer.

3.12 FIELD QUALITY CONTROL

3.12.1 Inspections

Include safety inspection as a part of the daily Quality Control inspections required in Section 01451, "Contractor Quality Control".

3.13 FLAMMABLE AND COMBUSTIBLE LIQUID HANDLING AND STORAGE

3.13.1 Safety Gas Containers

Handling of flammable and combustible liquids shall be in safety containers with flame arresters, with not more than 19 L capacity, having a spring-closing lid and spout cover and designed to safely relieve internal pressures under fire exposures. Flammable and combustible Liquids shall be stored in separate NFPA approved storage cabinets 15 m away from any sources of ignition with suitable NO SMOKING OR OPEN FLAME signs posted in all such areas.

-- End Of Section --

SECTION 01572
CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
02/03

PART 1 GENERAL
1.1 GOVERNMENT POLICY
1.2 MANAGEMENT
1.3 PLAN
1.4 RECORDS
1.5 COLLECTION
1.5.1 Source Separated Method.
1.5.2 Co-Mingled Method.
1.5.3 Other Methods.
1.6 DISPOSAL
1.6.1 Reuse.
1.6.2 Recycle.
1.6.3 Waste.

PART 1 GENERAL
1.1 GOVERNMENT POLICY
Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse.

1.2 MANAGEMENT
The Contractor shall take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling shall accrue to the Contractor. Firms and facilities used for recycling, reuse, and disposal shall be appropriately permitted for the intended use to the extent required by federal, state, and local regulations.

1.3 PLAN

A waste management plan shall be submitted within 15 days after notice to proceed and prior to initiating any site preparation work. The plan shall include the following:

a. Name of individuals on the Contractor's staff responsible for waste prevention and management.

b. Actions that will be taken to reduce solid waste generation.

c. Description of the specific approaches to be used in

recycling/reuse of the various materials generated, including the areas and equipment to be used for processing, sorting, and temporary storage of wastes.

d. Characterization, including estimated types and quantities, of the waste to be generated.

e. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

f. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity.

g. List of specific waste materials that will be salvaged for resale, salvaged and reused, or recycled. Recycling facilities that will be used shall be identified.

h. Identification of materials that cannot be recycled/reused with an explanation or justification.

i. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

1.4 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction. Required records are also described in Section 01010, paragraph 3.6.4.

1.5 COLLECTION
The necessary containers, bins and storage areas to facilitate effective waste management shall be provided and shall be clearly and appropriately identified. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials and separated by one of the following methods:

1.5.1 Source Separated Method.
Waste products and materials that are recyclable shall be separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing.

1.5.2 Co-Mingled Method.
Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

1.5.3 Other Methods.
Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.6 DISPOSAL
Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

1.6.1 Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Sale or donation of waste suitable for reuse shall be considered. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in this project.

1.6.2 Recycle.
Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling whenever economically feasible.

1.6.3 Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

-- End of Section --

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SECTION 01670

RECYCLED / RECOVERED MATERIALS

12/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.2 OBJECTIVES

Government procurement policy is to acquire, in a cost effective manner, items containing the highest percentage of recycled and recovered materials practicable consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. The Environmental Protection Agency (EPA) has designated certain items which must contain a specified percent range of recovered or recycled materials. EPA designated products specified in this contract comply with the stated policy and with the EPA guidelines. The Contractor shall make all reasonable efforts to use recycled and recovered materials in providing the EPA designated products and in otherwise utilizing recycled and recovered materials in the execution of the work.

1.3 EPA DESIGNATED ITEMS INCORPORATED IN THE WORK

Various sections of the specifications contain requirements for materials that have been designated by EPA as being products which are or can be made with recovered or recycled materials. These items, when incorporated into the work under this contract, shall contain at least the specified percentage of recycled or recovered materials unless adequate justification (non-availability) for non-use is provided. When a designated item is specified as an option to a non-designated item, the designated item requirements apply only if the designated item is used in the work.

1.4 EPA PROPOSED ITEMS INCORPORATED IN THE WORK

Products other than those designated by EPA are still being researched and are being considered for future Comprehensive Procurement Guideline (CPG)designation. It is recommended that these items, when incorporated in the work under this contract, contain the highest practicable percentage of recycled or recovered materials, provided specified requirements are also met.

1.5 EPA LISTED ITEMS USED IN CONDUCT OF THE WORK BUT NOT INCORPORATED IN THE WORK

There are many products listed in 40 CFR 247 which have been designated or proposed by EPA to include recycled or recovered materials that may be used by the Contractor in performing the work but will not be incorporated into the work. These products include office products, temporary traffic control products, and pallets. It is recommended that these non-construction products, when used in the conduct of the work, contain the highest practicable percentage of recycled or recovered materials and that these products be recycled when no longer needed.

-- End of Section --