FC 4-211-03F
3 MAY 2016

FACILITIES CRITERIA (FC)

AIR FORCE FIGHTER ENGINE MAINTENANCE FACILITY

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AIR FORCE
FIGHTER ENGINE MAINTENANCE FACILITY

U.S. ARMY CORPS OF ENGINEERS

NAVAL FACILITIES ENGINEERING COMMAND

AIR FORCE CIVIL ENGINEER CENTER (Preparing Activity)

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

Change No.	Date	Location

FOREWORD

Facilities Criteria (FC) provide functional requirements (i.e., defined by users and operational needs of a particular facility type) for specific DoD Component(s), and are intended for use with unified technical requirements published in DoD Unified Facilities Criteria (UFC). FC are applicable only to the DoD Component(s) indicated in the title, and do not represent unified DoD requirements. Differences in functional requirements between DoD Components may exist due to differences in policies and operational needs.

All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the most stringent of the FC, the SOFA, the HNFA, and the BIA, as applicable.

Because FC are coordinated with unified DoD technical requirements, they form an element of the DoD UFC system applicable to specific facility types. The UFC system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, applicable to the Military Departments, Defense Agencies, and the DoD Field Activities. The UFC System also includes technical requirements and functional requirements for specific facility types, both published as UFC documents and FC documents.

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

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

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

Refer to UFC 1-200-01, *General Building Requirements*, for implementation of new issuances on projects.

AUTHORIZED BY:

EDWIN H. OSHIBA, SES, DAF
Deputy Director of Civil Engineers
DCS/Logistics, Engineering & Force Protection

FACILITIES CRITERIA (FC)
NEW SUMMARY SHEET

Document: FC 4-211-03F, *Fighter Engine Maintenance Facility*

Superseding: None.

Description: This FC provides requirements for evaluating, planning, programming, and designing fighter engine maintenance facilities. The information in this FC applies to the design of all new construction projects, to include additions, alterations, and renovation projects in the continental United States (CONUS) and outside the continental United States (OCONUS). It also applies to the procurement of design/build services for the above-noted projects. Alteration and renovation projects should update existing facilities to meet the guidance and criteria within budgetary constraints.

Reasons for Document: This FC is the initial release to establish requirements for a fighter engine maintenance facility. It defines the criteria for determining appropriately sized, flexible, cost optimized, durable, quality-designed facilities on a life cycle basis to support the mission.

Impact: This FC will facilitate and standardize the design of fighter engine maintenance facilities throughout the Air Force.

- It will provide more complete and consistent project requirements and will expedite the programming and design of facilities and reduce initial design cost.
- The improved performance-based criteria and coordination with the Air Force request-for-proposal (RFP) template will reduce design-build proposals.

Unification Issues: None.

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FIGURES

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CHAPTER 1 INTRODUCTION

1-1 GENERAL INFORMATION.

The standard facility prototype design program defines consistent facility requirements across the Air Force enterprise to expedite delivery of a facility. The objective is to deliver appropriately-sized, flexible, cost-optimized, durable, quality-designed facilities on a life cycle basis to support the Air Force mission.

This FC was provides standard facility prototype design criteria to assist Air Force planners in preparing and validating requirements for DD 1391, “FY __ Military Construction Project Data,” and to assist A-E design professionals with the approved project-specific design requirements. It is a source of basic programming and functional information for fighter engine maintenance facilities. This FC is consistent with Air Force Corporate Facility Standards (AFCFS) and UFCs, and complies with Air Force Manual (AFMAN) 32-1084, *Facility Requirements*. Together with the AFCFS, this FC defines Air Force expectations for project programming and A-E design decisions.

A standard facility prototype represents a shift in Air Force facility design philosophy toward maximizing use of open office space and systems furniture. This design approach allows maximum flexibility to reconfigure the building space as mission needs change. Where offices require sound attenuation, or physical or visual separation, evaluate the use of systems furniture or demountable partition walls in lieu of full-height hard wall construction. Maximizing open office space may require more systems furniture; funding must be listed on the 1391 as an FF&E cost. Comply with the latest Air Force policy on centralized procurement of systems and other furniture.

1-2 GENERAL BUILDING REQUIREMENTS.

Comply with UFC 1-200-01, *General Building Requirement*s. UFC 1-200-01 defines applicability of model building codes and government-unique criteria for typical design disciplines and building systems, as well as for accessibility, antiterrorism, security, high performance and sustainability requirements, and safety. Use this FC in addition to UFC 1-200-01 and the UFCs and government criteria referenced herein.

1-3 REFERENCES.

Appendix A contains a list of related documents and references to be used with this FC. The publication date of the code or standard is not included. Use the latest available issuance of the reference.

1-4 INSTRUCTIONS.

The standard facility prototype was developed by determining personnel counts, allowable/authorized space/room sizes, adjacency diagrams between the functional spaces, and the overall facility space requirements. It establishes Air Force criteria for the facility type. Use these criteria together with other Air Force requirement documents such as AFIs and UFCs when programming and designing this facility type.

Supplement this FC with thorough review by individual program managers and operations staff.

1-4.1 Standard Facility Prototype Tools.

This standard facility prototype consists of four parts to be used by programmers and designers:

1. Facilities Criteria for standard prototype (this FC).
2. Interactive programming sheet.
3. Facility Building Information Modeling (BIM) drawings.
4. Supplemental RFP data.

1-4.2 Facilities Criteria.

The facilities criteria consist of three primary components:

- Notional site.
- Composite facility adjacency diagram(s).
- Modules with associated room data sheets.

1-4.2.1 Notional Site.

The notional site plan diagram depicts key site development criteria. It is not a site-specific solution. The information represents the land requirements to construct this facility and includes associated antiterrorism standoff and parking. Use of existing or shared parking is allowable and may reduce the total acreage required for the facility. Adapt the requirements to the specific site and location and comply with the applicable Installation Development Plan (IDP) and Area Development Plan (ADP) for facility siting.

1-4.2.2 Composite Facility Adjacency Diagram(s).

The composite diagram(s) represent ways to conceptually assemble the functional areas (modules) into a cohesive whole. They demonstrate how the various functional components of the facility type can be successfully placed together into layout diagrams. Individual modules are represented by different colors. They are not intended to be definitive building designs.

1-4.2.3 Modules.

Spaces and rooms that are integrally related with a specific functional connection or operational flow are grouped into a module. Modules and the associated room data sheets identify specific criteria and additional detail for each functional area of the facility as outlined in the space program sheets located in Appendix D. Information is provided in a standard presentation and data sheet format. The required space adjacencies and modules are illustrated in figures.

The modules are a grouping of functional spaces and represent “Lego® blocks” to be used in a “kit-of-parts” design approach. Use the fixed modules as pre-assembled pieces of the facility “puzzle.” Assemble them to comply with the required adjacencies indicated in the diagrams and module plans. Arrange modules and create a configuration/composite building layout/plan responding to the constraints and opportunities of the specific site.

The resulting shape of the facility assembled from the standard facility prototype modules must provide construction efficiencies obtained from building proportions and overall configuration. The building footprint shall be organized and well composed. The building design must comply with the installation facility standards (architectural compatibility plan) and the AFCFS.

1-4.2.4 Module Flexibility/Adjustments.

Modules must be used as designed to the greatest extent possible, and must not be deconstructed or altered except as indicated herein. The intent of the standard facility prototype criteria is to avoid manipulation of the composition, functional relationships, adjacencies, and module sizes. Modules contain fixed attributes and must not be changed arbitrarily. Modules may be rotated, flipped, and reversed to accommodate an overall composition or site issue. When the fixed modules cannot be arranged to produce a constructible floor plan due to site constraints, it is permissible to slightly adjust a module proportion to create a constructible plan. Manipulating the module shape must not result in an overall increase in square feet or reduce the functionality of any module or the composite plan.

Some modules are linked to space requirements that increase or decrease in size based on the personnel count and equipment for a particular mission. In these cases, increase or decrease the size of the module to match the revised scope calculation. This may sometimes require minor adjustments in adjacent modules so that they properly fit together to create a constructible facility floor plan. Spaces must comply with any critical dimensions indicated on module plans. Manipulate as few modules as possible to create a constructible facility. The resulting composite plan must respect the established modules’ adjacencies and must not exceed the authorized project scope.

1-4.2.5 Room Data Sheets.

Specific requirements for each room, space, or area are provided on room data sheets that are located following their respective module. Information contained on the data sheets defines the functional and physical requirements for each of the spaces within the facility type.

1-4.3 Programming Sheet(s).

This tool is provided in two formats. The pdf programming sheet cited in Appendix B reflects the baseline standard facility program and is provided primarily as a reference. The additional interactive programming sheet provides a tool for planners and programmers. It allows the input of authorized personnel positions and special purpose spaces. Updated inputs are automatically calculated and provide new required square

footage for each space and the estimated overall facility size. Appendix C contains a link for direct access to the interactive tool.

1-4.4 Facility Drawings – BIM.

This component of the standard facility prototype tool includes both a pdf version and Revit version of the modules and rooms. The spaces, rooms, and modules shown reflect the baseline standard facility program spreadsheet located in Appendix B. Drawings in this FC are exact copies of the larger BIM drawings and comply with the program scope. The BIM drawings provide a starting point for the digitization of building data and a starting point in the design and construction of a facility. BIM and pdf documents are found at the link provided in Appendix C.

1-4.5 Additional and Alterations.

For additions and alterations to existing facilities, use the adjacencies, sizing/scope, and detailed requirements contained in the site diagrams, module drawings, and room data sheets to the maximum extent possible. The functionality and adjacency of the modules are still valid, but may require some manipulation to fit into existing spaces. This standard may be modified slightly to accommodate the existing structure. Move non-structural walls to the greatest extent possible to open up space in the existing facilities to make them more receptive to the placement of the modules. The planner and designer will determine the most efficient means to balance the placement of modules within existing spaces or as a facility addition.

CHAPTER 2 SITE AND OVERALL ADJACENCY

2-1 GENERAL FACILITY OVERVIEW.

A fighter engine maintenance facility is typically a one-story structure. It is a standalone facility that houses fifth-generation fighter engines and maintenance crews based upon four engine work bays – typical for fifth generation fighters. (Note: The F-35 does not require a separate engine maintenance facility). The engine maintenance facility will include the following modules: engine shop bay module, engine shop support module, flight chief/training administration module, break room module, toilet/shower/locker module, and building support module.

2-1.1 AFCFS.

Consult the AFCFS to determine quality standards for this facility group. This standard facility prototype is considered a Group 3 hierarchy.

2-1.2 Facility Users/Occupants.

This facility is operated by active duty, guard, and reserve military personnel, as well as contractor representatives from the selected engine provider. The number of occupants is approximately 25 personnel per shift (typically two shifts) used by both civilian and military personnel throughout the building

2-1.3 Operational Aspects.

Hours of operation for this facility type are user-driven and vary for different engine types. Amount of air traffic on base can also alter the hours of operation. Engines are delivered on flatbed trucks from offsite locations, delivered to engine bay for initial processing, and trailered to and from the flight line. An exterior wash bay is used before and/or after an engine is serviced.

2-2 NOTIONAL SITE.

The site diagram represents a notional layout to reflect site development requirements/criteria only. It is not an actual site design. Siting must comply with the Installation Development Plan (IDP) and Area Development Plan (ADP).

2-2.1 Site Location and Orientation.

Several factors must be analyzed to determine the most appropriate and cost-effective location for a facility, such as availability and capacity of required utilities, the mass/scale of the facility relative to adjacent structures, and noise issues. Emphasize operation, function, and safety when siting the facility. The preferred location for a fighter engine maintenance facility is immediately adjacent to the flight line, or in close proximity. Other facilities/functions sited in close proximity may include general purpose maintenance hangars and aircraft sunshades. Analyze and comply with airfield clearances, building setback restrictions, and line-of-sight restrictions from the adjacent flight line.

The preferred orientation allows direct access to flight-line operations and ease of access for flight line vehicles and equipment. The approximate project area required for a four-bay shop is 4.00 acres, which includes antiterrorism standoff and parking.

2-2.2 Vehicular and Pedestrian Circulation.

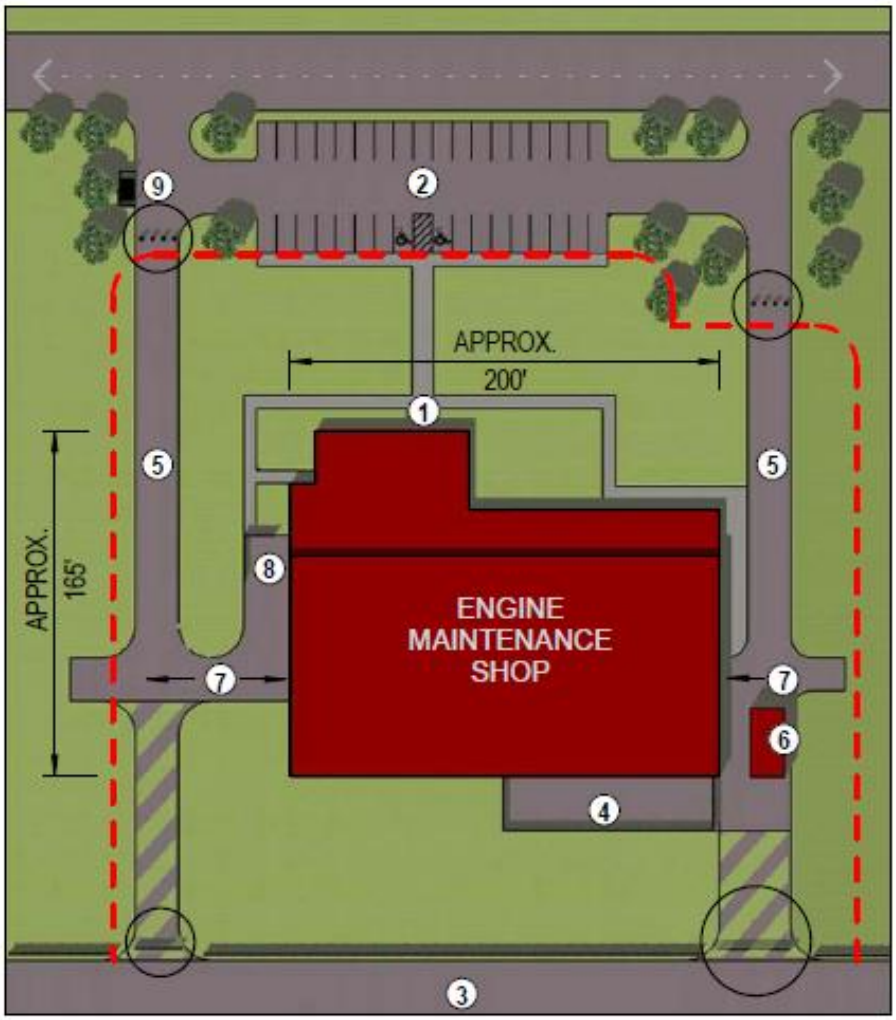
Ensure convenient, safe vehicular access and circulation for personal vehicles and essential services, including operations, maintenance, deliveries, trash and garbage collection, and emergency services. Provide parking to accommodate the largest shift size plus an additional 40 percent for shift overlap. Separate service drives to the facility from parking circulation areas.

Locate sidewalk networks to provide convenient and safe pedestrian circulation from existing circulation elements of the project site to the new parking areas and doors of the facility.

2-3 COMPOSITE FACILITY ADJACENCY (FIGURE 2-2).

This facility has a mixed use of occupants and many points of entry. A majority of administration and training personnel will enter through the main building entrance. Maintenance groups will be in/out of the engine shop bay throughout the day. If the facility is operational and occupied, spaces are left unlocked and accessible for transitioning engines to/from the flight line. Finalize any additional entrances when siting and orienting the building.

Figure 2-1 Notional Site Diagram



NOTES:

① PRIMARY BUILDING ENTRY
② POV PARKING LOT
③ FLIGHT LINE ACCESS (PREFERRED BUT NOT REQUIRED)
④ EXTERIOR ENGINE COMPONENT STORAGE
⑤ SERVICE DRIVE (ONE WAY)
⑥ EXTERIOR COVERED ENGINE WASH BAY
⑦ TRUCK ACCESS
⑧ MECHANICAL SERVICE YARD
⑨ DUMPSTER / SCREENED ENCLOSURE

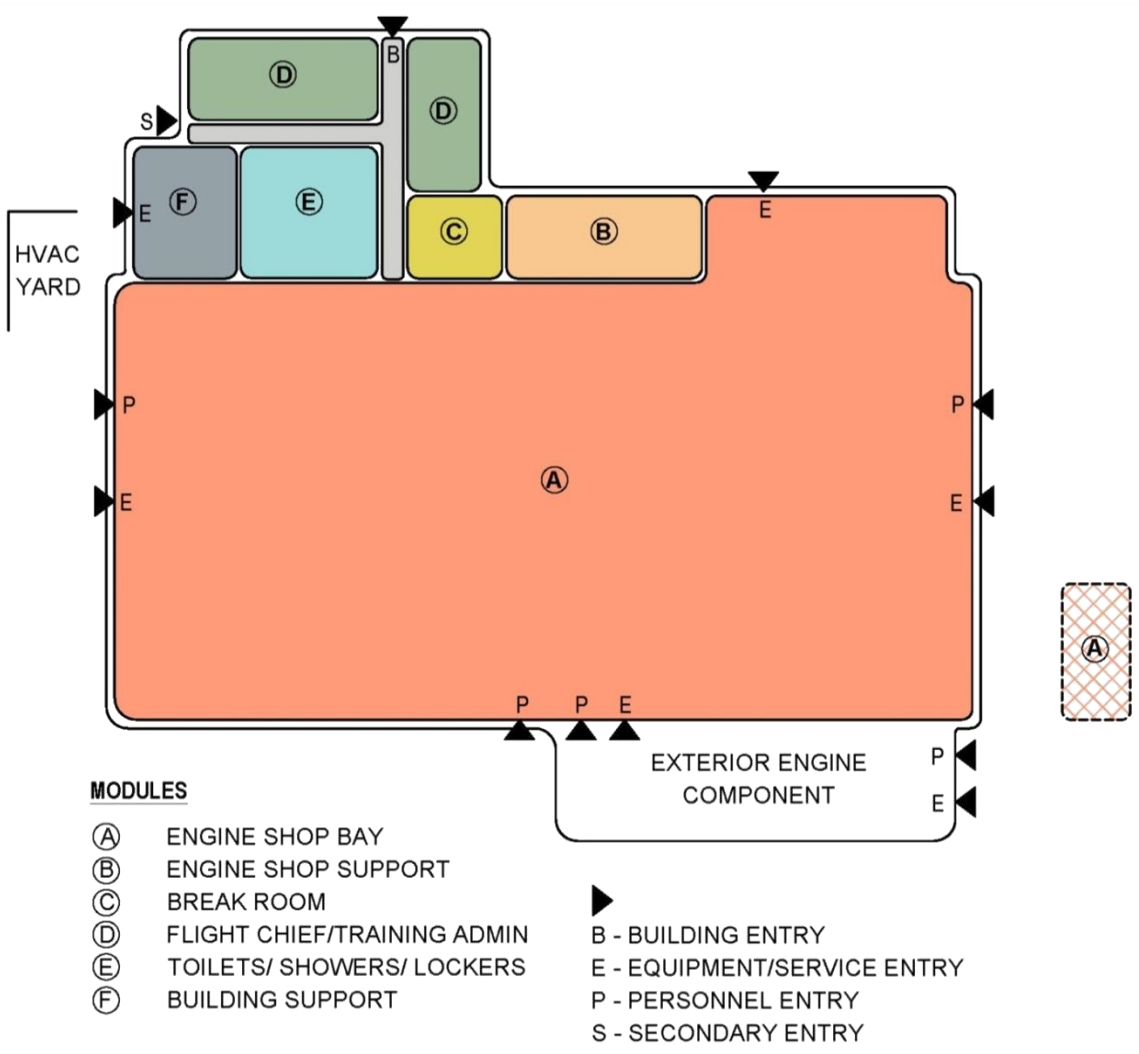
LEGEND:

CONCEPTUAL AT SETBACK (REFERENCE UFC 4-010-01)

ACCESS STREET

CONTROLLED VEHICLE ACCESS

Figure 2-2 Functional Adjacency Diagram



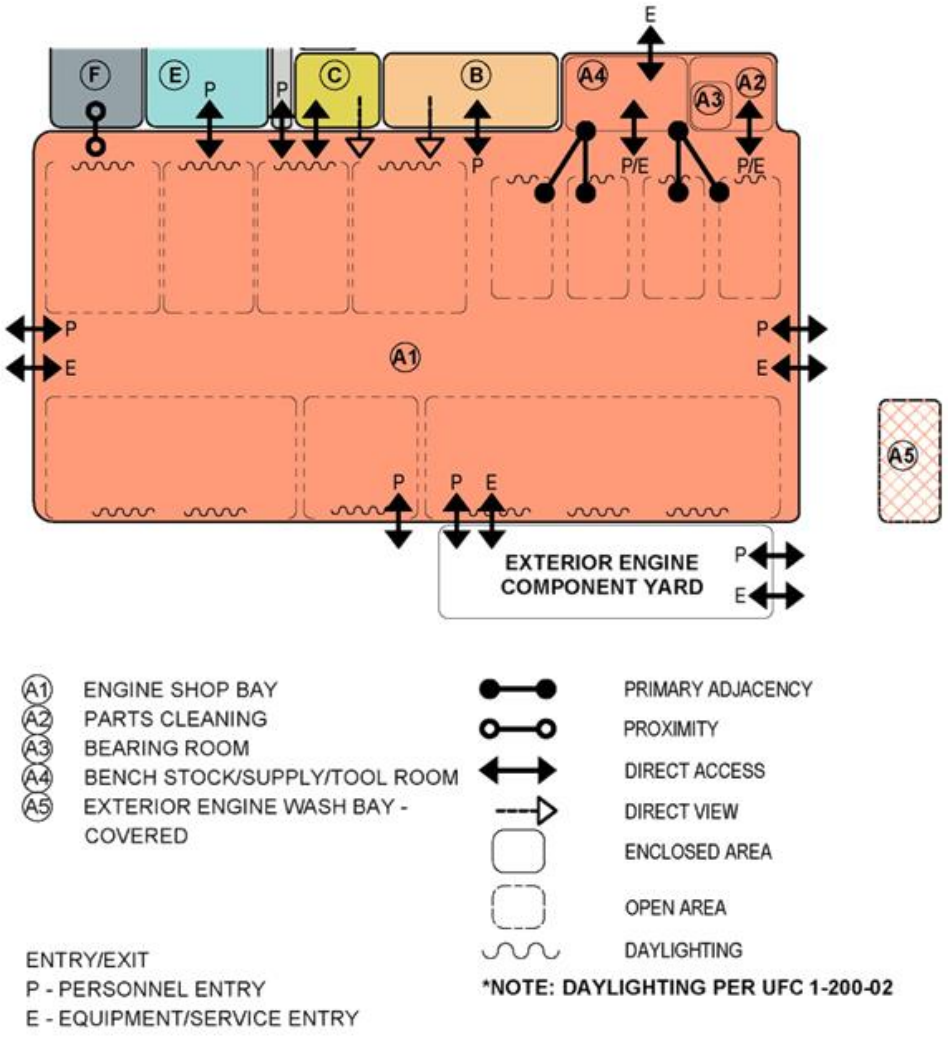
CHAPTER 3 FACILITY REQUIREMENTS AND CRITERIA

3-1 MODULE A - ENGINE SHOP BAY MODULE.

3-1.1 Function and Adjacency.

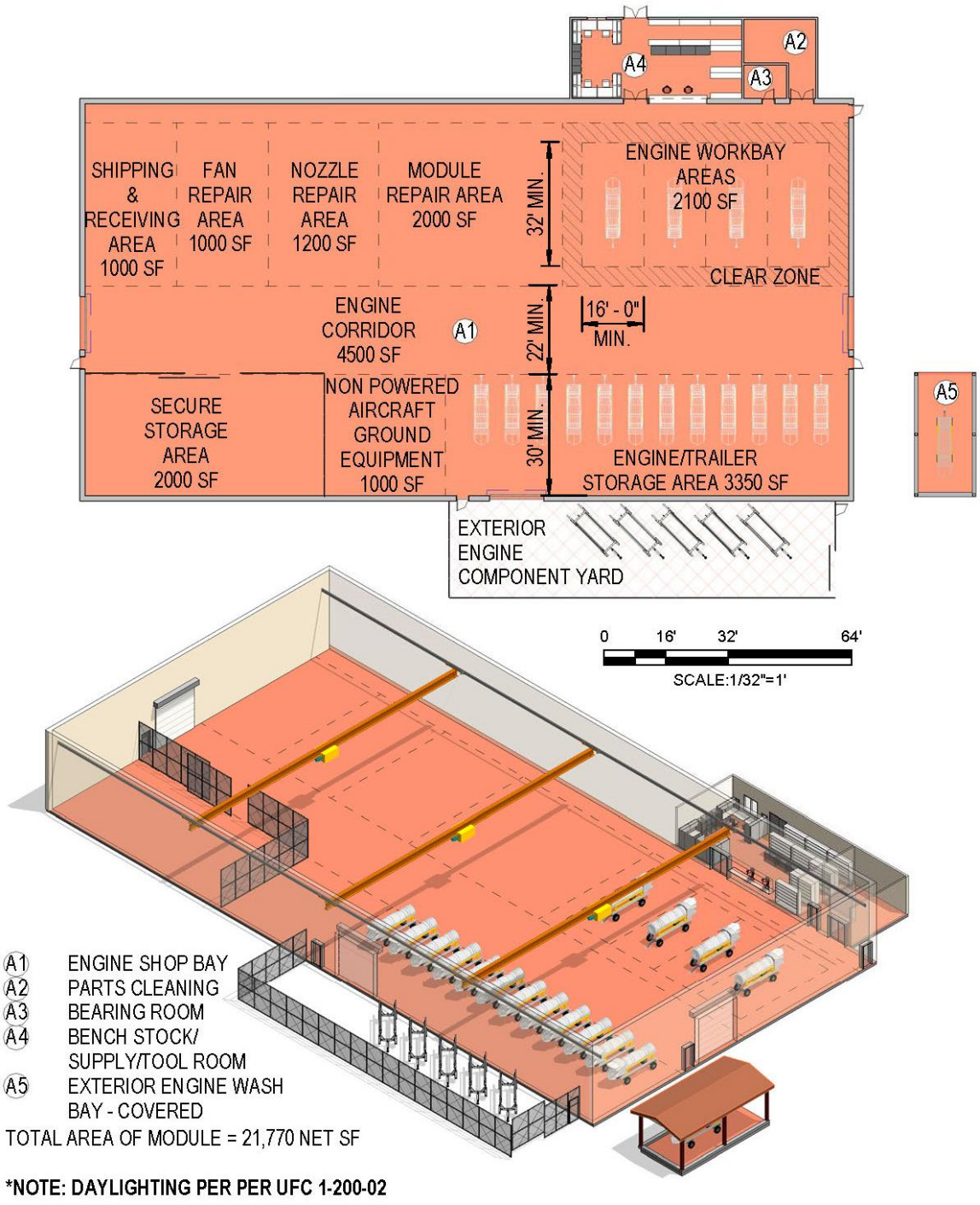
The engine shop bay supports the primary function of the maintenance facility. It is a high-bay, open-space module, with different sub-areas for different types of engine maintenance. Each area is delineated by paint or separated by an internal fence. Equipment and sub-areas are location- and engine-specific and must be verified for final layout. The engine shop bay must have overhead doors on both sides for shipping and receiving engines. An engine will travel in either direction depending upon its maintenance schedule. Trucks work with the bridge cranes to transition engines to and from the flight line or an off-site location. The width of the bay is determined by critical dimensions shown. The listed sub-areas, or a variation of these, are required. The size of these areas is based on the number of engine work bays, and can range proportionally.

Figure 3-1 Module A Adjacency Diagram



3-1.2 Engine Shop Bay Floor Plan (Figure 3-2).

Figure 3-2 Module A Floor Plan and Axonometric



3-1.3 Data Sheets.

Figure 3-3 A1 Engine Shop Bay Room Data Sheet

Description/Usage		General engine maintenance for F-15, F-16, F-22 aircraft engines. Areas include four engine work bays, secure storage area, non-powered aircraft ground equipment, work aisle, engine trailer storage for 14 trailers with a trailer work area, contractor module repair, nozzle, fan repair, and shipping/receiving.
Ceiling Height		20'-0" minimum or as required for 15' hook height clearance
Windows		Translucent wall panels or glazing for daylighting
Doors	**Type**	Hollow metal, 3'x7' Overhead insulated coiling door, 14'x14' power operated
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels 5"x20" at all exterior doors and bench stock room Kick plates both sides of all doors
Finishes	**Walls**	CMU - painted wainscot to 8', pre-finished metal wall or liner panels above to roof deck
	Floor	Epoxy - Non-slip (fuel resistant) or sealed concrete
	Base	No base
	Ceiling	Exposed structure – painted
Plumbing		No floor drains; eyewash shower/eyewash stations per UFC 3-420-01; compressed air drop every 25 feet; coordinate drop locations with users; hose bib
HVAC		Heated with overhead infrared heaters; ventilation with exhaust fans and intake louvers
Fire Protection		Wet pipe or dry pipe sprinkler system as required by UFC 3-600-01
Power		270Vdc/400hZ aircraft power, 480V RECEPT, and receptacles per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	Intrusion Detection System (IDS)
Acoustical		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Three 5-ton bridge cranes running the full length of the bay – 15' hook height A.F.F.
Special Requirements		Exterior engine component area 25' x 125' of fenced (7'-0" high w/3-strand barbed wire) storage space with concrete surface located adjacent engine shop bay

Figure 3-4 A2 Parts Cleaning Room Data Sheet

Description/Usage		Used to clean engine parts outside of the engine work bay areas. Parts cleaning uses manual solvent parts washers/ cleaners for light to moderate soil levels. Small parts are manually cleaned in the sink and the solvent drains into a 30-gallon reservoir below. Space will have localized exhaust hoods at a parts cleaner station. This space is occupied only by maintenance personnel when cleaning engine parts.
Ceiling Height		No ceiling, 9'-0" minimum clearance
Windows		N/A
Doors	**Type**	Hollow metal, pair 3'x7'
	Security/ Hardware	Keyed lock set Provide door seals for fume containment
	View Panels/ Kick Plates	View panels, 5"x20" at door to engine shop bay Kick plates both sides of each door
Finishes	**Walls**	CMU - painted
	Floor	Epoxy - non-slip or sealed concrete
	Base	No base
	Ceiling	Exposed to structure - painted
Plumbing		Industrial sink, emergency shower/eyewash stations per UFC 3-420-01
HVAC		Air conditioned; heated; localized exhaust over parts cleaning tanks
Fire Protection		Wet pipe sprinkler system
Power		Hazardous location Per UFC 3-520-01 and NEC
Lighting		Hazardous location Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	IDS
Acoustical		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Parts cleaning equipment; work bench
Special Requirements		

Figure 3-5 A3 Bearing Room Data Sheet

Description/Usage		Used for cleaning, inspection, lubrication, and wrapping of the engine bearings. The room must be a clean, dust free, environmentally controlled area. This space is occupied by maintenance personnel only when accomplishing maintenance on engine bearings.
Ceiling Height		No ceiling, 9'-0" minimum
Windows		N/A
Doors	**Type**	Hollow metal, 4'x7'
	Security/ Hardware	Keyed lock set Provide door seals for fume containment
	View Panels/ Kick Plates	View panels, 5"x20" at door to engine shop bay Kick plates on both sides of door
Finishes	**Walls**	CMU – painted
	Floor	Epoxy – non-slip or sealed concrete
	Base	No base
	Ceiling	Exposed to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone; localized exhaust
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01 and a 30A 240V power outlet. Hazardous areas per T.O. 44B-1-15.
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	IDS
Acoustical		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Bearing cleaning vats and equipment, work bench
Special Requirements		Electrical classification of the area around the cleaning vat and ventilation and filtering of the room air must comply with T.O. 44B-1-15. A tacky vinyl blotter/floor mat is required on both sides of the bearing room door entrance.

Figure 3-6 A4 Bench Stock/Supply/Tool Room Data Sheet

Description/Usage		Room for bench stock personnel, tool storage and tool distribution to maintenance personnel
Ceiling Height		9'-0" minimum clearance
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, pair 3'x7', interior to engine shop bay and exterior 4'x8' coiling manual counter shutter to engine shop bay
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" at door to engine shop bay Kick plates on both sides of doors
Finishes	**Walls**	CMU or impact resistant gypsum board - painted
	Floor	Epoxy – non-slip or sealed concrete
	Base	Resilient
	Ceiling	Exposed to structure - painted or acoustical ceiling tile
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	IDS
Acoustical		N/A
Furnishings, Equipment and Casework		Four workstations in open office setting; storage racks; counter with coiling manual counter shutter from tool delivery area to engine shop bay
Special Requirements		

Figure 3-7 A5 Exterior Engine Wash Bay - Covered Room Data Sheet

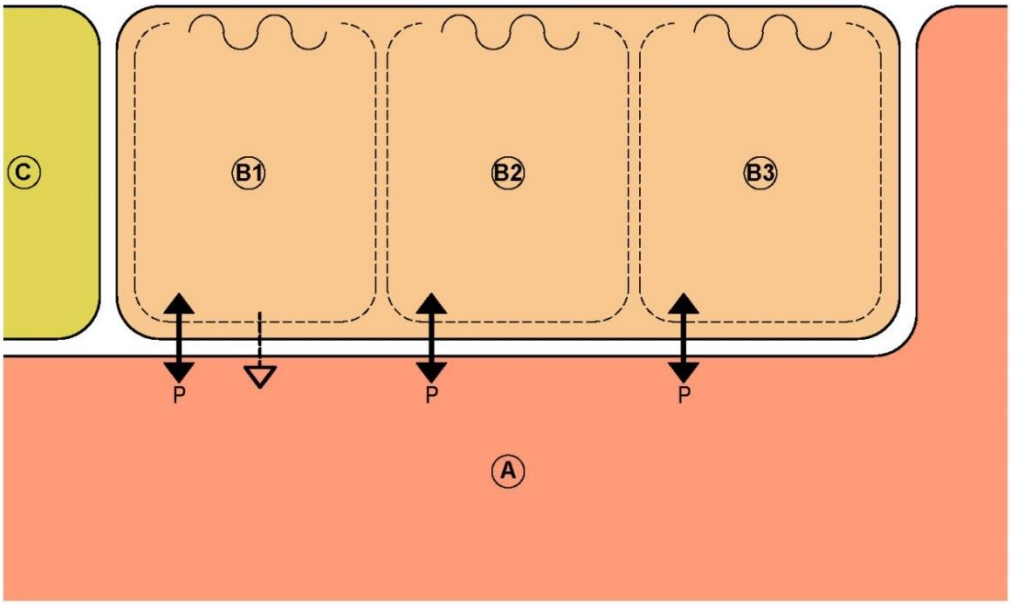
Description/Usage		An open wash bay to clean engines before or after being transported. Engines are backed in on trailers.
Ceiling Height		12’ minimum clear height to structure
Windows		N/A
Doors	**Type**	N/A
	Security/ Hardware	N/A
	View Panels/ Kick-Plates	N/A
Finishes	**Walls**	N/A
	Floor	Concrete or asphalt
	Base	N/A
	Ceiling	Exposed structure - painted
Plumbing		Freeze-proof hose stations; localized area drains
HVAC		N/A
Fire Protection		N/A
Power		N/A
Lighting		Flood lighting; per UFC 3-530-01
Communication	**Tele.**	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		N/A
Furnishings, Equipment and Casework		N/A
Special Requirements		Provide hose stations in close proximity 16’ (w) x 32’(L) x 12’(H) clear of all obstructions; canopy sun shade for engines as required by mission and base constraints

3-2 MODULE B – ENGINE SHOP SUPPORT MODULE.

3-2.1 Function and Adjacency (Figure 3-8).

The engine shop support module is comprised of administration spaces that directly support the engine shop bay and is the only administration module placed directly adjacent to the engine shop bay. It is used by maintenance crews or personnel working directly with maintenance crews. Space requirements for personnel is the driving force in determining the net square footage needed in this module. These spaces can be separated by demountable partitions, systems furniture, or metal stud/gypsum board wall construction.

Figure 3-8 Module B Adjacency Diagram



B1 REPAIR SECTION CHIEFS
B2 READY ROOM
B3 JET ENGINE INTERMEDIATE MAINTENANCE (JEIM)

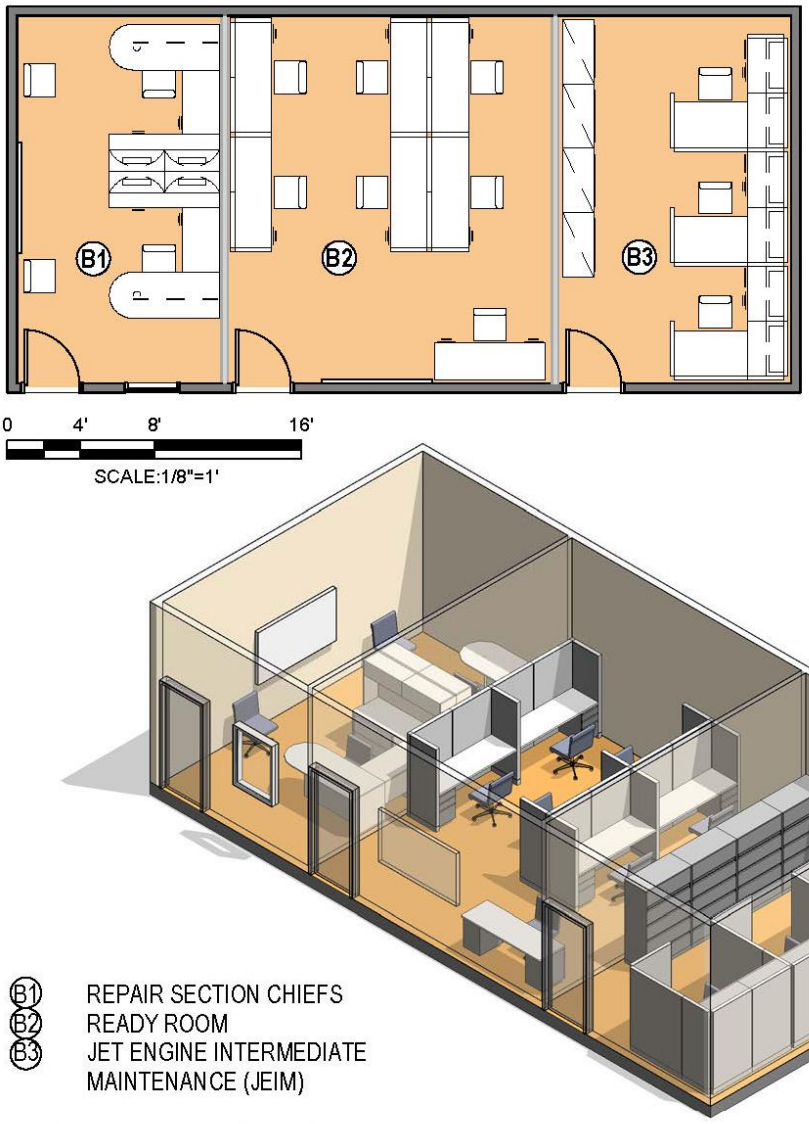
ENTRY/EXIT
P - PERSONNEL ENTRY
E - EQUIPMENT/SERVICE ENTRY

PRIMARY ADJACENCY
PROXIMITY
DIRECT ACCESS
DIRECT VIEW
ENCLOSED AREA
OPEN AREA
DAYLIGHTING

***NOTE: DAYLIGHTING PER UFC 01-200-02**

3-2.2 Engine Shop Support Floor Plan (Figure 3-9).

Figure 3-9 Module B Floor Plan and Axonometric



3-2.3 Data Sheets.

Figure 3-10 B1 Repair Section Chiefs Room Data Sheet

Description/Usage		Two Section Chiefs who oversee work in engine shop bay
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant; interior (3'x4') with view to bay
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" at door to engine shop bay Kick plates both sides all doors
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete or tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	IDS
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Two workstations and seats for visitors, whiteboard for instructional use
Special Requirements		

Figure 3-11 B2 Ready Room Data Sheet

Description/Usage		A transitional space between shifts and a training room for engine shop bay. For training, provide seating for each student and for instructors at ratio of one per six students. Provide space for hoteling, checking e-mails, etc.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated ATFP
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" at door to engine shop bay Kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete or tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile, or open to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	IDS
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Seven desks with computer-based training and whiteboard on one wall; desks (and associated power/data) should be flexible in layout to accommodate different functions.
Special Requirements		

Figure 3-12 B3 Jet Engine Intermediate Maintenance (JEIM) Room Data Sheet

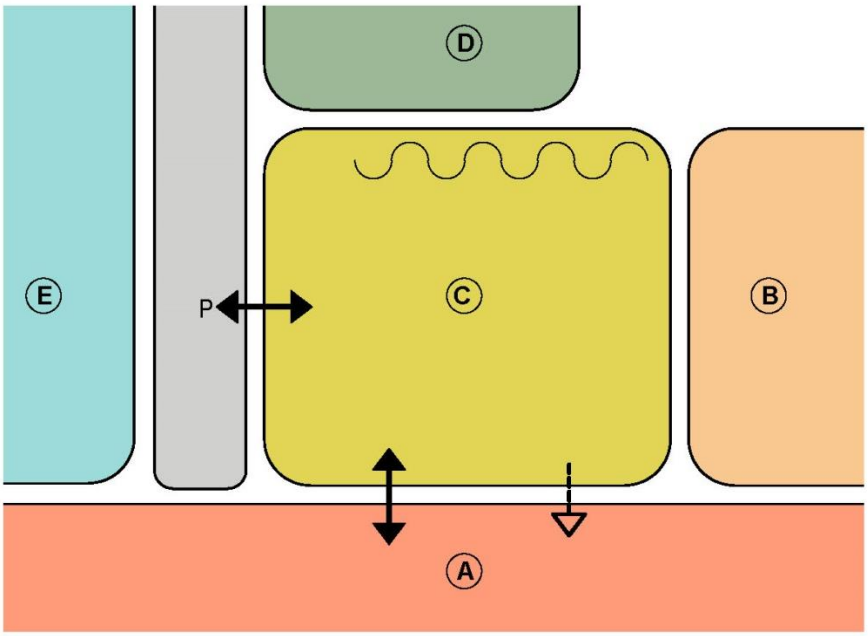
Description/Usage		Administration space for three occupants to log information regarding jet engine maintenance
Ceiling Height		9'-0" minimum
Windows		Exterior insulated ATFP
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" at engine shop bay kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete or tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR / SIPR
	CCTV	N/A
	CATV	N/A
	Security	IDS
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Three workstations and (4) 3 high 36" lateral files per occupant
Special Requirements		

3-3 MODULE C – BREAK ROOM MODULE.

3-3.1 Function and Adjacency (Figure 3-13).

The break room module is a stand-alone module, sized to accommodate 16-20 personnel. It will include a counter with sink and cabinets above, and areas for a microwave, refrigerator, and vending machines. This module supports the maintenance crews in the engine shop bay, as well as the administration personnel. It also functions as a team room for meetings. This module is centrally located for easy access from both groups.

Figure 3-13 Module C Adjacency Diagram



Ⓒ BREAK ROOM

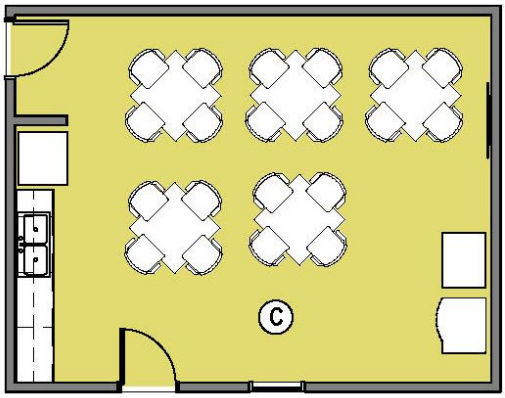
ENTRY/EXIT
P - PERSONNEL ENTRY
E - EQUIPMENT/SERVICE ENTRY

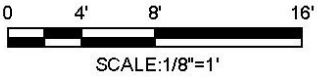
PRIMARY ADJACENCY
PROXIMITY
DIRECT ACCESS
DIRECT VIEW
ENCLOSED AREA
OPEN AREA
DAYLIGHTING

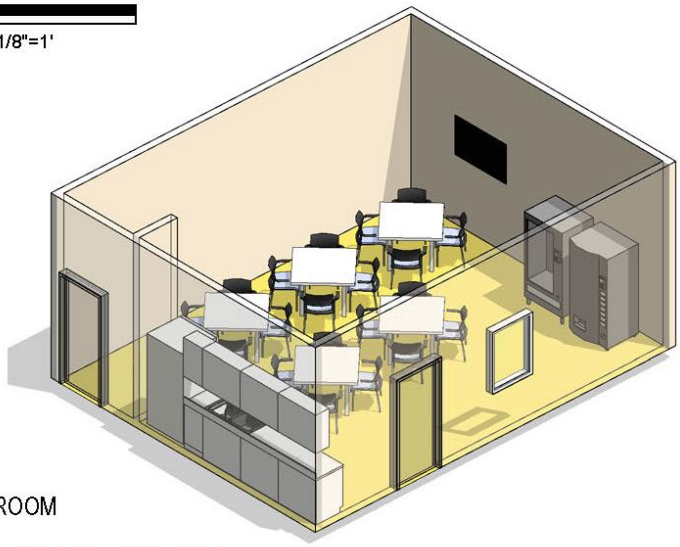
***NOTE: DAYLIGHTING PER UFC 01-200-02**

3-3.2 Break Room Floor Plan.

Figure 3-14 Module C Floor Plan and Axonometric







Ⓒ BREAK ROOM

TOTAL AREA OF MODULE = 520 NET SF

***NOTE: DAYLIGHTING PER UFC 1-200-02**

3-3.3 Data Sheets.

Figure 3-15 C Break Room Data Sheet

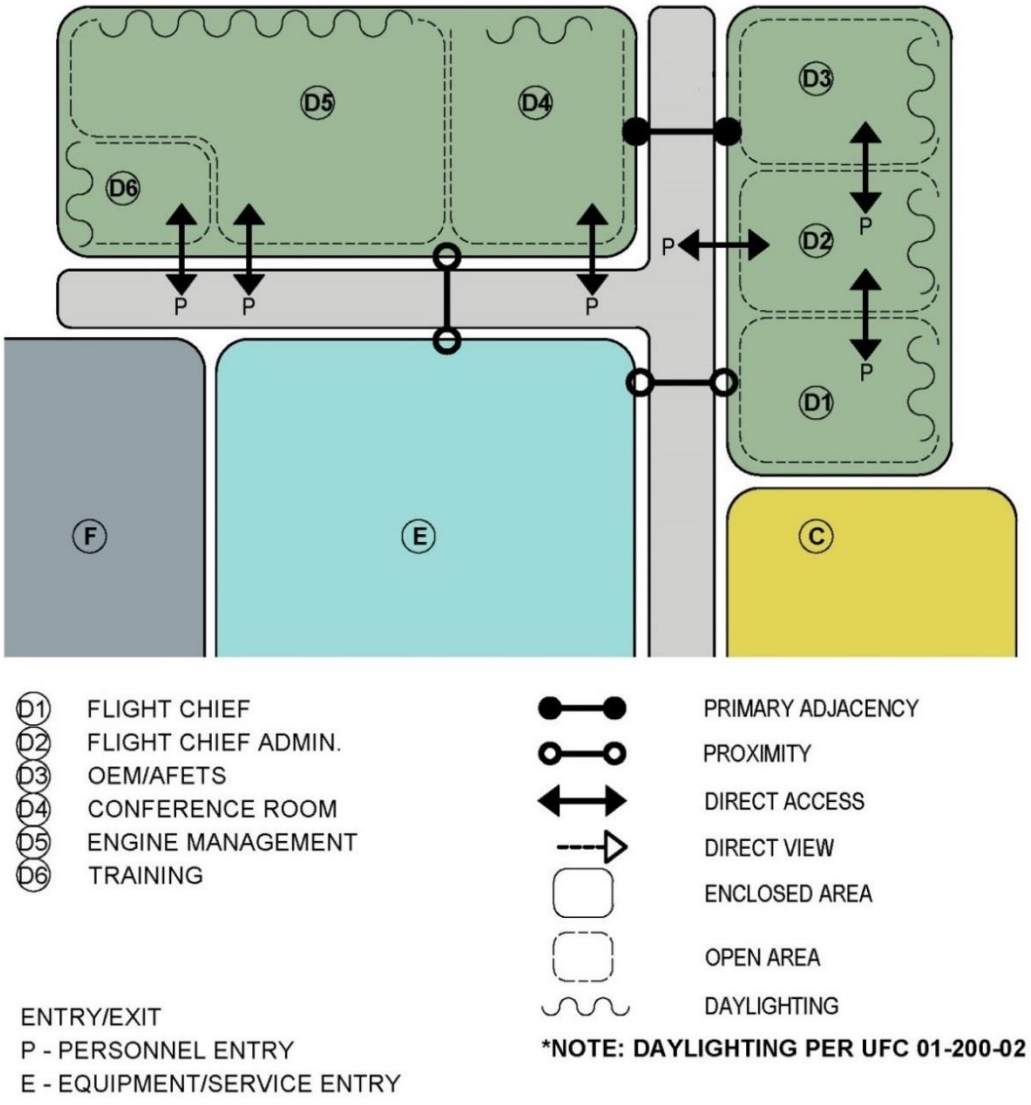
Description/Usage		An informal gathering space for personnel during lunch and breaks, and a transitional space before and after shifts; also used as a classroom and meeting room for up to 20 persons.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant or clearstory; interior (3'x4') with view to engine shop bay
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" for both interior doors kick plates both sides of doors
Finishes	**Walls**	Gypsum board – painted or CMU - painted
	Floor	Sealed concrete, stained concrete, quartz epoxy or tile
	Base	Resilient or quartz epoxy or tile
	Ceiling	Acoustical ceiling tile or open to structure – painted
Plumbing		Sink with disposal
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		120V dedicated circuits for coffee maker, microwave, and refrigerator; 120V convenience outlets per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Determined by operations at location
	Data	NIPR
	CCTV	N/A
	CATV	Yes, see plans for locations
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Seating for 16-20 people; refrigerator, microwave, dishwasher, double sink with disposal; vending machines; wall-mounted video monitor and bulletin board.
Special Requirements		

3-4 MODULE D – FLIGHT CHIEF/TRAINING ADMINISTRATION MODULE.

3-4.1 Function and Adjacency (Figure 3-16).

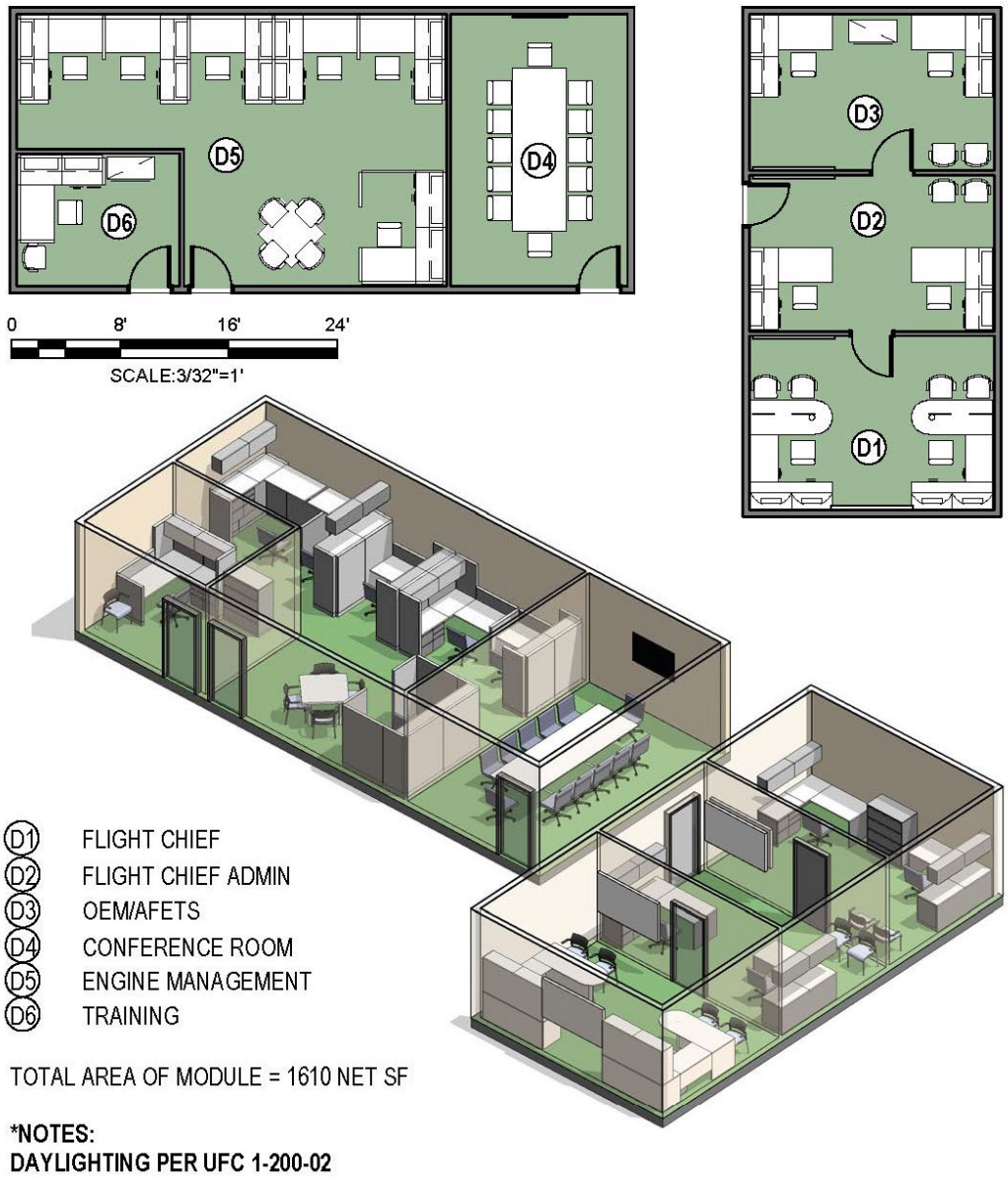
The Flight/Chief training administrative module comprises the following spaces: the Flight Chief office, with two workstation desks for the two Flight Chiefs; a Flight Chief administration area with two workstations, adjacent to the Flight Chief's office; an OEM/AFETS office with two workstations, located near the Flight Chief administration area; a conference room sized for 12 persons, centrally located near the Flight Chief's office; an engine management office with five open workstations and one small conference table; and a training office with one workstation. Locate this module directly adjacent to the building's main corridor, near the toilets/showers/lockers module and break room module. Interior spaces can be separated by demountable partitions, systems furniture, and/or gypsum board permanent construction.

Figure 3-16 Module D Adjacency Diagram



3-4.2 Flight Chief/Training Administration Floor Plan (Figure 3-17).

Figure 3-17 Module D Floor Plan and Axonometric



3-4.3 Data Sheets.

Figure 3-18 D1 Flight Chief Room Data Sheet

Description/Usage		An open office space that accommodates two Flight Chiefs for general administration, it must have space for up to four visitors during operational hours.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"X20" Kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete, tile, or carpet tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile, or open to structure – painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation;
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Two workstations with computer connection capabilities and whiteboard on one wall for instructional use
Special Requirements		

Figure 3-19 D2 Flight Chief Admin Room Data Sheet

Description/Usage		Supports the Flight Chiefs with daily tasks. Provide workspace for two occupants plus two visitors in a waiting area.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" Kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete, tile or carpet tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile, or open to structure – painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation;
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Two workstations with computer connection capabilities & whiteboard on one wall for instructional use;
Special Requirements		

Figure 3-20 D3 OEM/AFETS Room Data Sheet

Description/Usage		Open office space that accommodates two general administration personnel; must have space for two visitors during operational hours.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" Kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete, tile or carpet tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - panted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation;
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Two workstations with computer connection capabilities and whiteboard on one wall for instructional use; shared lateral storage.
Special Requirements		

Figure 3-21 D4 Conference Room Data Sheet

Description/Usage		Serves all personnel in the facility (is available for use by all in the facility, but not at once). Both maintenance crews and administration personnel will use this space. Clearance around conference table is a requirement.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panel, 5"x20" on door to corridor Kick plates both sides of door
Finishes	**Walls**	Demountable partitions, gyp. board- painted
	Floor	Sealed concrete, stained concrete, tile or carpet tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation;
Fire Protection		Wet pipe sprinkler system
Power		Per UFC3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one for the room
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Conference table with seating for 12; wall-mounted video monitor
Special Requirements		

Figure 3-22 D5 Engine Management Room Data Sheet

Description/Usage		Open office space that accommodates six general administration personnel. It must have enough space for two visitors during operational hours and a mini-conference area for collaboration.
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" for door to corridor Kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete, tile or carpet tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Six workstations; small conference table with seating for four to six personnel
Special Requirements		

Figure 3-23 D6 Training Room Data Sheet

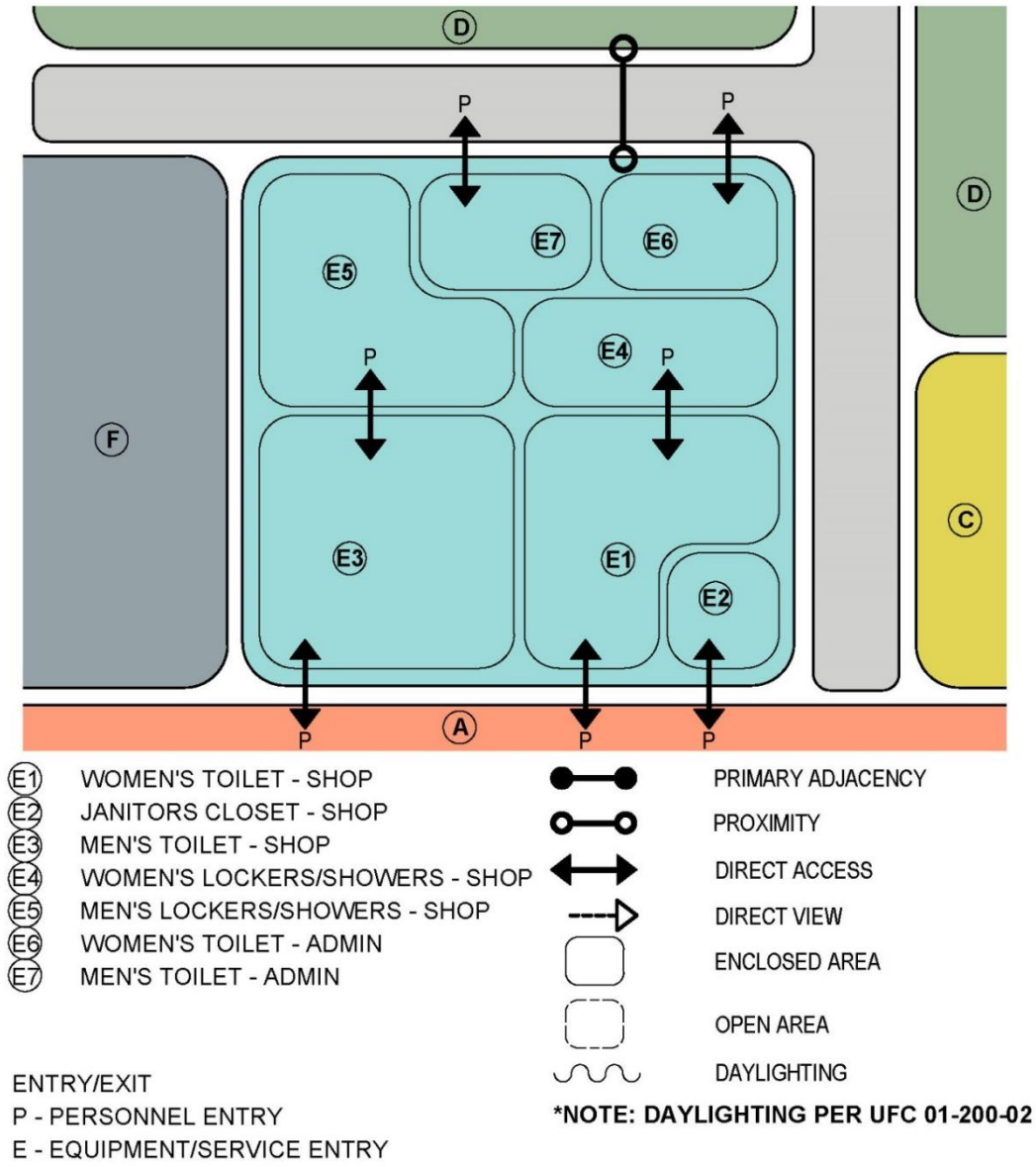
Description/Usage		An enclosed space for personalized training
Ceiling Height		9'-0" minimum
Windows		Exterior insulated AT compliant
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	View panels, 5"x20" on door to corridor Kick plates both sides of door
Finishes	**Walls**	Systems furniture, demountable partitions or gyp. board - painted
	Floor	Sealed concrete, stained concrete, tile or carpet tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - painted
Plumbing		N/A
HVAC		Air conditioned; heated; ventilation; single zone
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		One workspace with space for visitors; lateral storage; whiteboard for instructional use.
Special Requirements		

3-5 MODULE E – TOILETS/SHOWERS/LOCKERS MODULE.

3-5.1 Function and Adjacency.

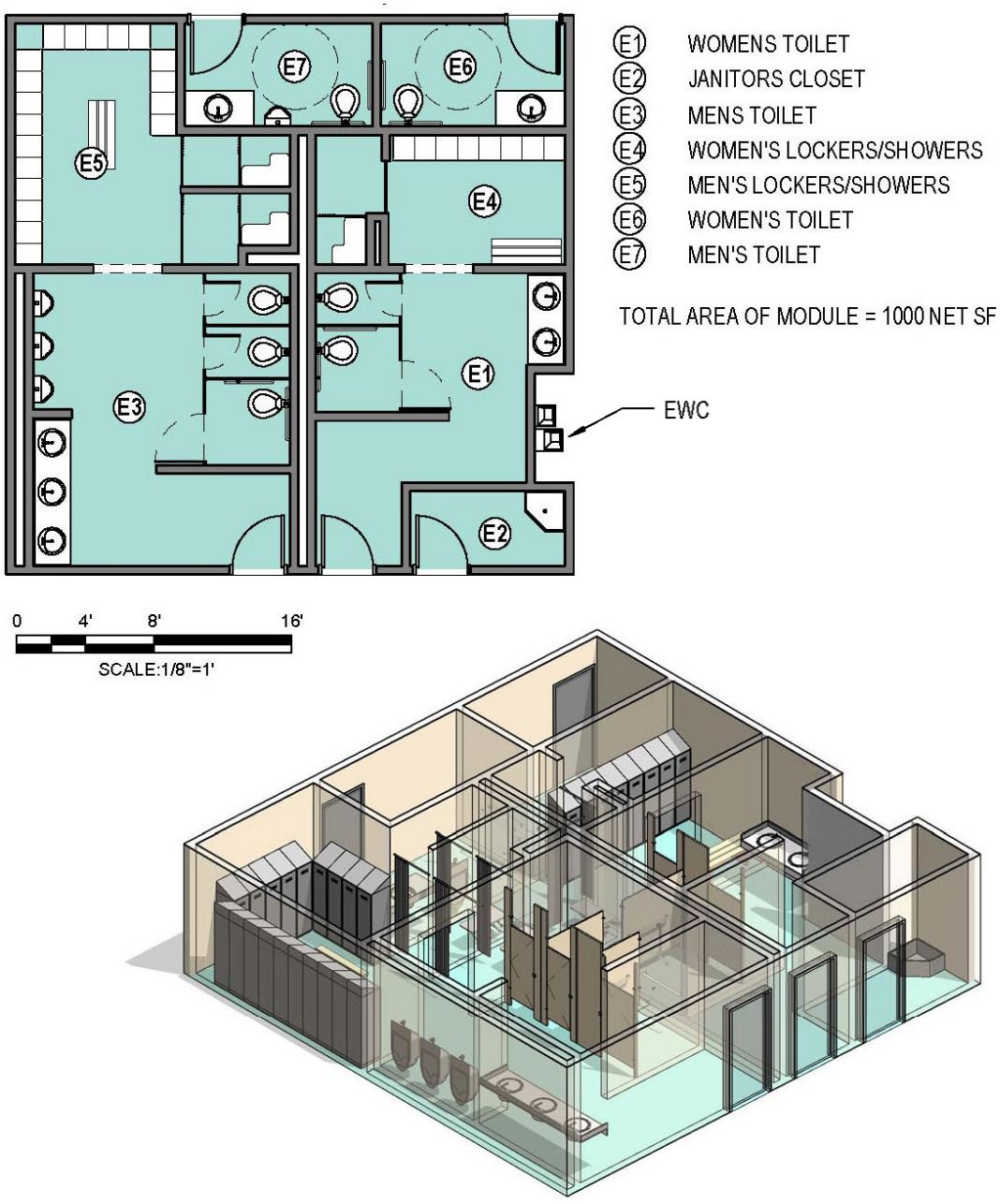
The toilets/showers/lockers module consists of men's and women's toilet/shower/locker rooms (sized for 25 total per shift, 75/25 male/female ratio) and a janitor's closet. It will be centrally located, with direct access to the engine shop bay area. The locker room module will have full-height lockers for two shifts (25-30 lockers). It will contain a single male toilet room and a single female toilet room, each with one water closet and an adjacent lavatory, and with access to the administrative module.

Figure 3-24 Module E Adjacency Diagram



3-5.2 Toilets/Showers/Lockers Floor Plan (Figure 3-25).

Figure 3-25 Module E Floor Plan and Axonometric



3-5.3 Data Sheet.

Figure 3-26 E1-E7 Toilets/Showers/Lockers Room Data Sheet

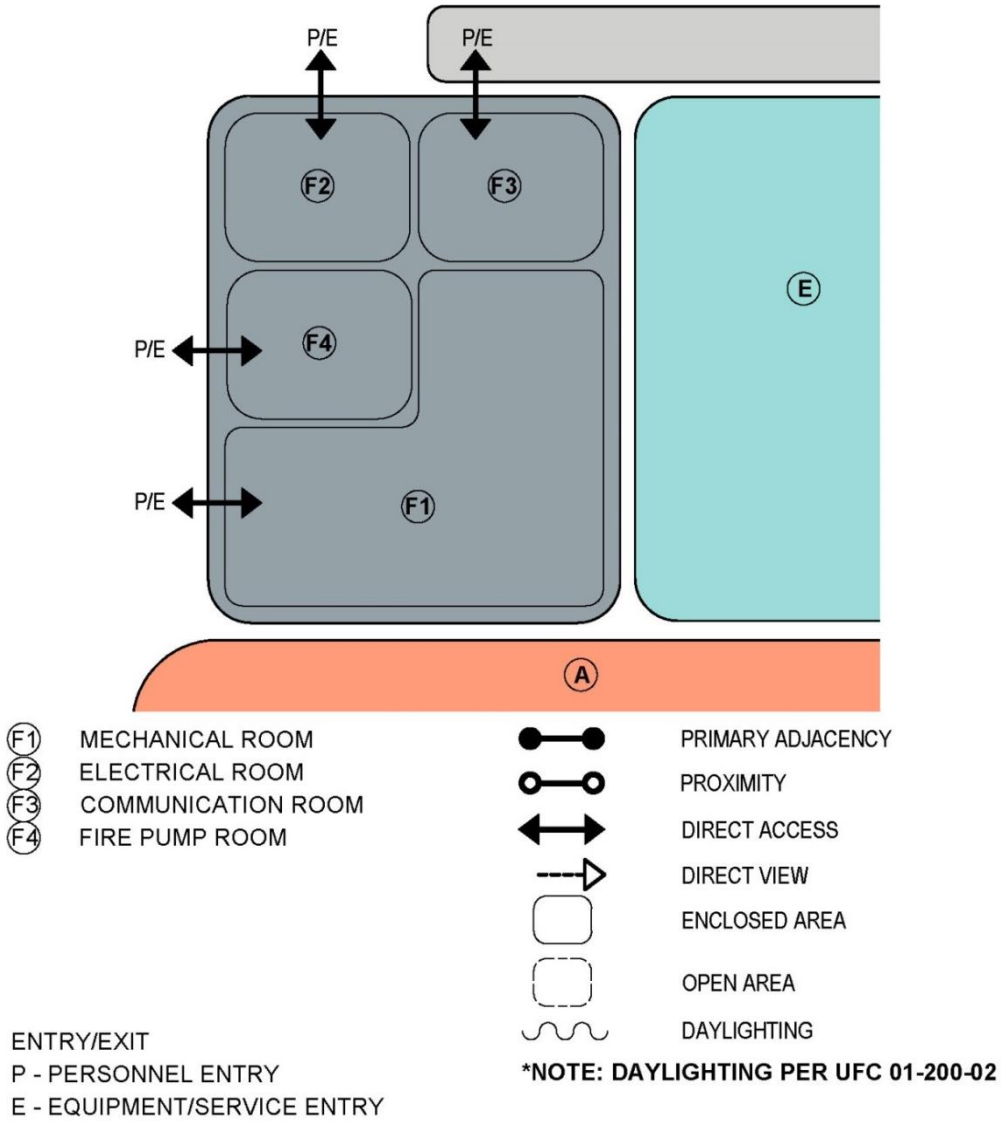
Description/Usage		Toilets/showers/showers serve all personnel in the facility. Toilet for maintenance crew use must be available from the engine shop bay.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	**Type**	Hollow metal, 3'x7'
	Security/ Hardware	Push-pull
	View Panels/ Kick Plates	No panels Kick plates both sides of doors
Finishes	**Walls**	Ceramic tile full height at wet walls, showers, gypsum board - painted
	Floor	Porcelain tile or quartz epoxy
	Base	Porcelain tile or quartz epoxy
	Ceiling	Gypsum board - painted
Plumbing		Sinks; toilets; urinals; floor drains in restroom areas, shower and locker areas; mop sink; EWC
HVAC		Air conditioned and heated restrooms, showers, lockers; ventilation; exhaust from restrooms, locker rooms, janitor's closet
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		Determine fixture count by number of building occupants at maximum load; wall hung urinals; lavatories in counter tops.
Special Requirements		Water-resistant gypsum board throughout. See RFP for accessories requirements.

3-6 MODULE F – BUILDING SUPPORT MODULE.

3-6.1 Function and Adjacency.

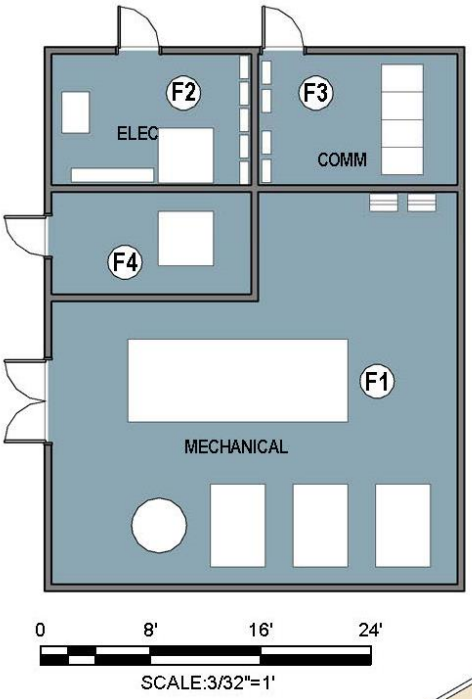
The building support module consists of a mechanical room, an electrical room, and a telecommunications room (fire protection room if not in mechanical room). All rooms must have exterior access (with exception of the communication room, which may have interior access). Building support modules must be located on an exterior wall adjacent to the utility courtyard and accessible for maintenance.

Figure 3-27 Module F Adjacency Diagram



3-6.2 Building Support Floor Plan (Figure 3-28).

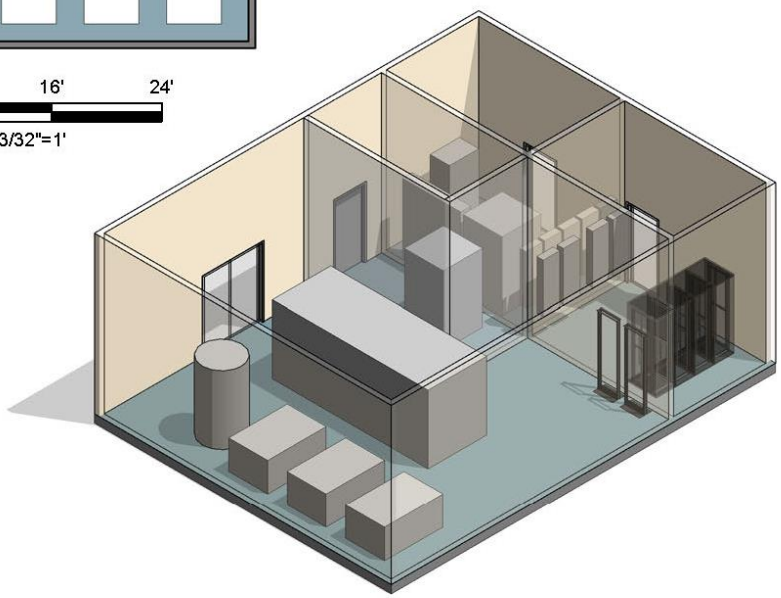
Figure 3-28 Module F Floor Plan & Axonometric



F1 MECHANICAL ROOM
F2 ELECTRICAL ROOM
F3 COMMUNICATION ROOM
F4 FIRE PUMP ROOM

TOTAL AREA OF MODULE = 1150 NET SF*

*BUILDING SUPPORT AREAS ARE ESTIMATES ONLY. ACTUAL SIZE IS DEPENDENT ON REQUIREMENTS FOR CLIMATE ZONE, LOCATION, SYSTEMS, ETC.



3-6.3 Data Sheets.

Figure 3-29 F1 Mechanical Room Data Sheet

Description/Usage		Mechanical equipment and service
Ceiling Height		No ceiling
Windows		N/A
Doors	**Type**	Hollow metal, pair 3'x7', exterior access required
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	Kick plates
Finishes	**Walls**	CMU – painted to deck
	Floor	Sealer hardener
	Base	No base
	Ceiling	Open to structure - painted
Plumbing		Floor drains as required
HVAC		Heated and ventilated
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		Per UFC 3-450-01 for noise control
Furnishings, Equipment and Casework		
Special Requirements		

Figure 3-30 F2 Electrical Room Data Sheet

Description/Usage		Electrical equipment and service
Ceiling Height		No ceiling
Windows		N/A
Doors	**Type**	Hollow metal, 3'x7', exterior access required
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	Kick plates
Finishes	**Walls**	CMU - painted
	Floor	Sealer hardener
	Base	No base
	Ceiling	Open to structure - painted
Plumbing		N/A
HVAC		Heated and ventilated
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	One per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/AB
Acoustical Requirements		N/A
Furnishings, Equipment and Casework		
Special Requirements		

Figure 3-31 F3 Communication Room Data Sheet

Description/Usage		Communication and UPS service
Ceiling Height		9'-0" minimum clearance
Windows		N/A
Doors	**Type**	Hollow metal, 3'x7', interior or exterior access is acceptable
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	Kick plates
Finishes	**Walls**	CMU - painted
	Floor	Sealer hardener
	Base	No base
	Ceiling	Open to structure - painted
Plumbing		N/A
HVAC		Heated and ventilated; dedicated cooling for comm.
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	Yes, one per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		N/A
Furnishings, Equipment and Casework		
Special Requirements		

Figure 3-32 F4 Fire Pump Room Data Sheet

Description/Usage		Fire pump equipment
Ceiling Height		No ceiling
Windows		N/A
Doors	**Type**	Hollow metal, 3'x7', exterior access required
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	Kick plates
Finishes	**Walls**	CMU – painted to deck
	Floor	Sealer hardener
	Base	No base
	Ceiling	Open to structure - painted
Plumbing		N/A
HVAC		Heated and ventilated
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	One per desk
	Data	NIPR
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		N/A
Furnishings, Equipment and Casework		
Special Requirements		

Figure 3-33 Circulation Room Data Sheet

Description/Usage		Use this data sheet for circulation or corridor spaces. The corridor may become part of the Flight Chief/training administration module.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	**Type**	Hollow metal, 3'x7' (egress)
	Security/ Hardware	Keyed lock set
	View Panels/ Kick Plates	N/A Kick plates both sides of door
Finishes	**Walls**	Gypsum board - painted
	Floor	Sealed concrete, stained concrete or tile
	Base	Resilient or tile
	Ceiling	Acoustical ceiling tile or open to structure - painted
Plumbing		N/A
HVAC		Heated and air conditioned
Fire Protection		Wet pipe sprinkler system
Power		Per UFC 3-520-01
Lighting		Per UFC 3-530-01
Communication	**Tele.**	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical Requirements		N/A
Furnishings, Equipment and Casework		
Special Requirements		

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APPENDIX A REFERENCES

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MISCELLANEOUS

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APPENDIX B BEST PRACTICES

B-1 ENGINE MAINTENANCE FACILITY PROGRAMMING SHEET.

MODULE NO.	AREA	NO. OCCUP	SF PER USER	NO. OF ROOMS REQUIRED	INDIVIDUAL ROOM RQRMNTS	NET USER REQUIREMENTS		COMMENTS
					SF	SF	SM	
A	Engine Shop Bay							
A.1	Engine Shop Bay (4 Engine WorkBays)	20		1	20230	20230	1,879.37	1
A.2	Parts Cleaning	2		1	280	280	26.01	
A.3	Bearing Room	1		1	100	100	9.29	
A.4	Bench Stock/Supply & Tool Room	6		1	900	900	83.61	
A.5	Exterior Engine Wash Bay- Covered (1/2 Scope)	0		1	260	260	24.15	
	SUBTOTAL ENGINE BAY AREA					21770	2,022.43	
B	Engine Shop Support							
B.1	Repair Section Chiefs	2	80	1	250	250	23.23	3, 7
B.2	Ready Room	7	64	1	350	350	32.52	3
B.3	Jet Engine Intermediate Maintenance (JEIM)	3	64	1	250	250	23.23	3, 7
	SUBTOTAL ENGINE SHOP SUPPORT AREA					850	78.97	
C	Break Room							
C.1	Break Room	16-20	note 2	1	520	520	48.31	2
	SUBTOTAL BREAKROOM AREA					520	48.31	
D	Flight Chief /Training Administration							
D.1	Flight Chief	2	120	1	240	240	22.30	3, 7
D.2	Flight Chief Administration	2	100	1	200	200	18.58	3, 7,11
D.3	OEM/AFETS	2	100	1	200	200	18.58	3, 7
D.4	Conference Room	12	20	1	360	360	33.44	3,7
D.5	Engine Management	6	64	1	490	490	45.52	3, 7,10
D.6	Training	1	120	1	120	120	11.15	3
	SUBTOTAL TRAINING AREA					1610	149.57	
E	Toilets / Showers / Lockers							
E.1	Women's Toilet	2		1	200	200	18.58	8
E.2	Janitors Closet	0		1	60	60	5.57	8
E.3	Men's Toilet	6		1	250	250	23.23	8
E.4	Women's Lockers/Showers	12		1	150	150	13.94	8
E.5	Men's Lockers/Showers	19		1	200	200	18.58	8
E.6	Women's Toilet	1		1	70	70	6.50	
E.7	Men's Toilet	1		1	70	70	6.50	
	SUBTOTAL ADMINISTRATION AREA					1000	92.90	
F	Building Support							
F.1	Mechanical	0		1	740	740	68.75	6
F.2	Electrical	0		1	150	150	13.94	6
F.3	Telecommunications	0		1	150	150	13.94	6
F.4	Fire Pump	0		1	110	110	10.22	6
	SUBTOTAL BUILDING SUPPORT AREA					1150	106.84	
	Covered Entry (1/2 Scope)	0		1	50	50	4.65	
	TOTAL FACILITY NET FLOOR AREA					26,900.00	2,499.01	
	NET TO GROSS	15%						4,5
	TOTAL FACILITY GROSS AREA					30,935	2,874	
	Exterior Elements							
A.6	Engine Bay Support Yard			1	2500	2500	232	9
	SUBTOTAL EXTERIOR ELEMENTS					2,500	232	
	TOTAL FACILITY SITE SUPPORT					2,500	232	

COMMENTS:

1	Programming Matrix is based upon 4 engine workbays - typical for 5th Gen. Fighters (Note F-35 does not require a seperate engine maintenance facility)
2	Break Room also serves as Classroom, sized per Table 6.3 Break Rooms and Table 6.4 Classroom of Air Force Manual 32-1084 (Break Room 16% of 50 occupants mulitplied by 18 sf per occupant plus Classroom of 20 persons multiplied by 25 sf per person)
3	Reference Tables in Chapter 6 of Air Force Manual 32-1084 for additional information.
4	Includes all areas listed in Air Force Manual 32-1084, Chapter 1 and Chapter 6
5	Per AFM 32-1084 Chapter 1, net-to-gross multiplier of up to 25%, used 15% as large portion of area is in Engine Shop Bay.
6	Building Support areas are estimates only and actual size is dependent on requirements for climate zone, location, system, etc.
7	Administration Areas include circulation factor of 10% per Chapter 1 Air Force Manual 32-1084
8	Male/Female ratio of 75/25
9	Exterior Engine Component Yard is uncovered exterior space
10	Engine Management room has small Mini Conference area for up to 6 persons @ 15 sf per person
11	Waiting area in Flight Chief Admin. per AFM 32-1084 Table 6.3 - 20 sf per person, 2 people

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APPENDIX C BIM AND PDF DRAWINGS LINK

BIM & PDF versions of the drawings are available at:

http://www.wbdg.org/references/afbim_tools.php.

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APPENDIX D AIR FORCE MILCON SUSTAINABILITY REQUIREMENTS SCORESHEETS

Air Force MILCON Sustainability Requirements Scoresheet

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* required entry

General Information

Federal Requirements Complete

XXXX123456	Project ID (e.g. ABCD12345)
xxxxxxxxxxxxxxxxx	Real Property Unique ID (RPUID)
Fighter Engine Maintenance Facility (Prototype Design)	Building Name
New Building Construction	Project Type
Other	Installation
Other	City
Other	State
Other	CONUS
Air Combat Command	MAJCOM
TBD	PM Name
$0.00	PA ($k)
28,000	Building Size (SF)
2014	Program Year (FY####)
Initial Design Charrette	Project Phase
2014	Design Started (FY####)
10/9/2017	BOD (MM/DD/YY)
In Progress	Pursuing formal LEED® Certification
	Date Project Registered (MM/DD/YY)
	Date Project Certified by GBCI (MM/DD/YY)
	LEED Points Awarded by GBCI (e.g. 42)
	LEED Energy and Water Points Awarded by GBCI
	[Select] LEED Certification Level Awarded by GBCI
	Fees ($): Registration 900, Certification 6512.15
LEED® 2009	LEED® Rating System
58	LEED® Points Status
Silver	LEED® Certification Level Status
29	LEED® Energy and Water Points Status
100%	HPSB Compliant
30%	Energy Efficiency Achieved (% below ANSI/ASHRAE/IESNA Standard 90.1-2010)
11/3/2014	Date Scoresheet Completed or Revised
2013_V0	Scoresheet version

Color Coding: See Instructions Tab for more detail

Drop-Down Box	Recommended (not required)
No Entry Required	Yes or N/A
Custom Entry	Maybe
LEED Prerequisite	No

* required entry

Federal Requirements for High Performance and Sustainable Buildings (HPSB) & UFC 1-200-02

HPSB I: Employ Integrated Design Principles (UFC 1-200-02 para 2-2)

Total Points	2		Possible Points	2
Yes	HPSB I.1	Integrated Design		1
Yes	HPSB I.2	Commissioning		1

UFC 1-200-02 para 2-3. Promote Sustainable Location and Site Development

Total Points	1		Possible Points (HPSB only)	1
Yes	UFC para 2-3.1	Site selection		1
Yes	UFC para 2-3.2	Mitigation of Heat Island Effect		1
Yes	UFC para 2-3.3	Reduction of Light Pollution		1
Yes	HPSB III.3-4	Stormwater Management		1

Air Force MILCON Sustainability Requirements Scoresheet

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* required entry

HPSB II: Optimize Energy Performance (UFC 1-200-02 para 2-4)				
Total Points	4		Possible Points	4
Yes	HPSB II.1	**Energy Efficiency**		1
		Yes	Reduce energy use 30% below ANSI/ASHRAE/IESNA Standard 90.1-2010 or if not - achieve maximum energy efficiency that is lifecycle cost effective	
		30.0%	Insert percentage below ANSI/ASHRAE/IESNA Standard 90.1-2010 in terms of energy use (e.g. 32)	
		0	Insert building energy intensity (kBtu/yr-sqft) calculated IAW 10 CFR 433	
Yes	HPSB II.2	**On-site Renewable Energy - Solar Hot Water Heater System**		1
		Yes	Installed solar hot water heater system or found installation not lifecycle cost effective	
		0.0	Insert generation capacity (MMBtu/yr)	
		0.0%	Insert percentage of demand	
Yes	HPSB II.3	**On-site Renewable Energy**		1
		Yes	Installed renewable energy elements or projects were not lifecycle cost effective	
		0	Renewable energy types (check below)	
		☐ Solar PV ☐ Geothermal ☐ Hydro ☐ Waste to Energy ☐ Solar CP ☐ GSHP ☐ Wind ☑ Renewables were not ☐ Solar Thermal Electric		
		0.0	Insert generation capacity (kW)	
		0.0%	Insert percentage of total building	
Yes	HPSB II.4	**Measurement and Verification**		1
		Yes	Water Metering: Select N/A if no service	
		Yes	Electric Metering: Select N/A if no service	
		Yes	Natural Gas Metering: Select N/A if no service	
		N/A	Steam Metering: Select N/A if no service	
HPSB III: Protect and Conserve Water (UFC 1-200-02 para 2-5)				
Total Points	3		Possible Points	3
Yes	HPSB III.1	**Indoor Water**		1
Yes	HPSB III.2	**Outdoor Water**		1
Yes	HPSB III.4	**Water used for heating and cooling**		1
		Yes	Water efficient measures were implemented with heating and cooling equipment when life cycle effective	
HPSB IV: Enhance Indoor Environmental Quality (UFC 1-200-02 para 2-6)				
Total Points	6		Possible Points	6
Yes	HPSB IV.1	**Thermal Comfort**		1
Yes	HPSB IV.2	**Ventilation**		1
Yes	HPSB IV.3	**Moisture Control**		1
Yes	HPSB IV.4	**Daylighting**		1
Yes	HPSB IV.5	**Low Emitting Materials**		1
Yes	HPSB IV.6	**Protect Indoor Air Quality during Construction**		1
Yes	HPSB IV.7	**Environmental Tobacco Smoke**		
HPSB V: Reduce Environmental Impact of Materials (UFC 1-200-02 para 2-6)				
Total Points	6		Possible Points	6
Yes	HPSB V.1	**Recycled Content**		1
Yes	HPSB V.2	**Biologically-based Products**		1
Yes	HPSB V.3	**Environmentally Preferable Products**		1
Yes	HPSB V.4	**Waste and Materials Management - Recycling**		1
Yes	HPSB V.5	**Waste and Materials Management - Divert 50% from Disposal**		1
		50.0%	Insert percentage diverted from landfill	
			Data element is not applicable	
Yes	HPSB V.6	**Ozone Depleting Substances**		1
HPSB Totals			Possible Points	22
22	Federal Requirements - Yes or N/A			
0	Federal Requirements - Maybe			
0	Federal Requirements - No			
100%	Percentage of Federal Requirements Met			

Air Force MILCON Sustainability Requirements Scoresheet

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LEED® 2009 Checklist

LEED® Credits and/or Prerequisites that meet HPSB/UFC Requirements
LEED® Credits and/or Prerequisites that align closely with HPSB/UFC Requirements
LEED® Credits that meet USAF Energy & Water Criteria (may depend on technologies & strategies)

Sustainable Sites			
Achievable Points	11	Sustainable Sites	Possible Points 26
Yes	Prereq 1	Construction Activity Pollution Prevention (HPSB GP3)	Required
Yes	Credit 1	Site Selection	1
Maybe	Credit 2	Development Density & Community Connectivity	5
Maybe	Credit 3	Brownfield Redevelopment	1
Maybe	Credit 4.1	Alternative Transportation - Public Transportation Access	6
Maybe	Credit 4.2	Alternative Transportation - Bicycle Storage & Changing Rooms	1
Yes	Credit 4.3	Alternative Transportation - Low-Emitting & Fuel Efficient Vehicles	3
Yes	Credit 4.4	Alternative Transportation - Parking Capacity	2
Maybe	Credit 5.1	Site Development - Protect or Restore Habitat	1
Maybe	Credit 5.2	Site Development - Maximize Open Space	1
Yes	Credit 6.1	Stormwater Design - Quantity Control (HPSB GP3)	1
Yes	Credit 6.2	Stormwater Design - Quality Control (HPSB GP3)	1
Yes	Credit 7.1	Heat Island Effect - Non-Roof (UFC)	1
Yes	Credit 7.2	Heat Island Effect - Roof (UFC)	1
Yes	Credit 8	Light Pollution Reduction	1
		Option 1: Select which LEED® Interior Lighting Option was used	

Water Efficiency			
Achievable Points	7		Possible Points 10
Yes	Prereq 1	Water Use Reduction - 20% Reduction (HPSB GP3)	Required
4	Credit 1	Water Efficient Landscaping (HPSB GP3)	2 to 4
		2: Reduce Potable Water Use by 50% (HPSB GP3)	2
		4: No Potable Use or Irrigation (HPSB GP3)	2
Maybe	Credit 2	Innovative Wastewater Technologies	2
3	Credit 3	Water Use Reduction (HPSB GP3)	2 to 4
		2: 30% Reduction (HPSB GP3)	2
		3: 35% Reduction (HPSB GP3)	1
		4: 40% Reduction (HPSB GP3)	1

Energy & Atmosphere			
Achievable Points	17		Possible Points 35
Yes	Prereq 1	Fundamental Commissioning of the Building Energy Systems (HPSB GP1)	Required
Yes	Prereq 2	Minimum Energy Performance (HPSB GP2)	Required
Yes	Prereq 3	Fundamental Refrigerant Management (HPSB GP5)	Required
15	Credit 1	Optimize Energy Performance (HPSB GP2)	1 to 19
		1: 12% for New Buildings/8% for Existing Building Renovations	1
		2: 14% for New Buildings/10% for Existing Building Renovations	1
		3: 16% for New Buildings/12% for Existing Building Renovations	1
		4: 18% for New Buildings/14% for Existing Building Renovations	1
		5: 20% for New Buildings/16% for Existing Building Renovations	1
		6: 22% for New Buildings/18% for Existing Building Renovations	1
		7: 24% for New Buildings/20% for Existing Building Renovations	1
		8: 26% for New Buildings/22% for Existing Building Renovations	1
		9: 28% for New Buildings/24% for Existing Building Renovations	1
		10: 30% for New Buildings/26% for Existing Building Renovations	1
		11: 32% for New Buildings/28% for Existing Building Renovations	1
		12: 34% for New Buildings/30% for Existing Building Renovations	1
		13: 36% for New Buildings/32% for Existing Building Renovations	1
		14: 38% for New Buildings/34% for Existing Building Renovations	1
		15: 40% for New Buildings/36% for Existing Building Renovations	1
		16: 42% for New Buildings/38% for Existing Building Renovations	1
		17: 44% for New Buildings/40% for Existing Building Renovations	1
		18: 46% for New Buildings/42% for Existing Building Renovations	1
		19: 48%+ for New Buildings/44%+ for Existing Building Renovations	1
0	Credit 2	On-Site Renewable Energy (HPSB GP2)	1 to 7
		1: On-site 1%	1
		2: On-site 3%	1
		3: On-site 5%	1
		4: On-site 7%	1
		5: On-site 9%	1
		6: On-site 11%	1
		7: On-site 13%	1
Yes	Credit 3	Enhanced Commissioning (HPSB GP1)	2
Maybe	Credit 4	Enhanced Refrigerant Management (HPSB GP5)	2
No	Credit 5	Measurement & Verification (HPSB GP2)	3
No	Credit 6	Green Power	2

Air Force MILCON Sustainability Requirements Scoresheet

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* required entry

Materials & Resources				
Achievable Points	7		Possible Points	14
Yes	Prereq 1	Storage & Collection of Recyclables (HPSB GP5)		Required
0	Credit 1.1	Building Reuse - Maintain Existing Walls Floors & Roof		1 to 3
		1	Maintain 55% of Existing Walls Floors & Roof	1
		2	Maintain 75% of Existing Walls Floors & Roof	1
		3	Maintain 95% of Existing Walls Floors & Roof	1
Maybe	Credit 1.2	Building Reuse - Maintain 50% of Interior Non-Structural Elements		1
2	Credit 2	Construction Waste Management (HPSB GP5)		1 to 2
		1	50% Recycled or Salvaged	1
		2	75% Recycled or Salvaged	1
0	Credit 3	Materials Reuse		1 to 2
		1	5% of value of material reused content	1
		2	10% of value of material reused content	1
2	Credit 4	Recycled Content (HPSB GP5)		1 to 2
		1	10% of value of material recycled content	1
		2	20% of value of material reused content	1
2	Credit 5	Regional Materials		1 to 2
		1	10% Extracted, Processed & Manufactured	1
		2	20% Extracted, Processed & Manufactured	1
Maybe	Credit 6	Rapidly Renewable Materials (HPSB GP5)		1
Yes	Credit 7	Certified Wood (HPSB GP5)		1
Indoor Environmental Quality				
Achievable Points	10		Possible Points	15
Yes	Prereq 1	Minimum IAQ Performance (HPSB GP4)		Required
Yes	Prereq 2	Environmental Tobacco Smoke (ETS) Control (HPSB GP4)		Required
Yes	Credit 1	Outside Air Delivery Monitoring		1
Maybe	Credit 2	Increased Ventilation		1
Yes	Credit 3.1	Construction IAQ Management Plan, During Construction (HPSB GP4)		1
Yes	Credit 3.2	Construction IAQ Management Plan, Before Occupancy (HPSB GP4)		1
Yes	Credit 4.1	Low Emitting Materials, Adhesives & Sealants (HPSB GP4)		1
Yes	Credit 4.2	Low Emitting Materials, Paints & Coatings (HPSB GP4)		1
Yes	Credit 4.3	Low Emitting Materials, Flooring Systems (HPSB GP4)		1
Yes	Credit 4.4	Low Emitting Materials, Composite Wood & Agrifiber Products (HPSB GP4)		1
Yes	Credit 5	Indoor Chemical & Pollutant Source Control		1
Yes	Credit 6.1	Controllability of Systems, Lighting (HPSB GP4)		1
Maybe	Credit 6.2	Controllability of Systems, Thermal Comfort		1
Yes	Credit 7.1	Thermal Comfort, Design (HPSB GP4)		1
Maybe	Credit 7.2	Thermal Comfort, Verification		1
Maybe	Credit 8.1	Daylight & Views - Daylight 75% of Spaces (HPSB GP4)		1
Maybe	Credit 8.2	Daylight & Views - Views for 90% of Spaces		1
Innovation & Design Process				
Achievable Points	4		Possible Points	6
Yes	Credit 1.1	Innovation in Design 1.1		1
			Select if ID 1.1 was for energy and/or water	
Yes	Credit 1.2	Innovation in Design 1.2		1
			Select if ID 1.2 was for energy and/or water	
Yes	Credit 1.3	Innovation in Design 1.3		1
			Select if ID 1.3 was for energy and/or water	
Maybe	Credit 1.4	Innovation in Design 1.4		1
		Energy & Water	Select if ID 1.4 was for energy and/or water	
Maybe	Credit 1.5	Innovation in Design 1.5		1
		Energy & Water	Select if ID 1.5 was for energy and/or water	
Yes	Credit 2	LEED® Accredited Professional		1
Regional Priority Credits				
Achievable Points	2		Possible Points	4
Yes	Credit 1.1	Regional Priority 1.1		1
			Select if RP 1.1 was for energy and/or water	
Yes	Credit 1.2	Regional Priority 1.2		1
		Water	Select if RP 1.2 was for energy and/or water	
Maybe	Credit 1.3	Regional Priority 1.3		1
		Water	Select if RP 1.3 was for energy and/or water	
Maybe	Credit 1.4	Regional Priority 1.4		1
			Select if RP 1.4 was for energy and/or water	
LEED Project Totals	**(pre-certification estimates)**		**Possible Points**	**110**
58	Total LEED® Yes Points			
19	Total LEED® Maybe Points			
2	Total LEED® No Points			
29	Total LEED® Energy and Water Related Points			
Silver	LEED® Certification Status			
N/A	LEED® Horizontal Benchmark Level			
N/A	LEED® Utility Benchmark Level			
N/A	LEED® Industrial Benchmark Level			

LEED®: Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80-110

APPENDIX E GLOSSARY

E-1 ACRONYMS AND ABBREVIATIONS.

‘	foot
“	inch
A.F.F.	above finished floor
ABA	Architectural Barriers Ac
AC	Advisory Circular
ACI	American Concrete Institute
ADP	Area Development Plan
A-E	Architect-Engineer
AFCEC	Air Force Civil Engineer Center
AFCFS	Air Force Corporate Facility Standards
AFI	Air Force Instruction
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AFMAN	Air Force Manual
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineer
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
AT	antiterrorism
ATFP	antiterrorism force protection
AWS	American Welding Society
BIA	Bilateral Infrastructure Agreements
BIM	Building Information Modeling
CATV	community access television

CCTV	closed circuit television
CMU	cement masonry unit
CONUS	Continental United States
DoD	Department of Defense
EISA	Energy Independence and Security Act
EPA	Environmental Protection Agency
EPACT 2005	Energy Policy Act of 2005
FAA	Federal Aviation Administration
FC	Facility Criteria
FF&E	furniture, fixtures, and equipment
HNFA	Host Nation Funded Construction Agreements
HQ USACE	Headquarters United States Army Corps of Engineers
HVAC	heating, ventilation, and air conditioning
hZ	hertz
IBC	International Building Code
IDP	Installation Development Plan
IDS	intrusion detection system
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
IFC	International Fuel Gas code
IMC	International Mechanical Code
IPC	International Plumbing Code
JEIM	jet engine intermediate maintenance
MIL-HDBK	Military Handbook
MIL-STD	Military Standard
MUTCD	Manual on Uniform Traffic Control Devices

N/A	not applicable
NAVFAC	Naval Facilities Engineering Command
NEC	National Electrical Code
NFPA	National Fire Protection Association
NIPR	non-secure internet protocol router
OCONUS	outside continental United States
POV	personally-owned vehicle
RFP	Request for Proposal
SF	square foot
SOFA	Status of Forces Agreement
TI	Technical Instruction
T.O.	Technical Order
UFC	Unified Facilities Criteria
USGBC	U.S. Green Building Council
V	volt
Vdc	volts direct current