

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE N/A	PAGE OF PAGES 1 160
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2. AMENDMENT/MODIFICATION NO. 0001	3. EFFECTIVE DATE MAY 27, 2004	4. REQUISITION/PURCHASE REQ. NO. N/A	5. PROJECT NO. (If applicable) SPEC. NO. 1400
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6. ISSUED BY CODE	7. ADMINISTERED BY (If other than Item 6) CODE
DEPARTMENT OF THE ARMY U.S. ARMY ENGINEER DISTRICT, SACRAMENTO SACRAMENTO, CALIFORNIA 95814-2922	DEPARTMENT OF THE ARMY U.S. ARMY ENGINEER DISTRICT, SACRAMENTO SACRAMENTO, CALIFORNIA 95814-2922

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	(√)	9A. AMENDMENT OF SOLICITATION NO. W91238-04-R-0017
	×	9B. DATED (SEE ITEM 11) MAY 11, 2004
		10A. MODIFICATION OF CONTRACTS/ORDER NO. N/A
		10B. DATED (SEE ITEM 13) N/A
CODE	FACILITY CODE	

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:
 (a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
N/A NOTE: ITEM 13 BELOW IS N/A.

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A. N/A
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority) N/A

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)
 FY 04
 AEF DEPLOYMENT CENTER
 Hill AFB, Utah

3 Encl

- Revised Pages: Table of Contents, Pricing Schedule (Page 3), 00110-4, 00110-5, Section 01011 (Replace existing Section in its entirety), 01330-5,
- Revised Drawing: C1.10
- As Built Drawings: (Various Bldg. 900 As Built Dwgs) 72 drawings

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	

~~5. EFARS 52.214 5000 ARITHMETIC DISCREPANCIES~~

~~(a) For the purpose of initial evaluation of bids, the following will be utilized in the resolving arithmetic discrepancies found on the face of Pricing Schedule as submitted by the bidder.~~

~~(1) Obviously misplaced decimal points will be corrected,~~

~~(2) Discrepancy between unit price and extended price, the unit price will govern,~~

~~(3) Apparent errors in extension of unit prices will be corrected,~~

~~(4) Apparent errors in addition of lump sum and extended prices will be corrected.~~

~~(b) For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends the bid to be evaluated on basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.~~

~~(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.~~

6. The target ceiling for contract award for design and construction is **\$5,183,000.00** based on the funds made available for this project. The Government cannot guarantee that additional funds can be made available for award. Offerors are under no obligation to approach this ceiling.

#8	Joint Venture Agreement
#9	Economic Price Adjustment for Steel

c. Detailed submission Requirements for the Price Proposal.

TAB 1 OF THE PRICE PROPOSAL: The proposal cover sheet is required by FAR 52.215-1(c)(i)-(v). This provision, titled “Instructions to Offerors—Competitive Acquisition”, is provided in full text in Section 00100. The format for the proposal cover sheet is also furnished elsewhere in this section.

TAB 2 OF THE PRICE PROPOSAL:

(a) The SF 1442 located in Section 00010 must be completed by the Offeror and duly executed with an original signature by an official authorized to bind the company in accordance with FAR 4.102, which includes specific instructions pertaining to individuals, partnerships, corporations, joint venture participants, and agents.

(b) Any and all amendments must be acknowledged in accordance with the instructions on the Standard Form 30, Amendment.

TAB 3 OF THE PRICE PROPOSAL: Submit the completed Pricing Schedule located in Section 00010 with the offeror’s proposed contract line item prices inserted in the appropriate spaces. Prices must be proposed for all contract line items and priced sub-line items. Unit prices must be extended to the actual “dollar and cents” amounts (i.e., to two decimal places). Do not round off the extended prices to the nearest dollar. Check the completed pricing schedule very carefully for mathematical and clerical errors prior to submission.

TAB 4 OF THE PRICE PROPOSAL: All offerors must complete and return the “Representations, Certifications, and Other Statements of Offerors” which are located at Section 00600 of the solicitation. If the offeror is a Joint Venture, all participants must separately complete Section 00600.

TAB 5 OF THE PRICE PROPOSAL: A bid guarantee (e.g., Standard Form 24, Bid Bond) is required.

TAB 6 OF THE PRICE PROPOSAL: Pre-award survey data is required. The format for this information has been provided elsewhere in this section.

TAB 7 OF THE PRICE PROPOSAL: The requirement for submitting a subcontracting plan applies only to large business concerns; small business concerns are not required to submit subcontracting plans. The format for the subcontracting plan has been provided elsewhere in this section. The negotiation of an acceptable subcontracting plan prior to contract award to a large business is a contractual requirement that is separate from the “best value” source selection process. Therefore, requests for and submission of revisions to the subcontracting plan will not constitute discussions, regardless of their timing.

TAB 8 OF THE PRICE PROPOSAL: If the offeror is a joint venture (JV), include a copy of the JV agreement and indicate its status.

TAB 9 OF THE PRICE PROPOSAL: The Contracting Officer ~~has included~~ **may include** in the solicitation/**contract** and is considering offering an economic price adjustment clause to authorize adjustment to the price of architectural and structural steel products to be used on this project. Any such adjustment is to be capped at a 25% upward adjustment. No adjustment for labor is being considered. In order to make the clause effective, the resulting contract will have to include in the schedule an identification of the items subject to adjustment according to the clause, ~~52.236-4~~ **52.216-4** Economic Price Adjustment – Labor and Material. Therefore, offerors desiring the protection this clause could afford must include with their price proposal information on the quantities and types of steel products being used, the bid item the steel product is being used on, the costs of those items at the time of proposal substantiated by

at least three, dated signed, letterhead competitive quotations, and rationale for why protection would be needed. In the case quotations are for “when delivered” prices, a price will still have to be provided as if the material was going to be delivered at the time of proposal. The Contracting Officer will use this information: to establish the need for an economic price adjustment in the resulting contract; those items that will be subject to adjustment; and, the baselines used for any subsequent adjustments. Any omissions or failure to provide this information before contract formation will result in no consideration for adjustment after contract award unless the requested adjustment is the result of new work added after contract award. The request, or failure to request protection under an economic price adjustment clause, will have no bearing on the evaluation of offers relative to price or technical factors.

5. SPECIFIC INSTRUCTIONS FOR THE TECHNICAL PROPOSAL

a. Number of Sets of the Technical Proposal

Submit the original and six additional sets of the written Technical Proposal, with each set separately packaged. In addition, submit one complete copy of the technical proposal on Compact Disk (CD) using a searchable “pdf” file format.

b. Format and Contents of the Technical Proposal/List of Tabs

Organize your technical proposal in accordance with the following chart, which may be used as the Table of Contents. (If the contents of a particular tab do not apply to your proposal, you may skip that tab, but do not renumber the subsequent tabs.)

Note: The main tabs directly correlate to the main evaluation factors identified in Section 00120.

TAB	CONTENTS OF THE TECHNICAL PROPOSAL
#1	DESIGN-BUILD MANAGEMENT APPROACH
1-1	Organization Chart(s) with Narrative
1-2	Letters of Commitment and Authorization from Key Subcontractors
1-3	Offeror’s Approach to Quality Control
1-4	Offeror’s Approach to Scheduling and Phasing of Major Activities
#2	RESUMES OF KEY PERSONNEL
#3	CAPABILITY (EXPERIENCE AND PAST PERFORMANCE)
3-1	Reference Projects Demonstrating Design Team Capability
3-2	Reference Projects Demonstrating Construction Team Capability
#4	SOCIO-ECONOMIC CONSIDERATIONS
4-1	Proposed Small Business Participation
4-2	Proposed HBCU/MI Participation
4-3	Participation of Small Disadvantaged Businesses (SDBs) under the Authorized Codes and Regions

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(1) A11 - STANDARD FOUNDATIONS

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(4) D24 - SANITARY WASTE AND VENT

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(1) D31 - ENERGY SUPPLY

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(3) D33 - REFRIGERATION

(4) D34 - AIR DISTRIBUTION

(5) D36 - HVAC CONTROLS

- c. D4 - FIRE PROTECTION
 - (1) D41 - FIRE SPRINKLER AND EXTINGUISHING SYSTEMS
 - (2) D43 - FIRE DETECTION AND ALARM
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 - (3) D59 - OTHER ELECTRICAL POWER ELEMENTS
- e. D6 - ARTIFICIAL LIGHTING
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3. END OF TABLE OF CONTENTS

CHAPTER 1**PROGRAM SUMMARY****1. BASIC FUNCTION**

1.1 Project: This project is an industrial facility consisting of areas for administrative areas, administrative support, building support areas, and mission areas.

2. SPACES

2.1 Interior Spaces: See Chapter 11

2.2 Exterior Spaces: The project includes spaces of the following types:

2.2.1 Outdoor Resident (SR Spaces): Spaces for sitting, resting, and smoking.

2.2.2 Outdoor Utility Equipment (SU2 Spaces): Dedicated spaces for outdoor elements of water and drainage, heating and cooling, fire protection, electrical power, and telecommunications services.

2.2.3 Automotive (SV2 Spaces): Spaces for parking private vehicles, access roads, driveways, and passenger loading zone.

3. PROGRAM

~~3.1 Project Program: The project program, entitled Requirements Document (RD), is included as part of this RFP in the attachments.~~

3.1 Project Program: The project program is described throughout this document.

4. EXISTING CONDITIONS

4.1 The proposed project site is an area next to building 900.

4.2 The project site is currently vacant except for minor site structures.

4.3 See external documents in the Attachments for more information.

END OF CHAPTER 1

CHAPTER 11

PROJECT PROGRAM

~~4. THE PROJECT REQUIREMENTS ARE EXPLAINED IN THE REQUIREMENTS DOCUMENT (RD) FOR THE AEF DEPLOYMENT CENTER, WHICH IS INCLUDED IN THIS PACKAGE AS AN ATTACHMENT.~~

1.

1.1 Program Narrative.

1.1.1 The work consists of the design and construction of a new AEF Deployment Center Facility of approximately 55,000 gross SF located at Hill Air Force Base, Utah. The facility's primary function will be to provide adequately sized, efficiently configured transportation and management mobility training and support facility needed to train and process AEF units that will deploy from Hill AFB under constant state and wartime conditions.

1.2 Staffing.

1.2.1 The facility may be used on a 24/7 basis.

1.3 General Room by Room Requirements:

1.3.1 Ceiling shall be minimum 9' high except minimum 10' in the Mechanical Room unless otherwise specified.

1.3.2 Ratio of a room's or a space's length to width shall be appropriate to the function, furniture, and/or equipment required. Ratio of a room's or a space's length to width shall be no more than 2 to 1, except for corridors and mechanical room, unless otherwise approved by the User during the Design Charrette process.

1.3.3 Interior walls shall not butt against glass window surfaces.

1.3.4 Gypsum wallboard walls shall be provided with bullnose corners.

1.3.5 Provide HVAC system, requirements shown in section D3.

1.3.6 Provide Fire Protection system, requirements shown in section D4 .

1.3.7 Use Adjacency Matrix in the Attachments for more information.

1.4 Administrative Areas:

1.4.1 Locate administrative area near the Entry Vestibule/Lobby, Conference/Break, Vending Area, and Restrooms.

1.4.2 Ceilings for the Administrative Areas should be at minimum 9' high.

1.4.3 System & Management (Supply) and Transportation Management Operation (TMO):

- a. Provide minimum 7,700 square feet space for approx. 55 NIC workstations for both Supply and TMO.
- b. Provide a minimum of four (min. 9 square feet each), with approximately 24 square feet of operable window area in the exterior wall.
- c. Provide two exterior doors and hardware with direct access to the outside in two different locations.
- d. Provide room for a fax, printing, and copy machine.
- e. Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
- f. Provide phone and LAN connection for each workstation.
- g. Provide standard electrical system.

- h. Provide space for an individual Main Office for each of the areas, Supply and TMO. Each office should be separated for privacy with interior walls that shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
- i. Provide supply with a reception/waiting area. Waiting area should at minimum seat 5 people.

1.4.4 Administrative Support Areas:

- a. Men's Restroom:
 - (1) Provide as a minimum 3 water closets, 2 urinals, and 3 lavatories.
 - (2) Provide partitions and screens for the water closets and urinals.
 - (3) Provide countertop for the lavatories. A full-length mirror shall be provided over the counter.
 - (4) At each water closet, provide a toilet tissue dispenser and a toilet seat cover dispenser.
 - (5) At the lavatories, provide one combination paper towel dispenser and disposal.
 - (6) At each lavatory, provide a liquid soap dispenser.
 - (7) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
- b. Women's Restroom:
 - (1) Provide as a minimum 3 water closets and 3 lavatories.
 - (2) Provide partitions for the water closets.
 - (3) Provide countertop for the lavatories. A full length mirror shall be provided over the counter.
 - (4) At each water closet, provide a toilet tissue dispenser, a toilet seat cover dispenser, and a sanitary napkin/tampon disposer.
 - (5) At the lavatories, provide one combination paper towel dispenser and disposal.
 - (6) At each lavatory, provide a liquid soap dispenser.
- c. Entry Vestibule/Lobby/Waiting Area:
 - (1) Minimum 375 square feet.
 - (2) Locate this main public entry with a pair of glass/aluminum doors and hardware with handicapped accessible assisted controls from public parking area.
 - (3) As a minimum, provide at least 90 linear feet of 2 ft wide display area capacity behind glass counter/shelving.
 - (4) Provide space and service for a base phone.
 - (5) Provide standard electrical system.
- d. Conference Room/Break Room:
 - (1) Minimum 500 square feet based on 20 person occupancy.
 - (2) Locate near Transportation Management Operation (TMO), and System & Management (Supply).
 - (3) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
 - (4) Provide space for NIC large conference table and 20 ergonomic chairs.
 - (5) Provide TV bracket for wall-mounted TV.
 - (6) Provide two phone and LAN connections.
 - (7) Provide standard electrical system plus services for NIC media (i.e. overhead projection equipment, computer station connected to projection with access to LAN, DVD, CD, VCR, and sound equipment).
- e. Conference/Break Room's Storage Room:
 - (1) Minimum 50 square feet.
 - (2) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
 - (3) Provide standard electrical system.
- f. Vending Area:
 - (1) Minimum 150 square feet.
 - (2) Design for minimum 2 vending machines.

- (3) Interior walls shall be extended to the floor structure above. Provide standard electrical system.
- (4) Provide standard electrical system.

1.4.5 Building Support Areas:

a. Mechanical Room:

- (1) Minimum 144 square feet with approximate dimensions of (12' X 12').
- (2) Area shall be sized as required for equipment and for proper clearances around the equipment for maintenance access.
- (3) Locate this room on exterior walls, away from building entrances and noise-sensitive rooms and spaces.
- (4) Locate near electrical and communication rooms.
- (5) Locate louvers on sides of building away from public view at public parking.
- (6) Access to the room shall be from the exterior only.
- (7) Provide a single double door (minimum 3'-2" width for each leaf) (Hardware for double doors) to the exterior unless more doors (Hardware for single doors) are otherwise required in accordance with code and with functional arrangement of equipment.
- (8) Any equipment placed outside of the Mechanical Room shall be surrounded by concrete masonry unit screen walls to a height that conceals equipment with access gates.

b. Electrical Room:

- (1) Minimum 144 square feet with approximate dimensions of (12' X 12').
- (2) Area shall be sized as required for equipment and for proper clearances around the equipment for maintenance access.
- (3) Locate this room on exterior walls, away from building entrances and noise-sensitive rooms and spaces.
- (4) Locate near mechanical and communications rooms.
- (5) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.

c. Communication Room:

- (1) Minimum 180 square feet with approximate dimensions of (15' X 20').
- (2) Area shall be sized as required for equipment and for proper clearances around the equipment for maintenance access.
- (3) Locate near mechanical and electrical rooms.
- (4) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
- (5) Line all walls with 8 foot high by ¾ inch thick plywood sheets. Plywood to be finished on both sides with two coats of insulating varnish or fire retardant paints.
- (6) Provide standard Lan system.
- (7) Provide HVAC controls.

d. Janitor Closet:

- (1) Minimum 20 square feet with minimum dimensions of 4'x5'.
- (2) Locate next to Restrooms.
- (3) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
- (4) Provide three adjustable, wall-mounted shelves approx. 5' long x 12" wide.
- (5) Provide mop and broom holder.
- (6) Provide a deep service ~~wall-mounted~~ wall/floor-mounted sink.
- (7) Provide standard electrical system.

1.4.6 Mission Support Areas:

a. Weapons Vault:

- (1) Minimum 11,730 square feet.
- (2) Locate near existing Building 900
- (3) Provide open bay space for (NIC) vertical storage shelves not to exceed 8'.

- (4) Provide Intrusion Detection (IDS) system and hook into base system.
 - (5) Provide room for pallet build-up area.
 - (6) Provide phone for IDS connection.
 - (7) Provide standard electrical system.
 - (8) Other requirements for this room will be taken from C19 Other Interior Construction section.
- b. K-Loader Maintenance:
- (1) Minimum 6,400 square feet.
 - (2) The ceiling height to match height of existing building 900 (approx. 14'-16').
 - (3) Locate near existing Building 900.
 - (4) Provide drain in floor to account equipment being brought into area during inclement weather so that water will be removed from the work area. Connect drain line directly to ~~new Industrial Waste~~ (IW) line in the area.
 - (5) Provide open bay space for (NIC) vertical storage shelves not to exceed 8'.
 - (6) Provide service counter.
 - (7) Provide emergency shower and eyewash.
 - (8) Provide compressed air lines. Extend existing *1 inch* compressed air lines from building 900. The existing compressed air pressure in building 900 is *93 psi*
 - (9) Provide 110 voltage outlets.
 - (10) Provide access to this area from outside and inside with a personnel and roll-up coiling doors. Accommodate access for a drive-through type maintenance operation, from the existing building to exterior of the new building. Provide a roll-up coiling door at each end of the bay (minimum 15' x 10')
 - (11) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
 - (12) Provide phone and LAN connection.
 - (13) Provide standard electrical system.
- c. Air Transportable Clinic (ATC)
- (1) Minimum 7,040 square feet.
 - (2) Provide open bay space for (NIC) vertical storage shelves not to exceed 8'.
 - (3) Provide space for approx. 5 CON-EX boxes with the approx. dimensions of 88" W x 108" L x 96" H.
 - (4) Provide service counter.
 - (5) Provide access to this area from outside or west side.
 - (6) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to outside or west side.
 - (7) Provide phone and LAN connection.
 - (8) Provide standard electrical system.
 - ~~(9) Provide portable walk-in cooler for storing supplies that require refrigeration.~~
- d. Mobility Bag Storage and Handling:
- (1) Minimum ~~14,400~~ **15,000** square feet.
 - (2) The ceiling height to match height of existing building 900 (approx. 14'-16').
 - (3) Locate near Room 8 of Building 900.
 - (4) Provide open bay space for (NIC) vertical storage shelves not to exceed 8'.
 - (5) Provide service counter.
 - (6) Provide access to this area from outside and inside with personnel and cargo doors.
 - (7) Interior walls shall be extended to the roof structure above. Provide an interior door with Hill AFB Facility Design Standard lock and hardware to interior corridor.
 - (8) Provide phone and LAN connection.
 - (9) Provide standard electrical system for room and carousels.
 - (10) Provide room for approx. nine carousels and supporting equipment. Minimum dimension requirements are shown in the Attachments section.

1.5 Options Items

- 1.5.1 (Option CLIN #0004) Design, procure, receive, store, install, connect, and test all facilities/features for evaporative cooling for ATC area (except as otherwise noted), complete and useable per D3.
- 1.5.2 (Option CLIN #0005) Design, procure, receive, store, install, connect, and test facilities/features for landscaping (except as otherwise noted), complete and useable per G23.

END OF CHAPTER 11

CHAPTER 111

FACILITY PERFORMANCE

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide built elements and site modifications as required to fulfill needs described in the project program.
- 1.1.2 The complete project comprises the following elements:
- a. Substructure (A): Elements below grade and in contact with the ground.
 - b. Shell (B): The superstructure, exterior enclosure, and the roofing.
 - c. Interiors (C): Interior construction, stairs, finishes, and fixtures, except fixtures associated with services and specialized equipment.
 - d. Services (D): Mechanized, artificial, automatic, and unattended means of supply, distribution, transport, removal, disposal, protection, control, and communication.
 - e. Equipment and Furnishings (E): Fixed and movable elements operated or used by occupants in the functioning of the project.
 - f. Demolition (F): Removal of unneeded and undesirable existing elements.
 - g. Sitework (G): Modifications to the site, site improvements, and utilities.
- 1.1.3 Technical criteria to be used for construction shall be taken from the **most current references at the date of April 28, 2004** and shall only be modified as described herein.
- 1.1.4 Code: Make all portions of the project comply with the code. The code referred to herein and 01010 document consists of all applicable local Base Facility Standard, State, and federal regulations, including those listed below:
- a. Federal Regulatory Requirements:
 - (1) Americans with Disabilities Act of 1990, as a public accommodation, as implemented in:
 - (a) 28 CFR 35, Department of Justice regulations relating to State and local governments, including ADAAG.
 - (b) 28 CFR 36, Department of Justice regulations, including ADAAG-1994.
 - (2) Uniform Federal Accessibility Standards (UFAS).
 - (3) 29 CFR 1910-1997, Occupational Safety and Health Standards, as a work place.
 - b. Building codes used for design at Hill AFB include:
 - (1) International Building Code (IBC)
 - (2) NFPA 101, Life Safety Code
 - (3) TI 809-04 Seismic Design For Buildings
 - (4) International Plumbing Code
 - (5) NFPA 13, Installation of Sprinkler Systems
 - (6) NFPA 54, National Fuel Gas Code
 - (7) NFPA 70, National Electrical Code
 - (8) NFPA 72, National Fire Alarm Code
 - (9) NFPA 90A, Installation of Air- Conditioning and Ventilating Systems,
 - c. Standards: The following Hill AFB, Air Force, and Army standards are to be followed:
 - (1) Hill AFB Architectural Compatibility Standards
 - (2) ~~Hill AFB Base Facility Design Standards~~
 - (2) Hill AFB Base Facility Design Standards (refer to Attachments section for version to use)
 - (3) UFC 3-600-01 Fire Protection for Facilities Engineering, Design and Construction
 - (4) ~~AFI 31-101, Air Force Installation Security Program (FOUO)~~
 - (5)(4) MIL-HDBK-1013/1A, Design Guidelines for Physical Security of Facilities
 - (6)(5) DOD 5100.76-M, Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives

- ~~(7)~~(6) UFC 1-200-01 Design: General Building Requirements
- ~~(8)~~(7) UFC 4-010-01 Design: DoD Minimum Antiterrorism ~~Standards~~ Standards for Buildings
- ~~(9)~~(8) UFC 3-520-01 Design: Interior Electrical Systems
- ~~(10)~~(9) UFC 3-400-02 Engineering Weather Data
- ~~(11)~~(10) UFC 3-410-01FA Design: Heating, Ventilating, and Air Conditioning
- ~~(12)~~(11) UFC 3-410-02A Design: Heating, Ventilating, and Air Conditioning (HVAC) Control Systems
- ~~(13)~~(12) UFC 3-420-01FA Design: Plumbing
- ~~(14)~~(13) Air Force AFJMAN 32-1080: Electrical Power Supply and Distribution
- ~~(15)~~(14) Air Force ETL 02-12: Communications and Information System Criteria for Air Force Facilities
- ~~(16)~~(15) Air Force AFM 88-9/Chapter 3: Electrical Design-Lightning and Static Electricity Protection

- d. Occupancy: The primary occupancy of the project, according to the code, is Group F-1 (Factory Industrial Moderate-Hazard Occupancy) per IBC.
- e. Life Safety: The primary hazard of the project, according to the code is Ordinary Hazard, per NFPA 101 Life Safety Code.

1.1.5 Environmentally Responsible Design: In addition to other requirements, provide design and construction that minimizes adverse effects on the exterior environment, enhances the quality of the indoor environment, and minimizes consumption of energy, water, construction materials, and other resources.

- a. The goals listed below are some of those that are applicable to the project.
 - (1) The goals indicated as "required" must be achieved.
 - (2) The goals indicated as "desirable" will be given high priority in evaluating proposals, as specified in ~~Chapter 00200~~.
 - (3) The goals indicated as "if possible" must be achieved if the design and site considerations allow.
 - (4) The goals indicated "as specified" have different requirements specified in other Chapters.
- b. Conservation of Materials and Resources:
 - (1) Central location for collection and storage of recyclables: Required.
 - (2) Recycling and/or salvaging of construction waste: Desirable.
 - (3) Use of salvaged or refurbished materials: Desirable.
 - (4) Use of materials containing recycled content: Desirable.
 - (5) Use of local/regional materials: Desirable.
 - (6) Use of rapidly renewable materials: Desirable.
 - (7) Use of certified wood: Desirable.
- c. Indoor Environmental Quality:
 - (1) Smoking will be prohibited in the building.
 - (2) Minimum ventilation performance: Required.
 - (3) Location for make-up air intake ventilation shall be minimum 10 feet above ground level in with the new DOD anti-terrorism policy.
 - (4) Use of materials that are low-emitting, non-toxic, and chemically inert: Required.
 - (5) Control of sources of indoor pollutants: Required.
- d. Substantiation:
 - (1) Preliminary Design Stage: LEED Checklist annotated to show specific credits to be achieved with brief description of how they will be achieved.
 - (2) Design Development and Construction Documents Stages: LEED Checklist annotated to show status of design related to specific credits to be achieved and a comprehensive checklist of certification document specified in LEED Reference Guide annotated to show status of preparation of documentation.

1.1.6 Food Preparation, Storage, and Serving Facilities: Located, designed, and constructed to allow

efficient operations, to minimize contamination and spoilage of foods, to allow easy maintenance and cleaning, and to provide effective protection against the entrance and harborage of pests.

a. Substantiation:

- (1) Construction Documents: Material and equipment specifications.

1.1.7 Sustainable Design Considerations:

a. Sustainable Design Techniques:

- (1) Sustainable Design techniques shall be considered as they relate to site design, site engineering, building design, and building engineering. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged. Integration of energy conservation systems with the building design (lighting, structure, mechanical systems, and aesthetics) is essential to facilitate usability and maximum energy savings. The following paragraphs define the goals and general objectives for inclusion of Sustainable Design Considerations in this project. This information is taken from US Army Corps of Engineers, ETL 1110-3-491. The listing is not all inclusive, and the techniques suggested may not be cost effective at a given location or site. Additional consideration in the technical evaluation will be given to designs which incorporate and identify Sustainable Design techniques included in the proposal.

b. Goals and Objectives of Sustainable Design:

- (1) The overall USACE goal of Sustainable Design is to be environmentally responsible in the delivery of facilities. The key traditional elements for decision making in the facility delivery process are cost, quality and time. These elements need to be expanded to include the ecological and human health impacts of all decisions.

c. Sustainable Design and Construction of the Built Environment. Design and construction of sustainable buildings should be in accordance with the following concepts:

- (1) Site Work and Planning--Environmentally sensitive planning looks beyond the boundary of the project site to evaluate linkages to transportation and infrastructure, ecosystems and wildlife habitat and community identification. Site planning evaluates solar and wind orientation, local microclimate, drainage patterns, utilities and existing site features to develop optimal siting and appropriate low maintenance landscape plant material (note: in this project, building location and orientation are already set);
- (2) Building Layout and Design--Optimize building size, and maintain an appropriate building scale for the environment and context of the building or a building component. Layout the rooms of a building for energy performance and comfort, and design for standard sizes to minimize material waste. Pay careful attention to the location of exterior windows. Avoid structural over-design and the resultant waste. Design components of the built environment for durability and ease of adaptation to other uses, and for waste recycling.
- (3) Energy--Building orientation and massing, natural ventilation, day-lighting, shading and other passive strategies, can all lower a building's energy demand and increase the quality of the interior environment and the comfort and productivity of occupants (note: in this project, building orientation and massing are already set);
- (4) Building Materials--Environmentally preferable building materials are durable and low maintenance. Within the parameters of performance, cost, aesthetics and availability, careful selection and specification can limit impacts on the environment and occupant health;
- (5) Indoor Air Quality--Indoor air quality is most effectively controlled through close coordination of architecture, interiors and MEP design strategies that limit sources of contamination before they enter the building. Construction procedures for IAQ and post-occupancy user guides also contribute to good long-term IAQ;
- (6) Water--Site design strategies that maximize natural filtration of rainwater and consideration. Water conservation is enhanced by low flow plumbing fixtures, water appropriate landscaping and HVAC and plumbing system design;
- (7) Recycling and Waste Management--Waste and inefficiency can be limited during

- construction by sorting and recycling demolition and construction waste, reuse of on-site materials and monitoring of material use and packaging. Accommodating recycling into building design reduces waste while generating revenues, and;
- (8) Building Commissioning, Operations and Management--Effective building commissioning is essential to ensure proper and efficient functioning of systems. Facilities operations benefit from the monitoring of indoor air quality and energy and water saving practices, waste reduction and environmentally sensitive maintenance and procurement policies.
- d. Documentation of Sustainable Design. The Contractor shall analyze the project using the United States Green Building Council's (USGBC) "Leadership in Energy and Environmental Design (LEED) Green Building Rating System and report the finding to the Contracting Officer. See also "Sustainable Facility Guide", 3/31/00, prepared by John Barrie Associates Architects Inc. and the United States Air Force Air Combat Command. The project shall meet a "certified" rating (minimum 26 points of maximum 69 points), including all prerequisites, in accordance with LEED's Green Building Rating System Version 2.1 rating tool. LEED certification by USGBC is not required.
- 1.1.8 In addition to the requirements of this chapter, comply with requirements of Chapter 1 - Program Summary and Chapter 11 - Program.
- 1.2 Amenity and Comfort:
- 1.2.1 Thermal Performance: Design and construct to provide comfortable interior environment in accordance with the code and the following:
- a. Outside Air Design Conditions:
- (1) Summer Outside Air Design Temperature: 92 deg F dry-bulb; 64 deg F wet-bulb.
 - (2) Winter Outside Air Design Temperature: 10 deg F dry-bulb.
- b. Energy Design Wind Speed: 9 mph.
- 1.3 Health and Safety:
- 1.3.1 Fire Resistance: Provide ~~Type~~ minimum Type II-B construction in accordance with ICC International Building Code.
- 1.3.2 Fire Protection System: Provide wet type automatic sprinkler system in accordance with UFC 3-600-01 and NFPA 13.
- 1.3.3 Plumbing System: Provide toilet for both gender in every occupied facility to support basic sanitary and hygienic requirements. Construction of plumbing system shall be in accordance with the Base Facility Standard and International Plumbing code, Federal, State and other local regulations. Plumbing fixture requirements by Chapter 11 Room by Room requirements shall be in accordance with the AFMAN 32-1070, Chapter 4. Provide oil and grease interceptor for the waste water coming from the floor drain at the K-Loader hydraulic system repair area.
- 1.3.4 Prevention of Accidental Injury: As required by code and as follows:
- a. Safety Glazing: As defined by 16 CFR 1201; provide in locations required by code.
- b. Other requirements specified in other Chapters.
- c. Substantiation:
- (1) Preliminary Design: Identification of building elements that require special accident prevention measures.
 - (2) Design Development: Identification of safety measures taken, detailed description of design criteria, and structural analysis of load-resisting elements prepared by a structural engineer licensed to practice in the State of Utah.
 - (3) Construction Documents: For load-resisting elements, structural design calculations and drawings sealed by structural engineer licensed to practice in the State of Utah.
- 1.3.5 Lightning Hazard: Design to prevent damage to occupants, structure, services, and contents due to lightning strikes.

- a. Provide protection equivalent to that specified in NFPA 780-2000; supplementary strike termination devices, ground conductors, and grounding electrodes are required only where the integral portions of the structure cannot perform those functions.
- b. Ground Resistance Measurement Methods: As described in NFPA 780-2000, Appendix I, or IEEE 81-1983.
- c. Substantiation:
 - (1) Design Development: Diagrams showing locations of strike (air) terminals and zones of protection; identification of internal components that require bonding to equalize potential.
 - (2) Construction Documents: Drawings showing locations and sizes of conductors, bonding of metal bodies, and components; detailed installation specifications.
 - (3) Commissioning: Continuity tests for grounding conductors, equipotential bonding of other systems, and ground terminals; ground resistance test for each ground terminal, or equivalent taking into account related grounding systems.
 - (4) Commissioning: Certification of system complying with UL Master Label or Lightning Protection Institute Certified System requirements.
 - (5) Closeout: Maintenance and inspection procedures.
 - (6) Closeout: Project record data; location of ground terminals, ground resistance and soil conditions at time of test.

1.3.6 Health Hazards:

- a. Design to prevent growth of fungus, mold, and bacteria on surfaces and in concealed spaces.
- b. Hazardous Construction Materials: Design and construct to comply with the requirements of the code.
 - (1) All existing friable asbestos and asbestos-containing materials must be removed or abated to the extent required by and using procedures specified by federal, state, and local regulations.
 - (2) All existing lead-based paint must be removed or abated to the extent required by and using procedures specified by federal, state, and local regulations.
 - (3) All existing PCB-containing equipment and PCB-contaminated materials must be removed using procedures specified by federal, state, and local regulations.
 - (4) See Chapter F for additional requirements relating to potentially hazardous materials in existing structures.
- c. Indoor Air Quality: Design and construct to comply with the code and the following:
 - (1) Acceptable air quality as defined by ANSI/ASHRAE 62-2001.
 - (2) Substantiation:
 - (a) Design Development: Identification of methods to be used to comply with requirements; ventilation design calculations. Identification of unusual indoor contaminants or sources and methods to mitigate their effects on occupants.
 - (b) Construction Documents: Specifications showing that construction materials are not contaminant sources and do not adversely affect air quality.
 - (c) Commissioning: Field measured outside and supply air quantities for each space and its associated air handler.

1.3.7 Electrically-Operated Equipment and Appliances: UL listed for application or purpose to which they are put; suitable for wet locations listing for exterior use.

1.4 Materials: The materials for the new structure will be the same or similar to the existing building 900 to keep a uniform aesthetic pleasing look to the building, so that the building does not look like two distinct buildings but one seamless unified structure unless otherwise specified. Materials will also comply with the Hill AFB Facility Design Standard.

1.5 Structure:

- 1.5.1 Sesimic Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements

- 1.5.2 Wind Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements
- 1.5.3 Snow Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements
- 1.5.4 Live Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements
- 1.5.5 Other Significant Loading Condition(s): Any other applicable loading condition that may dictate the selection of building materials, control the size and geometry of members, and /or affect the adequacy of connection of members shall be identified developed and accommodated.
- 1.5.6 Substantiation:
 - a. Proposal: Identification of major structural materials and systems.
 - b. Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a structural engineer licensed to practice in the State of Utah.
 - c. Construction Documents: Detailed design analysis by structural engineer licensed to practice in the State of Utah accompanied with the appropriate drawings, (including structural notes and specifications).
- 1.6 Durability:
 - 1.6.1 Expected Service Life Span: Expected functional service life of the built portions of this project is 25 years.
 - a. Service life spans of individual elements that differ from the overall project life span are defined in other Chapters.
 - b. Substantiation: Since actual service life cannot be proven, substantiation of actual service life is not required; however, the following are reasonable indicators of anticipatable service life:
 - (1) Preliminary Design or Design Development: Service life expectancy analysis, for each element for which life span is specified; including:
 - (a) Length of effective service life, and aesthetic service life if specified, with action required at end; e.g. complete replacement, partial replacement, refurbishment.
 - (b) Conditions under which estimate will be valid; e.g. expected uses, inspection frequency, maintenance frequency, etc.
 - (2) Design Development: Replacement cost, in today's dollars, for each major element that has a service life expectancy less than that of the project; include both material and labor cost, but not overhead or profit; base costs on installing in existing building, not as a new installation.
 - (3) Design Development: Life cycle cost of project, over the specified project service life, excluding operating staff costs; include costs of:
 - (a) Replacement of each element not expected to last the life of the project; identify the frequency of replacement.
 - (b) Energy for operation of equipment and systems, from energy analysis specified under "Operation and Maintenance".
 - (c) Routine cleaning of exposed materials; identify type of cleaning and frequency.
 - (d) Deduct salvage value of replaced elements.
 - (e) Calculate costs in today's dollars, disregarding the time value of money, inflation, taxes, and insurance.
 - 1.6.2 Animals: Do not use materials that are attractive to or edible by animals or birds.
 - 1.6.3 Insects: Do not use materials that are edible by insects, unless access by insects is prevented.
- 1.7 Operation and Maintenance:
 - 1.7.1 Space Efficiency: Minimize floor area required while providing specified spaces and space relationships, plus circulation and services areas required for functions.

- 1.7.2 Energy Efficiency: Minimize energy consumption while providing function, amenity, and comfort specified.
- a. Provide energy efficient design using procedures and values specified in UFC 3-400-01 and ASHRAE 90.1-2001.
 - (1) Provide at least 10 percent less energy consumption than that of an equivalent minimally-complying baseline building, demonstrated by comparing the actual Design Energy Cost to the Energy Cost Budget of a prototype building, both calculated in accordance with ASHRAE 90.1.
 - b. Substantiation:
 - (1) Design Development: Detailed listing of design criteria and design analysis showing compliance with UFC 3-400-01 and ASHRAE 90.1, prepared by a licensed mechanical engineer.
 - (2) Design Development: Energy cost of all energy-consuming equipment and systems over the first year of operation; include analysis of probable change in annual cost over time due to aging but disregarding inflation and rate changes.
- 1.7.3 Water Consumption: Minimize water consumption.
- 1.7.4 Ease of Operation: Provide facility, equipment, and systems that are easily operated by personnel with a reasonable level of training for similar activities.
- a. Minimize the need for specialized training in operation of specific equipment or systems; identify all equipment and systems for which the manufacturer recommends or provides training programs.
 - b. Train Government's personnel in operation of equipment and systems; see Chapter 00830 for additional requirements.
- 1.7.5 Ease of Maintenance: Minimize the amount of maintenance required.
- a. Substantiation:
 - (1) Design Development: Maintenance cost for first year of operation, based on use of maintenance contracts; estimate of the impact that aging materials will have on maintenance costs; description of maintenance activities included in estimated cost.
- 1.7.6 Ease of Repair: Elements that do not meet the specified requirements for ease of repair may be used, provided they meet the specified requirements for ease of replacement of elements not required to have service life span equal to that specified for the project as a whole; the service life expectancy analysis and life cycle cost substantiation specified for service life are provided; and Government' acceptance is granted.
- 1.7.7 Ease of Replacement:
- a. Elements Not Required to have the Expected Service Life Span Equal to that Specified for the Project as a Whole: Make provisions for replacement without undue disruption of building operation.

2. ELEMENTS AND PRODUCTS

- 2.1 In addition to requirements specified in other chapters, provide products and elements that comply with the following.
- 2.2 Where "no substitutions" is indicated, use only the product (or one of the products) specified.
- 2.3 Elements Made Up of More Than One Product:
- 2.3.1 Where an element is specified by performance criteria, use construction either proven-in-use or proven-by-mock-up, unless otherwise indicated.
 - a. Proven-In-Use: Proven to comply by having actually been built to the same or very similar design with the same materials as proposed and functioning as specified.
 - b. Proven-by-Mock-Up: Compliance reasonably predictable by having been tested in full-scale mock-up using the same materials and design as proposed and functioning as specified.

- Testing need not have been accomplished specifically for this project; when published listings of independent agencies include details of testing and results, citation of test by listing number is sufficient (submittal of all test details is not required).
- c. The Design-Builder may choose whether to use elements proven-in-use or proven-by-mock-up, unless either option is indicated as specifically required.
 - d. Where test methods accompany performance requirements, use those test methods to test the mock-up.
- 2.3.2 Where a type of product is specified, without performance criteria specifically applicable to the element, use the type of product specified.
- 2.3.3 Where more than one type of product is specified, without performance criteria specifically applicable to the element, use one of the types of products specified.
- 2.3.4 Where a type of product is specified, with applicable performance criteria, use either the type of product specified or another type of product that meets the performance criteria as proven-in-use or proven-by-mock-up.
- 2.3.5 Where more than one type of product is specified, with applicable performance criteria, use either one of the types of products specified or another type of product that meets the performance criteria as proven-in-use or proven-by-mock-up.
- 2.3.6 Where neither types of products nor performance criteria are specified, use products that will perform well within the specified life span of the building.
- 2.4 Products:
- 2.4.1 Where a product is specified only by a manufacturer name and model number/brand name, use only that model/brand product.
- 2.4.2 Where the properties of a product are specified by description and/or with performance criteria, use products that comply with the description and/or performance criteria.
- 2.4.3 Where manufacturers are listed for a particular product, use a product made by one of those manufacturers that also complies with other requirements.

3. SUBSTANTIATION

- 3.1 Definition: Substantiation is any form of evidence that is used to predict whether the design will comply with the requirements or to verify that the construction based on the design actually does comply. During Preliminary Design, Design Development, and Construction Documents, requirements to submit substantiation are primarily intended to forestall use of designs or constructions that will not comply. At any time before completion of construction, substantiation is presumed to be only a prediction and may subsequently be invalidated by actual results.
- 3.1.1 Regardless of whether substantiation is specified or not, the actual construction must comply with the specified requirements and may, at the Government's discretion, be examined, inspected, or tested to determine compliance.
- 3.1.2 Substantiation submittals will not be approved or accepted, except to the extent that they are part of documents required to be approved or accepted in order to proceed to the next stage of design or construction. However, approval or acceptance of substantiation will not constitute approval or acceptance of deviations from the specified requirements unless those deviations are specifically identified as such on the submittal.
- 3.1.3 The Government accepts the responsibility to review substantiation submittals in a timely manner and to respond if they are unacceptable.
- 3.2 In addition to the requirements stated in other chapters, provide the following substantiation of compliance at each stage of the project:

- 3.2.1 If a substantiation requirement is specified without an indication of when it is to be submitted, submit or execute it before the end of Construction Documents.
- 3.3 Previous Construction: Where elements proven-in-use are used to comply with performance requirements:
 - 3.3.1 During Design Development, identify proven-in-use elements proposed for use, including building name, location, date of construction, owner contact, and description of design (including applicable loading parameters) and materials in sufficient detail to enable reproduction in this project.
- 3.4 Mock-Up Testing: Where elements proven-by-mock-up are used to comply with performance requirements:
 - 3.4.1 In the Proposal, identify which elements will be accomplished using proven-by-mock-up elements.
 - 3.4.2 During Design Development, identify proven-by-mock-up elements proposed for use, with test report including date and location of test, name of testing agency, and description of test and mock-up.
- 3.5 Design Analyses (including Engineering Calculations) and Fire Protection Design Analysis:
 - 3.5.1 Where a design analysis or calculation is specified without identifying a particular method, perform analysis in accordance with accepted engineering or scientific principles to show compliance with specified requirements, and submit report that includes analysis methods used and the name and qualifications of the designer.
 - 3.5.2 Where engineering design is allowed to be completed after commencement of construction, substantiation shall be in the form of shop drawings or other data.
 - 3.5.3 Submit design analyses at the end of Design Development unless otherwise indicated.
 - 3.5.4 Where design analysis is specified to be performed by licensed design professional, use a design professional licensed in the state of Utah.
- 3.6 Products:
 - 3.6.1 Where actual brand name products are not identified by either the Government or the Design-Builder, identify the products to be used.
 - 3.6.2 In the Proposal:
 - a. Identify one or more product types for each system, assembly, or element.
 - b. For each product type, provide brief descriptive or performance specifications.
 - c. For major manufactured products that are commonly purchased by brand name, and any other products so indicated, identify at least one manufacturer that will be used.
 - 3.6.3 During Preliminary Design or Design Development:
 - a. Where more than one product type is identified for a particular system, assembly, or element, identify exactly which type will be used.
 - b. For each product type, provide descriptive or performance specifications; early submittals may be brief specifications, but complete specifications are required prior to completion of construction documents.
 - c. For each product type, identify at least one manufacturer that will be used.
 - d. For major manufactured products that are commonly purchased by brand name, and any other products so indicated, provide manufacturer's product literature on at least one actual brand name product that meets the specifications, including performance data and sample warranty.
 - 3.6.4 During Construction:
 - a. Identify actual brand name products used for every product, except commodity products specified by performance or description.

- b. Where a product is specified by performance requirements with test methods, and if so specified, provide test reports showing compliance.
 - c. Provide manufacturer's product literature for each brand name product.
 - d. Provide the manufacturer's certification that the product used on the project complies with the contract documents.
- 3.6.5 Before End of Closeout:
- a. Provide copies of all manufacturer warranties that extend for more than one year after completion.

END OF CHAPTER 111

CHAPTER A

SUBSTRUCTURE

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide substructure as required to support the completed and occupied building safely and without uncontrolled subsidence or other movement.
- 1.1.2 Substructure comprises the following elements:
 - a. Foundations (A1): Structures responsible for transferring dead loads, live loads, and environmental loads of completed building to the earth in such a way that the building is supported evenly and without movement.
- 1.1.3 Where substructure is integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Performance: Provide thermal resistance as necessary to maintain interior comfort levels specified and in accordance with code and the following:
- 1.2.2 Water Penetration: Prevent ground water penetration into the interior of the building, under any circumstances.
- 1.2.3 Acoustical Performance: Limit sound transmission through substructure as follows:
 - a. Ambient Sound Level: Maintain ambient sound levels in enclosed, occupied substructure spaces within noise criteria (NC) ranges specified in Chapter C - Interiors during normal hours of occupancy.
 - b. Vibration Control: Use substructure elements that will not resonate at frequencies that are characteristic of ambient underground sound and vibration sources at the project site.

1.3 Health and Safety:

- 1.3.1 Fire Resistance: Design and select materials to provide fire resistance in accordance with code.
- 1.3.2 Substance Exclusion: Prevent accumulation of harmful chemicals and gases such as radon and methane in spaces below substructure and subsequent penetration into occupied spaces.
- 1.3.3 Vermin Protection: Provide permanent protection against infestation of construction by ground dwelling termites and other vermin.

1.4 Structure:

- 1.4.1 Capacity: Provide loadbearing substructure members as required by code and designed to distribute dead loads, live loads, and environmental loads so that bearing capacity of soil is not exceeded. Contractor's Geotechnical Engineer shall prepare the Geotechnical Report for the design of the concrete foundations and slabs on grade of this building.
 - a. Extend bearing portions of substructure to levels below frostline at project location; not less than the frost line depth defined in the Hill AFB Facility Design Standard.
 - b. Provide spread footings that do not exceed the allowable soil bearing capacity, caissons or drilled piers that bear on rock, piles that provide adequate friction to withstand loading, or other foundation systems acceptable to governing authorities.
- 1.4.2 Dead Loads: Accommodate loads from weights of building materials, construction itself, and all fixed service equipment.

- 1.4.3 Live Loads: Accommodate loads from use and occupancy of the building, either uniformly distributed loads as prescribed by code or concentrated loads, whichever are more demanding structurally. Roof live loads are non-reducible.
 - a. Uniformly Distributed Loads: As required by code for building occupancy.
- 1.4.4 Environmental Loads: Accommodate loads from all environmental forces in accordance with code and the following:
 - a. Earthquake: In accordance with requirements of Chapter 111-Facility Performance.
 - b. Wind: Overturning forces attributable to design wind speed at project location applied to full building height. Basic wind speed shall be as defined in the Hill AFB Facility Design Standard.
 - c. Snow: Ground snow load shall be as defined in the Hill AFB Facility Design Standard.
- 1.4.5 Substantiation:
 - a. Proposal: Identification of major structural materials and systems.
 - b. Preliminary Design: Soil investigation report, detailed listing of design criteria, and preliminary analysis, prepared by a structural engineer licensed to practice in the State of Utah.
 - c. Construction Documents: Detailed design analysis by structural engineer licensed to practice in the State of Utah in conjunction with the appropriate drawings (including structural and geotechnical notes), and specifications.
- 1.5 Durability:
 - 1.5.1 Corrosion Prevention: Provide supplementary protection for underground metal elements, sufficient to prevent corrosion completely for the service life of the element without maintenance.
 - a. 3 inches of concrete cover is considered to be permanent protection.
 - b. Provide cathodic protection if any of the following is true; coatings or wrappings will not be considered sufficient protection for elements falling under these criteria:
 - (1) Metal elements are buried in a soil environment known to cause corrosion on similar nearby structures.
 - (2) Metal elements are buried in a soil environment in which stray DC electrical currents are present.
 - 1.5.2 ~~Resistance to Salt Water: At coastal locations, provide substructure elements made of materials that will resist deterioration by exposure to salt water.~~
 - a. ~~Substantiation:~~
 - (1) ~~Proposal: Identification of major structural materials and systems.~~
 - (2) ~~Construction Documents: Design details and specifications for corrosion resistant features.~~
- 1.6 Operation and Maintenance:
 - 1.6.1 Provide substructure elements that will endure for the lifetime of the building with no maintenance.

2. PRODUCTS

- 2.1 Use one of the following:
 - 2.1.1 Reinforced concrete.
- 2.2 Do not use any of the following:
 - 2.2.1 Combustible Materials
 - 2.2.2 Biodegradable Materials

END OF CHAPTER A

CHAPTER A1

FOUNDATIONS

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide foundations as required to support the completed and occupied building safely and without uncontrolled subsidence or other movement.
- 1.1.2 Foundations comprise the following elements:
 - a. Standard Foundations (A11): Includes spread footings below columns, linear spread footings below loadbearing walls, foundation walls not part of basements, caisson (pier) caps, and pile caps.
 - b. Floors on Grade (A13): All elements necessary for slab foundations, including trenches, pits, and sumps, equipment bases, integral thermal insulation, slab moisture protection, and subdrainage system.
- 1.1.3 Where foundations are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter A - Substructure.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Performance:
 - a. Minimum thermal performance values for individual foundation elements are also specified in other chapters.
- 1.2.2 Water Protection:
 - a. Waterproofing: Provide permanent waterproofing at portions of foundation that extend below water table.
- 1.2.3 Acoustical Performance:
 - a. Vibration Control: Use foundation elements that are designed to avoid sympathetic vibration at frequencies within the audible range of 500-4000 Hz.

1.3 Structure:

- 1.3.1 Capacity: Provide loadbearing foundation members as required by Chapter A - Substructure.
 - a. Minimum Wall Thickness: Not less than thickness of superstructure walls supported by foundation walls.
 - b. Minimum Wall Thickness: 8 in.
 - c. Footings: Minimum compressive strength will comply with Hill AFB Facility Design Standard.
 - d. Pile, Pier or Caisson Caps: Minimum compressive strength will comply with Hill AFB Facility Design Standard.

2. PRODUCTS

2.1 Use one of the following:

- 2.1.1 Concrete spread footings.

END OF CHAPTER A1

CHAPTER A11**STANDARD FOUNDATIONS****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide standard foundations as required to support the completed and occupied building safely and without uncontrolled subsidence or other movement.
- 1.1.2 Standard foundations comprise the following elements:
 - a. Spread footings below columns, piers, and loadbearing walls.
 - b. Foundation walls not a part of basements.
 - c. Pile caps.
 - d. Caisson caps.
- 1.1.3 Where standard foundations are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter A - Substructure, and Chapter A1 - Foundations.

1.2 Health and Safety:

- 1.2.1 Termite Protection: Provide protection against infestation of ground-dwelling termites, in accordance with vermin protection provisions of Chapter A and as follows:
 - a. Treatment of soil adjacent to and beneath standard foundation elements with EPA-approved chemicals prior to foundation construction.
 - b. Substantiation:
 - (1) Design Development: Product data and EPA certification of chemicals to be used.

2. PRODUCTS

2.1 Use one of the following:

- 2.1.1 Reinforced concrete spread footings.

END OF CHAPTER A11

CHAPTER A13**FLOORS ON GRADE****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide floors on grade as required to enclose habitable spaces and support interior functions without subsidence, structural cracking, or other uncontrolled movement. Floors on grade shall be in accordance with the ~~Contractors~~ Contractor's Geotechnical Report. No floors shall be less than than than 6 inches thick and deformed reinforcement shall be used.
- 1.1.2 Floors on grade comprise structural slabs, individual pavers, and framed flooring systems that are installed over fill or at excavated and compacted grade, including all depressions in the floor, such as trenches, pits, and sumps. Floors on grade also include equipment bases, under floor and perimeter drainage, thermal insulation at floor edge, and moisture barriers installed integrally with floor system.
- 1.1.3 Where floors on grade are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter A - Substructure, and Chapter A1 - Foundations.

1.2 Amenity and Comfort:

1.3 Durability:

- 1.3.1 Floor Classifications: For concrete floors on grade, comply with composition and finishing recommendations of ACI 302.1R-1996 for floor classifications based on type of anticipated traffic and intended use.
 - a. Comply with Hill AFB Facility Design Standard.
- 1.3.2 Air Content: For concrete slabs on grade that are partly or completely exposed to freezing conditions, provide air content in accordance with recommendations of ACI 201.2R-2001.

2. PRODUCTS

2.1 Use one of the following:

- 2.1.1 Concrete floor slabs throughout the project.

END OF CHAPTER A13

CHAPTER B**SHELL****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide permanently enclosed spaces for all functional areas shown in the project program, unless otherwise indicated. Provide a physical enclosure that keeps out weather, unwelcome people, animals, and insects without requiring specific action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside. Provide level floor areas, comfortable ceiling heights, and essentially vertical walls.
- 1.1.2 The elements forming usable enclosed space and separating that space from the external environment comprise the shell and consist of:
 - a. Superstructure (B1): All elements forming floors and roofs above grade ~~and within basements,~~ ~~and,~~ and the elements required for their support, insulation, fireproofing, and firestopping.
 - b. Exterior Enclosure (B2): All essentially vertical elements forming the separation between exterior and interior conditioned space, including exterior skin, components supporting weather barriers, and jointing and interfacing components; not including the interior skin unless an integral part of the enclosure.
 - c. Roofing (B3): All elements forming weather and thermal barriers at horizontal and sloped roofs and decks, and roof fixtures.
- 1.1.3 Exterior Surfaces Exposed to View: Surfaces visible from street or ground level, plus surfaces visible from windows of same building and adjacent existing buildings.
- 1.1.4 Where shell elements also function as elements defined within another element group, meet requirements of both groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Performance: Provide construction that will have thermal resistance as necessary to maintain interior comfort levels specified and in accordance with code and the following:
 - a. Energy Efficiency: As specified in Chapter 111.
 - b. Components That Have Surfaces Facing Both Interior and Exterior Environment: Condensation Resistance Factor (CRF) as required to meet requirement above, when tested in accordance with AAMA 1503.1-1998.
- 1.2.2 Water Penetration: Design and select materials to prevent water penetration into the interior of the building.
- 1.2.3 Natural Light: Provide fenestration in shell as required to meet requirements for natural light as specified in Chapter C and in accordance with code.
- 1.2.4 Acoustical Performance: Design and construct the shell to limit sound transmission as follows:
 - a. Ambient Sound Level: Maintain ambient sound levels in perimeter spaces within Noise Criteria (NC) ranges specified in Chapter C - Interiors during normal hours of occupancy.
 - b. Exterior Noise Level: Maintain maximum average daytime and nighttime noise level from interior sound sources in accordance with local regulations, measured at the project property line.
- 1.2.5 Cleanliness of Exterior Surfaces: Design and select materials to:
 - a. Prevent attraction and adherence of dust and air-borne dirt and soot, and minimize appearance

of settled dust and dirt.

- 1.2.6 Appearance: Design and select materials to provide exterior appearance with characteristics as follows:
- a. Providing a traditional architectural style, which complies with Hill AFB Architectural Compatibility Standards, and Hill AFB Facility Design Standards.
 - b. The new structure will be the same or similar to the existing building 900 to keep a uniform aesthetic pleasing look to the building, so that the building does not look like two distinct buildings but one seamless unified structure unless otherwise specified.
 - c. Concealing mechanical equipment and plumbing equipment from view from the street.
 - d. Substantiation:
 - (1) Proposal: Concept drawings of proposed solution indicating overall building configuration, massing, scale, and relationship to surrounding buildings.
 - (2) Preliminary Design: Drawings showing facade treatment for principal elevations identifying visible materials.
 - (3) Design Development: Drawings and artist's rendering showing all building elements that are part of the shell with sizes and locations to scale.
 - (4) Construction Documents: Details of building shell, annotated to show compliance with performance requirements.

1.3 Health and Safety:

1.3.1 Fire Resistance: Design and select materials to provide fire resistance in accordance with code.

1.3.2 Accidental Injury: Design and select materials to protect pedestrians and building occupants in accordance with code and the following:

- a. Prevent ice and snow from falling off building elements onto pedestrians, building occupants, and vehicles.

~~1.3.3 Physical Security: Design and construct to provide protection as follows:~~

1.4 Structure:

1.4.1 Structural Performance: Design and select materials to support all loads without unacceptable deflection/displacement or damage due to loads, in accordance with code.

- a. Design and provide shell elements to resist loosening or detachment in winds equivalent to the code design wind speed.
- b. Substantiation:
 - (1) Proposal: Identification of major structural materials and systems.
 - (2) Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a structural engineer licensed to practice in the State of Utah.
 - (3) Construction Documents: Detailed design analysis by structural engineer licensed to practice in the State of Utah in conjunction with the appropriate drawings (including structural notes) and specifications.
 - (4) Construction: For structures engineered by their manufacturer or fabricator, detailed design analysis prepared by and shop drawings stamped by a structural engineer licensed to practice in the State of Utah, with approval of engineer-of-record recorded.

1.4.2 Construction Loads and Erection Stresses: Accommodate temporary construction loads and erection stresses during construction.

1.5 Durability:

1.5.1 Service Life Span: Same as building service life, except as follows:

- a. Load-Bearing Structural Members: Minimum of 100 years.
 - (1) No anticipated deterioration when protected as specified.
 - (2) Protective Elements: Minimum 25 years.
- b. Wall Primary Weather-Barrier Elements: Minimum 100 years functional and aesthetic service

- life.
 - c. Transparent Elements (Glazing): Same as other wall primary weather-barrier elements, except accidental breakage is considered normal wear-and-tear.
 - d. Joint Sealers: Minimum 50 years before replacement.
 - e. Surfaces Exposed to View: Minimum 50 years aesthetic service life; in addition, deterioration includes color fading, cracking, and delamination of applied coatings.
 - f. Roof Covering Weather-Barriers: Minimum 50 years, fully functional.
 - g. Substantiation: As specified in Chapter 111 - Facility Performance, including service life analysis and life cycle cost analysis.
- 1.5.2 Water Penetration: Design and select materials to prevent water penetration into the interior of shell assemblies, under conditions of rain driven by 100 mph wind.
- a. Exception: Controlled water penetration is allowed if materials will not be damaged by presence of water or freezing and thawing, if continuous drainage paths to the exterior are provided, and water passage to the building interior is prevented.
 - b. Substantiation: In addition to requirements specified for proven-in-use and proven-by-mock-up construction, drawings showing paths of water movement, with particular attention to changes in direction or orientation and joints between different assemblies.
- 1.5.3 Weather Resistance: Design and select materials to minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, salt air, and atmospheric pollutants.
- a. Deterioration includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay and rot.
 - b. Surfaces Exposed to View: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.
 - (1) Coating Salt Spray Resistance: No deterioration when tested in accordance with ASTM B 117-2002 for 1000 hour exposure with 5 percent salt fog at 95 degrees F.
 - c. Transparent Elements (Glazing): No haze, loss of light transmission, or color change, during entire expected service life.
 - (1) Test Criteria: Less than 1 percent change in haze, transmission, and color over 2 years exposure, when tested after natural exposure conditions or accelerated light and water conditions simulating natural exposure at project, in accordance with ASTM D 1003-2000; accelerated exposure documented with comparison to natural conditions.
 - d. Service Temperature: Low temperature equal to historically-recorded low; high temperature equal to that expected due to any combination of air temperature and heat gain from solar and other sources.
 - e. Freeze-Thaw Resistance: Adequate for climate of project.
 - f. Corrosion Resistance: In locations exposed to the outdoor air or in potential contact with moisture inside shell assemblies, use only corrosion-resistant metals as defined in this Chapter.
 - g. Ozone Resistance: Do not use materials that are adversely affected by ozone.
 - h. Substantiation:
 - (1) Proposal: Identification of weather-exposed elements and proposed materials.
 - (2) Design Development: Details of proven-in-use materials and test reports.
- 1.5.4 Impact Resistance: Design and select materials to resist damage due to impact in accordance with code and the following:
- a. Minimize damage from windborne debris propelled at up to 100 mph.
 - b. Design and select materials to resist damage from hail of size up to 1/2 inch.
 - c. Minimize damage due to potential vandalism.
 - d. Minimum performance values for individual shell elements are also specified in other chapters.
 - e. Substantiation:
 - (1) Design Development: Identification of building elements required to resist impact damage, quantification of impact criteria, materials to be used, and methods of substantiation.

- (2) Design Development: Proven-in-use or proven-by-mock-up data.
- 1.5.5 Moisture Vapor Transmission: Design to prevent deterioration of materials due to condensation of moisture vapor inside assemblies.
 - a. Use supplementary vapor retarder if necessary to meet requirements.
 - b. Use method of sealing joints between elements that will be effective given available construction practices.
 - c. Substantiation:
 - (1) Design: Identification of building elements providing moisture barrier, materials to be used, and data showing performance.
 - (2) Design Development: Proven-in-use or proven-by-mock-up data.
- 1.5.6 Wear Resistance: Design and select materials to provide resistance to normal wear-and-tear in accordance with code and the following:
 - a. Elements Within Reach of Pedestrians: Minimize degradation from rubbing and scratching caused by pedestrians.
 - b. Minimize degradation caused by windblown sand and acid rain.
 - c. Substantiation:
 - (1) Design Development: Identification of building elements required to resist wear, quantification of wear criteria, materials to be used, and methods of substantiation.
 - (2) Construction Documents: Proven-in-use or proven-by-mock-up data.

2. PRODUCTS

- 2.1 Comply with Hill AFB Base Facility Design Standard.
- 2.2 Do not use:
 - 2.2.1 Air-supported structure.
 - 2.2.2 Different metals subject to galvanic action in direct contact with each other.
 - 2.2.3 Aluminum in direct contact with concrete or cementitious materials.
 - 2.2.4 Materials and products that require field finishing on surfaces exposed to the weather.
 - 2.2.5 Wood trim.
- 2.3 All structural /load carrying elements and systems:
 - 2.3.1 Shall be selected for use only where "Proven-in-Use" as defined in Chapter 111-Facility Performance. Furthermore, the elements, systems and connections shall not be used if any feature is anticipated to experience a stress greater than those experienced by the components already in place.

END OF CHAPTER B

CHAPTER B1

SUPERSTRUCTURE

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide structural elements, above grade and within basements, capable of supporting all anticipated loads without unacceptable deflection/displacement, failure or damage.
- 1.1.2 Do not use any electrically-operated or fuel-powered construction for support of floor or roof members.
- 1.1.3 The superstructure comprises:
 - a. Elevated Floors (B11): Floor construction above grade and within basements, including balcony, mezzanine, and ramp floors, floors elevated for access, stair construction if part of the structure, and roof decks intended for occupant live load; and the elements required for their support, insulation, fireproofing, and firestopping.
 - b. Roofs (B12): Roof construction, including canopies, and elements required for their support, insulation, fireproofing, and firestopping.
- 1.1.4 Where superstructure elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter B - Shell.

1.2 Structure:

- 1.2.1 Capacity: Design and provide load-bearing structural members of capacities required by code.
- 1.2.2 Dead Loads: Design to resist loads from weights of materials, construction, and fixed service equipment.
- 1.2.3 Live Loads:
 - a. Design to resist loads from use and occupancy of the building either uniformly distributed loads as prescribed by code or concentrated loads, which are more demanding structurally.
- 1.2.4 Environmental Loads:
 - a. Seismic Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements
 - b. Wind Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements
 - c. Snow Loads: Accommodate loads as directly, or indirectly, prescribed by UFC 1-200-01, Design: General Building Requirements
 - d. Other Significant Loading Condition(s): Any other applicable loading condition that may dictate the selection of building materials, control the size and geometry of members, and/or affect the adequacy of connection of members shall be identified, developed and accommodated.
- 1.2.5 Structural Design: In addition to the requirements of the code, design to comply with ASCE 7-2002.
- 1.2.6 Structural Serviceability: Comply with requirements and recommended design procedures of ASCE 7-2002.

1.3 Durability:

- 1.3.1 Moisture Resistance of Load-Bearing Members: Use materials that are not damaged by contact with water or moisture vapor.
 - a. Materials that will corrode in the presence of water may be used if protected from water.

b. Materials that will rot or be damaged by fungus may be used if protected from water.

1.3.2 Impact Resistance of Load-Bearing Members: Use materials that are not easily damaged by common hand tools.

1.3.3 Portions of Superstructure Exposed on Exterior: Comply with requirements of Chapter B for water penetration, weather resistance, impact resistance, and wear resistance.

2. PRODUCTS

2.1 Do not use:

2.1.1 Wood structural members.

2.1.2 Combustible materials.

2.1.3 Non-reinforced load-bearing masonry.

2.1.4 Steel stud bearing walls.

2.2 Fireproofing:

~~2.2.1 If applied fireproofing is required, use one of the following:~~

~~2.2.2.1~~ 2.2.1 Do not use:

a. Sprayed-on mineral fiber.

END OF CHAPTER B1

CHAPTER B11**ELEVATED FLOORS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide all floor construction above grade ~~and within basements, including balcony, mezzanine, and, including~~ ramp floors, floors elevated for access, stair construction if part of the structure, and roof decks intended for occupant live load; and the elements required for their support, insulation, fireproofing, and firestopping, as well as finishing, if an integral part of the floor construction.
- 1.1.2 Where floor elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B1 - Superstructure.

1.2 Amenity and Comfort:**1.2.1 Thermal Performance:**

- a. Shall comply with the Hill AFB Facility Design Standards.

1.3 Health and Safety:**1.3.1 Column-Beam Fire Resistance:**

- a. Supporting Elevated Floors: unprotected non-combustible.

1.3.2 Floor-Ceiling Fire Resistance:

- a. Elevated Floors: unprotected non-combustible.

1.4 Durability:

- 1.4.1 Exposed Interior Structural Floor Surfaces: Comply with requirements for floor finishes specified in Chapter C.

2. PRODUCTS**2.1 Structure Supporting Floors:****2.1.1 Do not use:**

- a. Wood structural members.

2.2 Elevated Floors:**2.2.1 Do not use:**

- a. Any construction with openings to floor below.
- b. Wood structural members.

END OF CHAPTER B11

CHAPTER B12**ROOFS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide all roof construction, including canopies, and elements required for their support, insulation, fireproofing, and firestopping.
- 1.1.2 Where roof elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B1 - Superstructure.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Performance: Shall comply with ASHRAE 90.1

1.3 Health and Safety:

- 1.3.1 Column-Beam Fire Resistance:
 - a. Supporting Roofs: ~~unprotected~~ non-combustible.
 - b. Supporting Canopies: ~~unprotected~~ non-combustible.

1.4 Durability:

- 1.4.1 Exposed Roof Deck Surfaces: Comply with requirements for roofing weather barrier specified in Chapter B31.

2. PRODUCTS**2.1 Structure Supporting Roofs:**

- 2.1.1 Use one of the following:
 - a. Structural steel beams, columns, girders, joists, and wind-bracing.
 - b. Open-web steel joists or joist girders.
- 2.1.2 Do not use:
 - a. Wood structural members.
 - b. Combustible materials.
 - c. Unfireproofed structural steel.
 - d. Precast concrete structural frame.
 - e. Steel stud bearing walls.

2.2 Roof Decks:

- 2.2.1 Use one or more of the following:
 - a. Steel deck without concrete fill.
- 2.2.2 Do not use:
 - a. Any construction with openings to floor below.
 - b. Combustible materials.
 - c. Wood structural members.

- 2.3 Roof Deck Finish Surface: See Chapter B31.

END OF CHAPTER B12

CHAPTER B2**EXTERIOR ENCLOSURE****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide an essentially vertical separation between exterior and interior conditioned space, that keeps out weather, uninvited people, and animals and insects, without unusual action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside.
- 1.1.2 The elements forming the vertical separation comprise the exterior enclosure and consist of:
 - a. Exterior Walls (B21).
 - b. Exterior Windows and Other Openings (B22).
 - c. Exterior Doors (B23).
- 1.1.3 Where exterior enclosure elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter B - Shell.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Performance:
- 1.2.2 Water Penetration: As specified in Chapter B.
- 1.2.3 Airborne Sound Isolation: Achieve the following minimum outdoor-indoor level reductions (OILR values) for perimeter spaces, when tested in accordance with ASTM E 966-2002 and classified in accordance with ASTM E 413-1987(R99):
 - a. Quiet space (NC values of 20-30) and very loud exterior noise source (dBA values of 70-80): OILR 42.
 - b. Moderately noisy space (NC values of 30-40) and deafening exterior noise source (dBA values above 80): OILR 37.
 - c. Very noisy space (NC values of 50-60) and deafening exterior noise source (dBA values over 80): OILR 33.
- 1.2.4 Glazing Appearance:
 - a. Use bronze tinted glazing.

1.3 Health and Safety:

- 1.3.1 Safety Glazing: Do not use fully tempered glass more than 25 feet above grade.
- 1.3.2 Fire Resistance:
 - a. All Materials of Exterior Enclosure: Non-combustible, no exceptions.

1.4 Structure:

- 1.4.1 Structural Performance: No requirements in addition to those specified in Chapter B.

1.5 Durability:

- 1.5.1 Ambient Temperature Change: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 70 degrees F greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage.
- 1.5.2 Water Penetration: As specified in Chapter B.

- a. Where interior skin is not integral part of exterior enclosure, test without interior skin installed.

1.5.3 Impact Resistance:

- a. Elements Adjacent to Traffic Lanes: Resist damage from accidental passenger vehicular impact 10 mph maximum velocity.

1.5.4 Glass:

- a. Type and thickness in accordance with ASTM E 1300-2002 combined with other applicable factors for each lite.
- b. Glazing must comply with UFC 40-010-01 Department of Defense Minimum Antiterrorism Standards for Buildings.

2. PRODUCTS

- 2.1 Construct the exterior enclosure as indicated in Chapter B Shell.

END OF CHAPTER B2

CHAPTER B21**EXTERIOR WALLS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide physical separation between exterior and interior conditioned space, that keeps out weather, uninvited people, and animals and insects.
- 1.1.2 The elements forming the physical separation comprise the exterior walls and consist of the supporting structure, the exterior skin, vapor retarders, air barriers, and insulation, the interior skin if an integral part of the wall, exterior screens and railings, balcony walls and parapets, exterior soffits unless they do not form a weather barrier, firestopping and draftstopping within wall and between wall and floors, and other exterior wall elements.
- 1.1.3 Where exterior wall elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B2 - Exterior Enclosure.

1.2 Amenity and Comfort:**1.2.1 Thermal Performance:**

- a. Shall comply with ASHRAE 90-1.
- b. Average Thermal Transmittance of Vertical Walls: shall comply with the Hill AFB Facility Design Standards included as an Appendix of the RFP and UFC 3-400-01.
- c. Provide continuous insulation over entire enclosure.

1.2.2 Acoustical Isolation:

- a. Provide composite STC values not less than OILR values required for the exterior enclosure in Chapter B2, when individual components are tested in accordance with ASTM E 90-2002 and classified in accordance with ASTM E 413-1987(R99).

1.2.3 Appearance:

- a. Provide materials for the structure that give a uniform look compared to the existing building 900. Use the same or similar materials to building 900 so as to give the same texture and appearance so that the new structure looks like a uniform addition and not like a separate building.
- b. Rhythm: Design to develop rhythm within building elevations consistent with building scale by varying patterns, placement, or color of finish materials

1.3 Structure:

- 1.3.1 As specified in Chapter B unless the following is more restrictive.
- 1.3.2 Wind Design: No damage when tested in accordance with ASTM E 330-2002 at 1.5 times positive and negative design wind loads using 10 second duration of maximum load.
- 1.3.3 Railing Assemblies: Resistant to required forces in accordance with ASCE 7-2002.

1.4 Durability:

- 1.4.1 Water Penetration: Drain water, moisture, and condensation entering assembly to the exterior.
- 1.4.2 Joint Sealers in Exterior Skin: Life span expectancy equal to that specified for primary weather barriers.
- 1.4.3 Impact Resistance:

- a. Exterior Insulation and Finish Systems: Resistant to permanent damage to supporting structure and exterior skin when tested in accordance with EIMA 101.86-1995 with a test force of 25-49 inch-lbs.

END OF CHAPTER B21

CHAPTER B22**EXTERIOR WINDOWS AND OTHER OPENINGS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Fill, cover, close, or otherwise protect all openings in the exterior walls (other than doors) so that the entire exterior enclosure functions as specified, using windows and other opening elements as specified, without using components that must be installed at changes of season.
- 1.1.2 The elements comprising exterior windows and other openings include windows, fixed glazing other than glazed walls, ventilation openings, protection devices for openings, and elements that form or complete the openings, unless an integral part of another element.
- 1.1.3 Where exterior window and other opening elements also must function as elements defined in another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B2 - Exterior Enclosure.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Performance of Elements Forming Exterior/Interior Separation: Shall comply with ASHRAE 90-1.
- 1.2.2 Air Infiltration:
 - a. Mechanical Ventilation Openings: Automatically closed when ventilation is not required. Unless ducted, maximum of 0.3 cfm/sq ft of crack when closed, measured in accordance with ASTM E 283-1991(R99) at differential pressure of 1.57 psf.
- 1.2.3 Acoustical Performance:
 - a. Window Sound Transmission Class: Minimum 31 STC, as measured in accordance with ASTM E 90-2002 and classified in accordance with ASTM E 413-1987(R99).
 - b. Louvers: No objectionable air movement noise.

1.3 Health and Safety:

- 1.3.1 Fire Resistance: Rating as required to maintain fire resistance rating of exterior wall in which they occur.
- 1.3.2 Forced Entry Resistance:
 - a. Openings At the Ground Floor: Class I in accordance with ASTM F 1233-1998, minimum, and Grade 10, minimum, in accordance with ASTM F 588-1997.
 - b. Openings Above the Ground Floor: Class I in accordance with ASTM F 1233-1998, minimum, and Grade 10, minimum, in accordance with ASTM F 588-1997
- 1.3.3 Openable Openings and Ventilation Openings: Equipped with means of keeping insects, birds, and animals out.

1.4 Structure:

- 1.4.1 Lintels: Constructed to span openings and support loads imposed by exterior wall; maximum deflection of 1/360 of span, vertically and horizontally.
- 1.4.2 Wind Design: No damage when tested in accordance with ASTM E 330-2002 at 1.5 times positive and negative design wind loads using 10 second duration of maximum load.
 - a. Members Not Supporting Glass: Maximum deflection of 1/180 of span.
 - b. Members Supporting Glass: Maximum deflection of flexure limit of glass; with full recovery of glazing materials.

1.5 Durability:

- 1.5.1 Air Intake and Exhaust Openings: Minimize rainwater penetration and protect adjacent interior spaces from damage from water.
 - a. Maximum Water Leakage: 0.01 oz/sf under most extreme conditions.
 - b. Test Air Velocity: For exhaust openings: 0; for intake openings: normal operational velocity.
 - c. Substantiation:
 - (1) Construction: Identify air velocity; show AMCA 511-1999 certified water penetration ratings.
 - 1.5.2 Water Penetration: Design openings and components of openings to positively drain water to exterior of the building.
 - a. Top of Openings: If wall construction does not provide its own methods of drainage, use separate flashing to prevent water from entering opening components or the interior of the building.
 - b. Bottom of Openings: Integral or separate sill or flashing to prevent water running over or draining out of opening components from entering the wall construction below or the interior of the building.
- 1.6 Operation and Maintenance:
- 1.6.1 Operating Components: Remaining operable for 10 years under normal exposure conditions for the project site.

2. PRODUCTS

- 2.1 Windows (Operable and Fixed):
 - 2.1.1 Follow Hill AFB Base Facility Design Standard

END OF CHAPTER B22

CHAPTER B23**EXTERIOR DOORS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Secure all openings in the exterior wall that function to allow the entrance and exit of people, vehicles, and goods, so that the entire exterior enclosure functions as specified, using doors as specified, without using components that must be installed at changes of season.
- 1.1.2 The elements comprising exterior doors include doors of all sizes and uses, gates, and elements that form or complete the openings, unless an integral part of another element.
- 1.1.3 Where exterior door elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B2 - Exterior Enclosure.

1.2 Amenity and Comfort:**1.2.1 Thermal Performance:**

- a. Provide thermal performance without using supplementary storm doors.

1.2.2 Air Infiltration: Maximum of 0.20 cfm/ft of crack length, measured in accordance with ASTM E 283-1991(R99) at differential pressure of 1.57 psf.**1.2.3 Acoustical Performance:**

- a. Sound Transmission Class: STC values as follows, when measured in accordance with ASTM E 90-2002 and classified in accordance with ASTM E 413-1987(R99):
 - (1) Main Entrance Doors: STC 33.
 - (2) Other Pedestrian Doors: STC 36.
 - (3) Service Doors: STC 36.

1.2.4 Convenience and Accessibility:

- a. Door Handles and Knobs: As required by code; where code and other requirements allow an option exit devices are preferred.
- b. Mode of Operation: Self-closing, with manual hold-open, unless otherwise indicated.
 - (1) Main Entrances: Manual.
 - (2) Service Entrances: Manual.
 - (3) Other Large Doors: Power-operated.
 - (4) Warehouse Doors: Power-operated.
- c. Power-Assisted and -Operated Door Control:
 - (1) Local actuators each side unless otherwise indicated.
 - (2) Use least obtrusive method of control/actuation possible.
 - (3) Access Control System: As specified in Chapter D92.
 - (4) Warehouse Doors: Local actuators

1.2.5 Appearance:

- a. Doors at Building Entrances: Match windows and window framing.

1.3 Health and Safety:**1.3.1 Emergency Egress:**

- a. Provide exit doors minimum 36 inches wide.

1.4 Keying and Hardware:

- 1.4.1 Comply with Hill AFB Facility Design Standard.

- 1.4.2 Fire Resistance:
- a. Doors Required by Code to be Fire Resistive: Fire resistance rating as required by code, for fire resistance rating of exterior wall in which doors occur, tested in accordance with a method acceptable to local authorities.
- 1.4.3 Physical Security:
- a. Doors non-removable from outside without use of key.
 - b. Secure each exterior door using a "fail-secure" method that allows entrance plus exit from inside using only one motion.
 - (1) Exceptions: The following must not allow entrance:
 - (a) Emergency exit doors that are not used for entrance (Exit Only function).
 - (2) Keys: Type as required to minimize unauthorized entry.
 - (a) Key to the existing keying system at Hill AFB.
 - (b) Key Changing: All locks changeable without disassembly of lock cylinders; acceptable methods include use of standard mortise cylinders and interchangeable removable core cylinders.
 - (c) All submittals and shop drawings referring to keys and keying shall be submitted to the Civil Engineering Project Manager and subsequently to the BCE locksmith for coordination and approval.
 - (d) Uniqueness of Key System: Unique in local dealership area, enforced indefinitely by reputable manufacturer.
 - (e) Keymaking Restrictions: Key blanks and keymaking restricted to owner.
 - (3) Lock Functions: Appropriate to the location and function and as follows:
 - (a) Entrance Doors: Public Entry/Exit ("nightlatch").
 - (b) Service Entry Doors: Always-Locked, Deadbolt.
 - (c) Exit Doors from Stairwells and Fire Exits: Exit Only.
 - (4) Lock Function Definitions: As described in ANSI/BHMA A156.2-1996 (F36-F48, F75-F94, F107-F109), A156.3-2001 ("X" prefix), A156.5-2001 ("E" prefix), A156.12-1999 (F95-F106), and A156.13-2002 (F01-F25); type of lock required may also be governed by other criteria.
 - (a) Always-Locked: F14.
 - (b) Entry, Deadbolt: F20.
 - (c) Exit Only: F08 Type 2, with no outside trim, no thumbturn or other unlocking feature inside, no holdback or dogging.
 - c. Forced Entry: Provide doors capable of resisting forced entry equivalent to:
 - (1) Swinging Doors: ASTM F 476-1984(R02) Grade 10.
 - (2) Exception for "Supervised" Doors: No forced entry requirement.
 - (a) "Supervised" Doors include: Main entrance doors.
- 1.4.4 Glazing in Doors: Comply with requirements for safety glazing, security, and forced entry specified in Chapters B and B2.
- 1.5 Structure:
- 1.5.1 Lintels: Constructed to span door openings and support loads imposed by exterior wall with maximum deflection vertically and horizontally of 1/360 of span.
- 1.5.2 Door Frames: Constructed to span door opening with maximum deflection vertically and horizontally of 1/360 of span.
- 1.6 Durability:
- 1.6.1 Water Penetration: Design openings and components of openings to positively drain water to exterior of the building.
- a. Top of Openings: If wall construction does not provide its own methods of drainage, use separate flashing to prevent water from entering opening components or the interior of the building.

- b. Bottom of Openings: Integral or separate sill or flashing to prevent water running over or draining out of opening components from entering the wall construction below or the interior of the building.
- 1.6.2 Physical Endurance:
- a. Doors, Frames, and Hardware: ANSI A250.4-2001 Level A using hardware specified.
 - b. Doors, Frames, and Anchors: NAAMM HMMA 862-1987 endurance test requirements.
- 1.6.3 Wear Resistance:
- a. Door Surfaces: Scuff-resistant in areas where foot impact is likely; highly scratch-resistant in areas where hand contact is likely.
 - b. Door Handles and Knobs: Highly scratch-resistant and of finish that will minimize appearance changes due to wear; satin or brushed finish, and no plated or coated finishes, and _____.
- 1.6.4 Flexible Seal Materials: Minimize deterioration due to operation of doors, and aging, and _____.
- 1.6.5 Swinging Doors: Control door swing to prevent damage due to impact, to either door or element impacted.
- 1.7 Operation and Maintenance:
- 1.7.1 Service Life Span of Operating Components: Remaining operable for 10 years under normal exposure conditions for the project site.
- 1.7.2 Ease of Use and Repair: Provide doors that will be easy to use by occupants, easy to repair or service, and with operating components easy to replace.
- 1.7.3 ~~All cargo~~ All warehouse doors shall be electrically operated.

2. PRODUCTS

2.1 Follow Hill AFB Facility Design Standard

2.2 Main Entrance Doors:

- 2.2.1 Use one of the following:
- a. Glazed metal doors.
- 2.2.2 Do not use:
- a. Revolving doors.
 - b. Sliding doors.
 - c. Automatic doors.
 - d. Folding doors.
 - e. Wood doors.

2.3 Other Pedestrian Doors:

- 2.3.1 Provide weatherstripping, thresholds, and all exterior doors.
- 2.3.2 Use one of the following:
- a. Hollow steel doors.
- 2.3.3 Do not use:
- a. Wood doors and frames.
 - b. Plastic doors and frames.

2.4 Warehouse Doors:

- 2.4.1 Use one of the following:
- a. ~~Roll~~ Roll up doors.
- 2.4.2 Do not use:

- a. Side sliding doors.

2.5 Lintels:

2.5.1 Use one of the following:

- a. Unit masonry.

2.6 Concealed Flashings:

2.6.1 Use one of the following:

- a. Aluminum flashing.
- b. Galvanized steel flashing.

2.6.2 Do not use:

- a. Stainless steel flashing.
- b. Copper flashing.
- c. Plastic flashing.
- d. Paper flashing.
- e. Uncoated steel flashing.

2.7 Joint Sealers: Same as specified in Chapter B21.

2.8 Glazing in Doors: Glass.

2.8.1 Type: Double pane insulated glass units.

2.8.2 Use one of the following:

- ~~a. Fully tempered glass at _____.~~
- ~~b. Laminated glass at _____.~~
- a. Glass that meets Force Protection requirements.

2.8.3 Do not use:

- a. Plain float or sheet glass.
- b. Heat-strengthened glass.
- c. Wired glass, except in fire-rated doors.

2.9 Door Louvers:.

2.9.1 Louvers in Metal Doors: Same material as doors.

2.10 Hardware for Swinging Doors:

2.10.1 Comply with Hill AFB Facility Design Standard.

2.10.2 Use satin, stainless steel finish.

2.10.3 Use fire rated hardware on fire rated doors.

2.10.4 Hinges: Ball-bearing butt hinges.

2.10.5 Exit Devices: Comply with Hill AFB Facility Design Standard.

2.10.6 Locksets: Comply with Hill AFB Facility Design Standard.

2.10.7 Door Closers: Unless specifically indicated as one type, surface overhead frame-mounted type or surface overhead door-mounted type.

2.10.8 Door Stops: Unless specifically indicated as one type, floor-mounted type or wall-mounted type.

2.10.9 Door Hold-Opens: Unless specifically indicated as one type, floor-mounted type or wall-mounted type.

2.11 Do not use:

2.11.1 Different metals subject to galvanic action in direct contact with each other.

2.11.2 Aluminum in direct contact with concrete or cementitious materials.

END OF CHAPTER B23

CHAPTER B24**EXTERIOR WALL FIXTURES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Exterior wall fixtures include all elements attached to the outside of the exterior walls, unless consisting of equipment or services fixtures. Fixtures required are those made necessary by the design and the following:
 - a. Main Building Identification Sign: Mounted on main elevation, for visibility from adjacent street; provide one.
- 1.1.2 See Chapter G22 for ground-mounted flagpoles, and ground-mounted signs, ~~and _____.~~
- 1.1.3 Where exterior wall fixtures also have a function defined in another element group, design such elements as specified for that element group, in addition to the requirements specified in this Chapter.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B2 - Exterior Enclosure.

1.2 Amenity and Comfort:

- 1.2.1 Noise Reduction:
 - a. Signs Noise Level: Not detectable by pedestrian or building occupants 20 feet from the sign.
- 1.2.2 Appearance:
 - a. Signs: Legible during daylight hours by pedestrians, and motorists from distance specified.

1.3 Durability:

- 1.3.1 Water Penetration Resistance:
 - a. Maintain integrity of exterior wall water penetration resistance at points of wall fixture attachment to supporting structure.
- 1.3.2 Weather:
 - a. Surface Finish: Minimum service life of 10 years without color deterioration, except for flags.
 - ~~b. Flagpoles: Protect flagpole finish from damage caused by wind-blown halyards and flagsnaps.~~
- 1.3.3 Impact Resistance:
 - a. Signs: For signs located at grade and the first floor of the building, constructed to resist damage from vandalism.

END OF CHAPTER B24

CHAPTER B3**ROOFING****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide a weather-proof enclosure over the entire "top-side" of building that also excludes unwelcome people, animals, and insects without requiring specific action by occupants, while shedding water and preventing uncontrolled water infiltration, withstanding anticipated loading conditions, providing required access, and permitting the entry of desirable natural light.
- 1.1.2 Provide all fixtures needed on the roof due to the design or indicated in the project program.
- 1.1.3 Roofing comprises the following elements:
 - a. Roof Coverings (B31): Weather barriers, vapor retarders, insulation, wearing surfaces, water collectors and conductors; including coverings over plaza decks, balconies, and other exposed floors.
 - b. Roof Openings (B32): Skylights, ventilation openings, access openings, and other roof opening elements.
- 1.1.4 Where roofing elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter B - Shell.
- 1.1.6 Substantiation:
 - a. Post-Construction: Roof inspection conducted in the first spring after completion of roofing, after chance of snow has passed.

1.2 Amenity and Comfort:

- 1.2.1 Run-Off: Direct water run-off to storm drains without splashing or dripping.
- 1.2.2 Appearance:
 - a. Color: per Hill AFB Facility Design Standards.
 - b. Ponding: Arrange drainage of roof so no ponding will occur, regardless of whether roofing material will withstand ponding of water or not.

1.3 Structure:

- 1.3.1 Rainwater Load: As required by code.
- 1.3.2 Roof Component Wind Resistance:
 - a. Uplift: Same pressure as specified in code for structural members.
 - b. Substantiation:
 - (1) Design Development: Identification of assemblies or methods used.
 - (2) Construction Documents: Identifying numbers on the construction drawings.
 - (3) Post-Construction: Reports of windstorms involving winds of over 25 mph within one year after completion of each roofing element, including wind speed, direction, duration, and results of inspection of roofing.
- 1.3.3 Snow Load:
 - a. Roof Opening Elements: Exceed code requirements by 15 percent.

1.4 Durability:

- 1.4.1 Weather Resistance: Provide weather-exposed roof coverings and other components that comply with weather resistance specified in Chapter B and the following:

- a. Minimization of Deterioration Due to Weather: For weather-barrier materials, minimization means no deterioration that adversely affects water penetration resistance at any time during the specified service life span.
 - b. Substantiation:
 - (1) Design Development: Identification of proven-in-use products and assemblies; in addition to substantiation items specified in Chapter 111, provide, for minimum of 3 existing applications, date of installation of roof covering; maintenance, repair, and replacement history; recommended inspection and maintenance program; detailed evaluation of similarities and differences of historical application from proposed application; estimated life span of similar assembly if constructed today.
 - (2) Design Development: As specified for service life span in Chapter 111, including service life analysis and life cycle cost analysis.
- 1.4.2 Water Penetration: None, under conditions of rain driven at 50 mph, unless water paths are completely accessible.
- a. Substantiation:
 - (1) Construction: Water flood tests of roof areas that can accumulate rainwater if primary drains are blocked, up to depth for which structure is designed.
 - (2) Construction: Reports of first 3 significant rainfalls after completion of each roofing element, including rainfall amount and intensity, wind speed and direction, and results of inspection of roof and underside.
- 1.4.3 Minimum Slope:
- a. Field of Roof: 1.5 inch per foot.
- 1.4.4 Grease, Chemical Resistance: Wherever there is a possibility of the introduction of grease, oils, or chemicals onto the roof, provide materials that are not damaged by such leakage.
- 1.4.5 Ice: Design to avoid damage due to ice formation and buildup on roofing and in water conductors.
- 1.4.6 Wear Resistance:
- a. Surfaces in Areas Occupied in Manner Similar to Interior Spaces: Same requirements as for the floor finishes for the equivalent interior space, as specified in Chapter C16.
 - b. Surfaces Subject Only to Maintenance Foot Traffic: Not punctured by ordinary materials or tools when stepped on.
 - c. Surfaces Subject to Other Traffic Levels: Durability appropriate to level of traffic anticipated.
 - d. Substantiation:
 - (1) Design Development: Proven-in-use products, or demonstration using tests appropriate to materials used, over same type of substrates as will be used in construction.
- 1.5 Operation and Maintenance:
- 1.5.1 Ease of Service:
 - a. Rooftop fixtures serviceable by simple replacement of parts, minimizing time required on roof, and eliminating need for repair work in the weather.

2. PRODUCTS

2.1 Roof Covering:

- 2.1.1 Use one of the following:
 - a. Any product indicated in Chapter B31.

2.2 Roof Openings:

- 2.2.1 Use one of the following:
 - a. Product specified in the code, provided the material complies with specified requirements.

END OF CHAPTER B3

CHAPTER B31

ROOF COVERINGS

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide a weather-resistive covering over the top side of the roof superstructure and any exposed floor superstructure.
- 1.1.2 Roof covering comprises all weather-resistive components, including the primary weather barrier, vapor retarders, insulation, water collectors and conductors, wearing surfaces, trim and accessories, but not including roof opening elements or roof fixtures.
- 1.1.3 Where roof covering elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter B - Shell, and Chapter B3 - Roofing.

1.2 Structure:

- 1.2.1 Roof Covering Substrate: Sufficiently rigid or dense to support water barrier in a manner that prevents puncture due to traffic on roof.
- 1.2.2 Wind Uplift: Where roof covering has a lower air transmission rate than the roof superstructure, provide means of preventing blow-off or ballooning due to low negative pressure over roof.

1.3 Durability:

- 1.3.1 Life Span: As specified in Chapter B, and the following:
 - a. Aesthetic Life Span: Significant degradation of appearance during the functional life span is not acceptable.
 - b. Manufacturer Approval of Design: Where roof covering manufacturer recommends or requires certain design features for satisfactory performance or for warranty, with manufacturer's requirements.
 - c. Manufacturer Warranty:
 - (1) Materials: 10 years, minimum.
 - d. Installer Warranty: 2 years, minimum.
 - e. Substantiation:
 - (1) Proposal: Material type, expected functional life span, expected changes in appearance over life span, and manufacturer warranty available.
 - (2) Design Development: Material type and specification, expected functional life span, and manufacturer warranty available.
 - (3) Construction Documents: Quality assurance program to be implemented to ensure complete and correct installation of weather-barrier elements.
 - (4) Construction: Actual manufacturer warranty.
- 1.3.2 Water Penetration:
 - a. Water Barrier Type: Use a water barrier that is lapped for positive run-off, a monolithic jointless membrane, or a membrane with sealed joints.
 - b. Fasteners Penetrating Water Barrier: Prohibited, unless fasteners are located under overlapping material.
 - e. ~~Shingles, Tiles, and Other Traditional Lap-Type Materials: If proven in-use overlap dimensions are used, mock-up testing is not required.~~

1.4 Operation and Maintenance:

- 1.4.1 Water Conductor Capacity: As required by code or SMACNA Architectural Sheet Metal Manual

(ASMM), 1993, whichever is greater, based on 10 year 5 minute intensity.

2. PRODUCTS

2.1 Sloped Roofs:

2.1.1 Use one of the following:

- a. Structural Standing Seam Metal roofing of aluminum or factory-finished hot-dipped galvanized steel.

2.2 Insulation Over Roof Superstructure:

2.2.1 Use one of the following:

- a. Rigid Insulation Board.

2.3 Water Collectors and Conductors:

2.3.1 Use one of the following:

- a. Factory-finished galvanized steel sheet metal.

2.4 Flashing, Trim, and Accessories: Sheet metal.

2.4.1 Use one of the following:

- a. Factory-finished galvanized sheet metal.

END OF CHAPTER B31

CHAPTER B32**ROOF OPENINGS****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Close all openings in the roof with elements that exclude unwelcome people, animals, and insects without requiring specific action by occupants, while shedding water and preventing uncontrolled water infiltration, withstanding anticipated loading conditions, providing required access, and permitting the entry of desirable natural light.
- 1.1.2 Roof opening elements include skylights, hatches, vents, and other elements necessary to close openings or elements associated with those openings.
- 1.1.3 Where roof opening elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapters 111 - Facility Performance, Chapter B - Shell, and Chapter B3 - Roofing.

2. PRODUCTS

2.1 Ventilation Openings In or On Plane of Roof:

- 2.1.1 Use one of the following:
 - a. Ridge vents.
 - b. Controlled Ventilators.
- 2.1.2 Do not use:
 - a. Gravity ventilators.
 - b. Louvered penthouses.

END OF CHAPTER B32

CHAPTER C

INTERIORS

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide appropriately finished interiors for all spaces indicated in the program, equipped with interior fixtures as required to function properly for specific occupancies.
- 1.1.2 Interiors comprise the following assemblies:
 - a. Interior Construction (C1): All elements necessary to subdivide and finish space enclosed within the shell, including applied interior surfaces of the exterior enclosure.
 - b. Interior Fixtures (C2): All elements attached to interior construction that add functionality to enclosed spaces, except for elements classified as equipment or services fixtures.
- 1.1.3 Provide physical separation between spaces, constructed to achieve fire ratings required by code, appropriate security between adjacent spaces, and visual, acoustical, olfactory, and atmospheric isolation as necessary to maintain desirable conditions in each space.
- 1.1.4 Provide finishes for interior surfaces that are appropriate for the functions of each space.
- 1.1.5 Provide interior fixtures that are necessary for the proper functioning of each space.
- 1.1.6 Where interior elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.7 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance.

1.2 Amenity and Comfort:

- 1.2.1 Natural Ventilation: Design and construct interiors to permit air movement between exterior openings positioned to enhance warm weather thermal comfort of occupants in all major spaces.
- 1.2.2 Access: Provide access to all primary interior spaces from Circulation spaces (SC Spaces) (no access to any primary interior space exclusively through another primary interior space).
- 1.2.3 Natural Light:
 - ~~a. Daylighting: Provide ambient natural lighting in primary spaces that is of intensity adequate for essential tasks when measured on a typical overcast winter day in midafternoon.~~
 - ~~(1) Spaces for daylighting include the following types:~~
 - ~~(a) Occupant Work (SP2 Spaces).~~
 - ~~(b) Meeting and Instruction (SP6 Spaces).~~
 - ~~(c) Occupant Services (SR Spaces).~~
 - ~~(2) Light Levels: Provide minimum light levels not less than those recommended in IESNA Lighting Handbook, 2000, for the types of tasks to be anticipated in each category of space.~~
 - a. Natural lighting is used to supplement the electrical lighting with daylight controls in areas which are applicable per the architectural room design for energy saving.
 - b. Daylight Control: Provide local devices to enable occupants to control brightness and glare from direct daylighting.
 - (1) Window treatments as specified in Chapter C23 are acceptable methods of complying with this requirement.
- 1.2.4 Acoustical Performance:
 - a. Background Noise: Provide interiors that maintain ambient sound levels in primary spaces within the following Noise Criteria (NC) ranges, as defined in ASHRAE HVAC Applications Handbook, 1999, when adjacent spaces are occupied and are being used normally:

- b. Impact Insulation: Provide floor-ceiling construction, including floor structure, floor finish, and ceiling finish, to insulate primary spaces from undesirable impact noise when adjacent spaces are occupied and are being used normally.
 - c. Reverberation: Provide reverberation times in primary spaces for frequencies of 500-1000 Hz as follows:
 - d. Substantiation:
 - (1) Preliminary Design: Engineering calculations for representative spaces, predicting acoustical conditions.
 - (2) Construction Documents: Engineering design calculations and drawings sealed by licensed acoustical engineer.
 - (3) Construction: Field test of acoustical conditions, verifying compliance with performance requirements.
- 1.2.5 Odor Control: Prevent unpleasant odors generated within a space from affecting occupants of adjacent spaces, by providing physical isolation of the spaces, separate ventilation, or a combination of isolation and ventilation.
- 1.2.6 Appearance: Provide interiors that are pleasing in appearance and do not detract from the primary functions performed in each space.
- 1.2.7 Texture: Provide interior elements and surfaces that are textured appropriately for primary functions to be accommodated within each space.
- a. For surfaces that are within normal reach of occupants, provide textures that are safe for occupants and require minimum maintenance.
 - b. For surfaces that are not within normal reach of occupants, design may provide textures that are generally of a coarser scale than those permitted within normal reach.
- 1.3 Health and Safety:
- 1.3.1 Egress: Provide egress from all interior spaces in accordance with code.
- 1.3.2 Fire Resistance: Design and select materials to provide fire resistance in accordance with code.
- a. Minimum performance values for individual interior elements are also specified in other chapters.
 - b. Substantiation:
 - (1) Design Development: Identification of assemblies required to have fire resistance rating and method to be used to achieve rating.
- 1.4 Structure:
- 1.4.1 Structural Performance: Provide interior construction and fixtures to support without damage or unacceptable displacement/deflection all loads either indicated and accepted as a "significant other load condition" or required by code.
- a. Substantiation:
 - (1) Design: Detailed listing of design criteria and preliminary analysis, prepared by a structural engineer licensed to practice in the State of Utah.
 - (2) Construction Documents: Detailed design analysis by structural engineer licensed to practice in the State of Utah.
- 1.5 Durability:
- 1.5.1 Service Life Span: Same as building service life, except as follows:
- a. Interior Doors and Other Operable Elements: Minimum 15 years functional and aesthetic service life.
 - b. Interior Ceiling Finishes: Minimum 15 years functional and aesthetic service life; including suspended ceilings.
 - c. Interior Wall and Floor Finishes: Minimum 10 years functional and aesthetic service life.
 - d. Other Interior Construction: Minimum 15 years functional and aesthetic service life.

e. Substantiation: As specified in Chapter 111, including service life analysis and life cycle cost analysis.

1.5.2 Wear Resistance: Provide interior construction and fixtures that are suitable in durability for the degree and type of traffic to be anticipated in each space.

1.6 Operation and Maintenance:

1.6.1 Cleaning: Provide interior construction and fixtures that will not be damaged by ordinary cleaning and maintenance operations.

2. PRODUCTS

2.1 Do not use:

2.1.1 Combustible materials.

END OF CHAPTER C

CHAPTER C1**INTERIOR CONSTRUCTION****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide physical separation between spaces required by the program, constructed to achieve fire ratings required by code, appropriate security between adjacent spaces, and visual, acoustical, olfactory, and atmospheric isolation as necessary to maintain desirable conditions in each space.
- 1.1.2 Provide appropriately finished interiors for all spaces required by the program.
- 1.1.3 Interior construction comprises the following elements:
 - a. Interior Doors (C12): All interior doors, including hardware and frames, except for elevator doors.
 - b. Other Interior Openings (C14): Interior utility openings such as hatches and access panels, louvers and vents.
 - c. Interior Finishes (C16): All functional and decorative applied interior finishes, including secondary support structures.
 - d. Other Interior Construction (C19).
- 1.1.4 Where interior construction elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter C - Interiors.

1.2 Amenity and Comfort:

- 1.2.1 Airborne Sound Isolation: Design and construct interior construction to achieve the following minimum noise isolation class (NIC) values between adjacent spaces, when tested in accordance with ASTM E 336-1997 and classified in accordance with ASTM E 413-1987(R99), based on NC values specified in Chapter C:
 - a. Spaces of Like Function and Similar NC Value: NIC 36.
 - b. Quiet Space (NC Values of 20-30) and Moderately Noisy Space (NC Values of 30-40): NIC 39.
 - c. Quiet Space (NC Values of 20-30) and Noisy Space (NC Values of 40-50): NIC 42.
 - d. Quiet Space (NC Values of 20-30) and Very Noisy Space (NC Values of 50-60): NIC 48.
 - e. Moderately Noisy Space (NC Values of 30-40) and Noisy Space (NC Values of 40-50): NIC 36.
 - f. Moderately Noisy Space (NC Values of 30-40) and Very Noisy Space (NC Values of 50-60): NIC 42.
 - g. Noisy Space (NC Values of 40-50) and Very Noisy Space (NC Values of 50-60): NIC 36.
 - h. Exceptions:
 - (1) Adjacent Offices Requiring High Speech Confidentiality: NIC 50.
 - i. Substantiation:
 - (1) Design Development: Drawings indicating proven-in-use STC values for construction separating primary spaces and separating primary spaces from noise sources such as mechanical equipment.
 - (2) Construction Documents: Proven-in-use or proven-by-mock-up data substantiating STC values.
 - (3) Construction: Field tests of representative construction, conducted after all systems are in operation.

1.3 Health and Safety:

- 1.3.1 Fire Resistance: Design and provide interior construction to achieve fire resistance required by

code, except for the following elements, which are in excess of code:

1.4 Structure:

1.4.1 Seismic Loads:

- a. Fire Rated Ceiling Assemblies: Provide ceilings that have been engineered and installed to withstand seismic forces that are 20 percent greater than those required by code.

2. PRODUCTS

2.1 Design and construct the interiors using the following:

~~2.1.1 Gypsum plaster on gypsum lath over metal framing.~~

2.1.1 Gypsum board.

END OF CHAPTER C1

CHAPTER C12**INTERIOR DOORS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Equip all openings in partitions that function to allow passage of people, vehicles, and goods, so that openings can be closed and secured when not in use, using components as specified.
- 1.1.2 The elements comprising interior doors include doors of all sizes and uses, gates, and elements that form or complete the openings, unless an integral part of another element.
- 1.1.3 Where interior door elements also must function as elements defined within another element group, meet requirements of both element groups; interior doors function as partition elements when doors are closed.
- 1.1.4 In addition to the requirements of this Chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C1 - Interior Construction.

1.2 Amenity and Comfort:**1.2.1 Acoustical Performance:**

- a. Provide in-place FSTC values for partitions with interior doors that are not less than NIC values specified for interior construction in Chapter C1.

1.2.2 Convenience:

- a. Dimensions: Provide interior doors that are sized appropriately for people, vehicles, and goods likely to move between adjacent spaces.
- b. Height: Not less than 80 inches in height.
- c. Width: Not less than 36 inches in width, except for doors to shallow closets.
- d. Closing Devices: Required on all doors; smooth closing motion, with slower latching speed than closing speed (no slamming).

1.2.3 Appearance:

- a. Provide interior doors coordinated with adjacent wall surfaces, using similar materials, colors, and textures.

1.3 Health and Safety:

- 1.3.1 Fire Safety: Protect door openings in fire-rated walls and partitions in accordance with the code and the following:
 - a. Closers: Sufficient closing force to close and latch door despite drafts and wind, but not more than that specified by code.
- 1.3.2 Emergency Egress: Where doors must be latched or locked, comply with the code and the following:
 - a. Locking Devices Requiring a Key for Egress: Not allowed.
 - b. Exit Doors Having Occupant Load of 50 or More (Regardless of Occupancy): Use exit hardware that releases the locking/latching mechanism upon the application of a force in the direction of egress travel.
- 1.3.3 Physical Security:
 - a. Locks: Secure each room door using a keyed lockset that allows exit from inside using only one motion.
 - (1) Exceptions:
 - (a) The following must not have any locking feature at all:
 - (1) Doors to restrooms, shower rooms, locker rooms, kitchens, and laundry rooms.
 - (b) The following must be exit only, without key or trim on outside:

- (1) Exterior egress doors from the warehouse.
- (c) See Chapter D92 for remote unlocking requirements related to access/entry control functions.
 - (2) Keying and Hardware: As specified in Chapter B23
- b. Lock Function Definitions: As described in ANSI/BHMA A156.2-1996 (F36-F48, F75-F94, F107-F109), A156.3-2001 ("X" prefix), A156.5-2001 ("E" prefix), A156.12-1999 (F95-F106), and A156.13-2001 (F01-F25); type of lock required may also be governed by other criteria.
 - (1) Entry, Deadbolt: F07.
 - (2) Exit Only: F13, with no outside trim, no thumbturn or other unlocking feature inside, no holdback or dogging.
 - (3) Office: F04, operation of key unlocks outside handle.
 - (4) Privacy: F02.
 - (5) Two-Key Entry: F22.
- c. Forced Entry: Doors into "secure zone" defined in Chapter 0 capable of resisting forced entry equivalent to:
 - (1) Swinging Doors: ASTM F 476-1984(R02) Grade 10.
 - (2) Locks and Lock Cylinders: ANSI/BHMA A156.5-2001 Security Grade 1.

1.4 Structure:

- 1.4.1 Door Frames: Constructed to span door opening with maximum deflection vertically and horizontally of 1/360 of span.

1.5 Operation and Maintenance:

- 1.5.1 Life Span of Operating Components: Remaining operable for 10 years under normal exposure conditions for the project site.

2. PRODUCTS

2.1 Interior Pedestrian Doors:

- 2.1.1 Use one of the following:
 - a. Hollow steel doors and frames.
- 2.1.2 Do not use:
 - a. Plastic laminate faced doors.
 - b. Stile-and-rail wood doors.
 - c. Glazed aluminum doors.
 - d. Glazed bronze doors.
 - e. Glazed stainless steel doors.

2.2 Security Grilles:

- 2.2.1 Use one of the following:
 - a. Overhead coiling grilles.

2.3 Fire Separation Doors Not Used for Egress:

- 2.3.1 Use one of the following:
 - a. Same type as for other doors.

2.4 Door Louvers:

- 2.4.1 Louvers in Metal Doors: Same material as doors.
- 2.4.2 Use fire rated louvers on fire rated doors.
- 2.4.3 Louver in Wood Doors: Use one of the following:
 - a. Steel louvers.

2.5 Hardware for Swinging Doors:

- 2.5.1 Comply with Hill AFB Facility Design Standard.
- 2.5.2 Use fire rated hardware on fire rated doors.

END OF CHAPTER C12

CHAPTER C14**OTHER INTERIOR OPENINGS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide interior openings between adjacent spaces when required for air movement, louvered where required for visual privacy, baffled where required for acoustical isolation, and equipped with automatic fire dampers where separations are fire-rated.
- 1.1.2 Provide interior openings where required for maintenance access to mechanical services and other concealed systems, designed to be as unobtrusive as possible.
- 1.1.3 Provide covers for interior expansion joints that protect joints from debris and provide safe and durable support for anticipated traffic.
- 1.1.4 Other interior openings comprise the following elements:
 - a. Louvers and vents.
 - b. Access doors and panels.
 - c. Hatches.
 - d. Expansion joint covers.
 - e. Elements forming or completing interior openings, including sills, jambs, heads, and operating hardware.
- 1.1.5 Where other interior openings are integral with elements defined within another element group, meet requirements of both element groups. Interior openings between adjacent spaces cannot degrade performance of partitions and other interior construction elements below the levels specified.
- 1.1.6 In addition to requirements of this Chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C1 - Interior Construction.

1.2 Amenity and Comfort:

- 1.2.1 **Air Movement:** Provide properly sized and located interior openings where required for natural ventilation specified in Chapter C.
- 1.2.2 **Return Air Movement:** Provide properly sized and located interior openings to accommodate air return where required for proper operation of forced air heating and air conditioning systems.
- 1.2.3 **Visual Privacy:** Where air movement is required between adjacent spaces, provide interior openings equipped with sightproof louvers where required for protection of visual privacy.
- 1.2.4 **Convenience:**
 - a. **Dimensions:** Provide access panels and hatches that are sized appropriately for access to services, and utilities concealed by other construction.
 - b. **Features:** Provide access panels and hatches with concealed hinges, recessed latch, keyed cylinder, and hold-open device.
- 1.2.5 **Appearance:**
 - a. **Compatibility:** Provide access panels, hatches, and louvers that are compatible in appearance with the finished surfaces in which they are installed, employing similar colors, and textures.

1.3 Health and Safety:

- 1.3.1 **Tripping Hazard:** Provide floor expansion joint covers and floor hatches that are flush with finished floor surface or lapped not more than 1/4 inch above finished surface with tapered edges to present minimal tripping hazard.

1.4 Structure:

- 1.4.1 Pedestrian Expansion Joint Covers: Provide expansion joint covers for interior floors capable of supporting minimum 300 lb/linear ft at fully expanded position without damage.

2. PRODUCTS

2.1 Louvers and Vents:

- 2.1.1 Use one of the following:
- a. Metal louvers matching other metal fabrications.
- 2.1.2 Do not use:
- a. Prefabricated wood louvers.
 - b. Custom fabricated wood louvers.

2.2 Access Doors:

- 2.2.1 Use one of the following:
- a. Manufactured metal doors.
- 2.2.2 Do not use:
- a. Custom fabricated metal doors.
 - b. Custom fabricated wooden doors.

2.3 Expansion Joint Covers:

- 2.3.1 Use one of the following:
- a. Manufactured all-metal covers.
 - b. Manufactured metal covers with resilient filler.

3. METHODS OF CONSTRUCTION

3.1 Construct other interior openings using the following methods and techniques:

- 3.1.1 Field installation of prefabricated closure elements in site-fabricated openings for expansion joint covers.
- 3.1.2 Field installation of shop-fabricated closure elements for louvers and vents.

3.2 Do not use:

- 3.2.1 Shop installation of prefabricated closure elements for louvers and vents.
- 3.2.2 Shop installation of shop fabricated closure elements for access panels.

END OF CHAPTER C14

CHAPTER C16**INTERIOR FINISHES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide appropriately finished interiors for all spaces required by the program.
- 1.1.2 Interior finishes comprise the following elements:
 - a. Wall finishes, including those applied to the interior face of exterior walls and to the vertical faces of superstructure elements.
 - b. Floor finishes, except for access floors.
 - c. Suspended ceilings and soffits.
 - d. Applied ceiling finishes.
 - e. Stair finishes, except for integral stair surfaces.
 - f. Finishes applied to other interior surfaces.
- 1.1.3 Where interior finishes are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C1 - Interior Construction.

1.2 Amenity and Comfort:**1.2.1 Thermal Performance:**

- a. Interior Wall Finishes at Exterior Walls: Provide vapor permeance of 1 perm maximum when tested in accordance with ASTM E 96-2000.
- b. Interior Ceiling Finishes at Roof Level: Provide vapor permeance of 1 perm maximum when tested in accordance with ASTM E 96-2000.

1.2.2 Reflectivity:

- a. Glare: Provide interior finishes that will not result in discomfort glare due to excessive contrast with light sources.
 - (1) Ceiling Surfaces: Not less than 80 percent reflectivity, when measured in accordance with ASTM E 1477-1998a.
 - (2) Wall Surfaces: Not less than 50 percent reflectivity.
 - (3) Floor Surfaces: Not less than 30 percent reflectivity.
- b. Specular Reflections: Provide interior finishes that will minimize specular reflections.

1.2.3 Acoustical Performance:

- a. Sound Absorption: Provide acoustical absorption within interior spaces to achieve reverberation times within the limits specified in Chapter C - Interiors.
- b. Sound Absorption: Provide surfaces with minimum Noise Reduction Coefficient (NRC) in spaces as follows, measured and calculated in accordance with ASTM C 423-2002:
 - (1) SP1 Customer Contact:
 - (a) Ceiling NRC: 0.55.
 - (b) Floor NRC: 0.20.
 - (2) SP2 Occupant Work, Closed Offices:
 - (a) Ceiling NRC: 0.55.
 - (b) Floor NRC: 0.20.
 - (3) SP2 Occupant Work, Open Plan Offices:
 - (a) Ceiling NRC: 0.70.
 - (b) Floor NRC: 0.20.
 - (4) SP3 Equipment Utilization:
 - (a) Ceiling NRC: 0.55.

- (b) Floor NRC: 0.20.
 - (5) SP6 Meeting and Instruction:
 - (a) Ceiling NRC: 0.50.
 - (b) Floor NRC: 0.20.
 - (6) SR1 Sanitary Facilities:
 - (a) Ceiling NRC: 0.50.
 - (7) SR3 Food Facilities:
 - (a) Ceiling NRC: 0.10.
 - (8) SC1 Corridors:
 - (a) Ceiling NRC: 0.50.
 - (b) Floor NRC: 0.20.
 - (9) SC2 Lobbies:
 - (a) Ceiling NRC: 0.50.
 - (b) Floor NRC: 0.20.
 - c. Articulation Class: For open office areas, provide ceilings that have been tested per ASTM E 1111-2002 to provide Articulation Class (AC) values not less than 150.
 - d. Sound Isolation: In areas where interior partitions stop at the ceiling and a plenum space extends above, provide ceilings tested in accordance with ASTM E 1414-2000a and classified in accordance with ASTM E 413-1987(R99) to provide minimum Ceiling Attenuation Class (CAC) values as follows:
 - (1) Similar Functions and NC Levels on Both Sides of Partition: CAC 40.
 - (2) Quiet Space (NC 20-30) Separated From Moderately Noisy Space (NC 30-40): CAC 45.
 - (3) Quiet Space (NC 20-30) Separated From Noisy Space (NC 40-50): CAC 50.
 - (4) Quiet Space (NC 20-30) Separated From Very Noisy Space (NC 50-60): CAC 55.
 - (5) Moderately Noisy Space (NC 30-40) Separated From Noisy Space (NC 40-50): CAC 45.
 - (6) Moderately Noisy Space (NC 30-40) Separated From Very Noisy Space (NC 50-60): CAC 50.
 - (7) Noisy Space (NC 40-50) and Very Noisy Space (NC 50-60): CAC 45.
- 1.2.4 Cleanliness:
- a. For kitchens, provide wall, ceiling, and floor surfaces that are USDA approved.
 - b. For spaces such as toilet rooms, provide wall, ceiling, and floor surfaces that are inherently resistant to moisture and that can be cleaned by caustic agents without damage.
- 1.3 Health and Safety:
- 1.3.1 Slip Resistance: For spaces subject to floor wetting, including entry lobbies, provide floor finishes with inherent slip resistance under wet conditions.
- a. At building entries, provide means for reducing or minimizing moisture and debris on shoe soles by use of a walkoff mat or recess foot grille.
 - b. At spaces such as kitchens, toilets, and maintenance rooms, provide floor surfaces with minimum static coefficient of friction of 0.60 when wet, measured in accordance with ASTM C 1028-1996 or ASTM D 2047-1999.
- 1.3.2 Slip Resistance: At stairs and corridors, provide floor finishes with minimum static coefficient of friction of 0.60, measured in accordance with ASTM D 2047-1999.
- 1.3.3 Slip Resistance: At ramps and sloped floor surfaces, provide floor finishes with minimum static coefficient of friction of 0.80, measured in accordance with ASTM D 2047-1999.
- 1.3.4 Tactile Warning Surfaces: Provide floor surfaces that comply with ADAAG-1994 detectable warning requirements at potentially hazardous locations, including top and bottom of stairs, top and bottom of ramps, and edge of loading dock.
- 1.3.5 Static Generation: At computer installations, provide floor finishes that generate less than 2.0 kV at 20 percent relative humidity, when tested in accordance with AATCC 134-2001 using step and scuff tests with Neolite and leather soles.

- 1.3.6 Antimicrobial Properties: At Kitchen/vending and Conference/Break rooms, provide wall surfaces that will not support mold, mildew, or bacterial growth.
- a. Provide floor materials that are heat-welded to provide seamless surfaces.
 - b. For carpeted areas, no fungal growth, when tested in accordance with AATCC 174-1993(R98).
- 1.3.7 Flammability:
- a. Ceilings in Exits and Corridors: Provide ceilings with ratings not greater than the following, when tested in accordance with ASTM E 84-2001:
 - (1) Flame Spread: 25.
 - (2) Smoke Developed: 450.
 - b. Walls in Exits and Corridors: Provide wall surfaces with ratings not greater than the following, when tested in accordance with ASTM E 84-2001:
 - (1) Flame Spread: 25.
 - (2) Smoke Developed: 450.
 - c. Floors in Exits and Corridors: Provide floor surfaces with ratings not greater than the following:
 - (1) Critical Radiant Flux of 0.45 W/sq. cm, per ASTM E 648-2003.
 - (2) Smoke Density: 450 or less specific optical density, per ASTM E 662-2001.
 - d. Ceilings in Primary Spaces: Provide ceilings with ratings not greater than the following, when tested in accordance with ASTM E 84-2001:
 - (1) Flame Spread: 25.
 - (2) Smoke Developed: 450.
 - e. Walls in Primary Spaces: Provide wall surfaces with ratings not greater than the following, when tested in accordance with ASTM E 84-2001:
 - (1) Flame Spread: 25.
 - (2) Smoke Developed: 450.
 - f. Floors in Primary Spaces: Provide floor surfaces with ratings not greater than the following:
 - (1) Critical Radiant Flux of 0.45 W/sq. cm, per ASTM E 648-2003.
 - (2) Smoke Density: 450 or less specific optical density, per ASTM E 662-2001.
- 1.4 Durability:
- 1.4.1 Wall Finishes: Provide integral or applied wall surfaces that are appropriate for anticipated usage and traffic, offering durability not less than would be provided by applied wall coverings as follows, classified in accordance with ASTM F 793-1993 (R98):
- a. SP3 Equipment Utilization: Category V- Type II Commercial Serviceability.
 - b. SP6 Meeting and Instruction: Category V- Type II Commercial Serviceability.
 - c. SR1 Sanitary Facilities: Category V- Type II Commercial Serviceability.
 - d. SR3 Food Facilities: Category V- Type II Commercial Serviceability.
 - e. SC1 Corridors: Category V- Type II Commercial Serviceability. SC2 Lobbies:
 - f. SC3 Waiting Areas: Category V- Type II Commercial Serviceability.
- 1.4.2 Interior Wall Finishes at Exterior Walls: Provide surfaces that will not be damaged by incidental condensation from windows.
- 1.4.3 Wall Protection: In corridors, freight receiving rooms, and Conference/Break room, provide impact resistant wall bumpers, and corner guards or wall surfaces that are inherently resistant to impact damage due to rolling carts, gurneys, hand trucks, and chair backs.
- 1.4.4 Opening Protection: At partition openings intended to accommodate pedestrian or vehicular traffic, provide protection of opening edges in the form of door frames (cased openings), or corner guards.
- 1.4.5 Flooring: Provide floor finishes that are appropriate for anticipated usage and traffic in each area, based on a 10 year replacement cycle.
- a. Substantiation:
 - (1) Design Development: As specified for service life span in Chapter 111, including service life analysis and life cycle cost analysis.

2. PRODUCTS

2.1 Design and construct interiors using the following materials and systems:

- 2.1.1 Ceramic mosaic tile (09300) at toilet rooms and janitor closets.
- 2.1.2 Glazed wall tile (09300) at toilet rooms and janitor closets.
- 2.1.3 Paver tile (09300) at entrance lobbies, kitchen and vending areas.
- 2.1.4 Acoustical tile ceilings (09500) at corridors, administrative and open offices, conference/break rooms.
- 2.1.5 Resilient sheet flooring (09600) at kitchen and vending areas.
- 2.1.6 Fluid-applied flooring (09600) at Maintenance Bay and Mobility Bag Storage.
- 2.1.7 Sheet carpet, glued-down (09600) at hardwall offices and conference/break room.
- 2.1.8 Carpet tile (09600) at corridor and open offices.
- 2.1.9 Vinyl-coated fabric wall covering (09700) at lobby/vestibule areas, administrative and open offices, conference/break room.
- 2.1.10 Acoustical wall treatment (09800) at conference/break room and administrative offices.
- 2.1.11 Interior paints (09900) at kitchen, vending, toilet rooms, mech./elec./comm./rooms, janitor closets.
- 2.1.12 High performance coatings (09900) at vault, maintenance bay and storage areas.

2.2 Do not use:

- 2.2.1 Quarry tile.
- 2.2.2 Portland cement terrazzo.
- 2.2.3 Precast terrazzo.
- 2.2.4 Thinset epoxy terrazzo.
- 2.2.5 Thinset polyacrylate terrazzo.
- 2.2.6 Acoustical panel ceilings.
- 2.2.7 Acoustical metal pan ceilings.
- 2.2.8 Luminous ceilings.
- 2.2.9 Linear metal ceilings.
- 2.2.10 Linear wood ceilings.
- 2.2.11 Athletic flooring.
- 2.2.12 Plastic laminate flooring.
- 2.2.13 Brick flooring.
- 2.2.14 Stone flooring.
- 2.2.15 Cushioned wood flooring.
- 2.2.16 Wood parquet flooring.
- 2.2.17 Wood strip flooring.
- 2.2.18 Resilient tile flooring.

- 2.2.19 Sheet carpet, stretched-in.
- 2.2.20 Wall fabrics.
- 2.2.21 Wallpaper.
- 2.2.22 Flexible wood veneer wall covering.
- 2.2.23 Stone facing.
- 2.2.24 Interior transparent stains.

3. METHODS OF CONSTRUCTION

- 3.1 Construct interior finishes using the following methods and techniques:
 - 3.1.1 Install interior construction elements with integral finishes as follows:
 - a. Throughout the project.
- ~~3.2 Do not use:~~

END OF CHAPTER C16

CHAPTER C19

OTHER INTERIOR CONSTRUCTION

1. PERFORMANCE

1.1 Basic Function:

~~1.1.1 The Arms Vault shall be designed for storage of Risk Category II Arms with a Class V door. The vault shall be designed in conformance with AFI 31-101, Air Force Installation Security Program (FOUO); MIL-HDBK-1013/1A, Design Guidelines for Physical Security of Facilities; and DOD 5100.76-M, Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives. The door/s for the Vault needs to be dimensioned in order to have a fork lift access through the door/s.~~

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END OF CHAPTER C19

CHAPTER C2**INTERIOR FIXTURES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide elements fixed to interior construction that are necessary for complete and proper functioning of spaces required by the program.
- 1.1.2 Interior fixtures are functional items that are permanently attached to interior walls, ceilings, and floors, except for equipment items and items that are integral components of service systems, and comprise the following elements:
 - a. Identifying Devices (C21): Informational accessories, including room numbers, signage, directories, and regulation.
 - b. Storage Fixtures (C22): Non-furniture items intended primarily for storing or securing objects, materials, and supplies, including cabinets, casework, closet fixtures, and shelving.
 - c. Window Treatment (C23): Non-furnishing accessories for control of light, solar heat gain, privacy, and view at interior and exterior windows, including blinds.
 - d. Accessory Fixtures (C24): Specialty items intended to provide service or amenity to building interiors, including toilet and bath accessories, postal fixtures, visual display surfaces, and telecommunications fixtures.
- 1.1.3 Where interior fixtures are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter C - Interiors.

1.2 Amenity and Comfort:

- 1.2.1 Accessibility: Provide interior fixtures that are easily usable by disabled persons without outside assistance.
 - a. Provide interior fixtures that comply with ADAAG-1994.
- 1.2.2 Light and Glare: Provide interior fixtures that are not a source of direct or reflected glare.
 - a. Written and Graphic Information on Interior Fixtures: Clearly legible from typical viewing distances by occupants with normal eyesight.
 - b. Surfaces Containing Written or Graphic Information: Matte finished to reduce the incidence of veiling reflections.
 - c. Trans-Illuminated Surfaces: Luminance that is not more than 10 times brighter than surrounding surfaces under ambient lighting conditions for the space.
- 1.2.3 Convenience: Provide interior fixtures with fittings and controls that are manageable without special instruction or the need for excessive force.
- 1.2.4 Appearance: Provide interior fixtures that are coordinated in design with other elements of interior construction, using compatible materials, colors, textures, and design features.
- 1.2.5 Texture: Provide durable, low maintenance exposed surfaces for interior fixtures that are within reach of occupants engaged in activities normal for the particular space in which they are installed.
 - a. Flat, Exposed Metal Surfaces: Finishes that are satin, that is, non-reflective rather than smooth polished surfaces.
 - b. Flat Metal Surfaces: Coatings not permitted.
 - c. Hardware and Other Rounded Metal Surfaces: Finishes that are polished or satin, or high performance organic coatings.
 - d. Plastic Surfaces: Matte, rather than glossy or polished finishes.
 - e. Flat Wood Surfaces: Low-gloss finishes, transparent or opaque.

- f. Concrete and Stone Surfaces: Honed or other textured, non-polished finishes.

1.3 Health and Safety:

- 1.3.1 Flammability: Provide interior fixtures made of materials with flame spread index of 25 or less and smoke developed index of 450 or less when tested in accordance with ASTM E 84-2001 at all locations throughout the project.

1.4 Structure:

- 1.4.1 Live Loads: Provide suspended interior fixtures or portions of fixtures designed for storage or support of persons or objects that have been engineered and installed to withstand 1.5 times the anticipated live loads without excessive deflection or permanent distortion.

- a. Substantiation:

- (1) Construction Documents: Engineering calculations or proven-in-use substantiation.

- 1.4.2 Seismic Loads: Provide interior fixtures or portions of fixtures designed for storage or support of persons or objects that have been engineered and installed to withstand seismic forces that are 20 percent greater than those required by code.

- a. Application: For design purposes, apply the component seismic force at the center of gravity of the component nonconcurrently in any horizontal direction.

- b. Substantiation:

- (1) Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a structural engineer licensed to practice in the State of Utah.

- (2) Construction Documents: Detailed design analysis by a structural engineer licensed to practice in the State of Utah.

1.5 Operation and Maintenance:

1.5.1 Ease of Use:

- a. Language of Identifying Devices: All text in English, ~~French, and Spanish.~~

- b. Interior Fixtures with Movable Components: Easy to use without special instruction and designed to prevent misuse.

- c. Hinges and Latches: Heavy duty hardware, easily adjustable, providing minimum anticipated service life of 20 years.

- d. Mechanical Controls: Movable cranks, rotors, pulleys, and levers designed for trouble-free operation over a minimum anticipated service life of 20 years.

- e. Substantiation:

- (1) Design Development: Product data on hardware and other movable components of interior fixtures.

- (2) Construction Documents: Details of interior fixtures, documenting construction features.

- 1.5.2 Ease of Repair: Provide interior fixtures at all locations that are designed to permit repair or replacement of individual components without removal of fixture.

- 1.5.3 Ease of Replacement or Relocation: Provide interior fixtures at all locations that are modular in form, detachable from substrate without damage to fixtures, and relocatable.

- 1.5.4 Theft Resistance: Provide interior fixtures at all locations that are attached to substrates with concealed, tamper-resistant, or tamperproof fasteners to minimize theft and vandalism.

2. PRODUCTS

2.1 Identifying Devices (10400):

2.1.1 Use one of the following:

- a. Dimensional characters at toilet rooms, hazardous areas.

- b. Building directories at entrance lobby.

- c. Wall-mounted room signs at all offices, kitchen/vending, conference/break room, all

- maintenance and service areas.
 - d. All interior signage shall comply with Department of the Air Force Sign Standards, AFPAM 32-1098.
- 2.1.2 Do not use:
- a. Backlighted, ceiling-mounted signage.
- 2.2 Storage Fixtures:
- 2.2.1 Use one of the following:
- a. Built-in manufactured cabinetry or casework (12300) at kitchen, toilet rooms.
 - b. Shelving (06400) at Mobility Bag Storage.
- 2.2.2 Do not use:
- a. Built-in wardrobes.
 - b. Closet shelves and hanging rods.
 - c. Built-in clothing lockers.
 - d. Storage lockers.
 - e. Storage fixtures.
- 2.3 Window Treatments: (12400)
- 2.3.1 Use one of the following:
- a. Window blinds throughout the project.
- 2.3.2 Do not use:
- a. Window shades.
 - b. Interior shutters.
 - c. Recessed curtain tracks.
 - d. Surface-mounted curtain tracks.

3. METHODS OF CONSTRUCTION

- 3.1 Provide interior fixtures using the following methods and techniques:
- 3.1.1 Manufactured specialty items for field installation and finishing throughout the project.

END OF CHAPTER C2

CHAPTER C21**IDENTIFYING DEVICES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide identifying devices fixed to interior construction that are necessary for direction to and identification of functions and spaces as required by the program.
- 1.1.2 Identifying devices comprise the following elements:
 - a. Room or function labels applied to doors or walls immediately adjacent to doorways.
 - b. Signs that provide guidance to, or information about, building functions or spaces, including directional signs, locator maps, and logotypes.
 - c. Large decorative or architectural signs, including three dimensional graphics and illuminated lettering.
 - d. Building directories with replaceable information strips.
- 1.1.3 Text/Content of Identifying Devices: Some content will be provided by Government; remainder to be provided by Design-Builder for Government's approval.
- 1.1.4 Where identifying devices are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C2 - Interior Fixtures.

1.2 Amenity and Comfort:**1.2.1 Accessibility:**

- a. Function Labels: Graphic and Braille signs for the following building services and functions:
 - (1) Toilets.
 - (2) Other rooms required by code.

1.2.2 Visibility:

- a. Illumination Levels: Provide ambient lighting or equivalent backlighting of identifying devices adequate to provide clear visibility for normally sighted persons at typical viewing distances.
 - (1) Wall-Mounted Corridor Signs or Signs Intended for Viewing at Less Than 5 feet: Minimum of 10 fc.
- b. Character Size: Provide signs with characters of adequate size to be seen comfortably by normally sighted persons at typical viewing distances.
 - (1) Wall-Mounted Corridor Signs or Signs Intended for Viewing at Less Than 5 feet: Minimum character height of 5/8 inch and maximum of 2 inch.
- c. Fonts: Provide one font throughout the project as follows:
 - (1) Helvetica medium
- d. Reflectivity: Provide signs with matte surface measuring 11-19 degree gloss on 60 degree glossimeter.
- e. Contrast: Provide signs with contrast between characters and background of not less than 70 percent.
 - (1) Characters: Light on dark background throughout project.

1.2.3 Appearance:

- a. Provide signage for entire project that is consistent in design with other interior features and coordinated with overall color scheme.
- b. Room Label Signs: Framed panel signs.

1.3 Health and Safety:

- 1.3.1 Emergency Signs: In addition to exit signs required by code, provide the following types of signs:
 - a. Self-illuminating signs at electrical closets, equipment rooms, fire hose cabinets, and fire extinguishers.

2. METHODS OF CONSTRUCTION

2.1 Provide identifying devices using the following methods and techniques:

- 2.1.1 Manufactured and prefinished sign systems for surface mounting throughout the project.

END OF CHAPTER C21

CHAPTER C22**STORAGE FIXTURES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide storage fixtures attached to interior construction that are necessary for proper functioning of spaces required by the project program.
- 1.1.2 Storage fixtures comprise the following elements:
 - a. Closed Material and Utensils Storage: Provide modular storage cabinets and countertops with capacity adequate to accommodate required functions in spaces as follows:
 - b. Display Storage: Provide cases and display shelving with capacity adequate for intended uses in spaces as follows:
 - c. Miscellaneous Storage Fixtures: Provide shelves, hooks, clothing hanger rods, and shoe racks with capacity adequate for anticipated occupancy in spaces as follows:
 - d. Temporary Lockable Storage: Provide lockable transient storage units adequate for anticipated occupancy in spaces as follows:
 - e. Open Material Storage: Provide storage racks or utility shelves for material storage adequate for anticipated needs in spaces as follows:
- 1.1.3 Where storage fixtures are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C2 - Interior Fixtures.

1.2 Amenity and Comfort:

- 1.2.1 Accessibility:
 - a. Provide storage fixtures that comply with ADAAG-1994.
- 1.2.2 Noise Control: Provide closed storage fixtures equipped with hardware or fittings that minimize the sound generated by door slamming.
- 1.2.3 Convenience:
 - a. Closed Material and Utensil Storage: Provide floor-mounted cabinets equipped with full-extension drawers, extension shelves, rotating corner storage shelves, and doors that open a full 180 degrees.
 - b. Door Hardware: Provide hardware on not less than 10 percent of latching doors that complies with ADAAG-1994.
- 1.2.4 Stored Item Security:
 - a. Locks: Provide locking capability at storage fixtures as follows:
 - (1) Cabinets: Keyed locks.
 - (2) Casework: Keyed locks.
- 1.2.5 Appearance:
 - a. Cabinetry: For closed storage fixtures, provide elements that are designed to complement interior finishes, with concealed hinges and door and drawer pulls integrated into cabinet fronts.
 - b. Countertops and Work Surfaces: Provide light-colored or metallic surfaces that are seamless or tightly jointed.
 - c. Casework: For casework intended for display of objects, provide fixtures with clear glazing and surface finishes that are per Hill AFB Facility Base Standards.

1.3 Health and Safety:

- 1.3.1 Combustibility: Provide storage fixtures throughout the project that are made of totally

incombustible or fire-retardant treated materials.

1.4 Structure:

- 1.4.1 Seismic Loads: Provide storage racks and shelving units that have been engineered and installed to withstand seismic forces as specified in Chapter C2.

2. METHODS OF CONSTRUCTION

2.1 Provide storage fixtures using the following methods and techniques:

- 2.1.1 Manufactured and factory-finished storage fixtures for field installation throughout the project.

END OF CHAPTER C22

CHAPTER C23**WINDOW TREATMENT****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide window treatments attached to interior construction that are necessary for adequate control of light, glare, privacy, and views for spaces with interior and exterior windows.
- 1.1.2 Window treatments comprise the following elements:
 - a. Window blinds at all exterior windows.
- 1.1.3 Where window treatments are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C2 - Interior Fixtures.

1.2 Amenity and Comfort:

- 1.2.1 Thermal Comfort: Provide window treatment throughout project that enhances interior thermal comfort.
 - a. Winter Conditions: With window treatment in closed position, improved winter thermal resistance (R) of not less than 0.5 IP.
 - b. Summer Conditions: With window treatment in optimum position, improved summer shading coefficient (SC) of not less than 50 percent.
 - c. Substantiation:
 - (1) Design Development: Product data on thermal properties of proposed window treatments.
- 1.2.2 Condensation Resistance: Provide window treatment throughout project that is water-resistant and made of non-corrosive materials that will not be damaged by contact with condensation on window surface.
- 1.2.3 Accessibility: Comply with ADA Accessibility Guidelines and the following:
 - a. Extent: Provide accessible controls for all window treatments, regardless of location.
 - b. Location: Where accessible window treatments are required, provide controls that are mounted so they can be reached from a wheelchair and are not more than 54 inches and not less than 15 inches from the floor.
 - c. Operating Force: Where accessible window treatments are required, provide controls that can be operated without tight grasping or pinching and by a force of not more than 5 lbf.
- 1.2.4 Light and Glare Control: Provide window treatment throughout project that will allow control of light transmitted through window assembly.
 - a. Full Open Position: Maximum reduction of light level of 10 percent.
 - b. Full Closed Position: Minimum reduction of light level of 50 percent.
- 1.2.5 Light and Glare Control with View: Provide window treatment throughout project that will allow control of light, glare, and solar heat gain in closed position while retaining some level of view to exterior.
 - a. Full Open Position: Maximum reduction of or interference with view of 10 percent.
 - b. Full Closed Position: Maximum reduction of or interference with view of 30 percent.
- 1.2.6 Privacy: Provide window treatment throughout project that will allow complete visual privacy for room interior from observers at any angle to window when window treatment is in fully closed position.
- 1.2.7 Convenience: Provide window treatment throughout project with controls that are conveniently located and easily operated.

- 1.2.8 Appearance: Provide window treatment throughout project that is coordinated with window modules and does not conflict with expression of architectural elements of interior construction.
- 1.3 Health and Safety:
- 1.3.1 Combustibility: Provide window treatments throughout the project that are made of totally incombustible or fire-retardant treated materials.
- 1.3.2 Flammability: Provide window treatments made of materials with flame spread index of 25 or less and smoke developed index of 450 or less when tested in accordance with ASTM E 84-2001 at all locations throughout the project.
- 1.4 Durability:
- 1.4.1 Colorfastness: Provide window treatment throughout project that is resistant to degradation from exposure to ultraviolet light.
- a. Painted Aluminum: Maximum of 5 Delta E units (Hunter) color change as calculated in accordance with ASTM D 2244-2002 after 5 years of exposure in accordance with AAMA 2604-2002.
- b. Substantiation:
- (1) Construction Documents: Test results or proven-in-use data for proposed window treatments.

2. PRODUCTS

2.1 Window Blinds:

- 2.1.1 Use one of the following:
- a. Horizontal aluminum mini-blinds at all exterior windows.
- 2.1.2 Do not use:
- a. Horizontal aluminum blinds.
- b. Horizontal wood mini-blinds.
- c. Horizontal wood blinds.
- d. Horizontal PVC mini-blinds.
- e. Horizontal PVC blinds.
- f. Vertical aluminum blinds.
- g. Vertical PVC blinds.
- h. Vertical fabric blinds.

END OF CHAPTER C23

CHAPTER C24**ACCESSORY FIXTURES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide accessory fixtures as required to accomplish the design as required by code and as indicated in the project program.
 - a. Mirrors:
 - (1) Continuous mirror for each group of lavatories.
 - b. Grab Bars: Wherever required for safety and assistance in use of toilet and bath fixtures, and at toilets designed for the disabled, showers, and bathtubs.
 - c. Waste receptacles.
 - (1) One for each paper towel dispenser.
 - d. Holders and dispensers for toilet, sink, and bath supplies furnished by Government.
 - (1) Toilet Paper: Roll, consumer-size; one dispenser per toilet and bidet.
 - (2) Towels: Paper, in rolls; one dispenser per 3 lavatories.
 - (3) Toilet Seat Covers: Paper; one dispenser per toilet.
 - (4) Hand Soap: Liquid, one dispenser for each lavatory.
 - (5) Women's Personal Supplies: Vending of sanitary napkins; for each group of 3 or more toilets.
 - e. Hooks for temporary storage of occupants' property; one in each toilet compartment.
 - f. Holders and dispensers for cleaning supplies, utensils, and tools furnished by Government.
 - (1) Mops and Brooms: 6 items to be hung up in each janitor's closet, plus shelf for supplies.
- 1.1.2 Where accessory fixtures also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter C - Interiors, and Chapter C2 - Interior Fixtures.

1.2 Health and Safety:

- 1.2.1 Slip Resistance:
 - a. Fixtures Expected to Support or Assist in the Support of Persons: Touchable surfaces having slip resistance of 0.50, measured in accordance with ASTM D 2047-1999, using wet conditions.

1.3 Structure:

- 1.3.1 Grab Bars: Strength, design, anchorage, and support as required to withstand 250 pounds-force applied vertically at the center between supports and 250 pounds-force tension applied at any support; supports of sufficient rigidity to prevent rotation of bars under load.

1.4 Durability:

- 1.4.1 Indoor Units: Materials and finish complying with specified requirements for equivalent environments specified in Chapter ~~C-4~~
- 1.4.2 Moisture Resistance:
 - a. Mirrors: Silvered surfaces protected from degradation due to presence of moisture.

1.5 Operation and Maintenance:

- 1.5.1 Frequency of Servicing: Government expects that refilling/emptying will occur at the following intervals; provide capacity appropriate to servicing interval and expected use, based on project occupancy:
 - a. Toilet Paper Dispensers: Weekly, with sufficient redundancy to prevent running out.
 - b. Toilet Seat Cover Dispensers: Weekly.

- c. Hand Soap Dispensers: Weekly.
 - d. Waste Receptacles: Weekly.
 - e. Personal Supplies Vendors: Weekly.
- 1.5.2 Ease of Cleaning:
- a. Waste Receptacles: Disposable liners or bags.
- 1.5.3 Ease of Repair:
- a. Mirrors: Breakable glazing replaceable without disassembly of frame.
- 1.5.4 Theft Deterrence:
- a. Toilet Accessories:
 - (1) In Public Restrooms: Secure to substrates using tamperproof or concealed concealed fasteners.

2. PRODUCTS

2.1 Reflective Surfaces of Mirrors: (10800)

2.1.1 Use one of the following:

- a. Glass.

2.1.2 Do not use:

- a. Polycarbonate plastic.
- b. Acrylic plastic.
- c. Stainless steel.

2.2 Toilet, Bath, and Laundry Accessories: (10800)

2.2.1 Use one of the following:

- a. Stainless steel accessories.

END OF CHAPTER C24

CHAPTER D**SERVICES****1. PERFORMANCE****1.1 Basic Function:****1.1.1 Provide the following services:**

- a. Water and Drainage (D2): Means of delivery of water to points of utilization; automatic heating and conditioning of domestic water; and unattended removal of water, rainwater, and liquid waste.
- b. HVAC (D3): Artificial means of maintaining interior space comfort and air quality, including heating, cooling, ventilation, and energy supply.
- c. Fire Protection (D4): Automatic fire detection, suppression, and warning and manual fire-fighting equipment.
- d. Electrical Power (D5): Energy to operate all electrically-operated devices, including those included under other services and those provided separately by the Government.
- e. Artificial Lighting (D6): Means of illuminating spaces and tasks, both interior and exterior, independent of reliance on natural light.
- f. Telecommunications (D7): Services that include voice and data transmission, telephone equipment, and sound reinforcement.

1.1.2 Utility Sources and Outlets:

- a. Water Source: Existing public utility.
(1) Water Utility: _____
- b. Sewage Disposal: Connect building sewer to the existing public sewage system.
(1) Sanitary Sewer Utility: _____

1.1.3 Equipment That is Not Part of Services Systems: Specified in the project program and in Chapters E, E1, or E11 through E19.**1.1.4 Where services elements must also function as elements defined within another element group, meet the requirements of both element groups.**

- a. Where services elements are located outside the building in the site area, meet applicable requirements of Chapters G3, G31, G32, G33, G34, and G39.

1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance.**1.2 Structure:****1.2.1 Supports for Piping, Conduit, Ducts, and Components: Attached to, and supported by, the superstructure, not to or by non-structural construction or sheet metal elements, so that they do not move or sag, using the following:**

- a. Supports that allow movement of the rigid linear elements (pipe, etc.) without undue stress on the piping, tubes, fittings, components, or the superstructure.
- b. Intermediate supports mounted between structural members to limit distance between supports.
- c. Supports capable of handling seismic forces in accordance with the code.
- d. Mounting frames, bases, or pads, designed for ease of anchorage or mounting.
- e. Rigid sway bracing at changes in direction of more than one-half of a right-angle, for all pipes.
- f. Substantiation:
 - (1) Design Development: Details of supports, including engineering analysis.

1.2.2 Concealed or Buried Components: Design cover or concealment so that components are not subjected to damaging stresses due to applied loads.

1.3 Durability:

- 1.3.1 Expected Service Life Span: Same as the service life of the building, except as follows:
- a. Ducts, Piping, and Wiring in All Services: Same as the service life of the building.
 - b. All Components Permanently Installed Underground or Encased in Concrete: Same as service life of building.
 - ~~e. Conveying Systems: Minimum 20 years.~~
 - ~~d.c.~~ Plumbing:
 - (1) Shut-Off Valves and Similar Components: Same as service life of building.
 - (2) Electrically- and Fuel-Operated Equipment: Minimum 20 years.
 - (3) Other Moving Components: Minimum 20 years.
 - (4) Plumbing Fixtures: Same as building service life.
 - (5) Sink Faucets, But Not Other Fittings: Minimum 10 years.
 - ~~e-d.~~ HVAC:
 - (1) Shut-Off Valves: Minimum 10 years.
 - (2) Dampers, Louvers, Registers, Grilles: Same as service life of building.
 - (3) Main Heat Generation and Cooling Equipment: Minimum 20 years.
 - (4) Secondary Equipment: Minimum 10 years.
 - (5) Control Components, Except Wiring: Minimum 10 years.
 - ~~f-e.~~ Fire Protection:
 - (1) Sprinkler Heads, Valves, and Other Inlet and Outlet Components: Same as building service life.
 - ~~g-f.~~ Software and Firmware Integral to Operation of Services Equipment: Minimum 20 years functional life without reprogramming required and, specifically.
- 1.3.2 Weather Resistance:
- a. All components exposed to outdoor environment must comply with the requirements of Chapter B and Chapter B2; equipment enclosures are considered the equivalent of the exterior enclosure.
 - b. Liquid Storage and Distribution Components: Prevent freezing during longest duration of low temperature anticipated, based on historical weather data; if necessary, provide automatically controlled supplemental heating.
 - c. Buried Water Piping: Minimum of 48 inches below grade for water line and 5 1/2 feet for fire protection lines.

END OF CHAPTER D

CHAPTER D2**WATER AND DRAINAGE****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide delivery of hot and cold domestic water to points of utilization and the removal of water, rainwater, and liquid waste.
- 1.1.2 Water and drainage elements comprise the following:
 - a. Water Supply (D21): Water sources and storage.
 - b. Plumbing Fixtures (D22): All fixtures necessary for sanitation, occupancy, and use, that are connected to water supply or drainage; not including water heating or conditioning equipment (D23) or kitchen appliances.
 - c. Domestic Water (D23): All elements required to distribute water to fixtures, including piping and equipment for water cooling, heating and storage.
 - d. Sanitary Waste (D24): All elements required for removal of sanitary waste, including piping, venting, discharge and disposal, and equipment.
 - e. Rain Water Drainage (D25): All elements required for drainage of rain water from building areas in which it may accumulate and drainage of clear wastes from building services; not including gutters and downspouts (B31) or subdrainage (A).
- 1.1.3 Where plumbing elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with requirements specified in Chapter 111 - Facility Performance and Chapter D - Services.

1.2 Amenity and Comfort:

- 1.2.1 Hot Water Supply:
 - 1.2.2 Noise:
 - a. Design to prevent noise due to air trapped in piping systems.
 - b. Locate risers in dedicated and sound attenuated chases.
 - c. Minimize noise produced by fixtures.
 - 1.2.3 Convenience:
 - a. Fixture Heights: As specified in code.
 - b. Fixture Configurations: As specified in code.
 - c. Water Connections: Hot water on the left side of fixtures and cold water on the right side of fixtures.
 - 1.2.4 Odors:
 - a. Locate odor producing elements in areas separate from human occupancy in dedicated equipment rooms.
 - b. Do not locate sanitary waste vent openings where odors are noticeable by occupants or by occupants of adjacent properties or where odor-bearing air may enter building spaces.
 - c. Connect fixtures to prevent entry of sewer gases into occupied spaces.
 - 1.2.5 Appearance:
 - a. Vents: Conceal vents from view.
- 1.3 Health and Safety:**
- 1.3.1 Health: Provide potable water.
 - a. Public utility water can be considered to be potable.

- 1.3.2 Waste Disposal: Connect each fixture to sanitary drainage system for proper disposal of waste and harmful materials.
- 1.3.3 Pressure Control: Control pressures to protect the building, fixtures, equipment, and occupants from harm.
 - a. Maximum Water Distribution Working Pressure: 80 psi.
 - b. Pressure Reduction: Use pressure reducing valves or regulators.
 - c. Air Removal: Remove air trapped in water distribution system.
- 1.3.4 Prevention of Sewer Gas Leaks:
 - a. Provide waste system vents as required by code to avoid trap siphonage or compression.
 - b. Prevent entry of sewer gases from the sanitary sewer into building's sewer system.
- 1.3.5 Protection of Potable Water Supply: As required by code.
- 1.3.6 Waste Drainage: Provide air conditioning equipment and water coolers with indirect waste pipe for drainage.
- 1.3.7 Burn Hazards:
 - a. Maximum Fixture Discharge Temperature: 120 degrees F.
 - b. Maximum Exposed Surface Temperature: 105 deg F.
- 1.3.8 Fire Hazards:
 - a. Do not use combustible piping materials inside the building.
 - (1) Terminate combustible piping entering the building within 5 feet of penetration.
- 1.3.9 Hazard Labeling: Clearly label domestic hot water, domestic cold water, rain water drainage, and sanitary waste and vent systems indicating the nature of contents and direction of flow.
 - a. Conform to requirements of ANSI/ASME 13.1-1996(R2003).
- 1.4 Structure:
 - 1.4.1 Insulated Pipes: Prevent compression of insulation by using pipe shields or saddles or dense insulation inserts.
- 1.5 Durability:
 - 1.5.1 Joint Durability: Provide watertight joints.
 - 1.5.2 Electrical Component Protection:
 - a. Do not route piping through electrical rooms, switchgear rooms, transformer vaults, and elevator equipment rooms unless it is absolutely necessary.
 - (1) Where piping must be routed near electrical equipment, shield the electrical equipment with drip pans which drain to the nearest floor drain.
 - b. Substantiation: See tests specified under Operation and Maintenance.
 - 1.5.3 Maximum Discharge Temperature into Sewer: 120 degrees F.
- 1.6 Operation and Maintenance:
 - 1.6.1 Capacity of Water Service: Provide adequate water flow and pressure to supply peak demand requirements. Comply with requirements specified in the code and Chapter D21.
 - a. Water Flow:
 - (1) Maximum Velocity: 8 fps at the design flow rate.
 - b. Water Supply Pressures:
 - (1) Service Main Working Pressure: 100 psi at 75 deg F.
 - (2) Water Distribution Working Pressure: 80 psi at 75 deg F.
 - c. Substantiation:
 - (1) Preliminary Design: Analysis and documentation of water supply source and flow conditions.

- (2) Design Development: Piping design calculations and entrance locations.
 - (3) Construction: Prior to installation of plumbing fixtures and prior to concealment of piping, air and water tests of piping systems at 110 percent of operating pressure, maintaining pressure for 2 hours to demonstrate system is watertight.
 - (4) Construction: Functional tests of fixtures and equipment.
 - (5) Occupancy: Observation of function during full occupancy simulating extreme conditions.
- 1.6.2 Waste Pipe Sizing:
- a. Size piping as required by code.
 - b. Building Drain: 4 inches diameter, minimum.
 - c. Buried Piping Below Slabs: 2 inches diameter, minimum.
 - d. Pipes 3 inches in Diameter and Smaller: Sloped at 1/4 inch per foot, minimum, downward in the direction of flow.
 - e. Pipes 4 inches in Diameter and Larger: Sloped at 1/4 inch per foot, minimum, downward in the direction of flow.
 - f. Substantiation:
 - (1) Preliminary Design: Analysis and documentation of sewer discharge method and locations.
 - (2) Design Development: Drainage design calculations and documentation of piping outlets.
 - (3) Construction: Air and water pressure tests of piping systems; functional tests of drains and equipment under simulated full occupancy loads.
 - (4) Occupancy: Observation of function during full occupancy simulating extreme conditions.
- 1.6.3 Rain Water Drainage Capacity: As specified in the code and as follows:
- a. Design Rainfall Rate: Short storm intensity of 1 inch in any 5 minute period.
 - b. Secondary Drainage: Required for roofs and exterior structural decks that do not drain naturally. Provide secondary roof drains connected to a secondary drainage system.
 - c. Substantiation:
 - (1) Preliminary Design: Analysis and documentation of rain water discharge methods and locations.
 - (2) Design Development: Drainage design calculations and documentation of piping outlets.
 - (3) Construction: Air pressure test to verify continuity of piping; functional tests of each drain.
 - (4) Occupancy: Field observation of performance during at least two storms.
- 1.6.4 Ease of Maintenance and Repair:
- a. Provide devices at each branch take-off which allow insertion of measurement devices to monitor flow and pressure levels in the water distribution system.
 - b. Isolation of Piping Segments and Equipment: Provide a means of isolating the following:
 - (1) Each building from main water service. Provide a shut-off valve located inside a valve box whose removable access cover is at grade level.
 - (2) Water meter from building piping.
 - (3) Each tenant space from building service, excluding locations where there is only one fixture with its own isolation valves.
 - (4) Each water branch from main service.
 - (5) Each vertical riser from piping below.
 - (6) Each water branch to fixtures or equipment from main vertical riser.
 - (7) Piping lower than the supply, to prevent unnecessary draining in the case of disconnection.
 - (8) Each plumbing fixture, storage tank, and item of equipment, so that removal of one will not necessitate shutdown of others.
 - (9) Individual fixtures and equipment. Provide an isolation device within 3 feet of pipe connection to item.
 - c. Provision for Drainage of Water Distribution Piping:
 - (1) Slope Piping Toward Drain: 1/4 inch per 10 feet.
 - (2) Provide a system drain at the lowest point in the system.

- (3) Provide an adequately sized drain for the volume of water inside the distribution system.
- (4) Drain valve (or fixture shut-off valve) located at each low point.
- d. Provision for Cleaning of Drainage Piping: Provide a cleanout as required by code and as follows:
 - (1) At the upstream end of each horizontal sanitary drainage pipe, for cleaning in direction of flow.
 - (2) At the dead end of each dead-end pipe.
 - (3) Pipe 3 inches and Smaller: At intervals of 50 foot, maximum.
 - (4) Pipe 4 inches to 6 inches: At intervals of 80 foot, maximum.
 - (5) Pipe 8 inches and Larger: At intervals of 100 foot, maximum.
 - (6) Clearance: As required by code to allow for cleaning and rodding of pipe.

2. PRODUCTS

2.1 Use the following:

3. METHODS OF CONSTRUCTION

3.1 Use the following practices and procedures:

- 3.1.1 Health: Maintain the safety of the potable water source at all times.
 - a. Do not connect the potable water source to any non-potable water source.
 - b. Keep animals and vermin out of open pipes, tanks, and other system components.
 - c. Keep other contaminants out of the distribution systems, equipment, and water source.
 - d. Do not connect private potable water source to public potable water source.

3.2 Do not use:

- 3.2.1 Asbestos material.

END OF CHAPTER D2

CHAPTER D21**WATER SUPPLY****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide water supply necessary for building occupancy and use.
 - a. Ensure contractor produces hydraulic calculations of existing water system to demonstrate system is adequate to meet the demands of the new facility.
 - b. Water lines exist all along Wardleigh Road. A line also exists along the eastern side of building 900.
- 1.1.2 Where water supply elements must also function as elements defined within another element group, meet requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D2 - Water and Drainage.

1.2 Operation and Maintenance:

- 1.2.1 Water Pressure: 30 psi, minimum, except as otherwise required by code.
- 1.2.2 Ease of Service: Provide a shutoff valve at the utility service main and the service entry point.
- 1.2.3 Ease of Repair: Do not locate underground piping beneath electrical service, equipment, or footings.

2. PRODUCTS**2.1 Pipe:**

- 2.1.1 Use one or more of the following:
 - a. Polyvinyl chloride (PVC).
 - b. Copper.
- 2.1.2 Do not use:
 - a. Ductile iron.
 - b. Galvanized steel.
 - c. Polybutylene (PB)
 - d. Polyethylene (PE).
 - e. Acrylonitrile butadiene styrene (ABS).
 - f. Asbestos cement.

3. METHODS OF CONSTRUCTION

- 3.1 Construct using the following practices and procedures:

END OF CHAPTER D21

CHAPTER D22**PLUMBING FIXTURES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide plumbing fixtures necessary for occupancy, use, and sanitation.
- 1.1.2 Fixtures Required: As specified by code.
 - a. Lavatories: At public and private restrooms and bathrooms.
 - (1) Group lavatories may be used wherever 4 or more lavatories would be required in a single room; 18 inches of group lavatory perimeter qualifies as a substitute for one lavatory.
 - b. Kitchen Sinks: Single compartment; one in each breakroom.
 - c. Utility Sinks: One in each janitor's closet.
 - d. Drinking Fountains: Minimum of one on each floor and within 10 feet of each restroom.
- 1.1.3 Fixtures Required: As specified by code.
 - a. Lavatories: As indicated in each bathroom.
 - b. Kitchen Sinks: Single compartment; one in each breakroom.
 - c. Water closet, floor mounted with flushometer.
 - d. Urinal, wall mounted.
 - e. Service sink.
 - f. Drinking fountain (refrigerated bottled water).
 - g. Floor drain in each mechanical room.
- 1.1.4 Where plumbing fixture elements must also function as elements defined within another element group, meet requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D2 - Water and Drainage.

1.2 Amenity and Comfort:

- 1.2.1 Convenience:
 - a. Provide comfortable space between and around fixtures.
 - b. Provide space between and around fixtures as required by code.
 - c. Faucets: Single action operation in the following locations.
 - (1) Restrooms.
 - (2) Mechanical room.
- 1.2.2 Appearance:
 - a. Smooth, corrosion-resistant, non-absorbent, with no crevices to collect dirt.
 - b. Aesthetically pleasing and easy and comfortable to use; high style appearance is very important.
 - c. Color: White, except where metal fixtures are required.

1.3 Health and Safety:

- 1.3.1 Burning Hazard: Protect wheelchair occupants from hot water pipes and drains.
- 1.3.2 Disease and Infection:
 - a. No overflow outlets in lavatories, sinks, or tubs.
 - b. All openings and edges around the sides and bottom of each fixture permanently sealed with waterproof material.

1.4 Structure:

- 1.4.1 Anchor fixtures to support weight of fixtures and a minimum of 400 pounds without failure or

stress on the connecting pipes.

1.4.2 Wall Mounted Fixtures: Carriers concealed inside fixture and in wall or floor.

1.5 Durability:

1.5.1 Expected Service Life Span of Faucet Valves: 20 years.

a. Substantiation: Manufacturer's unconditional warranty.

1.5.2 Expected Service Life Span of Flushing Mechanisms: 20 years.

a. Substantiation: Manufacturer's unconditional warranty.

1.5.3 Wear Resistance: Provide fixtures, trim and accessories that are resistant to corrosion, breakage, scratching, burning, fading and chipping due to continual contact with water, human usage, and cleaning with abrasive materials.

1.5.4 Acid resistant finish at lavatories.

1.6 Operation and Maintenance:

1.6.1 Fixture Functions:

a. Lavatories: Standard spout, with integral overflow.

b. Urinals: Siphon jet flushing action.

c. Kitchen Sinks: Swivel spout, water spray nozzle.

d. Drinking Fountains: With hand operation____; chilled water service.

e. Utility (Mop or Janitor's) Sinks: Filling of standard rolling mop bucket required; spout designed to support full bucket of water.

1.6.2 Water Pressure/Flow At Fixtures: 8 psi, minimum, except as otherwise required by code.

a. Flush Valves at Water Closets and Urinals: 15 psi, minimum.

1.6.3 Water Consumption:

a. Water Closets: 1.6 gallons per flush, maximum, with complete waste removal in one flush.

b. Urinals: 1.0 gallon per flush, maximum, with complete waste removal in one flush.

c. Lavatory Faucets in Other Areas: 0.25 gallon per use.

d. Drinking Fountains: (bottled water) 2.5 gallons per minute.

1.6.4 Maintenance Service:

a. Electrically-Powered Fixtures: .

1.6.5 Ease of Cleaning:

a. Provide adequate access for cleaning each fixture and the areas around it.

1.6.6 Ease of Repair:

a. Faucet valves easily removable and replaceable as a single unit.

b. Each pipe connection to each fixture provided with a stop valve, for easy disconnection from water service.

c. Provide access to all concealed connections, such as floor and wall cleanouts and slip-joint connections.

2. PRODUCTS

2.1 Water Closets:

2.1.1 Use one or more of the following:

a. External flush valve type.

b. Vitreous china.

c. Floor mounted fixtures.

2.1.2 Do not use:

a. Tank type.

- b. Solid plastic resin.
- c. Stainless steel.
- d. Wall mounted fixtures.

2.2 Urinals:

2.2.1 Use one or more of the following:

- a. Vitreous china.
- b. Enameled cast iron.
- c. Wall mounted fixtures.

2.2.2 Do not use:

- a. Solid plastic resin.
- b. Floor mounted, stall type.

2.3 Lavatories:

2.3.1 Use one or more of the following:

- a. Vitreous china.
- b. Enameled cast iron.
- c. Countertop-mounted fixtures.
- d. Undercounter-mounted fixtures.
- e. Wall-hung fixtures.

2.3.2 Do not use:

- a. Ceramic, non-vitreous china.
- b. Enameled steel.
- c. Solid plastic resin.
- d. Stainless Steel.
- e. Pedestal-mounted fixtures.

2.4 Kitchen and _____ Sinks:

2.4.1 Use one or more of the following:

- a. Stainless steel.
- b. Countertop-mounted fixtures.

2.4.2 Do not use:

- a. Vitreous china.
- b. Plastic.
- c. Enameled steel.
- d. Solid plastic resin.
- e. Enameled cast iron.

2.5 Faucets and Trim:

2.5.1 Use one or more of the following:

- a. Polished chrome-plated finish.
- b. Polished brass finish.

2.5.2 Do not use:

- a. Colored coated finishes.

2.6 Drinking Fountains:

2.6.1 Use one or more of the following:

- a. Electric water coolers.
- b. Enameled steel units.

2.6.2 Do not use:

2.7 Utility (Mop or Janitor's) Sinks: (15400)**2.7.1 Use one or more of the following:**

- a. Precast terrazzo.
- b. Enameled cast iron.
- c. Floor-mounted fixtures.

2.7.2 Do not use:

- a. Stainless steel.
- b. Wall-hung fixtures.

3. METHODS OF CONSTRUCTION**3.1 Construct using the following practices and procedures:**

- 3.1.1 Use commercial standard plumbing construction method in accordance with the International Plumbing Code.

END OF CHAPTER D22

CHAPTER D23**DOMESTIC WATER****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide hot and cold domestic water to plumbing fixtures as required.
- 1.1.2 Domestic water elements comprise the following:
 - a. Water Distribution: Piping within the building, serving fixtures and equipment.
 - b. Plumbing Equipment: Water heater, circulating pumps, and tank.,
 - c. Utility water supply fittings (hose bibbs, wall hydrants) are specified in Chapter D22.
- 1.1.3 Where domestic water elements must also function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D2 - Water and Drainage.

1.2 Amenity and Comfort:

- 1.2.1 Location:
 - a. Locate water heaters in utility room.
 - b. Do not locate water heaters above ceilings or where the public has access to them.
- 1.2.2 Noise:
 - a. Design to prevent noise due to water hammer.
 - b. Provide water hammer arrestors as shown on drawings to eliminate noise produced by the domestic water fixtures.

1.3 Health and Safety:

- 1.3.1 Excess Pressure Hazard: Include devices to reduce accidental excess pressure to acceptable level, with maximum overpressure of 10 percent over specified system operating pressure, for the following items:
 - a. Water heaters.
 - b. Hot water storage tanks.
 - c. Hot water recirculating pumps.

1.4 Durability:

- 1.4.1 Shock Resistance: Do not use cast iron components where thermal or mechanical shock is expected.
- 1.4.2 Moisture: Do not locate water heaters where leakage would cause damage to surrounding building materials, unless drip pans piped to floor drains are provided.
- 1.4.3 Condensation: Provide insulation on cold water pipes, fittings, valves, and equipment to limit condensation.
- 1.4.4 Temperature Changes: Provide method of allowing thermal expansion of domestic water in the hot water system.

1.5 Operation and Maintenance:

- 1.5.1 Pressure Classification: Provide pipe, pipe components, and equipment with a pressure classification of 125 psi.
- 1.5.2 Energy Efficiency:
 - a. Heat Loss: Provide insulation to limit heat loss of domestic hot water to a maximum of 2

- degrees F in any 100 feet of pipe, when water is running, and maximum of 2 degrees F per hour, when water is standing.
- b. Heat Loss: Provide recirculating pumps to limit the domestic hot water temperature drop to 2 degrees F within 100 feet of fixtures requiring domestic hot water.
 - c. Equipment Heat Loss: Provide insulation on the following equipment to limit domestic hot water heat loss to maximum of 2 deg F per hour, without energy input:
 - (1) Water heaters.
- 1.5.3 Method of Removing Air:
- a. Use one of the following:
 - (1) Automatic air vents.
 - b. Do not use:
 - (1) Manual air vents.
 - (2) Eliminating air tanks.
- 1.5.4 Water Heating Method:
- a. Use one of the following:
 - (1) Gas-fired water heaters.
 - b. Do not use:
 - (1) Electric water heaters.
 - (2) Hot water storage tanks.
- 1.5.5 Ease of Service and Maintenance:
- a. Fixture Shut-Off: As specified in Chapter D22.
 - b. Equipment Isolation: Valves on both supply and discharge sides.

2. PRODUCTS

2.1 Water Piping, Buried:

- 2.1.1 Use one of the following:
- a. Copper pipe (ASTM B 42-2002), with brazed or soldered cast copper or wrought copper or bronze fittings, or flared cast bronze fittings.
- 2.1.2 Do not use:
- a. Plastic pipe of any type.
 - b. Acrylonitrile butadiene styrene (ABS) plastic pipe.
 - c. Brass pipe.
 - d. Cement lined, ductile iron water pipe.
 - e. Galvanized steel pipe.
 - f. Polybutylene (PB) plastic pipe or tubing.
 - g. Polyvinyl chloride (PVC) plastic pipe.
 - h. Polyethylene pipe and fittings, with mechanical clamped joints.
 - i. Polyethylene/aluminum composite pipe, with brass compression joints.
 - j. Concrete, clay, or asbestos cement pipe.
 - k. Lead pipe or fittings (bends, traps, caps and plugs).

2.2 Water Piping, Not Buried:

- 2.2.1 Use one of the following:
- a. Copper tube, cast copper, wrought copper, or bronze fittings, and soldered joints.
- 2.2.2 Do not use:
- a. Plastic pipe of any type.
 - b. Acrylonitrile butadiene styrene (ABS) plastic pipe.
 - c. Brass pipe.
 - d. Galvanized steel pipe.
 - e. Chlorinated polyvinyl chloride (CPVC) plastic pipe or tubing.

- f. Polyvinyl chloride (PVC) plastic pipe or tubing.
- g. Polybutylene (PB) plastic pipe or tubing.
- h. Cross-linked polyethylene (PEX) plastic pipe or tubing.
- i. Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX/AL/PEX) pipe or tubing.
- j. Polyethylene/aluminum/polyethylene (PE/AL/PE) pipe or tubing.
- k. Concrete, clay, or asbestos cement pipe.
- l. Lead pipe or fittings (bends, traps, caps and plugs).

2.3 Insulating Materials:

2.3.1 Use one of the following:

- a. Mineral fiber.
- b. Fiberglass.

2.3.2 Do not use:

- a. Any plastic foam, fiber, or cellular insulation.
- b. Cellular glass.
- c. Calcium silicate.
- d. Cellular elastomeric.

2.4 Valves For Shut-Off or Isolation of Equipment, Fixtures, and Parts of Systems:

2.4.1 Use one of the following:

- a. Ball valves.
- b. Gate valves.
- c. Globe valves.

2.4.2 Do not use:

- a. Butterfly valves.
- b. Plug valves.

2.5 Valves For Flow Control, Throttling, or Bypass:

2.5.1 Use one of the following:

- a. Gate valves.
- b. Globe valves.

2.5.2 Do not use:

- a. Ball valves.
- b. Butterfly valves.

3. METHODS OF CONSTRUCTION

3.1 Construct using one of the following methods:

- 3.1.1 In accordance with the International Plumbing Code.

END OF CHAPTER D23

CHAPTER D24**SANITARY WASTE****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 A sewer line exists commencing at building 903, which then runs in a north-westerly direction away from the north-west corner of the building. There is also a line located on the eastern side of building 900. This line runs from the north-east corner of the building south across Wardleigh Road.
- 1.1.2 Provide drainage for disposal of waste as required by the code and for the following:
 - a. Fixtures and equipment which have a waste connection or a domestic water connection.
 - b. Cleaning Drainage: Floor drains located as indicated in program.
 - (1) Restroom.
 - (2) Hose-down areas.
 - (3) Provide floor drain with oil and grease interceptor at the K-loader hydraulic repair area.
 - c. Indirect Drainage: Floor drains to receive piping from:
 - (1) Equipment drain pans.
 - (2) Condensate drains.
 - (3) Other equipment that produces clear wastes.
 - (4) Other equipment specified to have indirect drain.
- 1.1.3 Where sanitary waste and vent elements must also function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D2 - Water and Drainage.

1.2 Amenity and Comfort:

- 1.2.1 Convenience:
 - a. Do not locate floor drains and floor cleanouts in doorways or directly in traffic paths.
- 1.2.2 Odors:
 - a. Do not terminate vents within 10 feet horizontally of doors, windows, air intake or exhaust openings, or other openings in the exterior enclosure, unless vent termination is at least 3 feet above the top of the opening.
 - b. Do not locate vent openings under overhangs.
 - c. Do not locate vent openings closer than 10 feet to lot line.
 - d. Extend vent pipes at least 6 inches above the surface of roofs.
 - e. Extend vent pipes at least 12 inches above overflow level of the highest fixture served by the vent.
 - f. Provide an automatic means of priming traps which may evaporate enough water to break the trap seal allowing sewer gases to enter the building.

1.3 Health and Safety:

- 1.3.1 Flammable or Toxic Wastes: Provide means of safely disposing of:
 - a. Diesel fuel.
 - b. Oil.
 - c. Anti-freeze (glycol solution).
 - d. Hydraulic oil

1.4 Structure:

- 1.4.1 Hub-and-Spigot Joint Support: Support joints so they do not separate under weight of pipe or live

loads.

1.5 Durability:

1.5.1 Corrosion Resistance:

- a. Where corrosive wastes can be neutralized or diluted below harmful levels, removal is not required; otherwise, provide appropriate interceptors to remove corrosive wastes, including solids.
- b. Oil Interceptors: Located as indicated in program [K-Loader].
- c. Sediment Interceptors: Located at each floor drain where significant amount of sand is likely to be tracked in by occupants or blown in by wind.

1.5.2 Condensation:

- a. Prevent condensation from forming on or dripping from sanitary drain piping, floor drain bodies, drinking fountain or water cooler waste piping, condensate piping, and p-traps.

1.6 Operation and Maintenance:

1.6.1 Maintenance of Drainage:

- a. Where sewer discharge is higher than item to be drained, provide a means of lifting the waste for drainage.
- b. Transitions Between Horizontal Piping and Vertical Risers:
 - (1) Sanitary Waste: Sanitary tees, wyes, or wyes and eighth bends.
 - (2) Vents: Wyes, wyes and eighth bends, and short radius fittings.

1.6.2 Ease of Cleaning:

- a. Floor Drains: At low points in floor and flush with finish floor surface.
- b. Cleanout Plugs: Flush with floor surface.
- c. Drain equipment which produces or collects clear waste, such as condensation from cooling coils. Provide piping for the clear waste to the nearest floor drain.
- d. Indirect Waste Pipes Over 1 inch Diameter: Provide a means to catch and remove solid materials 1/2 inch and larger, such as a strainer.
- e. Oil Interceptors: Located as shown on drawings.

1.6.3 Minimization of Cleaning:

- a. Grease Interceptors: Located at drains specifically intended for disposal of grease, as indicated in program.
- b. Sediment Interceptors: Located at each floor drain where significant amount of sand is likely to be tracked in by occupants or blown in by wind.

1.6.4 Ease of Maintenance:

- a. Interceptors That Must be Manually Cleaned:
 - (1) Designed for minimum of 2 months operation between cleanings.
 - (2) Located close to or in the same area as drains that receive the harmful wastes, for supervision and maintenance by occupants creating the waste.
 - (3) Removable waste container, with spare.
 - (4) Substantiation:
 - (a) Design Development: Manufacturer's maintenance schedule and recommended methods.

2. PRODUCTS

2.1 Sanitary Waste and Vent Piping, Buried:

2.1.1 Use one or more of the following:

- a. Acrylonitrile butadiene styrene (ABS) plastic pipe and fittings, with solvent welded joints.
- b. Cast iron pipe and fittings, hub-and-spigot, with neoprene or lead/oakum joint seals.
- c. Polyvinyl chloride (PVC) DWV pipe and fittings, with solvent welded or gasketed joints.

2.1.2 Do not use:

- a. Asbestos-cement sewer pipe.
- b. Reinforced concrete pipe.
- c. Non-reinforced concrete pipe.
- d. Copper pipe or tube.
- e. Fiberglass pipe.
- f. Vitrified clay pipe.
- g. Lead pipe.

2.2 Sanitary Waste and Vent Piping, Not Buried:**2.2.1 Use one or more of the following:**

- a. Cast iron pipe and fittings, hub-and-spigot, with neoprene or lead/oakum joint seals.
- b. Cast iron pipe and fittings, hubless, with neoprene gaskets and stainless steel clamps.

2.2.2 Do not use:

- a. Plastic pipe of any type.
- b. Acrylonitrile butadiene styrene (ABS) plastic piping and fittings.
- c. Brass pipe.
- d. Polyvinyl chloride (PVC) pipe.
- e. Copper pipe or tube.
- f. Galvanized steel pipe.
- g. Aluminum (DWV) pipe.
- h. Fiberglass pipe and fittings.
- i. Lead pipe.
- j. Glass pipe.

2.3 Cleanout Caps:**2.3.1 Use one or more of the following:**

- a. Brass.
- b. Plastic.
- c. Reinforced neoprene.
- d. Cast iron.

2.4 Floor Drains:**2.4.1 Use one of the following:**

- a. Cast iron.
- b. Plastic.

2.4.2 Do not use:

- a. Copper.
- b. Lead.

3. METHODS OF CONSTRUCTION**3.1 Construct using the following methods:**

- 3.1.1 Commercial plumbing installation standard in accordance with the International Plumbing Code._.

END OF CHAPTER D24

CHAPTER D25**RAIN WATER DRAINAGE****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 There is a storm drain located north of the project site, just south of the intersection of Patrick Way and Airfield Road. Two drains are located just east of this drain along the same line. There is also a drain existing at the south-east corner of building 900. One also exists at the south-west corner of the new project site.
 - a. There is an existing storm drain channel that runs along the entire western edge of the new buildings footprint. This drainage channel will need to be either relocated or demolished.
- 1.1.2 Provide drainage for disposal of rain water and clear wastes, as required by the code.
 - a. Drainage of roofs must be accomplished without the use of roof drains.
 - b. Drainage of roof areas that do not drain naturally without ponding, including built-in gutters.
 - c. Clear wastes include condensate drainage and HVAC cooling water.
 - d. Drainage for outdoor areas that are completely surrounded by construction that prevents natural drainage (e.g. areaways) or that are so sloped as to result in accumulation of water or ponding.
 - e. Drainage of interior areas where ground water may accumulate naturally, including sump pits and elevator pits.
- 1.1.3 Where rain water drainage elements must also function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D2 - Water and Drainage.

1.2 Amenity and Comfort:

- 1.2.1 Condensation:
 - a. Insulate horizontal and vertical rain water piping, including the underbody of roof drains, using material of sufficient insulating value to prevent condensation.
- 1.2.2 Convenience:
 - a. Install floor drains flush with the surface on which they are installed, out of pedestrian traffic patterns wherever possible.
- 1.2.3 Appearance:
 - a. Do not locate rain water leaders or downspouts where they are visible from the outside of the building.

1.3 Health and Safety:

- 1.3.1 Vermin Resistance: Provide grated coverings for drains to prevent entry of rodents, insects and birds.

1.4 Structure:

- 1.4.1 Locate drains to avoid ponding loads in excess of structural capacity.
- 1.4.2 Prevent inadvertent ponding by protecting drain openings from clogging, using raised strainers with minimum height of 4 inches wherever possible and flat gratings in all other locations.

1.5 Durability:

- 1.5.1 Water Penetration: Reinforce weather barrier around drains using extremely durable, permanently watertight material; one acceptable method is using 4 pound sheet lead, extending minimum of 10

inches from center of drain.

1.5.2 Abuse: Protect drainage conductors and leaders by placing in dedicated locations.

1.6 Operation and Maintenance:

1.6.1 Maintenance of Drainage: Pipes sloped at 1/8 inch per foot, minimum, downward in direction of flow.

1.6.2 Drainage Outlets: As specified in Chapter D and as follows:

- a. Secondary Drainage: Drain to completely redundant drain piping system.
- b. Scuppers: Drain to grade adjacent to building, rain water drainage system, street gutter, or dry well located in landscaped area.
- c. Areaways and Courtyards: Drain to rain water drainage system, sump pit with pump, dry well located in landscaped area, or water retention pond.

1.6.3 Capacity:

- a. Roof Areas of 10,000 sq ft and Less: Minimum of two roof drains.
- b. Roof Areas of 10,000 sq ft or More: Minimum of four roof drains.
- c. Areaways and Courtyards: Drainage is not required for areas with less than 100 square feet open to the sky.

2. PRODUCTS

2.1 Rain Water Piping, Not Buried:

2.1.1 Use one or more of the following:

- a. Any pipe/fitting/joint combination specified for sanitary sewer piping, not buried.
- b. Cast iron pipe, hub and spigot, with neoprene or lead/oakum joint seals.
- c. Cast iron pipe, hubless, with neoprene gaskets and stainless steel clamps.

2.1.2 Do not use:

- a. Brass pipe.
- b. Copper pipe.
- c. Copper tube.
- d. Galvanized steel pipe.
- e. Aluminum pipe.
- f. Fiberglass pipe.
- g. Lead pipe.

2.2 Rain Water Piping, Buried:

2.2.1 Use one or more of the following:

- a. Any pipe/fitting/joint combination specified for buried sanitary sewer piping.
- b. Acrylonitrile butadiene styrene (ABS) plastic pipe and fittings, with solvent welded joints.
- c. Cast iron pipe, hub and spigot, with neoprene or lead/oakum joint seals.
- d. Polyvinyl chloride (PVC) pipe and fittings, with solvent welded or gasketed joints.
- e. Reinforced concrete drain pipe and fittings, with gasketed joints.
- f. Non-reinforced concrete drain pipe and fittings, with gasketed joints.

2.2.2 Do not use:

- a. Copper pipe.
- b. Copper tube.
- c. Fiberglass pipe.
- d. Vitrified clay pipe.

2.3 Roof Drains, Area Drains, and Floor Drains: (15120)

2.3.1 Use one or more of the following:

- a. Bronze.

- b. Galvanized cast iron.

2.3.2 Do not use:

- a. Plastic.

3. METHODS OF CONSTRUCTION

3.1 The following existing rainwater drainage elements must be preserved:

3.1.1 Storm Water Permitting:

- a. Contractors shall obtain a Utah Pollutant Discharge Elimination System (UPDES) storm water permit if the project disturbs 5 or more acres of soil surface area. To obtain the permit the contractor must submit a Notice of Intent (NOI), Pollution Prevention Plan and the required fee to the State of Utah, Department of Environmental, Quality Division of Water Quality. Contractor shall submit and receive approval of the UPDES permit before starting construction.
- b. Contractors with projects disturbing one to five acres of soil surface area will submit a sediment and erosion control plan to the project manager for subsequent review and approval by the Environmental Compliance Office (OO-ALC/EMC). The contractor shall receive approval of the plan and implement approved best management practices before starting construction.
- c. Contractors with projects more than one acre of soil surface area will submit a plan for permanent stabilization of disturbed area to the project manager for subsequent review and approval by the Environmental Compliance Office (OO-ALC/EMC). The contractor shall receive approval of the plan and implement approved best management practices before contract closeout. Examples of best management practices are available at the following web sites:
 - (1) http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con_site.cfm
 - (2) <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/post.cfm>

3.2 Construct using the following methods:

- 3.2.1 Commercial standard plumbing method in accordance with the International Plumbing Code.

END OF CHAPTER D25

CHAPTER D3**HVAC - HEATING, VENTILATING, AND AIR CONDITIONING****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide artificial means of controlling temperature, relative humidity, velocity, and direction of air motion in the interior spaces enclosed by the shell, and reduction of airborne odors, particulates, and contaminant gases.
- 1.1.2 The HVAC system consists of the following elements:
 - a. Energy Supply (D31): Elements which provide energy used to maintain building comfort.
 - b. Heat Generation (D32): Elements required to heat building to maintain space comfort.
 - c. Refrigeration (D33): Elements necessary to generate the cooling required to maintain building comfort.
 - d. Air Distribution (D34): Elements required to distribute air to maintain building comfort.
 - e. HVAC Controls (D36): Elements required to control equipment which maintains building comfort.
- 1.1.3 Where HVAC elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter D - Services.

1.2 Amenity and Comfort:

1.3 Space Temperature Setpoint: As specified in Chapter 111 and as follows:

- 1.3.1 Admin Area: Summer: Air condition to 75 deg F, plus 3 deg F., Winter: Heat to 68 deg. F.
- 1.3.2 Mobility bag storage area: Summer: Evaporative cooling to 80 deg. Winter: Heat to 55 deg. F..
- 1.3.3 Weapon vault storage area: Summer: Air conditioning to 75 degree F db, plus (3) degree F. Winter 68deg. F.
- 1.3.4 K-Loader area: Summer: Outside air ventilation. Winter: Heat to 55 drg. F..
- 1.3.5 ATC area: Summer: Evaporative cooling to 80 deg. F. Winter: Heat to 55 deg. F.

1.4 Operation and Maintenance:

1.4.1 Design Criteria:

- a. Cooling Leaving Air Temperature: 55 degrees F.
- b. Heating Leaving Air Temperature: 105 degrees F.

2. PRODUCTS

2.1 HVAC System Type:

2.1.1 Use one or more of the following:

- a. Stand-Alone HVAC Systems:
 - (1) Forced-draft, natural gas furnace with split-system cooling.

2.1.2 Do not use:

- a. Stand-Alone HVAC Systems:
 - (1) Forced-draft, natural gas furnace with split-system heat pump.
 - (2) Packaged terminal air-conditioning units or heat pumps.
 - (3) Air-cooled, self-contained air handlers.
 - (4) Rooftop unit.

- (5) Variable air volume, self-contained, air-conditioning unit.
- b. Central HVAC Systems:
 - (1) Central chilled water and hot water heating systems with fan coil units and air handlers.
 - (2) Hot water heating system.
 - (3) Steam heating system.
 - (4) Chilled water cooling system supplied by a water-cooled chiller.
 - (5) Chilled water cooling system supplied by an air-cooled chiller.
 - (6) Variable volume air handlers with air terminals.
 - (7) Central condenser water loop with water-cooled, variable air volume, self-contained, air conditioning units or water source heat pumps.

END OF CHAPTER D3

CHAPTER D31**ENERGY SUPPLY****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide natural gas for use by HVAC, plumbing, and process equipment as follows:
- 1.1.2 Comply with UFC 1-200-01.
- 1.1.3 Comply with NATIONAL FUEL GAS CODE NFPA 54.
- 1.1.4 Substantiation:
 - a. Preliminary Design: Identification of each piece of equipment requiring fuel.
 - b. Design Development: Distribution system and equipment connections shown on drawings.
 - c. Construction: Functional performance testing; proper fuel supply, combustion, and venting.
- 1.1.5 Where energy supply elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.6 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D3 - HVAC.

1.2 Amenity and Comfort:

- 1.2.1 Heating: Provide fuel to all fuel burning equipment that is used to maintain space comfort.
- 1.2.2 Leakage:
 - a. Provide leak-free distribution systems.

1.3 Structural:

- 1.3.1 Seismic Protection:
 - a. Provide fuel distribution system with the ability to flex where differential movement is anticipated.
 - b. Provide fuel distribution system supports capable of supporting twice its installed weight.

1.4 Durability:

- 1.4.1 Expected Service Life Span: Provide a system which will last a minimum of 10 years in service without major repairs or operating expense.
- 1.4.2 Vandalism: Protect the service meter from unauthorized access.
- 1.4.3 Accidental Damage: Protect service meter from accidental damage by installing bollards to stop vehicles.

1.5 Operation and Maintenance:

- 1.5.1 System Capacity: Provide a fuel supply line (pipe) with capacity to serve the facility plus 50 percent reserve capacity.
- 1.5.2 Ease of Use:
 - a. Locate fuel piping system mains in dedicated piping chases.
- 1.5.3 Ease of Service:
 - a. Provide shut-off valves as required by code.

2. PRODUCTS

2.1 Pipe: (15105)

- 2.1.1 Use one or more of the following:
- a. Materials permitted by code.
 - b. Copper pipe with flared or brazed joints.
 - c. Ductile iron pipe with threaded or welded joints.
 - d. Steel pipe with threaded or welded joints.
 - e. Plastic pipe with heat fusion or solvent welded joints.

2.1.2 Do not use:

2.2 Fittings:

- 2.2.1 Use one or more of the following:
- a. Materials permitted by code.
 - b. Copper.
 - c. Ductile iron.
 - d. Plastic.
 - e. Steel.

END OF CHAPTER D31

CHAPTER D32

HEAT GENERATION

1. PERFORMANCE

1.1 Basic Function:

1.1.1 A 2-inch gas line is existing at the western side of building 916 (see sheet C1.10). The line runs westward away from building 916. There is also a 2-inch gas line which runs from the western side of building 46 down south to front of building 46 and then runs east along the fronts of buildings 45 and 46. The line ends in front of building 45. **There is also a 2-inch gas line at the southern side of new K-Loader facility (see sheet C1.10).**

1.1.2 Provide the necessary equipment and infrastructure to deliver heat to the conditioned spaces.

1.1.3 Where HVAC elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility and Performance, Chapter D - Services, and Chapter D3 - HVAC.

1.2 Health and Safety:

1.2.1 Hazards: Provide natural or LPG gas furnaces or radiant heaters which safeguard people, property and equipment from the following potential hazards:
a. Exposure to open combustible materials..

1.3 Durability:

1.3.1 Temperature Endurance: Provide equipment designed for ambient temperatures ranging from 50 degrees F to 122 degrees F (10 degrees C to 50 degrees C).

1.3.2 Chimneys and Flues: Provide flues designed for flue gas temperature of 1000 degrees F.

2. PRODUCTS

2.1 Furnaces: (15500)

2.1.1 Use one or more of the following:

- a. Horizontal gas-fired furnaces.
- b. Horizontal condensing gas-fired furnaces.

2.1.2 Do not use one or more of the following:

- a. Electric furnaces.

2.2 Chimneys and Flues: (15500)

2.2.1 Use one or more of the following:

- a. Double-walled; aluminum inner and galvanized outer Type B gas vents.
- b. Double-walled; stainless steel inner and aluminum coated steel outer duct with 1 inch (2.5 cm) thick insulation between inner and outer walls.
- c. Single wall stainless steel duct.

3. METHODS OF CONSTRUCTION

3.1 Use Natural gas fuel for heating.

3.2 Do not use any of the following methods or procedures:

3.2.1 steam for heating.

END OF CHAPTER D32

01011-D32 - 1

Encl. 1 to Amend. 0001

CHAPTER D33**REFRIGERATION****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide the necessary equipment to generate the cooling required to maintain building comfort.
- 1.1.2 Refrigeration elements comprise condensing units, packaged terminal air-conditioners, and packaged terminal heat pumps, ~~and _____~~, split type air conditioner with indirect fired gas furnace heater.
- 1.1.3 Where refrigeration elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D3 - Heating, Ventilating, and Air Conditioning (HVAC).

1.2 Health and Safety:

- 1.2.1 Construct condensing units to ASHRAE 15-2001, Safety Code for Mechanical Refrigeration.

1.3 Operation and Maintenance:

- 1.3.1 Energy Efficiency:
 - a. Condensing Unit Integrated Part Load Value (IPLV): In accordance with UFC 3-400-01,
 - b. Condensing Unit Energy Efficiency Ratio (EER): In accordance with UFC 3-400-01, .8 minimum,
 - c. Substantiation:
 - (1) Design Development: Manufacturer data showing efficiency available.
 - (2) Construction: Manufacturer's data showing performance, certified by independent testing agency.

2. PRODUCTS

2.1 Refrigeration Units:

- 2.1.1 Use one or more of the following:
 - a. Condensing units.
 - b. Packaged terminal air-conditioners - Heat pumps.

2.2 Auxiliary Equipment:

3. METHODS OF CONSTRUCTION

3.1 Construct in accordance with the following:

- 3.1.1 Use split type cooling unit and heating indirect fired gas furnace for heating in the administration area and radiant heater for heating and roof ventilation for cooling in the other areas.

3.2 Do not use:

- 3.2.1 ~~—Steam—~~ Steam coil for heating. ~~—~~

END OF CHAPTER D33

CHAPTER D34**AIR DISTRIBUTION****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Distribute air to maintain the required space conditions.
 - a. Special-Purpose Exhaust: See Chapters E12.
- 1.1.2 Where air distribution elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, Chapter D3 - HVAC, and Chapter D36 - HVAC Controls.

1.2 Amenity and Comfort:

- 1.2.1 Space Temperature Control: Coordination of air distribution system's design and installation with zoning and space temperature requirements specified in Chapter D36 - HVAC Controls.
 - a. Maintain winter effective temperature as defined by ANSI/ASHRAE Std 55-1992 with Addendum between 68 degrees F and 74 degrees F.
 - b. Maintain summer effective temperature as defined by ANSI/ASHRAE Std 55-1992 with Addendum between 73 degrees F and 79 degrees F.
 - c. Vertical Air Temperature Difference: Comply with requirements of ANSI/ASHRAE Std 55-1992 with Addendum.
 - (1) Substantiation:
 - (a) Measure dry-bulb temperature as specified in ANSI/ASHRAE Std 55-1992 with Addendum.
 - d. Vertical Air Temperature Difference: 5 degrees F, maximum air temperature difference from 4 inches to 67 inches above the floor.
 - (1) Substantiation:
 - (a) Measure dry-bulb temperature 4 inches above the floor and 67 inches above the floor.
- 1.2.2 Air Movement:
 - a. Provide an air distribution system that limits the air velocity to 50 fpm, maximum.
 - b. Adjustments: Provide an air distribution system which allows relocating supply diffusers, adjusting direction of airflow from supply diffusers, adjusting dampers, and changing the thermostat setpoint.
 - c. Substantiation:
 - (1) Occupancy: Measure air movement at work station in accordance with ANSI/ASHRAE Standard 55-1992 with Addendum in areas where more than 10 percent of the occupants are uncomfortable and adjust air distribution system to make occupants comfortable.
- 1.2.3 Acoustical Performance:
 - a. Air Distribution Background Noise: Provide systems which comply with the acoustical requirements of Chapter C - Interiors.
 - b. Air Distribution Background Noise: Provide systems which comply with the acoustical requirements of Chapter C - Interiors and the following NC Levels as defined in ASHRAE HVAC Applications Handbook, 1999. Do not exceed the sound pressure level for any octave band at the specified NC.
 - (1) Halls, Corridors, and Lobbies: 35-45, neutral.
 - (2) Executive and Private Offices: 25-35, neutral.
 - (3) Conference Rooms: 25-35, neutral.
 - (4) Open Plan Offices: 30-40, neutral.

- (5) Substantiation:
 - (a) Design Development: Equipment product data that predicts sound levels for anticipated use.
- c. Provide equipment with sound ratings which comply with testing and rating requirements of ARI 880-1998.
 - (1) Substantiation:
 - (a) Design Development: Equipment acoustical performance data.
 - (b) Construction: Tested and rated air terminals.
- 1.2.4 Cleanliness: Provide filtration of the air distributed to the occupied spaces.
 - a. Filter Efficiency: 25 percent atmospheric dust-spot efficiency per ASHRAE Standard 52.1-1992.
- 1.2.5 Odor: Provide exhaust to remove odors.
 - a. Toilet Room Exhaust: 75 cfm per fixture.
 - b. Toilet Room Exhaust: 2 cfm per sq. ft..
 - c. Janitors Closet Exhaust: 2 cfm per sq. ft..
 - d. Locker Room Exhaust: 2 cfm per sq. ft..
- 1.2.6 Appearance:
 - a. Diffuser Shape: Provide square diffusers.
 - b. Diffuser Color: Provide diffusers with ceiling matching color.
- 1.3 Durability:
 - 1.3.1 Expected Service Life Span: Provide a system which will last a minimum of 10 years in service without major repairs or operating expense.
 - 1.3.2 Aesthetic Life Span: Provide units exposed within the occupied space which will not fade, chip, or peel for a minimum of 10 years.
 - 1.3.3 Exposed Units within Occupied Spaces: Heavy gage, galvanized sheet steel, painted casing.
- 1.4 Operation and Maintenance:
 - 1.4.1 Operating Parameters:
 - a. Propeller Fans: Do not use propeller fans at static pressure above 1 inch water gage.
 - b. Duct Construction: In accordance with SMACNA HVAC Duct Construction Standards-1995 with Addendum No. 1, based on the following:
 - (1) Supply Duct Pressure Class: 2 inches w.g..
 - (2) Return Duct Pressure Class: 2 inches w.g..
 - (3) Outside Air Duct Pressure Class: 2 inches w.g..
 - (4) Exhaust Duct Pressure Class: 2 inches w.g..
 - (5) Transfer Duct Pressure Class: 2 inches w.g..
 - (6) All Ducts Pressure Class: 2 inches w.g..
 - (7) Duct Pressure Class: 2 inches w.g. for ducts between the supply fan and the terminal boxes. All other duct applications 1 inch w.g.
 - (8) Substantiation:
 - (a) Design Development: Identification of ducts to be tested; all duct systems.
 - (1) Allowable Leakage Rate: Definition of leakage rates for each system to be tested.
 - (a) Duct Pressure Class 2" and Duct Seal Class 4"; Leakage Rate: _____
cfm per 100 square feet.
 - c. Air Velocity: 1000 feet per minute, maximum.
 - d. Fans: Match fan pressure characteristics to the air distribution system pressure characteristics including the system effect factors; pressure characteristics based on ANSI/AMCA Standard 210-1999 fan ratings and system characteristics based on engineering

calculations.

- (1) Substantiation:
 - (a) Preliminary Design: Identification of the type of fan to be used.
 - (b) Design: Calculations showing the air distribution pressure characteristics and data supporting the selection of the fan.
 - (c) Construction: Calculations showing the air distribution systems pressure characteristics; AMCA seal and ratings on each fan used.
- 1.4.2 Ease of Use: Provide units with individual controls coordinated with controls specified in Chapter D36.
- 1.4.3 Ease of Cleaning: Provide units with removable access panels to allow cleaning.
- 1.4.4 Ease of Maintenance: Provide units which are modular in design.
- 1.4.5 Peak Electrical Demand: Provide a random start relay to prevent simultaneous start-up of all the heat pumps. Coordinate control requirements with Chapter D36 - Controls and Instrumentation.

2. PRODUCTS

2.1 Ductwork:

2.1.1 Use one or more of the following:

- a. Galvanized sheet metal duct.
- b. Fibrous glass duct.
- c. Flexible duct.

2.1.2 Do not use:

- a. Steel sheet metal duct.
- b. Stainless steel sheet metal duct.
- c. Aluminum sheet metal duct.

2.2 Diffusers, Registers, and Grilles (15800):

2.2.1 Use one or more of the following:

- a. Steel diffusers.
- b. Aluminum diffusers.

2.2.2 Do not use:

- a. Stainless steel diffusers.

2.3 Fans:

2.3.1 Use one or more of the following:

- a. Steel fan housing with an aluminum propeller.
- b. Steel fan housing with a stamped steel propeller.
- c. Aluminum fan housing with an aluminum propeller.
- d. Aluminum fan housing with an aluminum centrifugal wheel.
- e. Steel fan housing with an aluminum centrifugal wheel.
- f. Steel fan housing with a steel centrifugal wheel.

2.3.2 Do not use:

- a. Plastic fan propellers.
- b. Plastic fan wheels.

2.4 Air Filters:

2.4.1 Use one or more of the following:

- a. Panel filters.
- b. Pleated panel filters.

- 2.4.2 Do not use:
- a. Automatic roll filters.
 - b. Bag-type filters.
 - c. Cleanable media filters.

3. METHODS OF CONSTRUCTION

3.1 Construct the system using the following methods:

- 3.1.1 Use standard commercial practice in HVAC distribution construction in accordance with SMACNA standard.

END OF CHAPTER D34

CHAPTER D36**HVAC CONTROLS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide the elements necessary to control the building's indoor environment.
- a. Provide a building control system that is compatible with the existing base EMCS, controls the indoor environment, manages energy consumption, schedules preventative maintenance, controls interior lighting, controls exterior lighting, integrates fire alarm and security functions, monitors fuel consumption, monitors water usage, and monitors packaged equipment controls.
 - (1) Coordinate requirements with Chapter D91 - Integrated Facility Controls.
 - (2) Provide a thermostat for each zone to maintain the required space conditions.
 - (3) Provide monitoring of major pieces of HVAC equipment.
 - (4) Monitor the following equipment:
 - (a) Air handlers.
 - (1) On-off status.
 - (2) Entering air temperature.
 - (3) Leaving air temperature.
 - (4) Supply fan airflow.
 - (5) Return fan airflow.
 - (6) Exhaust fan airflow.
 - (7) Outside airflow.
 - (8) Filter static pressure.
 - (b) Packaged terminal air-conditioning units.
 - (c) Fan coil units.
 - (d) Unit ventilators.
 - (e) Furnace: On-off status.
 - (5) Control the following equipment:
 - (a) Air terminals.
 - (b) Air handlers.
 - (1) Start-stop.
 - (2) Entering air temperature.
 - (3) Leaving air temperature.
 - (4) Return fan airflow.
 - (5) Outside airflow.
 - (6) Filter static pressure.
 - (c) Chillers.
 - (1) Start-stop.
 - (d) Packaged terminal air-conditioning units.
 - (e) Fan coil units.
 - (f) Unit ventilators.
 - (g) Furnace: Start-stop.
- 1.1.2 Where control and instrumentation elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D3 - HVAC.
- 1.2 Amenity and Comfort:
- 1.2.1 Zoning and Space Temperature Control:
- a. Single thermostat and terminal unit for spaces with similar function, exposure, and location.
 - b. Substantiation:

- (1) Preliminary Design: Plans indicating occupancy types with special HVAC requirements shown.
- (2) Design Development: Documents showing zoning, equipment locations, and air distribution. Equipment cut sheets.
- (3) Construction: Testing, adjusting, and balancing report indicating initial airflow, final airflow, initial temperature, and final temperature of each conditioned space. Measurement of parameters during summer when the outside air temperature is within 10 percent of the summer design conditions, and during the winter when the outside air temperature is within 10 percent of the winter design conditions.
- (4) Construction: Report conforming to the requirements of AABC Test & Balance Procedures-1989, Fifth Edition.

1.3 Health and Safety:

- 1.3.1 Life Safety: Provide interconnection and coordination of HVAC controls with other life safety systems.
- 1.3.2 Fire Sources: Provide products which are rated for the specific locations where they are installed.

1.4 Durability:

- 1.4.1 Expected Service Life Span: Provide a system which will last a minimum of 10 years in service without major repairs or operating expense.
 - a. Substantiation:
 - (1) Design Development: Identification of a similar system in use in an existing facility for 3 years and manufactured by the existing controls system manufacturer.
- 1.4.2 Vandalism: Protect the system field panels from unauthorized access.
- 1.4.3 Accidental Damage: Protect thermostats from accidental damage.

1.5 Operation and Maintenance:

- 1.5.1 Ease of Use:
 - a. Locate field panels in electrical closets.
 - b. Locate the central controller in the maintenance office.
 - c. Provide a system which is user programmable.
 - d. Provide field panels which are independent and do not need the central controller to continue functioning.
- 1.5.2 Ease of Service:
 - a. Provide a system of modular design.
- 1.5.3 Allowance for Change and Expansion: Provide a building control system which is expandable to meet future needs.
- 1.5.4 Energy Efficiency: Provide the following control functions or features:
 - a. Holiday scheduling.
 - b. Night setback.

2. PRODUCTS

2.1 Building Control System Types:

- 2.1.1 Use one or more of the following:
 - a. Direct digital control (DDC) system.
- 2.1.2 Do not use:
 - a. Electric control system.
 - b. Pneumatic system.
 - c. Combination DDC/pneumatic system.

2.2 Operators and Sensors: (15900)

2.2.1 Use one or more of the following:
a. Thermistors.

2.2.2 Do not use:
a. Pneumatic valve actuators.
b. Electric valve actuators.
c. Pneumatic damper actuators.
d. Electric damper actuators.
e. Pneumatic thermostats.

3. METHODS OF CONSTRUCTION

3.1 Construct the system using the following methods:

3.1.1 Use direct digital control system.

3.2 Do not use any the following methods or procedures:

3.2.1 ~~Pneumatic~~ Pneumatic control system.

END OF CHAPTER D36

CHAPTER D4**FIRE PROTECTION****1. PERFORMANCE****1.1 Basic Function:**

1.1.1 Provide services systems to protect life and property.

1.1.2 Design all Fire Protection System in accordance with the UFC 3-600=01.

~~4.4.21.1.3~~ Fire protection comprises the following elements:

- a. Fire Sprinkler and Extinguishing Systems: Elements which automatically extinguish fires.
- b. Fire Detection and Alarm D43: Elements required to detect fires and communicate fire location to building occupants, building management, and public fire fighting agencies.
- c. Fire Protection Specialties: Elements required for manual fire-fighting by occupants.
- d. Other Fire Protection Elements: Elements that are not covered in other fire protection chapters.

~~4.4.31.1.4~~ Provide automatic fire suppression for the entire building.

- a. General offices.
- b. Computer room.
- c. Storage.
- d. Mechanical room.
- e. Warehouse.

~~4.4.41.1.5~~ Water Use:

- a. Provide a water supply to sprinkler systems that is sufficient to extinguish fires inside the structure.

~~4.4.51.1.6~~ Where fire protection elements also must function as elements defined within another element group, meet the requirements of both element groups.

~~4.4.61.1.7~~ In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter D - Services.

1.2 Amenity and Comfort:

1.2.1 Leakage: Provide systems that are leak-free.

1.2.2 Accessibility: Provide clearances around system components for service and use.

1.2.3 Sound: Provide audible alarm system to signal building occupants of fire hazard.

1.2.4 Convenience: Provide an automatic system to signal building occupants of fire.

1.2.5 Hazards: Provide systems which minimize risk of injury and damage to property.

1.2.6 Substantiation:

- a. Preliminary Design: Fire protection areas identified.
- b. Design Development: Fire protection zones indicated on the drawings with riser locations identified.
- c. Construction: Functional performance testing in accordance with code.

1.3 Health and Safety:

1.3.1 Path of Egress: Provide systems which safeguard path of egress.

1.3.2 Fire Source: Provide system materials which do not contribute to the spread of the fire.

1.3.3 Fire Spread: Provide systems to limit spread of fire from storage area to office area.

1.4 Structural:

1.4.1 Seismic Design: Provide support systems which sustain static (dead) loads twice the wet weight of the system.

1.5 Durability:

1.5.1 Corrosion Resistance: Use corrosion resistant materials; ferrous metal is not considered corrosion resistant unless it is hot dipped galvanized, chrome plated, or coated with rust inhibitive paint.

1.5.2 Vandalism: Provide systems which are tamper-resistant.

1.5.3 Freeze protection.

1.6 Operation and Maintenance:

1.6.1 Ease of Use: Provide easy access to and working clearances around system components.

1.6.2 Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

1.6.3 Substantiation:

a. Preliminary Design: System layout indicating operator interface locations.

b. Design Development: System equipment locations indicated on the drawings and manufacturer's product data indicating products to be used.

2. PRODUCTS

2.1 Use one or more of the following:

2.1.1 Wet pipe sprinkler system.

2.1.2 Fire detection and alarm system.

2.2 Do not use:

2.2.1 Preaction sprinkler system.

2.2.2 Deluge sprinkler system.

2.2.3 Non-water extinguishing systems.

2.2.4 Standpipe system.

2.2.5 Standpipe and hose system.

2.2.6 Smoke control system.

3. METHODS OF CONSTRUCTION

3.1 Construct using the following methods:

3.1.1 Commercial standard for construction of automatic wet type sprinkler system in accordance with the current edition of the Base Facility Standard, NFPA 13 Code, UFC 3-600-01 and NFPA 14.

END OF CHAPTER D4

CHAPTER D41

FIRE SPRINKLER AND EXTINGUISHING SYSTEMS

1. PERFORMANCE

1.1 Basic Function:

1.1.1 Provide fire sprinkler or fire extinguishing systems for all interior spaces.

1.1.2

1.1.3 Fire sprinkler and fire extinguishing system shall be designed per UFC 3-600-01.

~~4.4.21.1.4~~ Provide wet pipe sprinkler systems unless otherwise indicated or required by code.

~~4.4.31.1.5~~ Spaces and Areas with Fire Sprinklers:

- a. General Use (Not Indicated As Another Type): Wet pipe.
 - (1) Occupancy: Light Hazard.
 - (2) Density/Area: ≥ 0.10 gpm per sq ft over 3000 sq ft.
- b. Lobby:
 - (1) System Type: Wet pipe.
 - (2) Occupancy: Light Hazard.
 - (3) Density/Area: 0.10 gpm per sq ft over 3000 sq ft.
- c. General Offices:
 - (1) System Type: Wet pipe.
 - (2) Occupancy: Light Hazard.
 - (3) Density/Area: 0.10 gpm per sq ft over 3000 sq ft.
- d. Storage:
 - (1) System Type: Wet pipe.
 - (2) Occupancy: Ordinary (Group 2) Hazard.
 - (3) Density/Area: 0.20 gpm per sq ft over 3000 sq ft.
- e. Mechanical Room:
 - (1) System Type: Wet pipe.
 - (2) Occupancy: Ordinary (Group 2) Hazard.
 - (3) Density/Area: 0.20 gpm per sq ft over 3000 sq ft.
- f. Warehouse:
 - (1) System Type: Wet pipe.
 - (2) Occupancy: Ordinary (Group 2) Hazard.
 - (3) Density/Area: 0.20 gpm per sq ft over 3000 sq ft.

~~4.4.41.1.6~~ Provide code-required coverage if the coverage specified above is less than required by code.

~~4.4.51.1.7~~ Fire Sprinklers: Design and construction in accordance with code and NFPA 13-2002.

~~4.4.61.1.8~~ Where fire sprinkler and extinguishing elements also must function as elements defined within another element group, meet the requirements of both element groups.

~~4.4.71.1.9~~ In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D4 - Fire Protection.

1.2 Amenity and Comfort:

1.2.1 Accessibility:

- a. Provide fire department connections as required by code.

1.2.2 Appearance:

- ~~a. All spaces unless indicated otherwise on the drawings: Upright sprinklers.~~
- ~~b.a. All spaces: non-recessed sprinklers, except as follows:~~

(1) Warehouses: Upright sprinklers.

1.2.3 Convenience: Provide fire department connections for each standpipe as required by code.

1.3 Health and Safety:

1.3.1 Sprinkler Head Performance: As required by code and NFPA 13-2002.

1.3.2 Water Demand Requirements:

a. Determine minimum water supply requirements for each sprinkler system using the hydraulic calculation method defined by NFPA 13-2002.

b. Substantiation:

(1) Preliminary Design: Identification of water source.

(2) Design Development: Water supply for sprinkler systems shown on the drawings.

(3) Construction: Tests of each sprinkler system in accordance with the requirements of the design standard.

1.3.3 Water Source:

a. Provide water from a public service main.

~~b. Existing hydrant D-20 and D-3 near building 900 were fire flow tested last April 20, 2004~~

~~c. with a result of 70 psi static pressure, 62 psi residual pressure and a flow of 950 gpm.~~

b. Existing hydrants D-20 and D-3 near building 900 were fire flow tested last April 20, 2004 **with a result of 70 psi static pressure, 62 psi residual pressure and a flow of 950 gpm.**

1.4 Structural:

1.4.1 Seismic Design:

a. Provide a sprinkler system which allows movement where differential movement is anticipated.

b. Provide sprinkler system supports capable of supporting twice its installed wet weight.

1.5 Durability:

1.5.1 Expected Service Life Span: Provide a sprinkler system which will last a minimum of 10 years in service without major repairs or operating expense when maintained as specified in NFPA 25-2002.

a. Substantiation:

(1) Preliminary Design: Identification of the system type to be installed.

(2) Design Development: Identification of a similar system in use in an existing facility for 3 years and consisting of components from the same manufacturers.

1.6 Operation and Maintenance:

1.6.1 Ease of Service:

a. Spare Sprinkler Heads: Provide additional sprinkler heads as required by code to service the system.

2. PRODUCTS

2.1 Pipe:

2.1.1 Use one or more of the following:

a. Materials permitted by code.

b. Steel pipe with welded joints.

2.1.2 Do not use:

a. Copper pipe.

b. CPVC pipe.

c. PB pipe.

2.2 Fittings:

2.2.1 Use one or more of the following:

- a. Materials permitted by code.
- b. Steel.
- c. Cast iron.

2.2.2 Do not use:

- a. Copper.
- b. CPVC.
- c. PB.

3. METHODS OF CONSTRUCTION

3.1 Construct the system using the following methods:

3.1.1 Use black steel (std. 40) for the wet type fire sprinkler piping.

3.1.2 All fire protection system shall be designed by registered fire protection engineer.

END OF CHAPTER D41

CHAPTER D43**FIRE DETECTION AND ALARM****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide automatic fire detection and automatic alarm systems as required by code and as follows:
- 1.1.2 In addition to protected premises system(s), provide a new on-premises supervising station with connection between protected premises and supervising station by same method currently used for other buildings.
- 1.1.3 Integrated systems performing all functions are preferred, subject to requirements of code for separated, independent systems.
- 1.1.4 Where fire detection and alarm elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D4 - Fire Protection, and attached Base Facility Design Standard dated 11 Mar 2004, and Fire Alarm specification section 13852.
- 1.1.6 Substantiation:
 - a. Preliminary Design: Outline description of systems, inter-system interfaces, and functions provided.
 - b. Design Development: Details of each type of input and output device; capacities of systems; manufacturer data.
 - c. Construction Documents: Detailed layout of input and output device locations.
 - d. Closeout: Complete functional performance testing as specified in Chapter 00830, under Commissioning.

1.2 Amenity and Comfort:

- 1.2.1 Accessibility: Comply will requirements of local authorities for facilities for the disabled.

1.3 Health and Safety:

- 1.3.1 Detection, Alarm, Notification Methods: In accordance with NFPA 72-2002.
- 1.3.2 Evacuation Plan: Multiple smoke zones and alarm notification of any zone or combination of zones in addition to general evacuation of entire premises.
- 1.3.3 Detection:
 - a. Air Handling Units Over 2,000 cfm: Minimum of one detector in both supply and return.
 - b. Upon detection of fire or smoke condition, automatic notification of occupants, building operations staff, and owner's central emergency staff.
- 1.3.4 Alarms:
 - a. Manual stations at minimum of 150 feet intervals along means of egress paths.
 - b. Audible Alarms: Minimum of 15 dB over ambient noise, audible throughout common areas and means of egress.
 - c. Visual alarms, in locations required by code and public toilets and corridors.
 - d. Separate audible and visual signals for alarms and trouble notification in corridors.
- 1.3.5 Fire Protection Controls:
 - a. Provide connections between alarm and detection system and fire suppression system activation sensors.
 - b. Upon Alarm: Shut down or deactivate the following:
 - (1) HVAC air distribution.

- 1.3.6 Audible and visual trouble notification of operations staff, for alarm zone failures, annunciator zone failures, ground faults, backup power failure, water supply equipment failures.
- 1.3.7 Error and Failure Prevention: Hard wired system; "tamper" sensors at sensitive points; products of only one manufacturer or certified by manufacturer as compatible.
- 1.4 Operation and Maintenance:
 - 1.4.1 Power Supplies:
 - a. Dedicated Battery Backup Power:
 - (1) Storage batteries shall be provided and shall be the sealed type requiring no additional water. The batteries shall have ample capacity, with primary power disconnected, to operate the fire alarm system for a period of 24 hours. Following this period of operation via batteries, the batteries shall have ample capacity to operate all components of the system, including all alarm notification appliances in the total alarm mode for a minimum period of 5 minutes. Batteries shall be sized to deliver 50 percent more ampere/hours than required for the calculated capacities.
 - 1.4.2 Ease of Use:
 - a. Minimum of one centralized monitoring display for all systems is preferred; locate in main entry lobby area.
 - 1.4.3 Government Personnel Training: As specified in Chapter 00830.
 - a. Operational: Minimum of 8 hours, for 1 person, for each separate system.
 - b. Maintenance: Minimum of 8 hours, for 1 person, for each separate system.

2. PRODUCTS

- 2.1 Control Systems for All Applications:
 - 2.1.1 Use one of the following:
 - a. Microprocessor-based hardware. Addressible fire alarm control panel with connection for future expansion.
 - b. Transceiver shall be compatible with the Base existing Monaco D-700 radio monitoring system.
- 2.2 Fire/Smoke Detectors:
 - 2.2.1 Use one of the following:
 - a. Photoelectric smoke detectors.
- 2.3 Warning Devices:
 - 2.3.1 Use one of the following:
 - a. Horns.
 - b. ADA Strobes.
 - c. Combination horn/strobes.

END OF CHAPTER D43

CHAPTER D5**ELECTRICAL POWER****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide electrical power with the appropriate characteristics to operate all electrically operated devices, including those in other services.
- 1.1.2 The electrical system comprises the following elements:
 - a. Service and Distribution (D52): Service entrance equipment, distribution equipment, transformers, motor control equipment, service and feeder wiring (conductors and raceways), monitoring, safety and control equipment, and other elements required for a complete functional system.
 - b. Branch Circuits (D53): Branch circuit wiring and receptacles and other branch circuit wiring systems.
 - c. Other Electrical Power Elements (D59).
- 1.1.3 Utility Revenue Meters: Meter incoming electrical service on the low-voltage side of the service transformer (secondary metering).
- 1.1.4 Where electrical power elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter D - Services.

END OF CHAPTER D5

CHAPTER D52**SERVICE AND DISTRIBUTION****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Distribute electric power for equipment circuits, lighting circuits, receptacle circuits, and electrical utilization devices.
- 1.1.2 Main Electrical Service: Provide the service transformer to convert the utility distribution voltage to the building's utilization voltage.
- 1.1.3 Primary Voltage: The Primary voltage at Hill AFB is 12,470 volts.
- 1.1.4 All new high voltage cable shall be 15 KV, 133 percent insulation, shielded, with E P insulation.
- 1.1.5 Primary service shall be obtained from the 12.47 kv service near the new AEF Deployment Center around Wardleigh Street. Provide a new riser pole on the north side of Wardleigh between pole #D 9W and #D 10W and feed a new 4 way S&C switch and then to the new padmounted transformer for the AEF Deployment Center. The two extra feeds in the S&C switch are for future use.
- 1.1.6 Where service and distribution elements must also function as elements defined within another elements group, meet requirements of both groups.
- 1.1.7 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D5 - Electrical, and attached Base Facility Design Standard dated 11 Mar 2004.

2. PRODUCTS

- 2.1 Transformers: All new transformers shall be 3-phase pad mounted. Primary voltage is 12470/7200 volts grounded delta primary. Transformers shall have loop feed with elbow arrestors, dead front, bushing wells with inserts installed, 4 hole spades, 3-phase gang operated on/off loadbreak switch, bayonet fusing, top level oil temperature gages, liquid level & pressure vacuum gages, drain valve with sampler, copper windings and two each 2-1/2% taps above and below normal. This will assure that the user voltage can be regulated within proper limits. All transformer manufacturers selected will have an authorized rewind shop within 50 miles of Hill Air Force Base.

END OF CHAPTER D52

CHAPTER D53**BRANCH CIRCUITS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Power: Provide adequate electrical power and safe and efficient distribution from panelboards to lighting, wiring devices, equipment, appliances, and the locations where it is needed, based on the project program, other requirements in Volumes A through G, and as follows:
- 1.1.2 Branch circuits comprise the following elements:
 - a. Branch circuit breakers.
 - b. Conductors and cable from panelboards to fixtures, wiring devices, and mechanical equipment.
 - c. Raceways and boxes.
 - d. Wiring devices, including, but not limited to, receptacles, floor boxes and plates, wall switches, wall dimmers, remote control switching devices, and wall plates.
 - ~~e. Provide a overhead power connection point for each carousel.~~
 - e. Provide a overhead power connection point for each carousels on the ceiling. The power connection point(junction box) on the ceiling shall consist of 120v and 220v single phase for each of the 9 carousels.
- 1.1.3 Where branch circuits are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D5 - Electrical Power, and attached Base Facility Design Standard dated 11 Mar 2004..

1.2 Amenity and Comfort:

- 1.2.1 Accessibility: Comply with ADA Accessibility Guidelines and the following:

END OF CHAPTER D53

CHAPTER D59

OTHER ELECTRICAL POWER ELEMENTS

1. PERFORMANCE

- 1.1 Basic Function: Provide hook-up for an emergency mobile generator to supply the whole new AEF Deployment Center building similar to the existing building 900.

END OF CHAPTER D59

CHAPTER D6**ARTIFICIAL LIGHTING****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide artificial means of lighting interior and exterior spaces.
- 1.1.2 Artificial lighting comprises the following elements:
 - a. Interior Lighting (D61): General room lighting, emergency lighting, and accent lighting.
 - b. Exterior Area Lighting (D62): General lighting of exterior spaces including walkways, parking areas, and security.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter D - Services, and attached Base Facility Design Standard dated 11 Mar 2004.

1.2 Amenity and Comfort:

- 1.2.1 Light Levels: Provide maintained average illuminance values for all spaces that are based on the primary visual tasks to be accommodated and are not less than the following, when measured at task height:
 - a. Category B (Lobbies and other spaces characterized by short stays and the need for simple orientation): General lighting throughout space of 5 fc.
 - b. Category C (Working spaces where simple visual tasks are performed): General lighting throughout space of 10 fc.
 - c. Category D (Spaces requiring performance of visual tasks of large size and high contrast): Task illumination of 30 fc.
 - d. Category E (Spaces requiring performance of visual tasks of high contrast and small size, or low contrast and large size): Task illumination of 50 fc.

END OF CHAPTER D6

CHAPTER D61**INTERIOR LIGHTING****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide artificial lighting for all interior spaces that is adequate in quality and distribution for the performance of tasks typical for the type of space and the characteristics of the intended population, regardless of the availability of natural light.
- 1.1.2 Interior lighting comprises the following elements:
 - a. Luminaires for general illumination.
 - b. Accent lighting.
 - c. Emergency lighting.
 - d. Illuminated green LED exit signs .
 - e. Ceiling grid/troffer luminaires shall be 2'x2' type for admin. and office area.
- 1.1.3 Where artificial lighting is integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D6 - Artificial Lighting.

1.2 Amenity and Comfort:

- 1.2.1 **Accessibility:** Comply with ADA Accessibility Guidelines and the following:
 - a. **Location:** Where accessible lighting controls are required, provide devices that are mounted so they can be reached from a wheelchair and are not more than 54 inches and not less than 15 inches from the floor.
- 1.2.2 **Light Levels:** Provide maintained average illuminance values for all spaces that are based on the primary visual tasks to be accommodated and are not less than the following, when measured at task height:
 - a. **SP2 Occupant Work Spaces:**
 - (1) Private Office: 50 fc.
 - (2) Open Office Cubicle: 50 fc.
 - b. **SP6 Meeting and Instruction:**
 - (1) Conference Room: 20 fc.
 - c. **SR Resident or Occupant Service Spaces:**
 - (1) Toilet Room or Bathroom: 10 fc.
 - (2) Break Room: 20 fc.
 - d. **SC Circulation Spaces:**
 - (1) Corridor: 10 fc.
 - (2) Lobby: 10 fc.
 - (3) Waiting Room: 10 fc.
 - e. **SU1 Maintenance Facilities:**
 - (1) Janitors Closet: 10 fc.
 - (2) Maintenance Shop: 20 fc.
 - f. **SU2 Utility Equipment Spaces:**
 - (1) Mechanical Equipment Room: 10 fc.
 - (2) Electrical Equipment Room: 10 fc.
 - (3) Communications Equipment Room: 30 fc.

1.3 Health and Safety:

- 1.3.1 **Emergency Lighting:** Provide emergency lighting that complies with code.

END OF CHAPTER D61

CHAPTER D62**EXTERIOR AREA LIGHTING****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide artificial lighting for exterior spaces, as required by the project program, that is adequate in quantity, quality, and distribution for the performance of tasks typical for the type of outdoor space and the characteristics of the intended user population.
- 1.1.2 Exterior area lighting comprises the following elements: Exterior luminaires, poles, standards, or other means of mounting the luminaires, power supply, and controls.
- 1.1.3 Where exterior area lighting is integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D6 - Artificial Lighting.

1.2 Amenity and Comfort:

- 1.2.1 Light Levels: Provide maintained average illuminance values for exterior spaces that are based on the primary visual tasks to be accommodated and are not less than the following, when measured at grade:
 - a. Parking Lots, High Activity: 1.5 fc, maximum uniformity ratio (average to minimum) of 4:1.
 - b. Parking Lots, Medium Activity: 1.0 fc, maximum uniformity ratio (average to minimum) of 4:1.
 - c. Parking Lots, Low Activity: 0.6 fc, maximum uniformity ratio (average to minimum) of 4:1.
 - d. Building Entrance Areas: 4 fc, maximum uniformity ratio (average to minimum) of 4:1.

1.3 Structure:

- 1.3.1 Provide poles for parking lot area lighting that are located to avoid damage by automobiles, mounted to bases that are structurally capable of withstanding moderate impact, or protected by bollards or similar structures.
- 1.3.2 Provide mounting system for exterior area lighting that is capable of withstanding 3-second wind gusts in excess of 120 mph.

1.4 Operation and Maintenance:

- 1.4.1 Minimum Outdoor Operating Temperature: Provide lighting systems that operate at temperatures as low as -20 degrees F.
- 1.4.2 Power Consumption and Efficiency: Comply with requirements of Chapter D6 - Artificial Lighting.
 - a. Lighting Controls: Provide daylight sensing controls, on-off switches, and programmable timing.
- 1.4.3 Maintenance Efficiency: Provide luminaires that do not collect dirt rapidly and are readily cleanable.
- 1.4.4 Ease of Relamping: Provide luminaires designed for easy relamping with special tools.

2. PRODUCTS

2.1 Lamps:

- 2.1.1 Use one of the following types:
 - a. High pressure sodium lamps.

2.2 Lighting Standards or Poles:

- 2.2.1 Use one or more of the following:
- a. Galvanized steel match existing facility pole color.

END OF CHAPTER D62

CHAPTER D7**TELECOMMUNICATIONS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide the following telecommunications services:
 - a. Voice and Data (D71): Infrastructure for voice and data transmission and telephone equipment.
 - b. Sound Reinforcement (D72): Public address.
 - c. Existing building 900 has a spare fiber optic cable that is available for the new facility. New fiber distribution system (FDS) equipment is required to service the new building. There is no existing copper available for supplying the new facility.
 - d. The new communication room in the new facility shall be connected to the communication closet/area in existing building 900 with new fiber through a new 4-inch conduit, with 4-1-inch inner duct. Provide pull-cord in the other inner ducts not used.
 - e. The existing building 900 utilizes the telephones for an all building internal address system, which shall be tied into the new AEF Deployment Center, with exception the large warehouse areas will need to have separate speakers because there will not be telephones throughout those spaces.
 - f. Other Telecommunications Elements (D79).
- 1.1.2 Where telecommunications elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter D - Services, and attached Base Facility Design Standard dated 11 Mar 2004.

END OF CHAPTER D7

CHAPTER D71**VOICE AND DATA****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide means of conveying voice communication between rooms and spaces in the building and between the building and the Government's telephone network provider as follows.
- a. Point-to-Point Voice Communications For:
 - (1) Private two-way verbal communication.
 - (2) Group conversations among more than 2 stations, at user's option.
 - (3) Both handset and speaker operation, at user's option.
 - (4) Transfer of live call to another station, at user's option.
 - (5) Hands-free paging.
 - b. Recording and Management of Voice Messages:
 - (1) At and for each station.
 - (2) Incoming and internal messages.
 - (3) User-recorded reception message for each station.
 - (4) Automated answering of incoming voice telephone.
 - c. Voice and data outlets:
 - (1) Weapons: 2-LAN; 1-telecom
 - (2) Mobility: 11-LAN; 2-telecom
 - (3) K-loader: 1-LAN; 1-telecom
 - (4) ATC: 1-LAN; 1-telecom
 - (5) Admin: 55-LAN & telecom
 - (6) Provide a overhead data connection point for each carousel.
- 1.1.2 Where voice and data elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D7 - Telecommunications.

2. PRODUCTS**2.1 Communication Cabling:**

- 2.1.1 Use one of the following:
- a. Copper cable.
 - b. Fiberoptic cable.

END OF CHAPTER D71

CHAPTER D72**SOUND REINFORCEMENT****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide the following sound reinforcement functions:
 - a. Sound transmission to all locations in the new facility and existing building 900. The new public address system in the new facility shall be able tied into the existing bldg. 900 phone PA system. Provide the necessary electronic to interface the existing phone PA system in building 900 to the new PA system. The new warehouse area shall provided with speakers for the PA system.
 - b. Paging, from any telephone station.
 - c. Speaker Outlets: Required in the following spaces:
 - (1) Corridors.
 - (2) Equipment rooms.
 - (3) Warehouse areas.
- 1.1.2 Where sound reinforcement elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter D7 - Telecommunications.

END OF CHAPTER D72

CHAPTER D79**OTHER TELECOMMUNICATIONS ELEMENTS****1. PERFORMANCE**

- 1.1 ~~Basic~~ Basic Function: The weapons vault will need intrusion detection system(IDS), the regulations governing IDS are in MilHdbk 1013/1A and 1B and DoD5100.76-M. Verify if possible the IDS at the current weapons vault (bldg.845) could be removed and installed in the new weapons vault. Provide all the required phone line for transmission of IDS data to the Base police station.

END OF CHAPTER D79

CHAPTER E**EQUIPMENT AND FURNISHINGS****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Design the facility to accommodate the equipment and furnishings required by the Government, which are specified in the project program.
- 1.1.2 Equipment and furnishings comprise the following elements:
 - a. Equipment (E1): Mechanized, plumbed, and electrical devices, other than equipment that is part of a service system (HVAC, electrical, etc.), and permanently installed fixtures not covered by another chapter.
 - b. Furnishings (E2): Movable (loose) furniture and fittings, without electrical or plumbing connections.
- 1.1.3 All specified equipment and furnishings are to be provided by the Design-Builder.
- 1.1.4 The following equipment and furnishings are to be provided by the Government:
 - a. All loose (movable) equipment and furnishings.
 - b. Electrically-operated equipment with a cord-and-plug connection.
 - c. Items indicated as Not in Contract (NIC).
- 1.1.5 Government-Furnished Items: Performance requirements that specify characteristics of equipment or furnishings items do not apply; requirements for accommodating items to the project do apply.
- 1.1.6 Where equipment or furnishings elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.7 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance.

1.2 Amenity and Comfort:

- 1.2.1 Appearance:
 - a. Services Connections to Equipment: Concealed behind or under items or their housings.

1.3 Health and Safety:

- 1.3.1 Accident Prevention:
 - a. Comply with the requirements of 29 CFR 1910, regulations of Occupational Safety and Health Administration.
 - b. Prevent accidental pinching, crushing, and cutting of operator limbs, fingers, and toes in or by moving parts of equipment by using intelligent design or guards or other protection, without reliance on self-protective operation by operator.

1.4 Durability:

- 1.4.1 Service Life Span: Same as for building.
 - a. Substantiation:
 - (1) Proposal: Identification of proven-in-use assemblies of the same type, for inspection by Government.
 - (2) Preliminary Design: Identification of proven-in-use assemblies of the same type, for inspection by Government.
- 1.4.2 Weather Resistance: Items located outdoors must comply with requirements of Chapter B.
- 1.4.3 Vandal Resistance: Parts not easily removed without the use of tools.

1.5 Operation and Maintenance:

- 1.5.1 Ease of Maintenance: Not requiring any routine measures to maintain operation or finishes, other than washing with soap and water.
- 1.5.2 Ease of Repair: Serviceable parts and access panels easily removable with common tools.
- 1.5.3 Ease of Equipment Service: As specified in Chapter 111 and the following:

END OF CHAPTER E

CHAPTER E1**EQUIPMENT****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide equipment as specified in Chapter E.
- 1.1.2 Equipment comprises the following elements:
 - a. General Equipment (E11): Equipment that would be found in buildings of any type of occupancy, including loading dock equipment.
 - b. ~~Commercial Equipment (E13): Equipment used in functions that are primarily commercial, involving sales, display, financial transactions, and office activities.~~
- 1.1.3 Where equipment elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter E.

END OF CHAPTER E1

CHAPTER E11**GENERAL EQUIPMENT****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide general building equipment of the type and in the quantity required by the program and in accordance with the code.
- 1.1.2 General equipment comprises the following elements:
- 1.1.3 Where general equipment elements also must function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter E, and Chapter E1.

END OF CHAPTER E11

CHAPTER E12**FOOD SERVICE EQUIPMENT****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide food service equipment of the type and in the quantity required by the project program in accordance with the code.
- 1.1.2 Food service equipment comprises the following elements:
 - a. Refrigeration equipment and walk-in cold rooms and freezers.
 - b. Food and beverage storage equipment and fixtures, including vending machines.
 - c. Food preparation equipment and fixtures, including built-in and freestanding appliances.
 - d. Cleaning equipment, including sinks and garbage disposers.
 - e. Serving ware and utensil storage and handling equipment and fixtures, including cabinets.
 - f. Exhaust hoods and fans, including fire suppression requirements as specified in Chapter D41.
- 1.1.3 Provide equipment that prevents the entry of food, vermin, dust, and dirt into crevices and concealed spaces; will not impart toxic substances, odors, colors, or tastes to food; is easy to clean, safe to use, and easy to service.
 - a. Design interfaces between equipment and surroundings to comply with this requirement.
 - b. Design and construct services within food service spaces to comply with this requirement.
 - c. Use equipment and fixtures that comply with ANSI/NSF 2-2002e or an equivalent level of performance.
 - d. Substantiation:
 - (1) Construction Documents: Appliances and powered equipment certified by NSF International for compliance with published NSF standards and listed by UL for safety.
 - (2) Construction Documents: Surface material specifications, interface details, and installation requirements.
- 1.1.4 Where food service elements also must function as elements defined within another element group, meet the requirements of both element groups.
 - a. Services elements within food service spaces shall also comply with applicable requirements of Volume D.
- 1.1.5 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter E - Equipment and Furnishings, and Chapter E1 - Equipment.

1.2 Durability:

- 1.2.1 Service Life Span:
 - a. Appliances and Operating Equipment: Minimum of 15 years.
 - b. Fixtures and Non-Operating Components: Minimum of 50 years.
- 1.2.2 Surface Durability: Use only materials that will withstand normal wear-and-tear, including impact from mobile equipment, without significant deterioration over the specified life span.
 - a. Exposed Surfaces in Nonfood Zone: Also comply with requirements for finishes specified in Chapter C16 for SR3 Food Facilities.
- 1.2.3 Moisture Resistance: Do not use any hygroscopic material.
- 1.2.4 Corrosion Resistance: Do not use any exposed material that will corrode in the presence of moisture, unless finished with abrasion-resistant permanent coating that prevents passage of moisture vapor.
- 1.2.5 Rot and Fungus Resistance: Do not use any material, exposed or concealed, that will rot or grow fungus unless completely sealed with abuse resistant, moisture-resistant material.

- 1.2.6 Grease Resistance: Do not use any material that attracts grease or air-borne dirt.
- 1.2.7 Cleanability: All surfaces within food service areas must be smooth and easily cleanable.
- 1.3 Operation and Maintenance:
 - 1.3.1 Heating Modes: Acceptable means of generating heat for cooking are electricity, natural gas, and steam.
 - 1.3.2 Equipment Capacity: As specified in the project program.
 - 1.3.3 Hot Water Supply: If domestic hot water supply is inadequate for food service purposes, provide supplementary water heating.
 - 1.3.4 By-Products: Minimize adverse effects of waste heat, moisture, and humidity, produced by equipment, by using efficient equipment, thermal insulation, air movement, and/or exhaust air as required.
 - a. Include effects of by-products in energy efficiency computations.
 - b. During normal operation of equipment, maintain interior space temperature and humidity within ranges specified.
 - c. Prevent formation of frost and condensation on the warm side of refrigerated rooms and cases.
 - d. Prevent scorching of adjacent surfaces by heat-producing appliances.
 - e. Prevent water running or dripping on adjacent surfaces.
 - f. Prevent formation of fungus, mold, or mildew on surfaces inside spaces housing equipment.
 - 1.3.5 Ease of Cleaning Adjacent Surfaces: Where equipment is not permanently sealed to adjacent surface with waterproof joint sealant, provide at least 1 inch separation between equipment and adjacent surface or make equipment item easily movable for access to adjacent surfaces.
 - 1.3.6 Ease of Service, Repair, and Maintenance: As specified in Chapter E and all powered equipment easily removable for repair or replacement.

2. PRODUCTS

2.1 Surfacing Materials Used in the Food Zone:

- 2.1.1 Use one of the following:
 - a. Flat, smooth or slightly embossed, stainless steel.
 - b. Factory-applied non-stick cooking surfaces, of tetrafluoroethylene.
 - c. Fully-tempered glass.
 - d. Homogeneous opaque plastic panels complying with NSF 51-2002.
- 2.1.2 Do not use:
 - a. Transparent plastics.
 - b. Plastic laminate, either high- or low-pressure.
 - c. Wood, except hard maple cutting boards.

2.2 Surface Materials Used in the Splash Zone:

- 2.2.1 Use one of the following:
 - a. Any material acceptable in the food zone.
 - b. Laminated safety glass.
 - c. High-pressure plastic laminate, NEMA LD 3-1995, with no internal corners or angles, and with external corners sealed.
- 2.2.2 Do not use:
 - a. Transparent plastics.

2.3 Refrigeration:

2.4 Freezers:

~~2.52.3~~ _____ Cooking Equipment (11400):

~~2.5.12.3.1~~ _____ Use one of the following:

- a. Electric ranges.
- b. Gas ranges.
- c. Electric ovens.
- d. Gas ovens.

~~2.5.2~~ ~~Do not use:~~

~~2.62.4~~ _____ Sinks:

~~2.6.12.4.1~~ _____ Use one of the following:

- a. Stainless steel (11400).
- b. Homogeneous plastic resin (15400).

~~2.6.2~~ ~~Do not use:~~

~~2.72.5~~ _____ Sink Counters and Work Tables (11400):

~~2.7.12.5.1~~ _____ Use one of the following:

- a. Homogeneous plastic resin.
- b. High pressure plastic laminate.

~~2.7.2~~ ~~Do not use:~~

END OF CHAPTER E12

CHAPTER E13

COMMERCIAL EQUIPMENT

4. PERFORMANCE

4.1 Basic Function:

CHAPTER E2

FURNISHINGS

1. PERFORMANCE

1.1 Basic Function:

1.1.1 Furnishings comprise the following elements:

- a. General Furnishings: Furnishings that would be found in buildings of any type of occupancy, including furniture and accessories.
- b. Food Service Furnishings: Loose furnishings for food and beverage storage, preparation, serving, and cleanup, including furniture and equipment.
- c. Commercial Furnishings: Loose furnishings for commercial functions, principally office, including furniture, accessories, and open office furniture systems.
- d. Other Furnishings: All other types of furnishings, for any type of occupancy, including furniture, accessories, and conference tables and chairs.

1.1.2 Design of the furniture/furnishing or Comprehensive Interior Design (CID) package is the space planning and design, selection, color coordination and arrangement of interiors and building material finishes, furniture and equipment provided or procured separately from the construction contract. This service entails design and preparation of procurement documents for items detached from the building such as furniture, blinds, and artwork, to provide an integrated visual design theme which reflects the interior atmosphere desired by the customer. The CID package must be developed concurrently with the design of the facility and submitted for review with the drawing contract submittal. The use of systems furniture for all Air Force administrative facilities and areas of 1,000 SF or more is mandatory per ETL 90-2.

1.1.3 The CID package and procurement documents shall be designed and furnished to the customer in accordance with the Air Force Center for Environmental Excellence (AFCEE) Interior Design Presentation Format, Nov. 1996 and the Air Force Interior Design Policy, ETL 90-7.

1.2 Amenity and Comfort:

1.2.1 Desks, chairs and furniture systems shall be ergonomic and shall be selected to accomplish the functional mission of the AEF Deployment Center.

1.3 Health and Safety:

1.3.1 Specification of furniture should include user friendly features such as radius edges and the smoothly finished underside of surfaces. All applicable industry standards and tests requirements shall be met. Materials shall be fire retardant to the maximum extent possible. U.L. listings shall be met where applicable. Layout of furniture shall comply with NFPA 101 and Fed. Std. 795 (Uniform Federal Accessibility Standards) and the ADA, whichever is more stringent.

1.4 Structure:

1.4.1 Furniture system specified shall separate the power and communication lines within the panel or furniture system. Power lines shall be carried either in the top or bottom run, depending on the power source, and the communications lines shall be carried in run at work surface level.

1.5 Durability:

1.5.1 When evaluating sources the quality of construction and materials shall be considered. Warranties as a minimum shall be in the 10-25 year range with the exception of fabric, task lights and pneumatic parts.

1.6 Operation and Maintenance:

1.6.1 Local service shall be available within a reasonable radius (100 miles) to support warranties and

installation requirements. To the maximum extent possible, one manufacturer for each "series" or "type" of furniture and/or seating shall be specified to help with ease of maintenance, inventory control and continuity throughout the facility.

2. PRODUCTS

2.1 Construct using one of the following:

2.1.1 ACCESSORIES.

- a. Artwork. Artwork model numbers are to be indicated for preferred, however an equal may be supplied. Frame color and profile shall be specified with non-glare acrylic covering. Frame shall have security mounting hardware. Matting shall as a minimum have border in color to coordinate with the interior color scheme of the facility.
- b. Trash/Ash Containers. Salient features for trash/ash containers shall be approximately same capacity and size, have the same overall appearance, similar or better construction, same or better fire resistance, and be at least as durable and meet all tests and standards (such as UL 242) as specified by the contractor's Interior Designer.

2.1.2 CASEGOODS.

- a. No fiberboard, flakeboard, particleboard, or masonite shall be used in any part of furniture. Minimum construction and material shall be the type as noted below.
- b. Side and back panels, drawer fronts and doors shall be minimum of finished wood veneered (both sides) 5-ply, 19 mm (3/4") hardwood veneer-core plywood with minimum 10 mm (3/8") solid wood banding on all exposed edges. Back panels on pieces less than 1200 mm (48") may be 10 mm (3/8") in thickness. Tops shall be minimum 19 mm (3/4") hardwood veneer-core plywood with minimum 10 mm (3/8") solid wood edge banding on all edges. Finish on tops shall be finished veneer except for writing surfaces, which shall be laminate. Laminate tops shall have plywood substrate in lieu of the standard MDF, particle board or recycled material. All framing materials shall be solid hardwood. All joints must be stronger than the substrate and resist racking and withstand loading. Casegood bases shall be sealed in order to withstand a reasonable amount of moisture during mopping. Drawer glides shall be side mounted with 45 kg (100 lb) capacity. Hinges to be brass plated, heavy-duty weight and provide smooth operating opening angle. Drawer and door pulls shall be recessed wood or brass, routed wood, or full-length finder pull along bottom of drawer front.

2.1.3 TABLES.

- a. Legs shall be solid wood and match wood used for tops, edges or banding as well as other furniture in the same room, in color and species. All conference, work and miscellaneous tables shall be similar style and size shall be within 4" +/- as specified by the contractor's Interior Designer.
- b. Underside of tables or worksurfaces shall be completely and smoothly finished. Apron edges are strongly discouraged. If laminate edge is specified, it shall be postformed edge. Straight or 90 degree self edge tables are unacceptable. Leveling glides or leveling device shall be a feature.
- c. Rectangular tables shall have "T" type base rather than four (4) legs. If folding tables are specified, folding mechanism and legs, when folded, shall be flush with lip of the table.

2.1.4 UPHOLSTERED FURNITURE.

- a. Upholstered furniture may be provided by GSA contract. Desk chair series shall offer a variety of options, fabrics and caster choices to meet functional requirements. Five (5) star base shall be specified with castered chairs. Electrostatic discharge (ESD) properties shall be considered where function requires it. Arms shall have adjustable, impact resistant edge. Task chair arms shall be recessed. All seats shall be adjustable up and down as well as forward and back, and have waterfall edge.
- b. Desk/side/arm chairs. Must be approximately the same size (+/-), similar overall appearance (style, detailing, type and amount of wood), similar construction (thickness and type of

- materials, connections, joints, cushion attachment, attachment of fabric for replacement) as the chairs specified by the contractor's Interior Designer.
- c. Side and Arm chairs. Frames shall be solid wood and have a removable cushioned and upholstered seat and back. Chairs with legs shall be provided with an "H" or "U" shaped stretcher. Sled bases and 2 or 3 position bases shall be provided with a cross member at the base for lateral support. Wood finish shall be manufacturer's standard color and finish as selected by the contractor's Interior Designer. Maximum dimension of side and arm chairs should not exceed approximately 600 x 600 mm (24" x 24") unless otherwise noted in the RFP.
 - d. Replacement, retrofitting and/or reupholstering in the field shall be considered. Upholstery shall at a minimum be 50,000 double rubs, Wyzenbeek Abrasion Test with light fastness minimum 40 hours when tested by AATCC Method 16A. Upholstery and components shall be inherent or have a topical soil retardant added for heavy duty use.

2.1.5 DESKS, ADP/MODULAR WORKSTATION/FURNITURE SYSTEMS

- a. Products for desks, ADP/Modular Workstations and Furniture Systems drawers shall have either a cradle type of full extension ball bearing suspension with hanging file folder frames or compressor dividers. Drawers shall stay securely closed and not open when in the closed position. Each drawer shall contain a safety catch to prevent accidental removal when drawer is fully open. Pedestals shall be designed to protect wires from being damaged by drawer operation when wire management runs behind or along side the drawers. Box drawers shall be provided with pencil trays and/or stationary trays as appropriate.
- b. Overhead storage shall be able to accommodate task lighting. Depth of overhead storage shall be typical to accommodate a standard three ring binder. As needed, fifteen (15) inch depth overhead storage shall be provided to accommodate computer printouts. The shelf/storage pan shall be of metal construction with formed edges. Supporting end panels shall provide metal connections to the supporting panels.
- c. Task lighting shall not extend beyond the edges of the overhead storage unit. Fixtures shall be UL approved. Use energy efficient ballasts and lamps. All diffusers, grilles or other coverings shall be easily removable to permit cleaning and relamping. A variable intensity control is preferred.
- d. One worksurface per ADP/Modular workstation, desk or Furniture System shall be capable of accommodating an articulating keyboard. The articulating keyboard shall have the capability to be fully recessed under the worksurface and extend to give the user full access to the keyboard. Side travel rotation shall be a 180 degree swing. The keyboard pad shall have tilting capability and shall contain a wrist support.
- e. Worksurfaces shall not be affected by ordinary household solvents, acids, alcohols or salt solutions and shall be capable of being cleaned with ordinary household cleaning solutions. Edges shall be post formed, vinyl molding or equal, self-edge 90 degree edge is not acceptable.
- f. Wire management and accessories shall be specified at all desks, ADP/Modular workstations, and Furniture systems. Grommet kits or another suitable finish must be provided for all cable cutouts. Horizontal wire managers shall be supplied for mounting under all worksurfaces or be integral in worksurface for desks and ADP/Modular workstations. Furniture systems panels shall be equipped with eight conductor electrical circuits (three hot conductors, three neutral conductors, one ground conductor and one isolated ground conductor). For Right-Sizing requirements comply with AFH 32-1084. The wired panels for the furniture system specified shall separate the power and communication lines within the panel or furniture system. Power lines shall be carried either in the top or bottom run, depending on the location of the power source, and the communications lines shall be carried in run at work surface level.
- g. Furniture systems shall comply with ETL 90-2 to optimize space utilization. Panels shall not cover window spaces or exterior fin tube heating. Cubicles shall be sized appropriately for the functional use intended, however under no circumstances shall a cubicle be less than 48 square feet.
- h. Tack boards shall be specified as necessary.
- i. Leveling glides or other leveling device shall be a feature of the specified furniture system.

2.1.6 STORAGE.

- a. Shelving to hold weight as specified by the functional users and any additional accessories such as bins shall be specified as needed. Adjustable shelving shall be incorporated into storage units to the maximum extent possible.
- b. Lateral files shall meet Federal Specification AA-CC-1779D for heavy duty filing as well as ANSI/BIFMA X 5.2.
- c. If specified, vertical files shall meet ANSI/BIFMA X 5.3 standards.
- d. Leveling glides or other leveling devices shall be a feature of files and any type of storage cabinet.

2.1.7 VISUAL PRESENTATION - LECTERN/AV CABINET.

- a. Lectern or podium shall be floor supported model with hidden locking casters, reading shelf and minimum one additional shelf. Bottom edges shall not reach completely to the floor, there shall be a gap of approximately 1/2" minimum or some other method of protection against damage.
- b. AV cabinet shall have hidden casters, ventilated back, roll-out shelves and electrical outlet box with surge protection. Upper cabinet shall have pocket doors, not hinged doors. Cabinet shall accommodate all media requirements as specified by the functional user.

END OF CHAPTER E2

CHAPTER F

DEMOLITION

1. PERFORMANCE

1.1 Scope of Work:

- 1.1.1 Some parking areas in the project vicinity will need demolition. This is due to a requirement to design the parking lots for as many stalls as possible.
- 1.1.2 Recycle asphaltic concrete from any road removal work and use it for any new road construction, as needed.
- 1.1.3 Remove all existing construction and utilities that are not required for the design.
- Remove the existing storage shed building 901. Contractor may salvage anything from the demolition of building 901, granted they first check with appropriate base personnel in order to see if anyone on base would want the item(s). The base has a disposal area that allows for three types of materials; wood, asphalt, and soil/concrete. The areas are separated into cells. The disposal route/area is shown in figure 1. However, Hill AFB does not allow for construction debris to be disposed of at their disposal area. The construction debris can be disposed of at the Wasatch Energy Systems landfill in Davis County, approximately 3/4 of a mile east of Hill AFB's south gate.
 - There are some existing outdoor lights on the west wall of bldg. 900 need to be removed for the addition of the new facility.
 - ~~There is an existing storm drainage channel that runs along the entire western edge of the new buildings footprint. This drainage channel will need to be either relocated or demolished.~~
 - There is an existing **four-foot-wide concrete waterway that runs north/south along the entire length of the new buildings footprint (see sheet C1.10). It must be removed from under the building and approximately five feet from the building, if flow back towards the building is blocked. Otherwise, removal of the waterway to the new 6" barrier curb is required for drainage reasons. The plans could require complete removal of the waterway if drainage problems or conflicts will result from the construction of the new parking lot. A decision on the extent of removal will be made at the design charrette.**
 - ~~A portion 30 feet of an existing median that is between Wardleigh Road and building 900's parking area will require removal. The exact amount of removal is to be determined by base personnel.~~
- 1.1.4 Relocate existing construction and utilities as required for the design.
- The west side footprint of the new building will go right over an existing 12" fire main that will require relocation. Building 900 has a fire connection and alarm on the north-west side of the building exterior that will need relocating. Directly in front of the fire connection and alarm (facing away from building 900) is a fire hydrant with three valves adjacent to it that will require relocation.
 - On the south-west corner of the building is a steam plant line which may require relocation. There are also two steam vent pipes which come out of the west side wall of building 900 and they are located directly above steam plant line. Depending on the positioning of the new structure, it can be addressed by building around it and architecturally hiding it from view, while still allowing it's accessibility for servicing.
 - There is an existing approximately 60 foot tall flight line apron lighting pole that will also require relocating. It is located approximately 20 to 30 feet to the west of the hydrant mentioned in 1.1.4a.
- 1.1.5 The following known health hazards exist on the site:
- Asbestos or asbestos-containing materials, in the form of:
 - All Hard Thermal Insulation encountered above ceilings, behind walls, in wall chases and in mechanical rooms is assumed to be asbestos. This includes all insulation on pipe

runs, pipe saddles, tanks and elbows. Vibration Isolators in the HVAC system area also assumed to be asbestos.

- b. Lead-based paint, on the following surfaces:
 - (1) Building components located in building 901 that tested positive for lead based paint are as follows:
 - (a) exterior north metal wall (lead read = 1.5, color = dark brown)
 - (b) interior 3" center floor stripping (lead read = 2.9, color = yellow)
 - (c) exterior south metal wall (lead read = 1.2, color = light tan)

- 1.1.6 Where requirements of another element group also apply to demolition or relocation operations, meet the requirements of that element group as well.
- 1.1.7 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter G - Sitework, and Chapter G1 - Site Preparation.
- 1.2 Health and Safety: See Chapter 00830 for additional requirements.
 - 1.2.1 Health Hazards:
 - a. Whenever construction operations could result in worker contact with hazardous materials, follow recommendations of an American Board of Industrial Hygiene Certified Industrial Hygienist (CIH) employed by Design-Builder.
 - b. Existing Asbestos and Asbestos-Containing Materials: Comply with 29 CFR 1926.1101 and applicable state and local regulations; complete removal is required.
 - c. Existing Lead-Based Paint: Comply with 29 CFR 1926.62 and applicable state and local regulations; either removal or recoating is acceptable.
- 1.3 Structure:
 - 1.3.1 Prevent movement or settlement of structures that are to remain.
 - 1.3.2 Cease operations immediately if structures that are to remain appear to be in danger, or susceptible to displacement; do not resume operations until danger has been removed or remedied.
 - ~~1.3.3~~
 - ~~1.3.4~~ 1.3.3 Coordinate demolition with grading so that final grades do not subside within one year after completion.
- 1.4 Durability:
 - 1.4.1 Maintain temporary and permanent erosion and sediment controls during demolition and relocation operations or replace as soon as demolition or relocation is complete.

END OF CHAPTER F

CHAPTER G

SITWORK

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 Provide all modifications to the site and site improvements and utilities required for proper functioning of the project and as indicated in the project program.
- 1.1.2 Sitework comprises the following elements:
 - a. Site Preparation (G1): All modifications to the site and grades required for construction of new work and for proper functioning of the project.
 - b. Site Improvements (G2): All elements required to provide finished and durable site surfaces, indoor plantings, and outdoor improvements described in the project program.
 - c. Other Site Construction: Miscellaneous site elements.
- 1.1.3 Where site elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance.

1.2 Health and Safety:

- 1.2.1 Require the Contractor to create a "Free Zone" within the Pacer Protect Fence line by building a new and temporary Pacer Protect Fence (same design and construction criteria as the permanent fence) around the construction site. The Contractor will consider the needs within building 900 when erecting the temporary fence. Contractor may need to build a fence on the interior of building 900, maybe 10' to 12' from west side wall. The purpose of this fencing is to allow unescorted access to the construction site.
- 1.2.2 Maximum Slopes:
 - a. Slopes with Smooth Pavement: 1:10, unless restricted to vehicular use.
 - b. Slopes Covered with Grass: 1:5, unless less than 3 feet in height.
 - c. Slopes with Pedestrian-Inhibiting Vegetation: 1:1, unless less than 5 feet in height.
 - d. Slopes With No Access From Top: Limited only by structural stability and resistance to erosion.

END OF CHAPTER G

CHAPTER G1**SITE PREPARATION****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Provide all modifications to the site required for proper functioning of the project and as indicated in the program.
- 1.1.2 Site preparation is comprised of the following elements:
 - a. Earthwork (G12): Changing of grade levels, removal of soil and rock, modifying existing soils in preparation for construction, and temporary and permanent erosion and sediment control structures made of soil or rock.
 - b. Other Site Preparation (G19).
- 1.1.3 Where site preparation elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter G - Sitework.

END OF CHAPTER G1

CHAPTER G12**EARTHWORK****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 The Contractor will be required to perform a geotechnical investigation yielding a geotechnical report that shall be used as a basis for design. The Contractor will also be required to perform a topographical survey that shall be used as a basis for design.
- 1.1.2 Modify the site grades and soils as required for construction of buildings and utilities, for proper functioning of the project, and as indicated in the project program. All soils dumping shall be done on base. See figure 1 for haul route and disposal area.
- 1.1.3 Where earthwork elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter G - Sitework, and Chapter G1 - Site Preparation.

END OF CHAPTER G12

CHAPTER G19

OTHER SITE PREPARATION

1. PERFORMANCE

1.1 Basic Function:

- 1.1.1 The new facility will **Contractor shall** comply with the DOD Force Protection Construction Standards (UFC-DOD minimum anti terrorism standards for buildings dated 8 OCT 2003), Seismic, (IBC chapter 16) and the UFC 1-200-01, Design: General Building Requirements, dated 8 OCT 2003, ADA, and United Federal Accessibility Standards (UFAS).
- a. ~~This project will require that parking for the new structure meet current AT/FP guidelines. The stand-off distance from the new building to parking areas will be 33 feet. This work will require placement of a curb, 33 feet, parallel from the southern face of new structure and building 900. The installation of the curb will require some demolition and it will require reinforcing steel. Additional demolition may be required to remove the asphalt between the building and the curb to create a landscaped area (zero-scape/limited or maintenance free landscaping). Reinforcing steel would not be required if fill material were to be located in back of the curb (on the building side).~~
- a. The **Contractor shall** require that parking for the new structure meet current AT/FP guidelines. **The parking lot minimum standoff distance, either 33 feet or 82 feet, is to be in accordance with UFC 4-010-01, 8 October 2003, and will be determined during the design charrette. The building is classified as a Primary Gathering Place within a Controlled Perimeter. These security parameters will be discussed/verified during the charrette and will then govern the parking lot site layout. This work will require placement of a curb, at either 33 or 82 feet, parallel from the southern face of new structure and building 900. The installation of the curb will require some demolition and it will require reinforcing steel. Additional demolition will be required to remove the asphalt between the building and the curb to create a landscaped area (zero-scape/limited or maintenance free landscaping). Reinforcing steel would not be required if fill material were to be located in back of the curb (on the building side). The user representative, James Verhaal, has indicated a need for between 105 to 110 parking stalls, as a minimum.**

END OF CHAPTER G19

CHAPTER G2**SITE IMPROVEMENTS****1. PERFORMANCE**

1.1 Basic Function:

- 1.1.1 Provide all elements required for finished and durable site surfaces, indoor plantings, and outdoor improvements described in the project program.
- 1.1.2 Site improvements comprise the following elements:
 - a. Pavements and Surfacing (G21): Finished surfaces for vehicular, pedestrian, and sports and recreational traffic, other than turf.
 - b. Landscaping (G23): Outdoor plants and elements supporting plants.
 - c. **Other Site Improvements (G29): An awning will be installed along the southern face of new building and building 900.**
- 1.1.3 Where site improvements elements also must function as elements defined within another element group, meet the requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance and Chapter G - Sitework.

END OF CHAPTER G2

CHAPTER G21**PAVEMENTS AND SURFACING****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 Recycle asphaltic concrete from any road removal work and use it for new road construction, as needed.
- 1.1.2 Where pavements and surfacing are integral with elements defined within another element group, meet requirements of both element groups.
- 1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter G - Sitework and Chapter G2 - Site Improvements.

END OF CHAPTER G21

CHAPTER G23**LANDSCAPING****1. PERFORMANCE**

CONCERNING THE NEW PARKING LOT LAYOUT: ADDITIONAL DEMOLITION WILL BE REQUIRED TO REMOVE ASPHALT BETWEEN THE BUILDING AND THE STAND-OFF CURB (TO BE INSTALLED AT EITHER 33 OR 82 FEET) TO CREATE A LANDSCAPED AREA (ZERO-SCAPE/LIMITED OR MAINTENANCE FREE LANDSCAPING).

1.1 Basic Function (option item):

- 1.1.1 ~~Install an awning along southern side of new building and building 900. The awning will aid in tying the adjacent buildings together.~~
- 1.1.2 ~~Where landscaping elements also must function as elements defined within another element group, meet the requirements of both element groups.~~
- 1.1.3 ~~In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 Facility Performance, Chapter G Sitework, and Chapter G2 Site Improvements.~~

END OF CHAPTER G23

CHAPTER G29

OTHER SITE IMPROVEMENTS

- 1. *INSTALL AN AWNING ALONG SOUTHERN SIDE OF NEW BUILDING AND BUILDING 900. THE AWNING WILL AID IN TYING THE ADJACENT BUILDINGS TOGETHER.***

CHAPTER G3**SITE SERVICES****1. PERFORMANCE****1.1 Basic Function:**

- 1.1.1 See Chapter D for basic requirements for services.
- 1.1.2 Provide the following site services:
 - a. Water Supply (G31): Means of supplying, collecting, storing, and distributing water for all purposes required in buildings and on site. See Chapter D2 for additional requirements.
- 1.1.3 Where site services elements must also function as elements defined within another element group, meet requirements of both element groups.
- 1.1.4 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter D - Services, and Chapter G - Site Work.

END OF CHAPTER G3

CHAPTER G31

WATER SUPPLY

1. PERFORMANCE

1.1 Basic Function:

1.1.1 Ensure Contractor

1.1.2 Provide means of supplying, collecting, storing, and distributing water from existing water services for all purposes required in buildings and on site.

1.1.3 In addition to the requirements of this chapter, comply with all applicable requirements of Chapter 111 - Facility Performance, Chapter G - Sitework, and Chapter G3 - Site Services.

END OF CHAPTER G31

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 MECHANICAL ROOM LAYOUT DRAWINGS:

The Contractor shall submit a layout drawing, including appropriate elevations and sections as required, for each Mechanical Room showing the room arrangement he proposes for all pieces of equipment and appurtenances thereto (viz., air-conditioning equipment, boilers, compressors, hot water tanks, pumps, electrical control panels, ducts, piping, etc.), that are to be located in the room. The Mechanical Room floor slab will not be placed until the complete Mechanical Room layout drawing has been submitted **as part of the design documents**. ~~and approved. No payment will be made to the Contractor for any of the equipment for the room or its installation until these drawings have been approved. Mechanical Room Layout Drawings shall be identified and submitted in the manner specified for "Shop Drawings".~~ Equipment rooms shown on the drawings are of adequate size to accommodate equipment of required capacities, as available from several manufacturers, with sufficient space left for access, servicing, removal, etc. The use of equipment items with dimensions such as to crowd the space will not be permitted.

3.7 SPARE PARTS LIST AND MAINTENANCE OPERATIONS MANUALS:

Within 30 calendar days after approval of shop drawings and equipment lists, the Contractor shall submit, to the Contracting Officer, 3 copies of spare parts lists and operating and maintenance manuals as required under the various headings of these specifications. One reproducible, unfolded copy shall be provided of all operating instructions, control diagrams, etc., that are larger than 8-1/2-inches by 11-inches; this does not apply to standard manufacturer's data.

(A) Spare parts lists shall contain the following listed information:

- (1) Quantity of parts required for 120 days and one year of operation.
- (2) Description of each spare part.
- (3) Drawing number and shop drawing reference.
- (4) Part equipment code number.
- (5) Unit price of each item.
- (6) Total price of all items.
- (7) Procurement lead time with particular attention to long lead times.
- (8) Name and address of nearest supplier.
- (9) Such remarks and data as the manufacturer may consider pertinent.
- (10) Complete parts list of all replaceable items.