

UNIFIED FACILITIES CRITERIA (UFC)

ARMY RESERVE FACILITIES



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UNIFIED FACILITIES CRITERIA (UFC) DESIGN

GUIDE: ARMY RESERVE FACILITIES

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U.S. ARMY CORPS OF ENGINEERS (Preparing Activity)

NAVAL FACILITIES ENGINEERING COMMAND AIR

FORCE CIVIL ENGINEER SUPPORT AGENCY

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

Change No.	Date	Location

**This UFC supersedes UFC 4-171-05, Design Guide: Army Reserve
Facilities dated 1 January 2005 with Change 3 of 1 February 2010.**

FOREWORD

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with [USD\(AT&L\) Memorandum](#) dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate.

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

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- Whole Building Design Guide (WBDG) web site <http://dod.wbdg.org>.

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CHAPTER 1

INTRODUCTION AND GENERAL INFORMATION

1-1 PURPOSE OF THE DESIGN GUIDE

1-1.1 This Design Guide contains design criteria and general requirements for the development of designs for new construction and additions/alterations of Army Reserve facilities. Its purpose is to serve as one means for the Office of the Chief Army Reserve (OCAR) Engineer Office to convey functional and other criteria for Military Construction Army Reserve (MCAR) projects to the Design Agency charged with the planning and design of a facility. This Guide is also intended to aid in the formulation of project documentation for inclusion in military construction programs.

1-1.1.1 The OCAR Engineer Office is the Army Reserve Installation Management Directorate (ARIMD). An ARIMD representative, the Project Officer, is typically assigned to each project.

Figure 1-1
Ft. McCoy, NCO
Academy



1-1.1.2 The Support Installation is normally the Army Reserve Regional Support Command (RSC), which supports the facility. For a project on an Army Reserve or other military installation, personnel representing the installation are also likely to be involved in the design of the project and support of the facility upon completion, and are part of the Support Installation.

1-1.1.3 The Tenants are the Army Reserve soldiers and units that will occupy the facility. In a joint-use facility, the Tenants may include other military components in addition to the Army Reserve.

1-1.1.4 The Design Agency is the Corps of Engineers (USACE) or other engineering command, which acts as the Army Reserve's agent for obtaining design and construction services. The Design Agency may develop project designs utilizing their in-house design personnel, or may contract with private-sector architecture and engineering firms (A/Es) to provide design services. The in-house personnel or private-sector A/E team may be referred to as "designer" or "design team" in this Guide.

1-1.1.5 U.S. Army Reserve Command (USARC) G2/6 is the Information Technology proponent for the Army Reserve.

1-1.2 This Guide should also be used as a benchmark of acceptable quality for Army Reserve Full Facility Restoration (FFR), Real Property Exchange (RPX), Minor Maintenance and Repair (MMR), and other projects. See [Section 1-10](#) below for additional information on such programs and their funding.

1-1.3 This Guide provides guidance representing an 80% solution. The Design Agency should always obtain OCAR Engineer Office approval when departing from the guidance herein. However, this Guide is not intended to discourage innovation or creativity by the designer. The Army Reserve encourages creativity and innovations that improve the functionality, sustainability, maintainability, energy reduction, and aesthetics of the site and buildings.

1-1.3.1 Portions of this Guide are written in advisory language using “should” rather than “shall”, or similar prescriptive language. Such portions indicate preferences or past experience. When this Guide is incorporated as guidance in a design/build request for proposal (D/B RFP) or RPX action, the word “should” indicates a mandatory requirement for the project.

1-1.3.2 Similarly, the Guide lists alternative materials or strategies in some locations. When this Guide is incorporated as guidance in a design/build request for proposal (D/B RFP) or RPX action, the first choice or alternative listed is a mandatory requirement for the project, unless alternatives are noted as equivalent.

1-2 SCOPE OF THE DESIGN GUIDE

1-2.1 This Guide is applicable to all Army Reserve new construction projects, and serves as a general guide in the modernization or restoration of existing facilities. Only the more common or typical features associated with Army Reserve facilities are addressed. The Guide deals primarily with training center buildings and vehicle maintenance shops, both of which directly support a training facility or group of facilities.

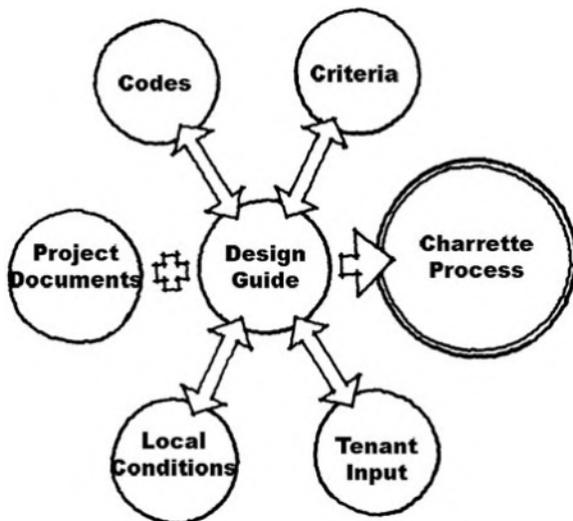
1-2.1.1 USACE Centers of Standardization have developed standard designs for some other facilities which may be constructed for the Army Reserve, such as Total Army School System (TASS), Dining Hall, etc. Verify whether such standard designs exist for facilities other than training centers, maintenance facilities, and unheated storage.

1-2.1.2 Some Reserve Centers will be developed as joint-use facilities and will include other Reserve, National Guard, or other components. In such instances, the Government will prepare a joint-use spreadsheet to delineate space usage/authorizations, and the Design Agency will need to verify appropriate criteria for the design of other components’ exclusive-use spaces. When the

Army Reserve takes the lead in joint-use facility acquisition, joint-use spaces are normally designed to Army Reserve criteria.

1-2.2 The intent of the Guide is to provide a portion of the general information and guidance required for the successful preparation of project designs. Additional information and other military installation design guidance must be obtained from the OCAR Engineer Office, the Support Installation, the Design Agency, and designer investigations on such matters as project scope, local codes, and site constraints. Typical project-specific and general documentation for the designers is listed below. Additional listings of criteria referenced in this Guide are in [Appendix A](#).

**Figure 1-2
Project Guidance**



1-2.2.1 Project documents - DD Form 1391 is the Government’s project authorization document. It is generally accompanied by the 5034R Space Allocation Worksheet (with notes), which provides additional detail on the Tenants and their requirements. A sample of these forms is in [Appendix C](#). The Design Agency will typically provide a contractual project scope of work for the design team.

1-2.2.2 Additional Design Criteria include the Army Reserve Design Process and Submittal Requirements, Unified Facilities Criteria (UFC), Unified Facility Guide Specifications (UFGS), codes, and other design guidance.

1-2.2.3 Additional guidance can be found on the Louisville District Design Guide Army Reserve Customer Website, (herein referred to as the [Army Reserve website](#)) including drawings and guidance on spaces specific to the Army Reserve. See the [Army Reserve website](#).

1-3 ARMY RESERVE CADD PLATFORM

1-3.1 Army Reserve drawing records are maintained in Microstation Bentley CADD and BIM. Army Reserve Tenants have Bentley CADD software. The shared data standard for Army Reserve CADD management is the United States Army Corps of Engineers TriServices BIM Standards, Datasets and Configuration for Bentley Building Applications. This Dataset is available at <https://caddbim.usace.army.mil/BIM> - under “Documents and Publications” “Current Version”. Verify the current version with the Louisville District Army Reserve Support Team. As-built drawings must be provided to the Government using Microstation.

1-4 FORMAT OF THE DESIGN GUIDE

1-4.1 The Design Guide format is intended to facilitate the development of project requirements and designs by dealing with major criteria on both a general and specific level.

Figure 1-3
ARC, Joliet, Illinois



1-4.2 Chapter 1 provides general information about the Army Reserve, and its facilities program and process. Chapter 2 provides information and guidance on overall planning of Army Reserve sites and buildings, with emphasis on site and building organization, functionality, adjacencies, and aesthetics. Chapter 3 contains information and guidance on systems and materials applicable to all Army Reserve facilities, site design, and the design of the various buildings – large-scale, total building or facility issues. Chapter 4 contains specific requirements for the design of each type of typical space in an Army Reserve facility. Additional information is included in the Appendices.

1-4.3 Illustrations in this Guide represent possible applications of the criteria and are not intended to be definitive. The Design Agency is encouraged to be creative throughout the design process. Local conditions, codes and specific project requirements are major design considerations in the development of a complete and integrated facility.

1-5 PROJECT PARTICIPANT RESPONSIBILITIES

1-5.1 The OCAR Engineer Office is responsible for the following:

1-5.1.1 Determining functional requirements from Army Reserve criteria.

1-5.1.2 Issuing Design Directives to the Design Agent.

1-5.1.3 Approving functional requirements or Tenant requests that extend beyond the scope of this Guide.

1-5.1.4 Preparing and submitting project documentation (DD Form 1391 and supporting data) in accordance with Army Regulation 140-483 (AR 140-483), and providing any updates of these documents as the project progresses.

1-5.1.5 Approving concept and later designs to certify compliance with functional requirements.

1-5.1.6 Developing additional information, as required, such as information technology or special electrical requirements, and equipment specifications.

1-5.2 The Design Agency is responsible for the following:

1-5.2.1 Ensuring that any required real estate purchase is accomplished in a timely manner.

1-5.2.2 Preparing a design that provides for a complete and usable facility, including all equipment, fixtures and furnishings except those specifically designated as Government-furnished.

1-5.2.3 Incorporating the functional requirements of the OCAR Engineer Office and Support Installation into the project design.

1-5.2.4 Developing a design responsive to the Tenant, RSC and installation operational requirements, criteria in this Guide and the project documentation, preparing all submittals required by the Design Process and Submittal Requirements, and the project scope of work.

1-5.2.5 Justifying, in the project Design Analysis, any issues of design which do not follow this Guide and other project documentation.

1-5.2.6 Incorporating the quality standards for the overall design as described in this Guide and other criteria for the project.

1-5.2.7 Satisfying all other requirements of the contract for design.

1-5.3 The Support Installation (RSC and/or military installation) and Tenants are responsible for the following, as applicable to the specific project:

1-5.3.1 Providing the Design Agency with as-built drawings of existing construction.

1-5.3.2 For alteration projects, providing a copy of all outstanding maintenance and repair work orders.

1-5.3.3 Providing a copy of the current Full Facility Assessment.

Figure 1-4
Classroom, Ft. Allen,
Puerto Rico



1-5.3.4 Providing a condition survey for any existing facilities affected by the proposed work, along with a list of any red or amber conditions noted in the Installation Status Report.

1-5.3.5 Reviewing and commenting on Design Agency submittals, and providing input to the Design Agency as requested.

1-5.3.6 Providing a threat assessment that identifies the level of risk for the facility to be designed.

1-5.3.7 If real estate was purchased for the project, providing a copy of the Real Estate Planning Report (REPR) and any Engineering Feasibility Study done during the real estate acquisition. The Support Installation may contract with the Design Agency for performance of these tasks.

1-5.3.8 Performing any required environmental investigations, and preparing any required environmental documentation such as environmental baseline surveys (EBS) and/or environmental assessments (EA). The Support Installation may contract with the Design Agency for performance of these tasks.

1-5.4 U.S. Army Reserve Command (USARC) G2/6 is responsible for:

1-5.4.1 Determining the specific information technology (IT) requirements for the project.

1-5.4.2 Funding, providing and installing the IT equipment and telephone handsets for the project. Determining project IT funding, architecture, pathways, cable specifications, and equipment rack requirements. Performing design and construction quality assurance reviews.

1-5.4.3 Overall coordination of IT requirements for work performed by military installations and/or other components involved in a joint project.

1-5.5 The participants above are known collectively as the Project Delivery Team (PDT).

1-6 PURPOSE OF THE ARMY RESERVE AND ITS FACILITIES

1-6.1 The purpose of the Army Reserve is to provide trained units and qualified individual soldiers for active duty in time of need.

1-6.2 The Army Reserve spends most of its battle assembly time in training. Therefore, a Reserve Center is a training facility.

1-6.2.1 The individual soldier is given hands-on training in the skills of his/her job with particular emphasis on the operation and maintenance of equipment.

1-6.2.2 Unit training is accomplished by progressively larger and larger elements to perform the mission as a team.

1-6.3 Every functional space in a Reserve Center is intended to be primarily a training space. For example:

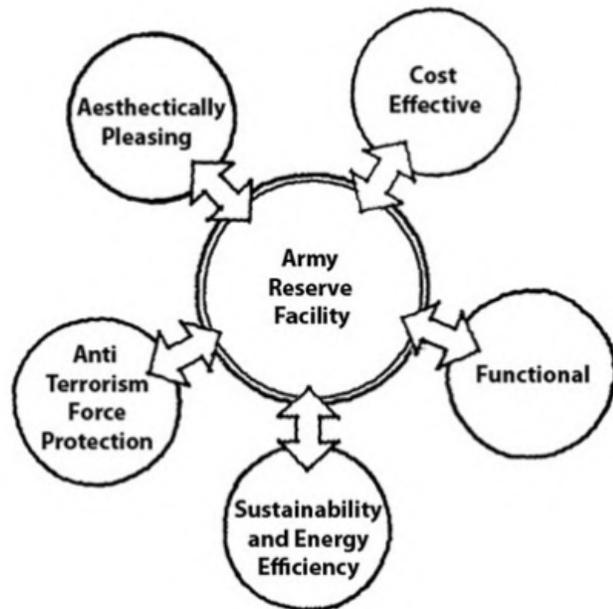
1-6.3.1 The primary purpose of a kitchen is to allow cooks to train. The secondary purpose is to feed the troops.

1-6.3.2 The primary purpose of the organizational maintenance shop (OMS) is to allow the training of mechanics. The secondary purpose is to maintain vehicles.

1-6.3.3 The primary purpose of office space is to allow the training of staff and clerical personnel. The secondary purpose is to perform administrative functions associated with the unit's mission.

1-6.4 A Reserve Center is an institutional facility with both community and national significance. The center is the home station for the local unit, composed of individuals sharing experiences of personal action on behalf of the community, much the same as a volunteer fire department. At the same time, as a Government installation of the U.S. Army, it represents the entire Army. Thus, the design of the building must reflect the Reservists' feelings of patriotism, pride and community participation, as well as a sense of the purpose of the U.S. Army: to keep the peace by maintaining a strong and capable organized military force.

Figure 1-5
Total Systems Design



1-7 QUALITY OF DESIGN

1-7.1 The Design Agency must seek design excellence through commitment to high standards. Success in achieving this objective lies not in the repetition of previous design solutions but in meeting or exceeding the

OCAR Engineer Office and Support Installation project-specific requirements, and responding to their unique needs.

1-7.2 The concept of total systems design will be emphasized in promoting the development of a functional, energy efficient and aesthetically pleasing building. Design concepts must evolve in a multidisciplinary manner with regard to architectural, interior design/furniture, civil, structural, electrical, and mechanical systems.

1-7.3 In evaluating the cost impact of design decisions, the designer will consider the life cycle cost, not just the initial cost.

1-8 PROJECT DELIVERY

1-8.1 Design/Bid/Build Delivery Process: The majority of Army Reserve facility projects are delivered through the design/bid/build (D/B/B) process. The Design Agency prepares a comprehensive and detailed set of construction documents. Interested construction contractors use these documents to prepare competitive “hard” bids for Government evaluation. The qualified bidder with the highest rated proposal is awarded the contract for construction at the proposed price.

1-8.1.1 Under the D/B/B delivery method, it is critical that the Design Agency provides construction documents that clearly define all construction requirements, so that the OCAR Engineer Office gets the benefit of best possible bids. No issues should remain vague or be left in a state to be resolved during construction. Any items identified as options to the base bid must likewise be fully defined. Both the base bid condition and the option condition must be adequately illustrated, detailed and specified.

Figure 1-6
ARC, McAlester,
Oklahoma



1-8.1.2 The designer must also keep in mind that bidders are not required to visit the construction site prior to bidding. The construction documents must allow for preparation of bids without the necessity of a site visit.

1-8.2 Design/Build Delivery Process: Some Army Reserve facility projects are delivered through a design/build (D/B) process. Under this delivery method the Design Agency develops a D/B Request for Proposal (RFP) solicitation package. Interested D/B teams respond with statements of qualifications as well as their proposed construction price. The proposals are evaluated on price, qualifications, and other items or information requested in the RFP. The highest-ranked proposing team is awarded a contract to complete the project design and perform the construction.

1-8.2.1 The OCAR Engineer Office, the Support Installation, and the Design Agency must determine the scope and content of the D/B RFP. The goal is to provide sufficient project information and criteria to ensure that the resulting facility will meet standard Army Reserve requirements for quality, functionality, performance, and aesthetics. The facility program and Army Reserve standards must be defined and specific Tenant requirements identified. Qualifications for selection must be described, along with design completion requirements and submittals.

1-8.2.2 The D/B RFP may include conceptual site and building plans, conceptual image sketches and outline specifications.

1-9 PROGRAM SYNOPSIS

1-9.1 A typical Army Reserve facility consists of two major components: the training center and related maintenance facilities. Joint use facilities may include other components.

1-9.2 Chapter 4 delineates the functional and environmental requirements for most individual spaces within the training center and maintenance buildings. Not all projects will include all of the spaces, nor are all of the possible types of spaces included in this Design Guide. Specific information on the types and sizes of spaces authorized is determined by the project documentation. The Design Agency will supplement the information in this Guide in the project documentation and at the initial design conference.

1-9.3 The training center (TC) generally consists of five main functional groups: administrative, assembly/kitchen, weapons, educational, and storage. Supporting these main functional groups are the special training and support areas. Within each group are subordinate functional areas that contribute to the operation of the group. Circulation and structural space are allocated to each project based on the size of the other authorized spaces.

1-9.3.1 The administrative group consists of spaces for offices, recruiting/retention, information technology, administrative support, and a lobby.

1-9.3.1.1 Full-time and unit exclusive space is dedicated space for full-time employees and unit supervisors. These may be single or shared offices, or appropriate workstations.

1-9.3.1.2 Unit common office space is shared space for use by non-supervisory unit personnel. The unit common workstations are available for use by the various Tenant units on their assigned battle assembly weekends.

1-9.3.1.3 Supporting spaces include such functions as the mailroom, administrative support rooms, information technology, recruiting/retention offices, family support office, and the lobby.

1-9.3.2 The assembly/kitchen group consists of the assembly hall, table and chair storage, kitchen, and the kitchen office.

1-9.3.2.1 The main element of the assembly group is a multipurpose space for assembly. The hall serves as a large classroom, a practical training area, a dining room, and as an area for battle assembly and ceremonies.

1-9.3.2.2 The kitchen serves as a training space for cooks, and is also used to prepare and serve meals for battle assembly and other events.

1-9.3.3 The weapons group consists of the arms vault, for storage of the Tenants' weapons, and the armorer's room, for weapon distribution/return and repair.

1-9.3.4 The educational group consists of classrooms, library reading and storage rooms, learning center, training aids storage, and communications security (COMSEC) training and storage rooms. These areas provide instructional space for Reservists during weekend training periods and testing areas for potential unit members.

**Figure 1-7 ARC,
Saginaw, Michigan**



1-9.3.5 The storage group consists of unit/individual storage areas, staging area, supply offices, and storage spaces for janitorial, facility maintenance, flammables, and controlled waste. The unit/individual storage space is closely related to the assembly group, which provides a training space for use of the equipment issued from the storage group.

1-9.3.6 Special training areas, when authorized, include such spaces as physical training, weapons training, drafting rooms, medical wings, band areas, and photo labs. General-use conference rooms, when authorized, are included as special training spaces.

1-9.3.7 Support areas are allocated in proportion to the number of soldiers, or the size of the other authorized spaces, in the facility. They include toilets, showers, locker rooms, vending, break room, and space for mechanical, electrical, and information technology equipment.

1-9.4 Maintenance facilities consist of organizational maintenance shops (OMS) and area maintenance support activity shops (AMSA).

1-9.4.1 Maintenance facilities may be collocated with a training center and with each other. Military equipment parking areas (MEP) are also associated with these facilities.

1-9.4.2 OMS Shops are used primarily to train Reserve mechanics, although some full-time employees may be assigned to these facilities.

1-9.4.3 AMSA shops are used primarily to service vehicles, using full-time staff. The bulk of maintenance work is performed in these shops.

1-9.4.4 An Equipment Concentration Site (ECS) is a large storage site with outdoor parking areas and enclosed warehousing of military equipment, typically located at a larger Government installation. The ECS is designed not only to store equipment, but also to efficiently issue and return equipment used in training exercises. Facilities which may be associated with an ECS, if included in the project documentation, are an MEP, fuel dispensing system, loading ramp, wash platform, indoor equipment storage warehouse, combat vehicle arms vault, fencing, security lighting, and an AMSA.

1-9.4.5 Common OMS/AMSA/ECS Configurations.

1-9.4.5.1 As a separate location, supporting Army Reserve units in a geographical area, a typical AMSA will consist of an AMSA building with a privately-owned vehicle (POV) area and military equipment park (MEP).

1-9.4.5.2 When collocated with an OMS, and supporting Army Reserve units in a geographical area, there will typically be an OMS/AMSA building with a shared POV area and a MEP.

1-9.4.5.3 If in a separate location, and supporting only an ECS, there will typically be an AMSA building, POV area, MEP, and any other ancillary facilities provided for in the project documents.

1-10 ARMY RESERVE PROJECT FUNDING

1-10.1 The Government generally utilizes two sources of funding for new and add/alter Army Reserve projects: Military Construction Army Reserve (MCAR or MILCON) funds, and Operation and Maintenance Army Reserve (OMAR) funds – see further descriptions below. A list of OMAR-funded collateral equipment can be found on the [Army Reserve website](#).

1-10.1.1 MCAR-funded work - All fixed site and building construction is typically MCAR-funded. Unless otherwise directed, all required built-in equipment and furnishings are also MCAR-funded and will be included in the design of the project, to be furnished and installed by the construction contractor. “Built-in”

items are defined as those which would require substantial effort to remove from the building or site construction, and would require removal or damage of other construction components. It includes items that are hard-connected to utilities.

1-10.1.2 OMAR-funded items - Moveable equipment (items not built into the construction, and could be relocated with relative ease to another facility for reuse) and some specialty items are OMAR-funded. They are included in the design, and are further divided into collateral equipment and furniture.

1-10.1.2.1 Collateral equipment will be furnished and installed by the construction contractor (contractor-furnished, contractor-installed or CFCI). The design team is responsible for including these items in its design and the construction cost estimate, but their detail and totals must be separate from the MCAR costs. All OMAR collateral equipment items are typically listed as options for bidding.

1-10.1.2.1.1 CFCI collateral equipment items must meet the Government's "Bona-Fide Need Rule" – generally speaking, they must be installed within 180 days of procurement or exercise of contract option.

1-10.1.2.1.2 Certain items, such as metal lockers and caging, which are made to order and require a lengthy submittal process, can have a longer delay between procurement and installation than "off the shelf" items. Such items are normally grouped in an OMAR option that may be exercised at or shortly after award of the MCAR construction contract.

1-10.1.2.1.3 The remaining collateral equipment items are normally grouped as a separate OMAR option that will be exercised approximately six months prior to the project's completion or beneficial occupancy date (BOD).

1-10.1.2.1.4 The construction documents and price breakout schedule must clearly define OMAR-funded collateral equipment and which OMAR option line item it will be funded under. The price breakout schedule must narratively define what OMAR collateral equipment will be funded at or shortly after the time of award, and what is to be awarded within six months of the beneficial occupancy date (BOD). In considering the time required for long bid acceptance, the PDT should consider award date, construction duration, lead time to procure items, and submittal requirements.

1-10.1.2.2 Furniture, including physical readiness equipment, will be procured and installed by the Government (Government-furnished, Government-installed or GFGI) using OMAR funding. The design team is responsible for the design of the furniture, and for including the design "for information only" in the construction documents. The design team does not provide a cost estimate for it, or include it in the price breakout schedule. The Government uses the design documents to procure the furniture under a separate contract.

1-10.2 The Full Facility Restoration (FFR), Minor Maintenance and Repair (MMR), and other programs are also OMAR-funded. These programs generally use simplified design methods to design and construct projects within annual OMAR funding cycles. Utilize the Design Guide as the starting point for project designs.

1-10.2.1 In the FFR program, all building components in the affected buildings, and the utility infrastructure, are evaluated for remaining useful life, and for compliance with current building and life safety codes. Systems and components that are at or near failure, or in serious need of modernization, are replaced with current products approved by the OCAR Engineer Office.

1-10.2.2 FFR projects are further evaluated against Plant Replacement Value (PRV), as defined by AR 420-10, and cannot exceed 50% of PRV without specific approval of the appropriate Deputy Assistant Secretary of the Army.

1-10.2.3 The majority of FFR projects consist of maintenance and repair (M&R), or health/life safety work. These projects are funded from different subsets of the OMAR "K" account.

1-10.2.4 FFR projects may include some incidental new Minor Construction work in order to provide complete and usable Army Reserve facilities. This work is funded from the OMAR "L" account. The current limits on the allowable construction cost must be verified and not exceeded.

1-10.2.5 Cost estimates for FFR projects must differentiate the amounts to be funded from different OMAR accounts, as directed by the OCAR Engineer Office.

1-10.3 Real Property Exchange (RPX) projects involve the exchange of Army Reserve property and/or facilities for property or facilities owned or built-to-suit by other Governmental units or the private sector. The entity with which the Army Reserve makes such an exchange is the "exchange partner". The exchange partner typically provides the funding for any facility design and construction to be acquired by the Army Reserve in such exchanges, and often provides both the design and construction of the facility, transferring ownership to the Army Reserve when the project is ready for occupancy.

CHAPTER 2

PLANNING GUIDELINES

2-1 INTRODUCTION

2-1.1 The goal of the site and building planning process is to develop one or more site/building concepts for a functional and efficient facility. In addition to meeting Army Reserve criteria and standards, the facility should fit well into the surrounding community and environment, and accommodate existing and future development, to the extent possible.

2-1.2 A wide variety of factors must be considered in the site and building planning process; this Chapter identifies and discusses some of the factors. The Design Agency must ensure that all appropriate factors are considered, including those that are specific to the project site.

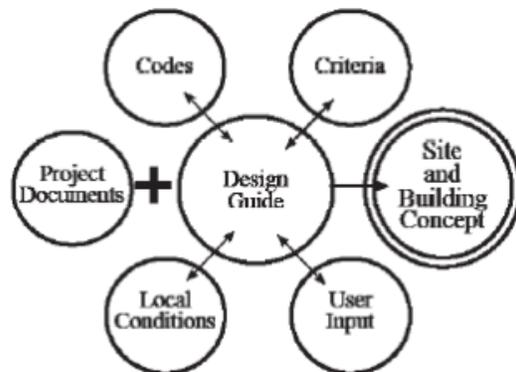
2-1.3 The two main documents submitted to the designer, prior to beginning design for a facility, are the project documents (see Paragraph 1-2.2.1) and this Guide. The project documents list the authorized spaces and their authorized areas for a specific project. This Guide provides design criteria and application guidelines which will be used in the development of the project. Use of these two documents will help the designer to quickly produce the schematic design and design development of the proposed facility.

2-1.4 Reserve units train primarily during the weekends, which is when its occupancy will peak. There is a smaller group of full-time personnel that occupies the facility during the week.

2-2 DESIGN AND REGULATORY CRITERIA AND THEIR APPLICATION

2-2.1 Applicable Criteria: The Design Agency must identify and become familiar with applicable design and regulatory criteria, and apply them to the planning process and later the design process. It is important that applicable criteria be identified early in the planning process to avoid revisions being required at a later point. In cases where criteria are in conflict, the more stringent criteria generally apply; address questions concerning conflicting criteria to the OCAR Engineer Office for resolution. Applicable criteria include the following (other criteria may be applicable as well):

**Figure 2-1
Project Design Development**



2-2.1.1 Army Reserve authorizations, standards and criteria include the project documents, this Design Guide, Design Process and Submittal Requirements, Army Reserve IT Manual, Army Reserve UFGS specification sections, and Army Reserve Center of Standardization (ARCOS) Bulletins. All, but the project documents, are available on the [Army Reserve website](#).

2-2.1.2 Engineering, Design and Other Guidance Criteria: See [Appendix A](#) for a list of criteria referenced in this Design Guide. The A/E Scope of Work or D/B RFP requirements will note additional applicable criteria.

2-2.1.3 Some RSCs have published their own design guides or preferences; designers will consider these in the design of the project. The RSC guides and preferences do not take precedence over this Design Guide or other government criteria. In case of conflict, the Design Guide or other criteria govern unless the Project Officer determines otherwise.

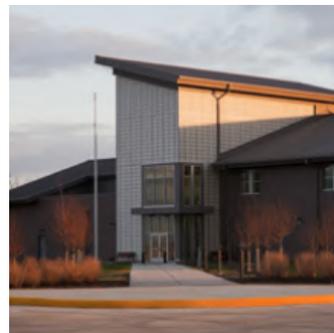
2-2.1.4 Codes, Regulations and Utility Requirements

2-2.1.4.1 The OCAR Engineer Office has identified UFC 1-200-01 as guidance for the use of model building codes and other criteria for design and construction of Army Reserve facilities. It references the International Building Code (IBC) as the basis for building design. The UFC contains specific instructions regarding application of IBC chapters. For fire protection and life safety requirements, it refers to UFC 3-600-01 Fire Protection Engineering For Facilities. UFC 3-600-01 governs fire protection requirements and includes National Fire Codes and other specific NFPA criteria, such as NFPA 101 for exiting requirements and NFPA 30A for maintenance shops.

2-2.1.4.2 For facilities not located on federal military installations, the Design Agency must identify local (state, county, city, etc.) codes, regulations, and utility requirements which would be applicable to a typical building project at the site, and determine their applicability to the project. Federal and military criteria generally take precedence over local code requirements unless local code requirements are more stringent.

2-2.1.4.2.1 If the project site is owned by the Federal Government, it may be a “Federal reservation”, and compliance with all local codes and regulations is not necessarily required. However, the Army Reserve strives to be a “good neighbor” in the communities of its citizen soldiers, and prefers to comply with local codes and regulations, unless such compliance would be

Figure 2-2
ARC, Joliet,
Illinois



particularly onerous or costly, or would reduce the level of safety within the facility. The OCAR Engineer Office encourages the Design Agency to meet with local code and regulatory officials to review the project and the local requirements, and to present any recommendations for non-compliance with local regulations to the OCAR Engineer Office for resolution.

2-2.1.4.2.2 Property owned by the Federal Government may also be under concurrent jurisdiction of the local and Federal Government, by agreement. If so, compliance with local codes and regulations is generally required. However, the OCAR Engineer Office still encourages the Design Agency to meet with local code and regulatory officials to review the project and the local requirements, and to present any recommendations for noncompliance with local regulations to the OCAR Engineer Office for resolution.

2-2.1.4.3 In general, on a Federal reservation, the Federal Supremacy Doctrine applies. The local building and zoning codes do not apply; no building permit will be required, nor will construction inspections be performed by local building officials. Local fire codes and utility requirements generally do apply, since these organizations will be the likely service providers to the facility. Other local requirements also generally apply, such as those governing environmental, drainage, traffic, and similar issues.

2-2.1.4.4 The Design Agency must identify any submittal or permitting requirements, and address them. This can be achieved either by the Design Agency making required submittals and applications, or by incorporating the requirement into the construction documents for contractor implementation. If application and permitting responsibilities are assigned to the construction contractor, the Design Agency must obtain and fill out applications as completely as possible, and convey them to the USACE construction district for contractor use and completion. The Design Agency must also identify any fees the contractor will be required to pay, and include them in the cost estimate and construction documents.

2-2.1.4.5 On a non-Federal reservation Army Reserve facility, such as a leased facility, local codes and regulations apply as they would for any private-sector project, and building permits and inspections will be required.

2-2.1.5 Installation Design Guidance

2-2.1.5.1 If the project site is on a larger Government installation, it is likely the property owner will have installation design guidance applicable to the project, such as an Installation Design Guide. Many installations also have mandates or guidance addressing resource-use reduction or other issues. The Design Agency must identify any such guidance, and work with the OCAR Engineer Office to determine its applicability.

2-2.1.5.2 On a larger Government installation, there typically will also be a public works or similar department, which is likely to have its own requirements for construction on the installation. This department may also control some or all of the utility services. The Design Agency should coordinate its design with the appropriate department personnel.

2-2.1.6 Corps of Engineers Guidance.

2-2.1.6.1 The Corps of Engineers design or construction District may have design guidance, such as Architect/Engineering Instructions, District Design Guides, or construction details that may be applicable. The Design Agency and the OCAR Engineer Office must determine their applicability.

2-2.2 Sustainable Development and Design (SDD)

2-2.2.1 The current SDD policy guidance memo can be found on the [Army Reserve website](#). The policy memo provides guidance for implementation of the Energy Policy Act of 2005 (EPA05), Energy Independence and Security Act of 2007 (EISA07), and Executive Orders (EO) 13423 and 13514, among other guidance. Also applicable is ARCOS BULLETIN 2011-1.

2-3 ENVIRONMENTAL

2-3.1 In general, an Environmental Assessment (EA) or similar environmental documentation, with a Finding Of No Significant Impact (FONSI), must be completed for each project. The Army Reserve also requires completion of an Environmental Condition of Property (ECP) checklist. Preparation of these environmental documents is typically the responsibility of the RSC or others, but the design team must become familiar with any requirements from the studies which need to be included in the design. These might include such issues as erosion control, protection of wildlife and habitat, limitations on construction operations, hazardous materials, and other measures.

2-3.2 Refer to Paragraph 2-2.1.4.4 above for permitting requirements which may apply to environmental concerns.

2-3.3 For very large projects, or projects with very large generators, permits may be required for equipment combustions sources.

2-3.4 Verify site potential for radon; the EPA website, <http://www.epa.gov/radon/index.html>, has general information and some counties or cities have more specific information. The Support Installation may also have information. If radon potential nears or exceeds four pCi/L, provide radon protection in accordance with "Radon Prevention in the Design of Schools and Other Large Buildings", available from the same website.

2-4 SITE SELECTION AND PLANNING

2-4.1 General Selection and Planning Criteria

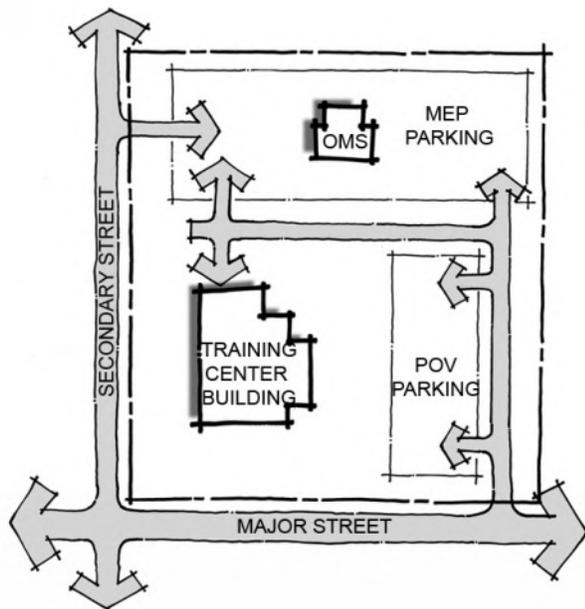
2-4.1.1 In most cases, the project site will have already been selected, based on the following characteristics. If the Design Agency is involved in site selection, the factors below, along with the budget, are important factors to be considered. For additional site selection considerations, see [Section 2-5, Antiterrorism/Force Protection](#).

2-4.1.1.1 A relatively level site, suitable for the parking of military training vehicles.

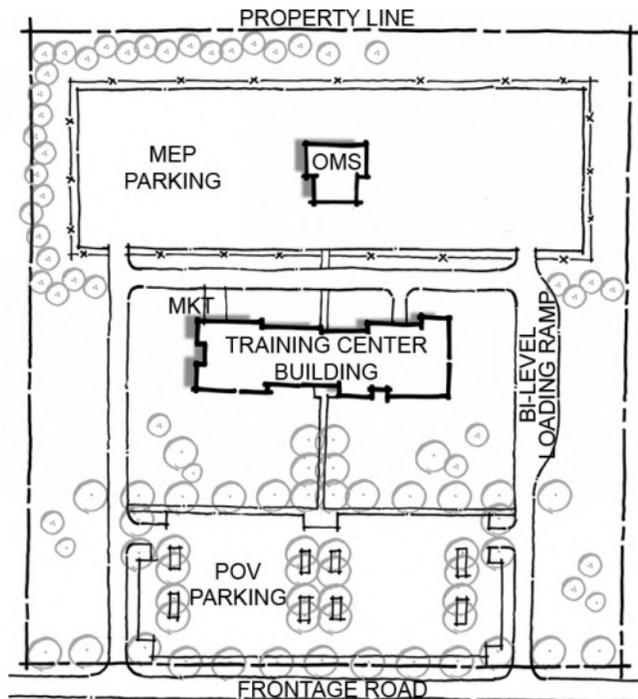
2-4.1.1.2 A site with high public visibility for the training center building.

2-4.1.1.3 A site with a buffered area available to mask the noise and disruption caused by exterior training exercises and military equipment use.

**Figure 2-3
Site Access**



**Figure 2-4
Typical Reserve Center Site Plan**



2-4.1.1.4 An easily accessible site; including access by the Tenants' military equipment.

2-4.1.1.5 A site with few or no environmental concerns, such as hazardous materials, protected or endangered species habitat, wetlands, flood plains, etc. In general, the Army Reserve will not acquire land that is located in the 100-year

flood plain. Sites at or near active remediation sites are not ruled out of consideration.

2-4.1.1.6 A site with utility services already in place, or close by.

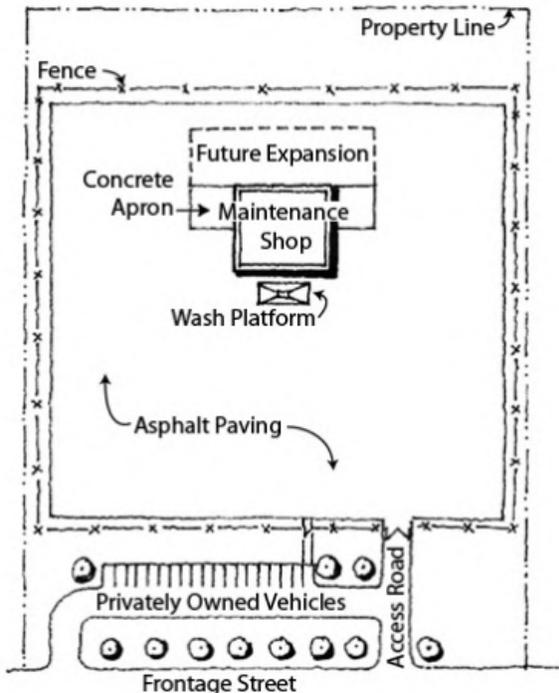
2-4.1.1.7 A site that will support energy reduction and sustainable design measures for the project, and may offer space for renewable energy strategies now or in the future. Consider mandated low-impact development (LID) measures, and how they will be accommodated.

2-4.1.1.8 Site with compatible uses around it; it is highly recommended to gauge community sentiment.

2-4.1.1.9 A site of sufficient size for required AT/FP standoff distances.

2-4.1.1.10 Oddly shaped sites have proven to be difficult to plan and lay out efficiently, and should be reviewed carefully. Antiterrorism standoffs can greatly reduce site area available for effective utilization.

Figure 2-5
Typical AMSA Site Plan



2-4.1.2 The standard Army Reserve training facility consists of the training center, organizational maintenance shop (OMS) with military equipment parking (MEP) area, unheated storage building (UHS), and privately-owned vehicle (POV) parking area. The interrelationship of these spaces and their appropriate site orientation require careful study. As the major point of activity and public access, the training center building should dominate the community interface of the entire facility and must be visible from adjacent public areas. The MEP and OMS also should generally be located to afford a showcase for public relations purposes. Review location of the OMS and MEP, and whether community concerns necessitate visual screening of these functions, with the Tenants.

2-4.1.3 As a general rule, the training center, due to its high usage and the desire to provide high community visual presence, will be located on the most visible portion of the site, and the site planning should direct visitors to the training center main entrance. The POV parking area is best located adjacent to the training center. The OMS/AMSA is an individual structure generally located

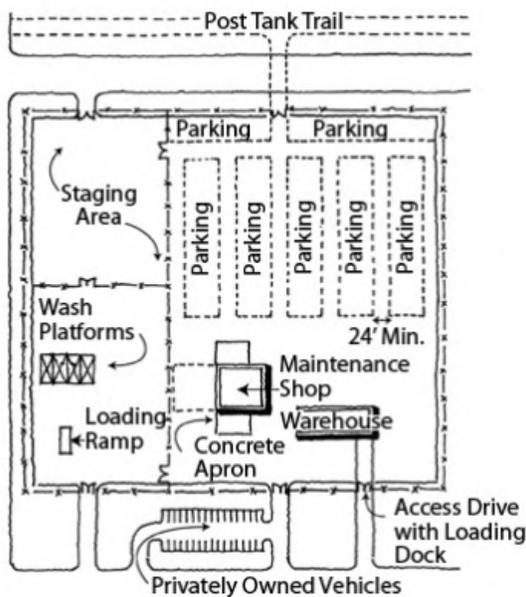
away from the training center to minimize noise and disruption. Most Tenants prefer that the administrative portions of any OMS/AMSA building be nearest the training center. The UHS can be located as the Tenants think appropriate, but it is frequently located near the maintenance shop area.

2-4.1.4 The general direction above tends to divide the site into two zones: an administrative zone for the training center and the POV, and a more utilitarian zone for the OMS and MEP. If possible, without duplication of roadways, develop site design to minimize vehicle circulation interference between traffic for the two zones. Avoid accessing the MEP lot, dumpsters, and delivery points through the POV lot.

2-4.1.5 Site access must be direct, safe and efficient to minimize the environmental impact of military vehicle traffic. The design should minimize access points but provide adequate acceleration and deceleration lanes at the primary entrance(s). Follow standard traffic planning practices. To the extent practical, keep POV and military traffic separated. Avoid, if possible, restrictions for site entrance and exit, such as “right-in, right-out” access only.

2-4.1.6 The schematic design concepts for both the site and the buildings should be based on a simple, logical idea which satisfies the requirements of the program, site, Tenant functions, and long-term maintenance. Project sites will vary; each requires its own solution.

**Figure 2-6
Typical ECS Site Plan**



2-4.1.7 The training center and main facility entrance should be apparent to passing traffic (while satisfying AT/FP requirements), to ensure community visibility and ease of access. Visitor parking and the main entry for building visitors should be readily identifiable.

2-4.1.8 Allocate space for a dumpster and a recycling area (verify specific requirements with Tenants).

2-4.1.9 Arrange AMSA and ECS sites, when not collocated with a training center or OMS, for functionality and vehicle access with consideration for future expansion.

2-4.1.10 When practical, orient the longest sides of buildings along an east-west axis. This orientation will generally result in most windows facing north and south to minimize solar heat gain. At extreme latitudes, energy savings may be better

with different building orientations.

2-4.1.11 Provide for future expansion of buildings and paving when planning the use of the site; as a rough guide, strive to allow 25% future expansion of buildings, POV and MEP. Consider that such expansion may require additional area for LID measures, and must meet AT/FP standoff requirements.

2-4.1.12 Consider two-story construction to reduce land coverage and area of impervious surfaces; a smaller footprint can offer a number of sustainability benefits.

2-4.1.13 The designers should strive for a compact site layout, to disturb as little of the site as practical, and to leave as much site as practical available for future expansion.

2-4.2 Availability of Utilities

2-4.2.1 It is the Design Agency's responsibility to verify availability and capacities of all utilities required for the project. Contact the utility providers, record all discussions and copy to the provider. Any required applications, permits, reviews, fees, design/construction requirements, easements, or service upgrades must be identified, and their impacts on design and construction costs and schedules calculated. If alternative providers exist for any utility, the designer should identify the alternatives to the Design Agency as early in the design process as possible, and verify whether a formal study of the alternatives is desired to provide comparative costs, benefits and drawbacks. Verify the existence of in-place utility easements, access agreements or requirements for new easements over utilities, and whether or not these affect the project design. Coordinate the results of this verification process with the other project design disciplines.

2-4.2.2 It is obviously preferable that utilities be available at or near the boundaries of the site. Extension of off-site utilities to the site will likely require third party (utility company, municipality, utility district) engineering and/or construction, and possibly acquisition of additional utility easements. Any such off-site work will require additional lead time, and may require formal requests or petitions for approval. If off-site work is required, the environmental documentation for the project must include any off-site work areas. Confirm that those preparing the documentation are aware of any off-site work areas.

2-4.2.3 Development of primary on-site systems for domestic water, fire water and sanitary sewer systems is not generally desirable; additional land may be required to prevent interference with on-site water supply and waste water disposal systems. In addition, development of sufficient on-site water supply or storage for fire protection and waste water treatment capabilities will add appreciably to typical project costs. Finally, the Government would prefer not to

operate and maintain such systems. The addition of secondary on-site water for reuse may be considered and is desirable to meet LID objectives. However, it is not typically a cost-effective solution for Army Reserve projects.

2-4.2.4 Gas, electric and telecommunications utilities operate in a competitive environment in many locations, and more than one source of service may be available to the site. Service area agreements between utilities may also be in effect that will limit which utility will service the site. Collect information regarding standard rates for utility connection fees, capacity charges or area assessments, and their method of payment.

2-4.2.5 Many Government installations have “privatized” the utility systems which were formerly under the ownership and operational control of the installation’s Department or Directorate of Public Works (DPW). Identify the privatized utility system owner, and gather the necessary information as outlined above.

2-4.2.6 Utilities brought onto the site and constructed by the utility owner may also require that an easement be designated over the utility line to allow the utility company access to maintain and service its line(s). The designer shall notify the Design Agency and coordinate with Real Estate early in the design process if easements are required by the utility. The Government generally prefers to avoid easements where practical, and generally prefers to author their own easement agreement when required.

2-4.2.7 In some cases, design and construction of off-site utilities may be required to bring services to the project. The Army Reserve requires that these utilities be owned by the utility provider once completed.

2-4.2.8 On some Government installations, the installation may be a potential utility provider. The design team must verify that the Government has sufficient utility capacity, and what entity will be responsible for the design, construction and funding of any required upgrades or extensions to the utility service.

2-4.3 Existing Jurisdictional Agreements

2-4.3.1 Some Reserve Centers or Government installations have written agreements with local jurisdictions which govern fire and/or police service, utilities, roadways, and similar issues. The designer must verify whether such agreements exist, and ensure that any requirements they impose are incorporated into the project planning.

2-4.3.2 If the facility is located near a civilian or military airport, the designer must verify the airport authority’s requirements, which may not be written into any agreement, but will still apply to project construction and operation. There may be height restrictions (affecting construction operations and/or the finished

buildings), other airspace envelope restrictions, and requirements for noise insulation, all of which must be a part of the planning process.

2-4.4 Floodways

2-4.4.1 All sites will be investigated to verify whether they contain designated floodways; this is typically a part of the EA effort. The information is normally available from local planning and zoning officials, or from public works water resources or planning sections on Government installations that have a public works directorate or department. The Federal Emergency Management Agency (FEMA) publishes maps of formally studied and designated floodways. Their information is normally available through the state agencies responsible for the implementation of the state's flood plain or flood protection program. Flood plain maps are also available on order from the FEMA website.

2-4.4.2 The U.S. Army Corps of Engineers District (Civil Works) in which the site is located, will also have information as to whether or not the site is protected by a Corps flood protection project.

2-4.4.3 Not all sites that flood are documented as part of a formal flood plain study or shown on floodway maps. This is usually referred to as small localized flooding, but may have a significant effect on any one site. Investigation of local reports of flooding on the sites is required. Many times, these reports are verbal or included in local newspapers. A preliminary hydrology/hydraulic analysis may be needed to determine the relative frequency and level of flooding that will need to be mitigated by site design.

2-4.4.4 Floodway areas cannot normally be developed. Filling of flood fringe areas is restricted and will require re-analysis of floodway hydraulics if fill depths are exceeded; such filling may not be allowed. It is the preference of the Government to avoid building in or modifying floodways.

2-4.5 Traffic Impacts

2-4.5.1 The development of an Army Reserve Center will normally result in additional traffic to the existing roadways at the site access point(s). As noted above, minimize such access points. The roadway from which access is gained will generally be under the jurisdiction of a public agency (state department of transportation, county, township or municipality). A Government installation with a public works department will be responsible for the installation roadways.

2-4.5.2 Identify and contact the responsible agency for the access roadway to review the project traffic planning. Verify that the responsible agency has not delegated roadway use and planning to a subordinate agency or level (i.e., a state highway for which the state department of transportation is allowing the local municipality to determine turn lane requirements). As with utilities, identify

any required applications, permits, reviews, fees, design/construction requirements, or service upgrades, and calculate their impacts on design and construction costs and schedules.

2-4.5.3 Develop an estimate of the traffic generation information for the facility for review with the responsible agency. The final Environmental Assessment should address this traffic issue. It is not unusual for such agencies to limit the number and location of access points, or to require directional access (left- and right-hand turns), turn lanes, acceleration/deceleration lanes, or alignment and spacing in relation to existing access points. Some roadway agencies, after review of traffic estimates, may require that a formal traffic study be accomplished. A formal traffic study typically requires more analysis and evaluation than that accomplished for the traffic section of the Environmental Assessment. The formal traffic study scope of work may be stipulated by the roadway authority. This study is typically accomplished through the roadway authority or by a local traffic consultant and funded by the owner either directly or through roadway authority fees. In a few cases, the designer may need to accomplish this study as a part of the design scope of work. In this case, the traffic study should be included in, or added to, the design scope of work.

2-4.5.4 Work on the access roadway is normally off-site construction, and the responsible agency may or may not allow construction by another agency or “private” party within its right-of-way. The procedures for designing, permitting and implementing this roadway work and associated fees must be identified. The responsible roadway agency may also require a performance bond in its name for the value of the work in their right-of-way if the construction is accomplished as part of the Government’s site construction contract.

2-4.6 Military Vehicle Information

2-4.6.1 The designers should verify what types of vehicles the Tenants will employ, and design site circulation and parking to accommodate them. These may include commercial delivery vehicles as well as the military vehicles operated and maintained by the unit(s). Site roadways and MEP areas are typically designed with turning radii to accommodate commercial over-the-road trucks, unless the Tenants indicate that they have vehicles which require larger maneuvering allowances.

2-4.6.2 The Tenants must provide a list of their vehicles and the delivery vehicles they anticipate, and should be able to provide vehicle specifications. Specifications for military vehicles can also be found in the technical bulletin TB 55-46-1 Standard Characteristics for Transportability of Military Vehicles, available for online purchase at the web site <http://engineers.ihs.com/document/abstract/NFQYDAAAAAAAAAAAA>.

This technical bulletin lists weights, but does not include turning radii; the designer will verify maximum anticipated turning radius vehicle with the Tenants, and ask them to provide the specifications for that vehicle.

2-5 ANTITERRORISM/FORCE PROTECTION (AT/FP)

2-5.1 Terrorist attacks have demonstrated the vulnerability of U.S. military and civilian personnel, and the facilities in which they work. To address this vulnerability, the Department of Defense (DoD) established standards to ensure that force protection measures are incorporated into the budgeting, planning, design, and construction of its facilities. The standards address both new construction and major renovation projects. They include minimum construction requirements, as well as measures that can be applied where higher threat levels are identified by the Support Installation. The Design Agency must request that a threat assessment be provided to identify the threat level at the proposed project site.

2-5.2 AT/FP criteria apply to the design of all Army Reserve facilities, and UFC 4-010-01 provides the mandatory guidance. The design team must verify what is applicable to the specific project, and the appropriate Support Installation security personnel must be involved in discussions and design of AT/FP features/considerations. The Army Reserve has its own policy on AT/FP, available on the [Army Reserve website](#), with additional requirements for design and construction of its projects.

2-5.3 The UFC mandates measures to be taken in both site and building design, and can have appreciable impact on site and building planning, and on construction cost. Designers are advised to incorporate AT/FP requirements at the earliest stages of design. A brief summary of some of the minimum construction requirements:

2-5.3.1 The AT/FP site criteria require, at a minimum, provision of standoff zones to separate buildings from parking, roadways, and other buildings. The standoff zones increase the minimum amount of land required to provide a compliant and functional site layout, and must be considered during site selection. For elevated threat levels, vehicle barriers might be required.

2-5.3.2 Several building design/construction measures address structural design and the threat of progressive collapse in the event of a bomb blast. These measures may discourage building designs of more than two stories due to the associated costs.

2-5.3.3 Other measures address locations of certain spaces, exterior glazing, utility locations/routing, locations of HVAC air intakes, landscaping, etc.

2-5.3.4 To reduce the risk of mass casualties, there must be a timely means to notify building occupants of threats and what to do in response to those threats. Comply with UFC 4-021-01, which provides guidance on mass notification systems.

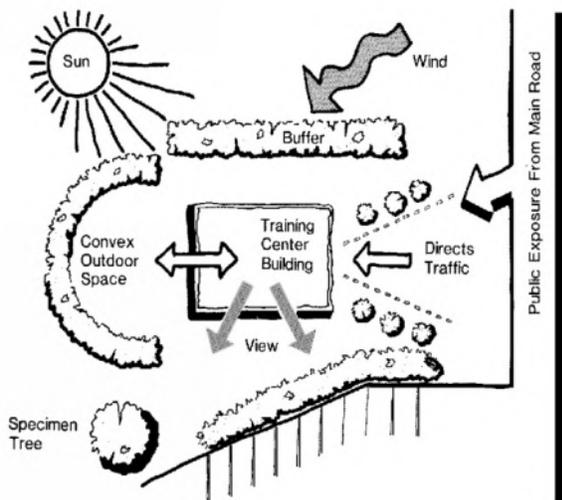
2-5.3.5 The UFC requirements for glazing, glazing frames, and their anchorage and support are stringent to mitigate the danger of personnel injury from flying glass shards.

2-5.3.6 While the UFC discourages locating mechanical, electrical and similar equipment within the unobstructed space around a building, it does not prohibit it when costs or practicality of locating it outside the space are appreciable. If the equipment would allow for concealment of explosive devices of the size indicated in the UFC, such equipment would need to be caged and locked to prevent access by unauthorized personnel. Such caging should allow easy access for maintenance of the equipment. If placement within the unobstructed space is necessary, the preferred location is adjacent to unoccupied or lightly occupied spaces within the building. For additional guidance see the [Army Reserve website](#).

Figure 2-7
Local Operating Console for Mass Notification



Figure 2-8
Landscape Planting



2-6 LANDSCAPE

2-6.1 Landscape design and use of plant and landscape material must be sustainable, conserve energy, and eliminate the use of potable water for irrigation, pesticide and herbicide application. Temporary irrigation means and methods shall be used to establish plant material and removed after the landscape is established. Ease of maintenance and frequency must be a primary consideration. Native landscapes, i.e. native grass and forb groundcovers, native trees, shrubs and perennials, must be emphasized to reduce maintenance activities due to limited resources.

2-6.2 Landscaping must be an integral part of the facility design process. Good landscape planning affords many valuable benefits. Planting design reflects an understanding of facility goals and objectives, an appreciation for

existing site conditions, habitat, and an ability to enhance the outdoor environment through the integration of natural and cultural conditions in a sensitive and pragmatic manner.

2-6.3 Architectural character and sense of place is supported by proper landscape design, which introduces aspects of scale, color, texture, form, regional materials, etc., to the living environment.

2-6.4 Landscape design must enhance and facilitate pedestrian and vehicular wayfinding. Good design encourages safety and assists in the resolution of conflicts between the automobile and the pedestrian.

2-6.5 Landscape design and use of plant and landscape material must be sustainable, energy-conserving, low maintenance and must reduce reliance on potable water for irrigation, pesticides and herbicides. Utilize landscape material to shade utility equipment without interfering with the operation and/or maintenance of the equipment. Proper siting of plant material should reduce heat gain in summer and heat loss in winter, provide wind protection, and filter particulates from the air before entering intakes of facilities. Proper use of living windbreaks can reduce energy associated with snow removal in northern climates, and create habitat.

2-6.6 Plant materials provide focus and reinforce positive views. Proper landscape treatment can screen unsightly structural elements and buffer poor visual panoramas.

2-6.7 Quality, usable outdoor spaces are created through an understanding of existing conditions, programmatic needs and well-developed landscape architectural concepts. Landscape design and the selection of materials must reflect the mission of the facility and Tenants' needs. Planting must be functionally, aesthetically and regionally appropriate, and reflect aspects of safety and security as outlined in the Department of Defense Antiterrorism/Force Protection Standards.

2-6.8 Refer to UFC 3-201-02 for comprehensive landscape design considerations.

2-7 BUILDINGS

2-7.1 General Design Considerations

2-7.1.1 Aesthetics – Architectural Style and Character

2-7.1.1.1 The military facility, by its presence, represents national security, strength, austerity, efficiency, professionalism, and pride in country and community.

2-7.1.1.2 Each facility is also the home and workplace of the soldiers it houses, and should provide them with a feeling of pride and ownership. An attractive facility can enhance the Tenants' sense of identity, and serve as one tool for the recruitment of new soldiers and retention of current soldiers.

Figure 2-9
AFRC, Middletown,
Connecticut



2-7.1.1.3 The architecture should be sensitive to the style, scale and materials of the local region not only for aesthetics, but also for function. Many local building forms and design statements are a direct outgrowth of a region's environmental and cultural characteristics.

2-7.1.1.4 Design buildings to be compatible with their surroundings and sensitive to the neighborhoods in which they are placed. Army Reserve facilities are intended to be 50-year buildings and as such, they should aim to be timeless, durable buildings. With

these considerations, design is encouraged to be relevant to current architecture while avoiding design fads. Facilities should evoke a sense of pride in the soldiers, and contribute to the community where a Reserve Center is located.

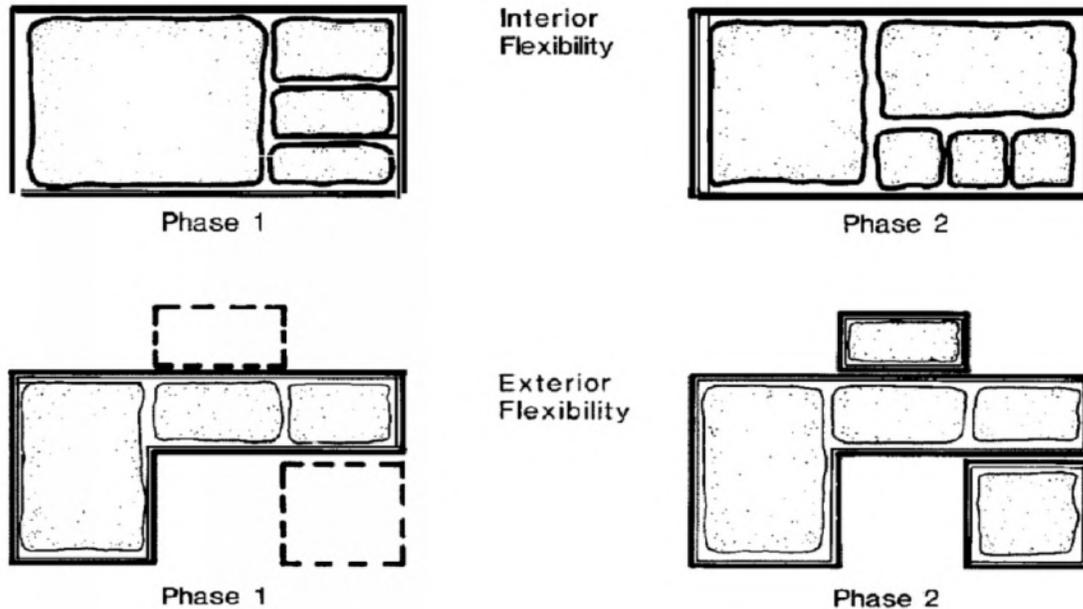
2-7.1.1.5 Select materials to be aesthetically pleasing, easily maintained, sustainable, and cost effective. Standard exterior finish materials approved by the OCAR Engineer Office are described in Chapter 3.

2-7.1.1.6 Select training center spaces will not have windows, for security reasons or by Tenant preference, such as unit storage, COMSEC training and storage, Army Global Command and Control System (AGCCS), Sensitive Compartmented Information Facility (SCIF), and others. The designer may want to locate these spaces away from major facades to allow use of fenestration on those elevations.

2-7.1.2 Flexibility and Economy

2-7.1.2.1 Incorporate internal flexibility as much as possible to readily accommodate the growth and change that will occur as units evolve and change their training emphasis. For example, a facility may be designed to accommodate infantry training and then, after a period of time, may need to be changed to accommodate a medical unit. This may require additional maintenance/shop space and a decrease in the unit storage area. If a facility is designed with internal flexibility of building systems, including electrical and data/IT, it can accommodate change more economically. Therefore, the design of office areas should not be too closely tailored to the units currently assigned, but should be more generic in design, providing a balanced ratio of exclusive office space to common office space. Where practical, workstations are preferred to hard-walled offices for future flexibility.

Figure 2-10
Flexibility for Future



2-7.1.2.2 External flexibility should also be planned to accommodate the potential for growth of the facility. This requires proper siting and utility planning, and a building systems approach to design universally applied to the facility.

2-7.1.2.3 Economy of design will be taken in its broadest sense: initial cost, maintenance, and building system flexibility. Consider the following flexible building systems:

2-7.1.2.3.1 Architectural: Durable and easily maintainable finishes, carpet tile, detailing which largely avoids custom fabrication, use of standard doors and windows, etc.

2-7.1.2.3.2 Structural: Strive for a regular column spacing layout to provide remodeling and interior space planning flexibility and economical structural systems.

2-7.1.2.3.3 Mechanical: HVAC systems should be designed to accommodate future relocation or addition of zones to meet future zoning requirements. Design of systems shall be integrated with sustainable design and development (SDD) considerations.

2-7.1.2.3.4 Electrical: Main electrical room and electrical closets should be located to minimize voltage drop, to efficiently serve equipment, and to provide system flexibility. Provide spare capacity in distribution equipment for future expansion and additional loads. Provide empty conduits for future expansion areas. Run cable trays for communication wiring. To extend power supply and communication system to electrified partitions, use flush floor boxes/poke-through and/or wall boxes in new facilities.

Figure 2-11
ARC, Hayden Lake, Idaho



2-7.1.2.3.5 Telecommunications: Telecommunications Equipment Room (TER) and Telecommunications Room (TR) located in accordance with the Army Reserve IT Manual to efficiently serve IT outlets. Cable tray provided for IT wiring flexibility.

2-7.1.2.4 Consider future expansion in each project, especially new centers, to the extent site allows. In the training center buildings, expansion will primarily consist of administrative, classroom and unit storage spaces. Site the OMS to allow for the construction of additional workbays to the extent that is possible. Site MEP and POV areas to accommodate increased parking requirements associated with increases in personnel and equipment.

2-7.1.3 New Construction, Alterations and Additions

2-7.1.3.1 The criteria and requirements contained within this Guide pertain to all three types of projects: new construction, alterations and additions. It is recognized, however, that due to the architectural configuration of existing facilities, the remaining life of systems, and other considerations, it may not be feasible in alteration projects to meet all new construction standards. Professional judgment is required to design a building which combines old and new portions into a harmonious finished design to provide a complete and usable facility at the lowest life cycle cost. As soon as possible after design initiation, the Design Agency should conduct a detailed facility investigation to establish the limits of construction. Investigations will include the following:

2-7.1.3.1.1 Review required real property maintenance and repair work. Consult the facility manager and the Support Installation Backlog of Maintenance and Repair (BMAR) list.

2-7.1.3.1.2 Verify accuracy of as-built drawings.

2-7.1.3.1.3 Determine adequacy of supporting utilities.

2-7.1.3.1.4 Determine the status of the following building components: structural, fire protection, electrical, plumbing, and HVAC systems; windows, roof, exterior and interior walls, doors and hardware, stairways, and insulation.

2-7.1.3.2 Based on the above and the project documents, develop recommendations as to the extent of the demolition and remodeling, including reuse or replacement of existing equipment, for the consideration of the OCAR Engineer Office.

2-7.1.3.3 The Government will perform any studies required to verify economic viability or remaining life of existing facilities considered for alterations or additions.

2-7.2 Training Center (TC) Functional Relationships

2-7.2.1 Adjacencies

2-7.2.1.1 The training center spaces are organized into the following groups: administrative, assembly/kitchen, weapons, educational, storage, special training and support.

2-7.2.1.2 As a general rule, organize the training center so that the spaces in each group are adjacent or in close proximity; i.e., group administrative spaces together, to the extent possible, possibly in one wing of the building. This is not necessarily true of all the storage, special training, and support group spaces.

2-7.2.1.3 Distribute the janitorial, facility maintenance, support and similar spaces throughout the building. Locate the special training spaces near spaces similar in function, or near the specific Tenants that utilize them most. In some cases, such as a band room, the spaces may function best if they can be somewhat isolated from other functions. Always consider Tenant preferences along with overall flexibility.

2-7.2.1.4 The training center typically functions efficiently when organized around a central lobby space, so that circulation distances are minimized. The elevator and a stair should be adjacent to the lobby in multi-story training centers.

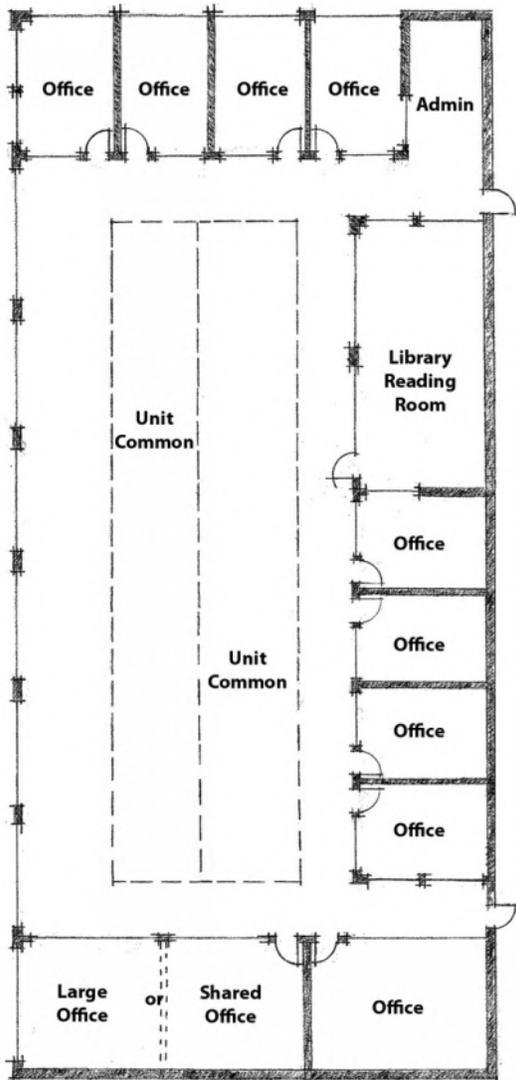
Figure 2-12
ARC, Garden Grove,
California



2-7.2.1.5 Administrative Adjacencies

2-7.2.1.5.1 Provide some administrative space close to the main lobby to greet and control visitors, since there is no receptionist.

**Figure 2-13
Office/Unit Common Relationship**



2-7.2.1.5.2 To the extent possible, arrange offices in unit common workspaces so that units can be grouped together, and so each unit's offices can be near its workstations within the unit common.

2-7.2.1.5.3 Cluster full-time workspaces together, and locate within open unit common spaces. Maximize daylighting possibilities, allowing all workstations and offices to access windows to the extent possible. Full-time offices that cannot be placed within the unit common should generally be located on main corridors. Multiple, smaller unit common areas with offices within them are typically preferable to a single, large unit common, for reasons of flexibility. Where practical, consider grouping full-time offices to facilitate zoning of HVAC systems to minimize energy use during the week.

2-7.2.1.5.4 Exclusive offices require the same adjacencies as full-time offices.

2-7.2.1.5.5 Locate unit common space adjacent to full-time and exclusive workspaces, and to administrative support spaces.

2-7.2.1.5.6 A command suite for a General Officer, is authorized an

accessible toilet with a sink, and a space for changing with lockers included. Provide access to the toilet/lockers from the command suite itself. This toilet is not counted when calculating number of required fixtures for building.

2-7.2.1.5.7 Locate the recruiting/retention office adjacent to the lobby for both monitoring and ease of location by potential recruits and existing soldiers.

2-7.2.1.5.8 Locate the mailroom away from heavily populated areas and critical infrastructure of the building, and on an outside wall, as AT/FP measures. Make travel distance to other administrative areas as short as possible while maintaining AT/FP criteria.

2-7.2.1.5.9 Locate family support office adjacent to or near the lobby to allow easy access for visiting family members, and to limit the need for family member access beyond the lobby area.

2-7.2.1.6 Assembly/Kitchen Adjacencies

2-7.2.1.6.1 The kitchen and the chair and table storage spaces will always be adjacent to the assembly hall. This storage space is the location for the assembly hall furniture when it is not in use.

2-7.2.1.6.2 Some Tenants prefer the assembly hall to be adjacent to the arms vault and armorer as weapons training sometimes occurs in the assembly hall.

2-7.2.1.6.3 Consider an adjacency with the lobby. The lobby can provide the gathering and dispersal space required for large numbers of people.

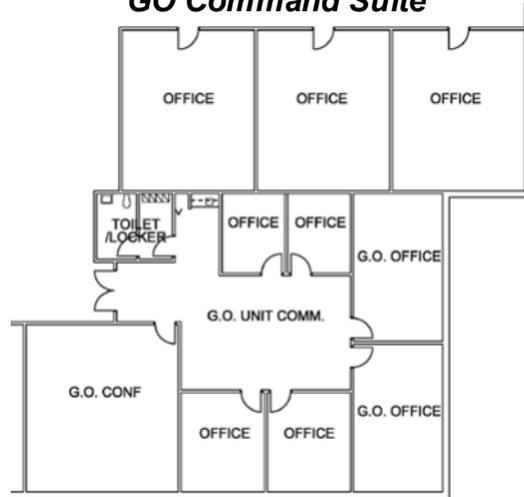
2-7.2.1.6.4 The kitchen is best located at the rear of the building. The equipment and refuse associated with the kitchen should not be on a building visitor's entry path.

2-7.2.1.7 Weapons Adjacencies

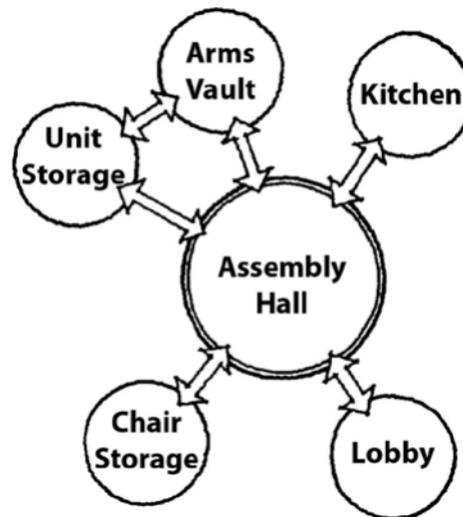
2-7.2.1.7.1 The armorer is always located immediately adjacent to the arms vault. Entry to the arms vault must be through the armorer's space for control of the weapons.

2-7.2.1.7.2 The weapons area may also be near the assembly hall, as weapons training sometimes occurs in the assembly hall.

**Figure 2-14
GO Command Suite**



**Figure 2-15
Assembly Hall Adjacencies**



2-7.2.1.7.3 The weapons area should also be near the staging area for ease of moving weapons onto transport for maneuvers. Some Tenants prefer that the arms vault and armorer spaces be located in Unit Storage.

Figure 2-16
ARC, Wilmington,
North Carolina



2-7.2.1.7.4 The weapons area should be on a circulation route that is frequently used to provide additional security against attempted theft.

2-7.2.1.7.5 The vault should not be located on an outside wall for security reasons.

2-7.2.1.8 Educational Adjacencies

2-7.2.1.8.1 The educational group of spaces is preferably located away from the administrative areas to minimize noise as soldiers come and go, and near an exit. Group classrooms together, off a single corridor if possible, and with training aids storage adjacent.

2-7.2.1.8.2 Group library reading, library storage, and learning center together. These spaces are generally used for individual learning, and need not be immediately adjacent to the classrooms.

2-7.2.1.8.3 The COMSEC storage room should be near the classrooms.

2-7.2.1.9 Storage Adjacencies

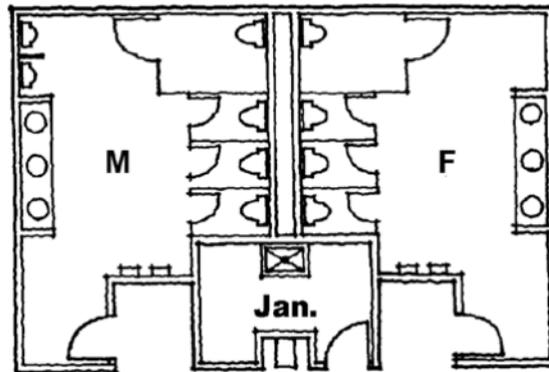
2-7.2.1.9.1 Locate unit/individual storage near the assembly hall, which may be used for training with or maintaining the equipment.

2-7.2.1.9.2 Supply offices are typically located in the unit storage space and overlooking the staging area, to provide the supply officers with visual monitoring capability of the stored materials. An exterior wall location, with a window overlooking the service drive access to the staging area is generally preferred.

2-7.2.1.9.3 The staging area is also located in the unit storage space, with an overhead door to an exterior driveway, to allow efficient marshaling of the equipment and transfer onto transport. Some Tenants prefer a depressed loading dock arrangement outside the staging area if site conditions allow.

2-7.2.1.9.4 The janitorial and facility maintenance spaces should be centrally located to be convenient for maintenance of the building, and off a main corridor for easy access. The facility maintenance space should also have reasonable access to the exterior for delivery of maintenance materials and equipment. In larger buildings, it is desirable to use the authorized space to create multiple rooms throughout the building for maintenance convenience. Locate janitorial spaces near toilets, where practical, for plumbing efficiency. Each floor must have a minimum of one janitorial space.

Figure 2-17
Janitorial and Toilets



2-7.2.1.9.5 Locate an area for collection of recyclables near an exit for easy transfer, preferably an exit that is accessible to vehicles. For more requirements on recycling space, see Paragraph 3-13.2.4.

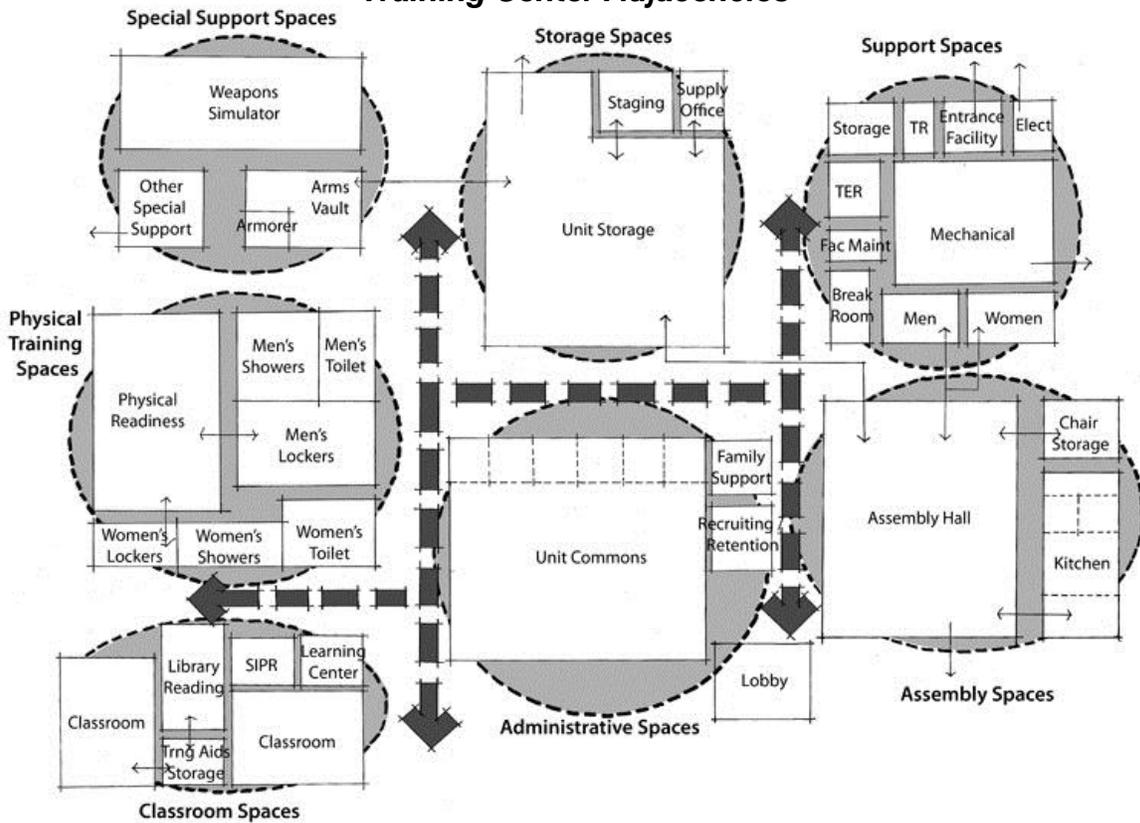
2-7.2.1.9.6 Flammable storage and controlled waste storage are not typically authorized for training center buildings collocated with an OMS. If authorized, locate these spaces on an exterior wall with exterior access only, as well as near a vehicle access for easy transfer for delivery to and removal from the facility.

2-7.2.1.10 Special Training Adjacencies

2-7.2.1.10.1 Medical section, physical exam, photo lab, soils testing lab, drafting room, GCCS, and some less common special training spaces have no specific adjacencies. They should be located near the unit that has the mission they support: some should be separated from noisier activities. Some of these areas may require venting or exterior access and should be located on exterior walls. Verify with Tenants.

2-7.2.1.10.2 The weapons training space utilizes an electronic simulator, the Laser Marksmanship Training System (LMTS), or Engagement Skills Trainer (EST), and is best located away from occupied areas of the building. The electronic weapons used are stored in the storage room; they need not be in the arms vault.

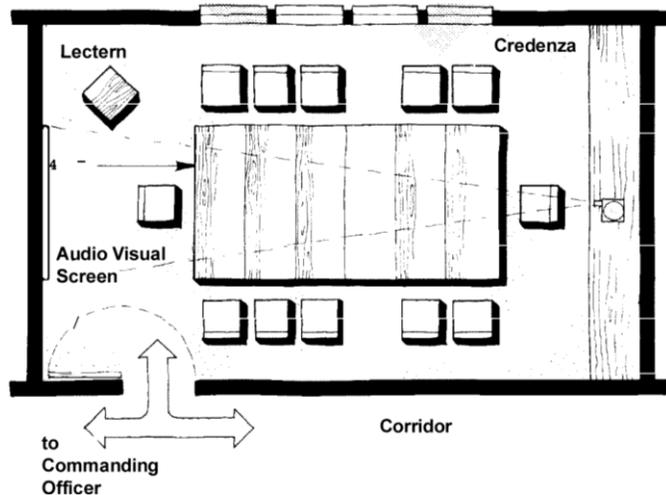
Figure 2-18
Training Center Adjacencies



2-7.2.1.10.3 The band room is often located near the assembly hall. However, the main criteria for its location is minimizing sound transmission to other parts of the building, especially to administrative and classroom areas.

2-7.2.1.10.4 Locate the physical readiness space adjacent to toilets, showers and lockers, and remote from the main entry and formal spaces. Provide a short route of access to the exterior, since many of the soldiers will run as part of their training.

Figure 2-19
GO Conference Room
Views



2-7.2.1.10.5 A conference room for a training center is almost always associated with a General officer. Locate within 50 ft (15 m) of the General's office, and adjacent to full-time staff. In most instances, it will be located within the General's suite.

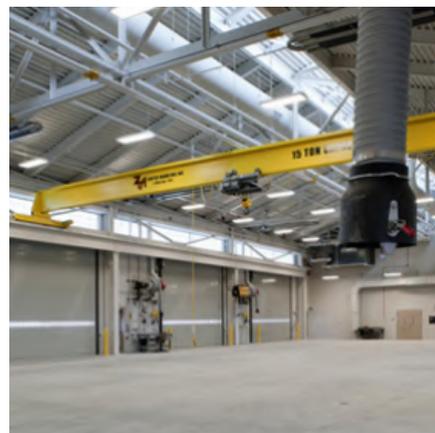
2-7.2.1.11 Support Adjacencies

2-7.2.1.11.1 Locate toilets centrally for the Tenants' convenience, and provide toilets on each floor of multi-story buildings. In larger buildings, consider splitting the space authorization not only between floors, but to provide more than one set of toilets per floor. Due to the potential for large numbers of people, the assembly hall and classroom area should have an ample number of toilets nearby. It may be necessary to provide more than the minimum number of toilet fixtures required by code or this Guide to provide reasonable numbers and locations of toilet facilities. Locker and shower rooms should always have a portion of the toilet space authorization located with them. Locate the locker and shower rooms adjacent to physical readiness.

2-7.2.1.11.2 The locations of the break area and vending alcove are flexible, based on Tenant preference, but the break area should be located away from the entry, lobby and formal spaces of the facility to minimize noise and food odors transmitting to those spaces. The vending alcove is frequently collocated with the break area, but can be broken into smaller spaces to distribute vending machines throughout a larger facility.

2-7.2.1.11.3 Mechanical and electrical rooms should be located, and distributed through the building for efficiency of function and building distribution. Locate main mechanical room on an exterior wall with exterior access to a drive for ease of maintenance, repair, and replacement work. Locate IT spaces in accordance with the Army Reserve IT Manual. Architectural, mechanical and electrical disciplines must coordinate size and location of building support spaces to provide sufficient space for equipment installation, operation and maintenance, as well as efficient distribution of services.

Figure 2-20
ARFC Middletown,
Connecticut



2-7.3 OMS Functional Relationships

2-7.3.1 An optimal space arrangement for an OMS would have several of the OMS spaces opening directly into the workbays. The equipment alcove is adjacent to the workbays without a partition between them.

2-7.3.2 The shop office, tools and parts room, toilets, and storage room are all closely associated with the workbays, and should be as nearly adjacent to them as possible. Tool/parts and storage are often combined into one room, subdivided into caged space, with direct access to the workbays. Other functional spaces usually have access to the workbays through a corridor, because of limited wall space for direct access.

2-7.3.3 The shop office should overlook both the workbays and the MEP for control and security purposes.

2-7.3.4 The flammable storage and controlled waste storage rooms must open only to the exterior of the building.

2-7.3.5 The OMS mechanical and information technology authorizations must also accommodate separate janitorial and electrical spaces. The mechanical equipment rooms are best located off a corridor, and need not be adjacent to the workbays. Where climate permits, it could be accessible from the exterior of the building only.

2-7.3.6 Locate Standard Automotive Tool Sets (SATS) trailer aprons near the tools and parts room.

2-7.4 Unheated Storage Functional Relationships

2-7.4.1 The unheated storage building serves only one function: the storage of operational equipment that requires no temperature or humidity control. A pre-engineered metal building system is frequently used to house this function.

2-7.4.2 The UHS may be located as the Tenants desire, but is frequently located near the OMS, but outside the MEP security fence.

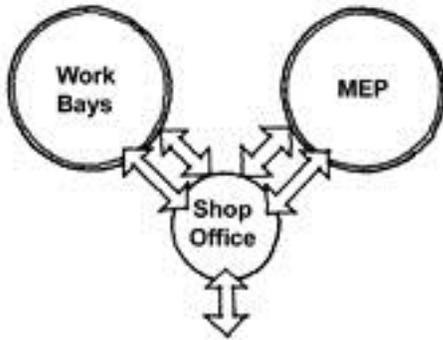
2-7.5 AMSA Functional Relationships

2-7.5.1 An AMSA is very similar to an OMS, with some additional spaces added. AMSA functional relationships are also the same as those for an OMS – see Paragraph 2-7.3.

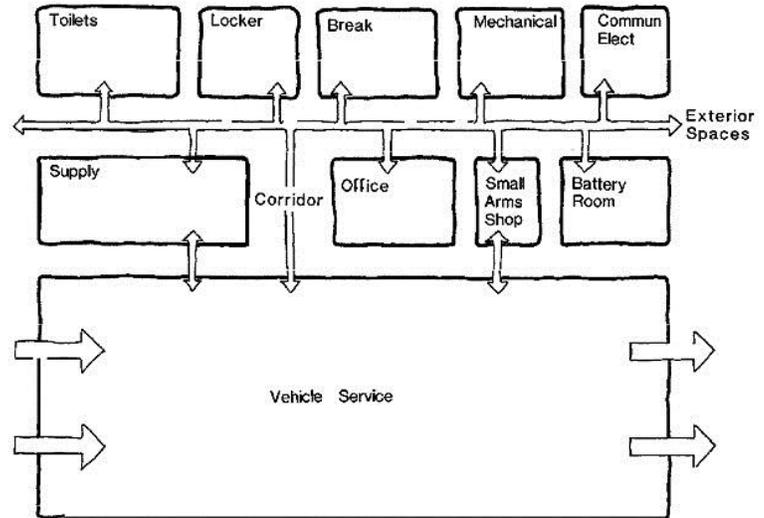
2-7.5.2 Since an AMSA has full-time staff, a classroom/break area, and male and female toilet, shower and locker rooms are provided. Locate adjacent to each other, they need not be immediately adjacent to the workbays.

2-7.5.3 In addition to the standard areas of an OMS, an AMSA is often authorized additional special maintenance offices, such as a supply room, an electronics/communication repair room, or a small arms repair shop and vault. All of these rooms would be best located adjacent to the workbays if space and NFPA 101 allow. They may also be located off a corridor leading to the workbays.

**Figure 2-21
Shop Office Views**



**Figure 2-22
AMSA Schematic Diagram**



2-8 FIRE PROTECTION/LIFE SAFETY

2-8.1 The primary criteria document for fire protection and life safety in Army Reserve facilities is UFC 3-600-01, “Fire Protection Engineering For Facilities”. New construction of training center, OMS, AMSA, and warehouse buildings generally includes fire sprinkler and life safety systems for protecting life, mission, and property while taking into account the costs of implementing the criteria and risks associated with the facility. Unheated storage buildings are typically not covered by fire sprinkler systems, unless they are larger than 5,000 sf (465 sq m), or the value of the contents warrant the additional expense. The criteria for providing and designing sprinkler systems are included in UFC 3-600-01. OMS and AMSA buildings are considered to be “shops”.

2-8.2 A “knox box” shall be provided at the main entrance and must be coordinated with local fire department requirements.

2-8.3 Verify jurisdiction for alarm systems with RSC or Tenants, and verify jurisdiction requirements.

2-9 INTERIOR DESIGN

2-9.1 The interior environment must respond to the needs of the facility as well as the individuals who occupy it, and be functional, aesthetically pleasing, and cost effective. In addition, the interior environment should provide a humane setting to promote a sense of belonging and well-being for the personnel. The following paragraphs provide criteria that will be considered to meet these goals.

2-9.2 The interior environment will be developed in coordination with the architectural design. All features of the building, including moveable furnishings and equipment, will be coordinated as parts of the overall design concept.

2-9.3 Through the planning process, the nature and configuration of the space can be examined. The adjacency requirements between the functional elements of an organization, work flow and patterns of communication will be initial considerations in the design process. Other factors will include multiple uses of space and flexibility for future uses and growth. Overall, the primary goal of space planning is to convert functional program requirements into a workable, aesthetically pleasing environment.

Figure 2-23
ARC, Butte,
Montana



2-9.4 Materials and finishes should not be selected for appearance alone; they will ultimately affect the acoustical, lighting, insulating, fire rating, and maintenance factors of an environment. Any selection must satisfy aesthetic and functional requirements regarding durability, wearability and maintenance. To a great extent, the Army Reserve has predetermined the materials and finishes they desire. These are listed with the individual rooms in Chapter 4.

2-9.5 Emotional responses are, to a great extent, the product of color and its character and quality as encountered within the environment. These responses are influenced by the viewing conditions, the use of color on surrounding objects and surfaces, and the size and relationships of these factors. Color can stimulate the imagination and create, attract, and maintain interest. Handled knowledgeably, imaginatively, and wisely, it is one of the most economical, yet psychologically satisfying and successful elements of the interior environment.

2-9.6 Specification of proper furnishings is critical to the performance and operational success of any facility. The standard criteria by which quality and appropriateness may be evaluated include function, movability, adjustability, maintenance, durability, comfort, and cost.

2-10 INFORMATION TECHNOLOGY

2-10.1 The primary criteria document for the design of information technology spaces and systems for Army Reserve facilities is the Army Reserve IT Manual. This manual defines the current Army Reserve standards and requirements for new facilities and facility revitalization, and is available at the [Army Reserve website](#). Information on the design of the IT spaces is included in the Guide in Chapter 4.

2-10.2 The Technical Criteria for the Installation Information Infrastructure Architecture (I3A) also applies to design of Army Reserve IT systems.

2-10.3 USARC G2/6 is the proponent for Army Reserve Information Technology, and will participate in project meetings to define project IT requirements and implementation. Information Systems Engineering Command (ISEC) personnel may also be involved; ISEC is the proponent for the I3A criteria noted above.

2-11 SIGNAGE

2-11.1 The Design Agency is responsible for designing and specifying signage for the building exterior and interior. The applicable criteria for signage is UFC 3-120-01 Air Force Sign Standard.

2-11.2 Interior signage typically consists of a building directory, room name/numbers, directional accessibility, and similar signs. For signs that indicate names, signs should have changeable inserts to allow changing of names.

Figure 2-24
Building Sign, ARC,
Honolulu,
Hawaii



2-11.3 Exterior signage typically consists of a training center monument sign, accessibility and other parking signs, traffic directional signs (if required), and similar signs. If the facility is on a larger

Government installation, the installation may have its own guidance for exterior signs. The Design Agency should verify whether such guidance governs.

2-11.4 The project signage will include “Minuteman” logo plaques for the project; designer will determine locations with Tenant input. Further information about Minuteman plaques can be found in Paragraph 3-5.2.4.

2-11.5 Some Reserve Centers will be memorialized – named in honor of a serviceman or woman. A memorial plaque will be furnished by the Government; provide a location of visibility and prominence. Coordinate appropriate location with Tenants.

2-11.6 Construct exterior monument sign with concrete footing and concrete or concrete masonry unit (CMU) foundation. The exterior sign material design should reflect materials on the training center elevations. The sign should have 10 in (250 mm) high minimum cast letters on two sides. Sign shall read “United States Army Reserve Center” or be titled to reflect the occupants, with the city

and state. Provide cap to prevent moisture penetration, and lighting on both sides.

2-12 ACCESSIBILITY

2-12.1 Army Reserve facilities must be designed to comply with the requirements of the Architectural Barriers Act Accessibility Standard for Department of Defense Facilities (ABA-DoD). The ABA-DoD standards include an exception for Army Reserve facilities for use exclusively by able-bodied military personnel. This exception allows OMS toilets to be designed without accessibility measures, as these facilities are assumed to be inhabited only by able-bodied soldiers.

2-12.2 Due to the threat of terrorism, the Design Agency should pay particular care to the requirements for accessible exiting, especially those addressing areas of refuge.

2-12.3 Provide truncated dome detectable warnings at curb ramps in accordance with ABA-DoD.

2-13 SECURITY

2-13.1 The primary criteria for physical security for Army Reserve facilities are AR 190-13, The Army Physical Security Program, and AR 190-16 Physical Security. AR 190-11, Physical Security of Weapons, Ammunition and Explosives governs the design of weapons storage spaces. The Design Agency should also coordinate its work with the Support Installation and the Provost Marshal Office (PMO), which is responsible for the physical security of the facilities.

2-13.2 Consider not only securing facilities and equipment from damage or theft from the outside, but also securing each unit's equipment within the facility. The units and soldiers are responsible for their equipment, and will want it segregated and secured from other units.

2-13.3 Once the facility is occupied, the PMO will conduct periodic inspections to ensure that appropriate security measures are in place. The Tenants are graded on these inspections; the facility design should ensure that the physical security measures meet their needs.

2-13.4 Common Access Card (CAC) locking systems are the preferred method of providing general Tenant access to Army Reserve buildings. Primary building entry points should receive CAC readers at the doors; this will generally be two or three doors for training centers and one or two doors for maintenance shops. The Support Installation may provide guidance on the type of locking system they prefer for other exterior doors. If the facility is part of a larger Government installation, the installation may have its own criteria.

CHAPTER 3

GENERAL DESIGN CONSIDERATIONS

3-1 INTRODUCTION

3-1.1 The purpose of this Chapter is to provide the Design Agency with general information and direction on the systems and materials applicable to all Army Reserve facilities, on the design of the site, and on the design of the various buildings. The Chapter includes some “lessons learned” and “best practices” by Corps of Engineers and private-sector A/E teams on previous Army Reserve projects.

3-1.2 The considerations in this Chapter are those which affect the site and landscaping, or an entire facility or building; for information on individual spaces, see [Chapter 4](#). Army Reserve building system and material preferences are also reviewed and discussed in this Chapter. Coordination between design disciplines is required to identify and eliminate conflicts among site and building facilities and to provide for the proper functions of facility components by placing site features in their proper locations.

Figure 3-1
Outlet Control Structure,
ARC, Wilmington,
North Carolina



3-2 CIVIL AND UTILITIES

3-2.1 Grading and Drainage

3-2.1.1 General

3-2.1.1.1 Develop sites for positive drainage away from all building areas using sheet drainage preferably over turf areas or other means of erosion control, especially adjacent to foundations. Avoid sheet drainage over sidewalks to prevent icy conditions. Minimize use of on-site ditches and channels for conveyance of surface water and design using low impact development (LID) practices. Extremely flat sites, on which it is not practical to establish sufficient elevation differences for overland drainage, may require use of localized storm sewers and catch basins to convey stormwater flow.

3-2.1.1.2 In general, all sites require application of LID stormwater management practices to meet the standards of local and state water resources agencies responsible for regulation of surface water discharges; designs will comply with local requirements for release of stormwater from the site. Government installations with a public works department may have adopted installation

specific stormwater management requirements, and may have formal agreements with local or state regulatory agencies to comply with agency design and permit requirements.

3-2.1.1.3 Site design should attempt to balance the quantity of cut and fill. Balancing cut and fill creates a more pleasing transition of the re-graded areas into the natural site, and minimizes the costs of hauling in additional fill or removing and disposing of extra cut. Send cut disposal, if necessary, to a regulated or installation landfill due to liability issues with possible contamination if the soil is disposed of off the site. Testing of soils for contaminants may also be required by receiving landfills to determine the proper means of disposal. If the material is clean, it may be used elsewhere. Likewise, testing of soils imported to the site is required to verify that contaminants are not brought onto the site in the imported soils.

3-2.1.1.4 Consult the project geotechnical evaluation for recommendations regarding the use of on-site soils. Suitable on-site soils may aid in balancing the site, while unsuitable soils may require spoil areas on-site or export from the site and import of suitable soil. Each site is unique.

3-2.1.1.5 Earth Retaining Structures

3-2.1.1.5.1 Design grades shall attempt to eliminate or minimize the need for reinforced slopes or retaining walls, but special circumstances may require the use of an earth retaining structure. In these cases the governing criteria will be FHWA Publication NHI-10-024 Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes – Volumes I and II, the Design Manual for Segmental Retaining Walls, 3rd Edition by the National Concrete Masonry Institute (NCMA), and the US Army Corps of Engineers Engineering and Design, Retaining and Flood Walls EM 1110-2-2502.

Figure 3-2
Flared End Section,
ARC, Fargo,
North Dakota



3-2.1.1.5.2 Earth retaining structures supporting buildings, parking lots or mission critical components are preferred to have a service life of 75 years.

3-2.1.2 Stormwater Management

3-2.1.2.1 Stormwater management consists of analysis and design of stormwater drainage on the site. Depending on the site, this may also include conveyance of drainage through the site for upland areas outside of the site. The basic stormwater management principles of volume, rate, and quality control

apply but the means and methods will require use of LID design in accordance with UFC 3-210-10 to the maximum extent technically feasible. Compliance with Federal environmental laws is required. There are typically stormwater regulations by local, regional, and state units of Government. The Army Reserve's "good neighbor" policy requires compliance with such regulations. Federal exemption from state and local permits is not to be assumed or applied for a project. Numerous state and local regulatory agencies have been granted permitting and enforcement authority for implementation of Federal environmental programs. If regulations greatly exceed Federal requirements and are not reasonably achievable, bring to the attention of the Project Officer. In general, state and local environmental permits will be needed. However, some state and local jurisdictions will accept the project meeting Federal regulations, may request a courtesy review of the project, and may waive permit or fee requirements. Research, determine, coordinate, and verify the appropriate agencies and permits to be obtained for stormwater management.

3-2.1.2.2 LID requires an integrated approach to stormwater management, site design and landscape architecture. LID design incorporates a variety of methods and it may be best to apply methods used in the area local to the project. Coordinate LID techniques with LEED and sustainable design practices. Site features applied as a part of LID design (such as water quality bio-infiltration basins, pervious pavements, etc.) will require additional monitoring and maintenance to which the Government is not accustomed. The physical appearance of LID features may be substantially different than the grass lawn of the past. Describe to Project Officer, RSC and Tenants the purpose, function and maintenance of LID features. Include types of maintenance operations, frequency of maintenance, and special equipment or services required, if requested. Provide a maintenance manual for LID features to the RSC.

3-2.1.2.3 Consider typical LID measures for design such as:

- Rain gardens, bioretention, and infiltration planters
- Porous pavements
- Vegetated swales and bioswales
- Green roofs
- Trees and tree boxes
- Pocket wetlands
- Reforestation/revegetation using native plants
- Protection and enhancement of riparian buffers and floodplains
- Rainwater harvesting for project use

3-2.1.2.4 Erosion, Sediment and Stormwater Control During Construction

3-2.1.2.4.1 Temporary drainage measures will be implemented to provide for erosion and sediment control according to the requirements of the National Pollutant Discharge Elimination System (NPDES) program, as implemented and

enforced by the responsible state or local agencies. Do not assume that if less than one acre is being disturbed, that NPDES or some other permit is not required. Each state and many local agencies have requirements for erosion and sediment control; obtain and implement these requirements either as part of the construction documents or as a requirement for action by the construction contractor. The designer is tasked with preparing permit paperwork and may file for the permit if so directed in the scope of work, and if jurisdiction allows.

3-2.1.2.4.2 Specific temporary measures preferred by the state or local water resources regulatory agencies may need to be implemented to meet site-specific requirements. Multiple applications of temporary seeding and mulching of exposed areas may be required in addition to installation of specific facilities such as silt fences, sedimentation ponds, filtration beds, and riprap or slope protection. Suppression of fugitive dust from earthwork operations should also be required.

3-2.1.2.4.3 The EPA and most state agencies overseeing the implementation of the NPDES permit system require the project to have a Stormwater Pollution Prevention Plan (SWPPP). If the site does not require an NPDES permit, a SWPPP is still required for Army Reserve projects. The designer is required to write the SWPPP. The SWPPP is comprised of plan documentation showing temporary erosion control measures and a booklet containing project specific information and forms for documentation during construction. Many states typically use the USEPA SWPPP template, but some states may have adopted their own SWPPP template that is to be used for projects in those states. Permit rules vary by state and these rules shall be implemented. Certain jurisdictions require that the SWPPP review and NPDES Notice of Intent (NOI) be filed and issued prior to bidding. In this case, the SWPPP must be signed by a designer with PE or CPESC credentials.

3-2.1.2.5 Control

3-2.1.2.5.1 The stormwater runoff rate from the site should typically be held to its pre-developed rate. Verify this requirement with the state and local regulatory agencies in case stricter requirements are in place.

3-2.1.2.5.2 One of the sustainable design considerations recommends that the stormwater plan adopted for the site results in a 25% decrease in the rate and volume of stormwater runoff if the existing impervious area of the site is greater than 50% of the site. This would require on-site LID measures.

3-2.1.2.5.3 Another recommended sustainable design measure is treatment systems for stormwater quality to remove 80% of the average annual post-development total suspended solids and 40% of the average annual post-development total phosphorus. This is to be implemented by instituting Best Management Practices (BMPs) as outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters

(EPA-840-B-92-002). The design methodologies for determining percent removals are generally highly empirical and no standard universal method has been adopted for this purpose. Therefore, the local governing water resources regulatory agency or water resources department of the Government installation directorate of public works will be consulted regarding acceptable design methodologies for surface water quality treatment on developing sites. Implement these preferred local methodologies for site design. Regulatory requirements are typically in a constant process of review and revision. The designer should check with state and local regulatory agencies for the most recent requirements. Address significant departure by state and local agencies from Federal requirements with the Project Officer.

3-2.1.2.5.4 If the site to be developed has been acquired on the commercial market and is part of a larger overall development scheme, it may be part of a regional system designed for control of the runoff from the overall development. In such cases, the controls implemented for the runoff from the site will be verified with the local water resources regulatory agency to ensure that it is within the parameters of the regional storm water facility design. Water quality treatment is typically provided in the design of each individual site, even though rate and volume controls are in place. Each project site still needs to incorporate LID measures.

3-2.1.2.5.5 Underground or subterranean stormwater infiltration or filtration facilities under paved parking areas, or ponding in permeable paved parking areas, are measures to be used only if space is not available for the construction of other LID measures. Bring to the attention of the Project Officer for approval.

3-2.1.2.5.6 Some sites do not have a natural positive overland drainage outlet. Additional site area may be required or alternative conveyance methods developed to accommodate the runoff from the site. If additional land is not available for a site on newly acquired land, off-site easement(s) for drainage purposes may be needed to properly convey stormwater from the site to a water body or drainage way that can receive this discharge according to local, state and Federal regulations. If easements are not required, stormwater features will need to be designed to replicate "natural" pre-project site conditions. These features are typically flow spreaders that simulate the overland sheet flow from previously undeveloped land. Not all jurisdictions allow these measures. Even though LID practices are used on the project site, the impact of stormwater discharge to adjacent lands needs to be evaluated and harmful effects mitigated further as needed. Sites that already exhibit stormwater runoff erosion and non-compliance should be brought to the attention of the Project Officer, along with recommendations for addressing the situation.

3-2.1.2.5.7 Design the site so that the runoff from large precipitation events exceeding the design storm requirements can be discharged without flooding the buildings or critical facilities. This may include analysis of runoff that passes

through or around the site from adjacent lands so that this discharge can pass through the site without flooding the buildings, or that backwater from downstream lands will not flood the site. Design site so that it does not create a backwater condition that causes increased flooding of adjacent upstream lands. Investigation into the floodplain documents will be very helpful in this regard, but may not identify localized conditions that can flood some parcels due to large precipitation events. Local watershed studies may also identify these types of conditions. Localized flood conditions that affect the site should be brought to the attention of the Project Officer upon discovery. It is important to coordinate and review project grading and drainage design with the regulatory agencies with stormwater management authority over the project lands to verify that stormwater design does not negatively impact the watershed area of the project.

Figure 3-3
Trench Drain in OMS Workbay,
Fargo, North Dakota



to materials and items locally available. Some sites may be located in areas where the soil and water are corrosive to concrete and metal. In this case, polyethylene or other synthetic pipe and drainage structure materials may be desirable for use.

3-2.1.3 Structural Drainage Features

3-2.1.3.1 Structural features for drainage facilities will generally be constructed of reinforced concrete, and are typically available from precast concrete suppliers local to the project area. Grates, and manhole covers and frames, and other appurtenances will be either a durable iron casting or galvanized steel construction according

3-2.1.3.2 Incorporation of State Department of Transportation (DOT) or Government installation public works drainage structure details is advisable, since these are generally familiar to contractors, municipalities, and roadway agencies near the site.

3-2.1.3.3 Structural features will be able to withstand applied vehicle loadings in their particular Government installations.

3-2.2 Utilities

3-2.2.1 Sanitary Sewer

3-2.2.1.1 Sanitary sewers include the service pipe and structures from the building(s) to the available utility stub or connection point. The preferred pipe material for on-site sanitary sewer is polyvinyl chloride (PVC) pipe. If extremely deep burial or heavy loads are encountered, the pipe may be installed in a steel casing or the pipe type changed to cement-lined ductile iron pipe. Design

sanitary sewer crossings of critical internal roadways, which should not be disturbed or open cut in the future, using a steel casing around the sanitary sewer pipe. Design pipe section and bedding to withstand the applied loads at its location. Sanitary sewer pipe sizing shall comply with UFC 3-240-07FA Sanitary and Industrial Wastewater and Collection: Gravity Sewers and Appurtenances.

3-2.2.1.2 Sanitary sewer manholes will be constructed of precast concrete with cast iron covers and frames. Clean-outs will be located at bends or changes in grade on any service line. The junction of one or more service lines and the resulting downstream sewer lateral should require a manhole. Manhole spacing should comply with UFC 3-240-07FA.

3-2.2.1.3 Verify the capacity requirements for capacity conveyance and treatment for the sanitary sewer utility system to which the project is connected. In general, private or municipal utility systems will represent that the downstream pipes and sewers are in serviceable condition to meet the needs of the project; the utility company maintenance and replacement program is traditionally funded by Tenant connection charges and use fees to pay for maintenance and upgrading.

3-2.2.1.4 On Government installations, where in-place sanitary sewer is to be incorporated into the project, it may be advisable to conduct a television inspection of the sanitary sewer to verify its serviceability for the proposed project. If the line is not in serviceable condition, its replacement or rehabilitation will be required. The OCAR Engineer Office and Support Installation will determine who is responsible for that work. Government installation public works utilities may not have implemented or budgeted for sanitary sewer utility maintenance or upgrade in all areas of the installation. Verification of the sewer serviceability and implementation and funding of repairs is required.

3-2.2.1.5 Sanitary sewer servicing OMS/AMSA facilities and wash platform will generally require oil/water and grit separation. This is accomplished by installation of separate structures within the sanitary system. Coordination with the mechanical discipline is required to determine if the separator structures are to be installed within the building footprint or outside the building.

3-2.2.1.6 Certain regions are using mechanical water and contaminant separators; consult the local Regional Support Command environmental and construction coordinators.

3-2.2.1.7 Wastewaters from fuel loading and dispensing systems, grease and oil from vehicle wash platforms, aircraft washing and garage or shop floor drains, and similar types of wastewater must be directed through oil/water separators to prevent such wastes from entering the sewers. The responsible wastewater regulatory agency requirements are generally in a state of continuing review and

revision. Some state and local agencies classify the wastewater from those uses listed in this paragraph as hazardous or contaminated industrial waste which will require special on-site treatment or separation from the sanitary waste stream and removal from the site. The designer should verify the latest regulatory requirements. Design of special on-site treatment facilities or waste collection, hauling, and disposal requirements are to be addressed with the Government.

3-2.2.1.8 Special wastewater collection points may be required for mobile laundry units, mobile kitchens, and deployable medical sets (DEPMEDS) equipment on the site. Coordinate design with the Project Officer, RSC and tenants for access points to sanitary sewer and the corresponding design requirements. Verify with the wastewater regulatory agency that the system will accept the effluent and flow from these uses.

3-2.2.2 Water Main

3-2.2.2.1 Water mains include the on-site building services for domestic and fire protection purposes from the building(s) to the water main system stub or connection point. Interior looping of the system for fire protection may be desirable.

3-2.2.2.2 Water main sizing for fire protection purposes will be based upon flow and pressure requirements for on-site hydrants and building fire suppression systems. It is recommended that the fire protection main be no smaller than 8 in (200 mm) diameter and the standard hydrant lead no smaller than 6 in (150 mm) diameter. On-site water storage reservoirs and/or fire booster pumps may be required for sites located in areas of low system pressure.

3-2.2.2.3 Verify with local fire protection, utility and building officials whether independent domestic and fire feeds external to the building are required, or if a single feed can be separated inside the building. The requirements for indicator valves will be verified with local building and fire protection officials, or with Government installation fire departments and public works directorate.

3-2.2.2.4 In general, on-site fire protection and water supply system valves, hydrant spacing, and sizing shall be in accordance with UFC 3-600-01. Preferred water main pipe materials are corrosion-resistant materials such as PVC pipe, or ductile iron pipe with corrosion protection and cathodic protection, if required. Pipe sections and bedding shall be designed to withstand applied loads. Crossings of critical internal roadways, which should not be disturbed or open cut in the future, will utilize a casing around the underlying utility pipe.

3-2.2.2.5 Conduct fire hydrant flow tests on the supplying water utility system at the earliest practical date to determine pressures available to the project site, and whether a fire pump will be required. Many water utilities are no longer willing to release their own internal hydrant flow data due to liability concerns. Contracting

with a local fire protection company or consulting engineer to conduct flow tests is required. Such flow test shall comply with NFPA 291 including the professional certification.

3-2.2.2.6 Coordinate with the water utility to determine meter type and installation. UFC 3-400-01 requires the utilities to be monitored through connection to a base wide energy and utility monitoring and control system directly or via the building HVAC control system; this will require installing a meter separate from the billing meter. Coordinate with the building mechanical and electrical design disciplines for individual building meter and corresponding controls requirements.

3-2.2.2.7 Special water supply points may be required for mobile kitchens, mobile laundry units and DEPMEDS equipment on the site. Coordinate design with the Project Officer, RSC and Tenant units for supply points, connection, and flow requirements. Coordinate design with water supply hose sizes and fittings provided with this equipment.

3-2.2.3 Natural Gas

3-2.2.3.1 The gas utilities consist of the internal gas distribution and service pipes and controls servicing the site from the building(s) to the gas utility connection point. The gas utility service industry is competitive in certain service location areas and more than one source of service may be available.

3-2.2.3.2 Gas companies normally provide some amount of service line and meter set at no charge, especially when the projected volume of gas use and resultant utility charges will justify the expenditure. Furnish estimated gas service requirements to the utility, and request they examine the construction requirements and demand of the site to make a cost determination for any construction of service for the site. If longer on-site service lines are required, verify whether they are to be constructed by the utility or as part of the construction contract, and ensure that any charges to be paid to the utility are included in the contractor's requirements.

3-2.2.3.3 UFC 3-400-01 requires the utilities to be monitored through connection to a base wide energy and utility monitoring and control system directly or via the building HVAC control system; this may require installing a meter separate from the gas provider billing meter.

3-2.2.3.4 Many of the Government installation gas systems have been privatized; service and connection procedures are normally the same as the commercial market.

3-2.2.3.5 Provide for an Army Reserve owned gas meter downstream of the gas company meter. Comply with U.S. Army Advanced Natural Gas Meter

Specifications. Coordinate with Project Officer and the RSC before incorporating this requirement into the project. Coordinate with the building mechanical and electrical design disciplines for individual building meter and corresponding controls requirements.

3-2.2.4 Other Utilities

3-2.2.4.1 Projects on Government installations may have access to a district heating system. Typically, detailed preliminary coordination with the steam or hot water installation control heating system operator is required for design to determine the system capacity to accommodate new and additional facilities.

3-2.2.4.2 See [Section 3-10](#) below for telecommunications and electric utilities.

3-2.2.5 Utility Metering

3-2.2.5.1 The Energy Policy Act (EPAAct) of 2005 requires all Federal facilities to install advanced meters by October 2012. The Corps has written advanced meter specifications for electric, water, steam, and natural gas. Coordinate with the mechanical and electrical design disciplines.

3-2.3 Roads and Pavements

3-2.3.1 General Design Consideration

Figure 3-4
ARC, Wausau,
Wisconsin



3-2.3.1.1 Design pavements to accommodate the loads and traffic imposed by Tenant vehicles and equipment. Obtain vehicle inventory from Tenants.

3-2.3.1.2 Geotechnical information to be gathered for pavement design is outlined in the Geotechnical Requirements for the Preparation of Full Plans and Specs Solicitation Packages for the Louisville District on the [Army Reserve website](#). Apply geotechnical design parameter and recommendations in pavement design.

3-2.3.1.3 It is recommended to adapt pavement specifications to conform to material and technical provisions to the state's Department of Transportation (DOT) Standard Specifications for Roadway Construction if the DOT specifications are not less stringent than the UFGS specifications. Local pavement material suppliers and paving contractors are likely to have necessary state DOT certifications

3-2.3.1.4 In northern regions, allow for snow removal and snow storage in design of paved areas. Design for snow conditions consists of items such as

providing layouts to facilitate snow plowing patterns, providing space for snow piles while not creating sight line obstacles and not resulting in storage on adjacent sidewalks, providing a layout that will make it easier to keep outdoor mechanical, electrical, and fire hydrant areas clear of snow, not using landscape or grading designs that promote formation of large snow drifts on parking lots and roads, and locating snow storage space so that melt water from snow piles does not drain directly to surface waters (coordinate with LID design).

3-2.3.2 Pavement Subgrade

3-2.3.2.1 Pavements or aggregate surfacing may require subgrade improvement measures to limit rutting or breakup over softer subgrade. Soil replacement is the preferred subgrade improvement option, but consider geotextile or stabilized subgrade where the improvement excavation would be deep or the area of needed improvement extensive. Obtain the recommendations of the project geotechnical engineer, the local Corps Construction District or the Government installation public works department.

3-2.3.2.2 Pavement underdrains are required in areas with cohesive subgrade soils. In addition to the standard components of a pavement cross section, a pavement underdrain system should consist of an aggregate drainage layer and drain tile sloped to daylight or to a drainage structure. If the aggregate drainage layer is to come in contact with natural subgrade soils containing fine particles, use a geotextile or graded aggregate separation layer to separate the fines from the void spaces.

3-2.3.2.3 Consider use of recycled aggregate for sub-base or as aggregate base material. Apply state DOT specification for use of recycled aggregate as sub-base or aggregate base. Recycle aggregate is to be tested for the presence of expansive or deleterious aggregates and not used if expansive or deleterious aggregates are present. The project geotechnical consultant, DOT or local Corps construction district may be consulted to verify sources and performance of recycled aggregate as sub-base and base materials.

3-2.3.3 Asphalt Concrete (AC) Pavement

3-2.3.3.1 Asphalt concrete mix designs should be relatively stiff to prevent wheel rutting or surface raveling during heavy traffic and wheel turning movements or periods of high temperatures. Check with local DOT engineers and contractors for asphalt grades that are used in the area of the project and that perform well under these conditions. In some cases, the stiffer mix could have a coarser surface finish but its strength and serviceability advantages are preferred.

3-2.3.3.2 Asphalt concrete (AC) may incorporate recycled aggregates for AC base courses, but not for surface courses. Use of recycled aggregates should be subject to state DOT specifications for recycled aggregates in AC mixes. Test for

the presence of expansive or deleterious aggregates, and do not use if expansive or deleterious aggregates are present.

3-2.3.4 Portland Cement Concrete (PCC) Pavement

3-2.3.4.1 PCC may be non-reinforced or reinforced depending upon the geotechnical recommendation and project load applications. Typically non-reinforced pavements are used, however, odd shaped panels or in-panels with large aspect ratios may require reinforcement.

3-2.3.4.2 Design joints according to joint design recommendations in UFC 3-250-01A Pavement Design for Roads, Streets, Walks and Open Storage Areas and UFC 3-250-04 Standard Procedures for Concrete Pavements. For airfield joints, use UFC 3-260-02 Pavement Design for Airfields.

3-2.3.4.3 Portland Cement Concrete (PCC) may contain recycled aggregate. Use of recycled aggregate should be subject to state DOT specifications for use of recycled aggregates in PCC mixes. Test for the presence of expansive or deleterious aggregates and do not use if expansive or deleterious aggregates are present.

3-2.3.4.4 PCC pavement is recommended as a sustainable design pavement type to reduce heat island effect because of its high reflectivity. PCC can achieve the necessary reflectivity, but its use usually introduces a cost increase over AC pavement or aggregate surfacing. Using special high albedo cement and light colored aggregate will result in additional cost over normal PCC pavement.

3-2.3.5 Aggregate Surfacing

3-2.3.5.1 Design of aggregate surfaces should consider stormwater runoff and the potential negative effect on the aggregate surface due to erosion. Use of mild slopes, and a coarse clean aggregate for the top few inches of the total aggregate section, is recommended to reduce erosion. This recommendation may lead to some wheel rutting depending on the vehicle and turning movements. Regardless, aggregate surfaces require continual maintenance by grading and grooming to maintain a good trafficable surface. Aggregate surfacing design should conform to the recommendations of UFC 3-250-09FA Aggregate Surfaced Roads and Airfields.

3-2.3.5.2 Design of the aggregate section and grades should consider the constructability of possible future application of PCC or AC pavement to the area. It is preferred that the aggregate section be incorporated into a hard service pavement section without removal of the entire aggregate section and additional subgrade improvement.

3-2.3.6 Pervious Pavement

3-2.3.6.1 Pervious pavements are to be considered where appropriate for stormwater management, as an LID measure, or for site sustainability. Pervious AC and PCC mix designs have been developed and either may be used depending on the application as noted in Paragraph 3-2.3.6.4. Pervious pavement requires maintenance by sweeping and vacuuming to maintain its permeable properties. Maintenance practices vary but sweeping and vacuuming three to four times a year is a typical recommendation. Obtain Project Officer and RSC concurrence for use of pervious pavements or pavers of all types on a project.

3-2.3.6.2 Pervious pavements include use of special pavers with openings in the paver units or with joints that result in open spaces between paver units to allow water to infiltrate. Interlocking pavers are preferred. The openings may be filled with open graded aggregate or plantings. Pervious paver availability and installation expertise may vary by regions of the country.

3-2.3.6.3 Pervious pavement and pavers need to be installed over a base of course clean aggregate in order to adequately convey water from the paved area until the water infiltrates through the aggregate to an outlet or can infiltrate into the subsoil. Depending on the subsoil permeability, the course aggregate may need to be at least 3 ft (900 mm) in thickness. Consult pervious pavement design practices in the project area.

3-2.3.6.4 Use pervious pavements in areas of lighter wheel loads and/or limited traffic. POV parking spaces, light stationary equipment pads and pedestrian traffic areas are typical examples.

3-2.3.7 Alternative Pavements

3-2.3.7.1 Alternative pavements include Resin Modified Pavement, which is a modified AC mix design, and Roller Compacted Concrete (RCC), which is relatively dry Portland Cement mix placed and compacted similar to AC. These alternative pavement types should not be applied to a project unless near ideal conditions exist for their use. Obtain Project Officer concurrence for use of alternative pavement and inform the RSC of maintenance requirements if different from normal AC or PCC pavements. Once in service, alternative pavement mixes or materials may not be easily or readily available to match the in-place alternative pavement for repair, patching or addition to the paved area.

3-2.3.8 Tracked Vehicle Parking and Roads

3-2.3.8.1 Tracked vehicle parking, roads and maneuvering areas will require aggregate surfacing or PCC pavement. Areas of high turnover of heavy equipment vehicle parking or of concentrated vehicle turning movements and maneuvering should receive PCC (turning pads, for example). Tracked vehicle maneuvering and circulation areas include the vehicle path from their parking pad to the maintenance apron. In some areas of the country, articulated cable tied concrete mats are available and may be considered for tracked vehicle use.

3-2.3.9 Vehicle Pavement and Equipment Surfacing Applications

3-2.3.9.1 The following listing gives the default pavement or surfacing types for specific applications. Some pavement or surfacing applications are subject to additional requirements or clarifications as noted below:

<u>Use</u>	<u>Pavement Type</u>
Roads/Circulation	AC, heavy duty
POV Parking	AC
MEP	PCC
OMS/AMSA Aprons	PCC
Dumpster Pads	PCC
Other Vehicle Aprons	PCC
Mechanical Equipment Pads	PCC
Sidewalks & Stoops	PCC
MKT Pads	PCC (Reinforced—see Paragraph 3-2.8)

3-2.3.9.2 Preferred pavement types and applications should be discussed with the RSC and Tenants. Departure from the listed pavement types may occur if different pavement types are programmed in the 1391, approved by the Project Officer, or incorporated as a bid option for the construction contract. For example, if a project encounters funding constraints, aggregate or AC surfacing could be considered for the MEP, possibly as the base bid, with an option for PCC if bids or funding allow.

3-2.3.9.3 PCC aprons for OMS facilities are required at vehicle doors. The apron size should not be less than the minimum size shown on the drawings on the [Army Reserve website](#). PCC aprons are also required for wash bay platforms and loading ramps. Consider aprons at areas in which concentrated wheel turning movements of heavy vehicles occur and in which heavy wheel loads repeatedly occur.

3-2.3.9.4 Stoops consist of external entry slabs for building doors to the outside. Coordinate design with structural and architectural if the stoops are supported on foundations. Coordinate large walks or slabs for plazas, outside assembly areas, or personnel shelters with architectural and landscape architectural designers.

3-2.3.10 Pavement Markings

3-2.3.10.1 Provide painted striping and marking in POV and MEP and roadways as required. Marking colors and dimensions are to be detailed. Paint materials should comply with Federal, state and local environmental regulations.

3-2.3.11 Curb and Gutter

3-2.3.11.1 The first option for design is to eliminate the use of curb and gutter. When needed, the extent of curb and gutter is to be minimized to achieve necessary drainage, grading, and maintenance purposes. However, use of curb and gutter may also be desired to channel traffic flow at access points, critical on-site intersections, or in areas in which vehicle traffic needs to be strictly separated from pedestrian traffic or parking areas. Curb and gutter are often used to define a more formal approach or access to public or administrative areas of a facility (training center) or to protect landscaping. Curb cuts to allow drainage to pass through the curb line (as in LID features) to infiltration basins may be incorporated into the design.

3-2.3.11.2 In areas where a number of adjacent accessible parking spaces are provided, the designer should consider use of a “ribbon” type or flat curb at these accessible parking spaces, so that multiple curb ramps are eliminated. This will eliminate repetitive dips and rises in the sidewalk.

3-2.3.11.3 Construct curb and gutter of concrete. Integral curb and gutter is strongly preferred where drainage is being conveyed along the gutter, with surmountable curb preferred. Curb-only sections may be used where drainage is directed away from the curb. Where substantial lengths of sidewalk are located along the back of the curb, an integral sidewalk/curb section is preferred.

3-2.3.12 Sidewalks

3-2.3.12.1 Sidewalks will be provided from building entrances to the POV and MEP areas; avoid sidewalks in the parking areas. Also provide sidewalks along natural paths through unpaved areas. Coordinate integral curb and sidewalk design with parking lot, grading and drainage designs.

3-2.3.12.2 Construct sidewalks of concrete, and of widths to comfortably accommodate anticipated traffic. Sidewalks immediately behind a curb at a parking area shall accommodate vehicle bumper overhang if wheel stops are not provided.

3-2.3.12.3 Coordinate sidewalk finishes with architectural and landscape design for special joint patterns, finishes and colors. The typical sidewalk finish should be a lightly broomed texture.

3-2.3.12.4 Special pedestrian or ramp details should be detailed on the construction drawings.

3-2.4 Civil Layout

3-2.4.1 Roadway Geometrics

3-2.4.1.1 Check turning radii and needed traffic clearances for adherence to the AT/FP requirements for spacing and setbacks at buildings. Consideration in design should also be given to the using vehicles from off-site sources, such as delivery trucks and maintenance or service vehicles.

3-2.4.1.2 Geometrics at the access drive will need to be coordinated with the agency responsible for the public or Government installation roadway which is being accessed. If off-site roadway improvements for access are needed, the geometrics will need to comply with the design standards of the responsible roadway agency.

3-2.4.1.3 Geometrics may be used to channel truck traffic away from POV parking areas by installing openings and radii suitable only for the POV traffic. One-way traffic and corresponding roadway geometry may be used to strictly control traffic patterns on some sites.

3-2.4.1.4 Comply with sightline design standards of the local or state roadway authorities at access driveways to public roads. Also apply these standards to internal roadways. When on an installation, consult with the installation traffic and public works authorities.

3-2.4.2 Slopes and Setbacks

3-2.4.2.1 Slopes will promote positive drainage and maintainable surfaces for landscape features. If landscaped area slopes approach 3.0 horizontal to 1.0 vertical, consider use of low retaining walls (modular concrete wall systems are efficient for low walls of limited lengths).

3-2.4.2.2 Follow typical state DOT roadway slope design limitations with consideration for parking and maneuvering requirements of military equipment. Much of the military equipment may be classified as all-terrain, but one of the

Figure 3-5
AFRC, Kingsville,
Texas



purposes of MEP and OMS/AMSA facilities is to provide for ease of parking and maneuvering for maintenance purposes or loading for transport.

3-2.4.2.3 Setbacks shall meet AT/FP requirements and conform, if practical, to local zoning requirements or Government installation design guidance in order to be compatible with neighboring facilities and uses.

3-2.4.3 Utility Clearances

3-2.4.3.1 Utility clearances shall provide for safe long-term operation and maintenance of utilities, prevent interference of one utility with another, and meet public health or safety requirements, such as minimum separation of sanitary sewers and water mains. Special designs, such as pipe encasement, insulation or isolation may be required where utilities are closer. This may occur on sites containing in-place utilities that cannot be feasibly relocated.

3-2.4.3.2 Contact utility providers for special requirements for utility separation beyond typical design values.

3-2.4.4 Driveway and Parking Layouts

3-2.4.4.1 Arrange POV parking to minimize pedestrian traffic through rows of parked cars. The authorized area for POV parking is normally calculated to provide spaces for a maximum of 80% of Tenants on the largest battle assembly weekend. Layouts must be efficient to provide the desired number of parking spaces, and 90-degree parking is typically preferred to 45 or 60-degree parking, unless site restraints dictate angled parking. Angle parking may be considered for large lots. The minimum POV parking space size is 9 ft x 18 ft (2750 mm x 5500 mm). Spaces for motorcycle parking may be considered, but are not required, and those types of spaces require concrete pavement with appropriate signage and marking.

3-2.4.4.1.1 Appropriate accessible parking must be provided in accordance with the ABA-DoD. The POV parking authorization in AR 140-483 specifically excludes accessible parking spaces. The area required for accessible parking may be added to the authorization in the 1391, but is not included in the project budget, and will have to come out of hide.

3-2.4.4.1.2 The area for parking spaces for low-emitting and fuel efficient vehicles that are required to obtain certain LEED credits is included in the POV parking authorization.

3-2.4.4.2 MEP parking may be more efficiently accommodated with a 45 or 60-degree angled parking layout due to the size of some vehicles and the variations in sizes among the vehicles. Designer should review parking layouts with Tenants to optimize parking and maneuvering. The MEP area generally is

provided for 60% of the unit vehicles, or 10% of the vehicles supported by an AMSA, with the rest kept at an Equipment Concentration Site (ECS). Therefore, the authorized MEP area will not typically accommodate all of the Tenants' vehicles, and some will be stored at an ECS. The MEP authorized area accounts for parking space and internal circulation lanes only; it does not include access drives to the MEP or circulation to and from the maintenance shop. Such paving will come from the 1391 access roads authorization, which may be insufficient. Additional needed paving must be authorized by the Project Officer.

3-2.4.4.3 At vehicle access driveways to kitchen, unit storage, mechanical, workbays, and similar spaces, AT/FP requirements dictate that a removable physical barrier be provided. This can be accomplished with gates, removable bollards, large chains between bollards, or similar devices. All such barriers must include locking provisions. Review with Tenants, Support Installation and Provost Marshal.

3-2.4.4.4 Bollards shall be located to protect buildings corners, overhead doors, man doors, and equipment including hydrants, mechanical or electrical equipment, transformers, meters, etc. where vehicles operate in close proximity to such equipment. Concrete embedded steel concrete filled pipe painted yellow is preferred. Provide bollard size appropriate to the vehicles expected to operate on the site; standard weight steel pipe minimum.

3-2.4.5 Traffic Safety

3-2.4.5.1 Coordination with local roadway agencies and implementation of DOT recommended roadway geometrics will accommodate a majority of the site traffic safety needs. The roadway agency may dictate control devices such as stop signs and other roadway design features at access points.

3-2.4.5.2 If the size of the site and its interior site traffic circulation is substantial, consider designing traffic control signs such as stop signs, pedestrian crossing warning signs, pavement markings, directional signs, information signs, and speed limits to provide safe traffic control and eliminate confusing traffic patterns on the site. On installations, coordinate speed limit requirements with the appropriate installation agency.

3-2.5 Fencing

3-2.5.1 Chainlink or other security fencing is always provided around the MEP area, and may be approved by the OCAR Engineer Office for other areas. If the budget allows, consider fencing to match the surrounding architectural character. Also consider fencing attractive nuisances such as equipment, ponding areas that will hold stormwater for appreciable lengths of time, solar panels, other energy-production provisions, etc. Such fencing does not have to meet physical security requirements for security fencing. Most Tenants prefer that fences are

located in a strip of rock mulch or similar surfacing to avoid the need to maintain grass or plantings along the fence line.

3-2.5.2 The standard chainlink security fence is a minimum of 7 ft (2140 mm) in height, with 6 ft (1840 mm) of fence fabric and a guard consisting of three strands of barbed wire totaling 1 ft (300 mm) above, sloped outboard. Fences of other materials providing similar security may be considered, but must be reviewed with Support Installation security personnel to verify they meet physical security criteria. The maximum allowable distance from hard ground to bottom of fence is 2 in (50 mm). A “clear zone” along both sides of the fence is typically required; this area generally extends for 10 ft (3000 mm) on each side of the fence, but the distance should be verified with Support Installation personnel. (Light pole bases may be located at least 5 feet from the fence on the inside.) For fences adjacent to property lines, the “clear zone” from the fence to the property line must be 20 ft (6100 mm). See [Army Reserve website](#) for fencing details which meet DoD standards.

3-2.5.3 Vehicle gates may be swinging or rolling, based on Tenant preference, but rolling gates must maintain the maximum height of 5 in (125 mm) above ground. It may be necessary to incorporate a “speed bump” at the gate in order to ensure the bottom of the gate does not exceed the maximum height above the paving. Powered gates are not normally provided. Check that swing gates and cantilever gates open or close in the direction of intended swing or operation area and are not adversely impacted by surrounding grades or other structures that impede proper operation of the gates. Maintain required clear distance when closed.

3-2.5.4 Fences must be electrically grounded.

3-2.6 Wash Platforms

3-2.6.1 Wash platforms are drive-through areas which provide utilities for washing. Wash bays for military equipment may be authorized in the project documents, or requested by the Tenants for OCAR Engineer Office approval.

3-2.6.2 Wash platforms are typically located along the side of maintenance shop workbays, and are always roofed. The wash area and aprons are concrete. The clear wash bay size is 20 ft (6100 mm) by the length of the adjacent workbay – 32 ft (9750 mm) or 40 ft (12200 mm) for the minimum OMS. A minimum clear opening height of 14 ft (4300 mm) is required. Wash platforms are authorized as units, not by area, and their area is not added to the authorized area of the adjacent shop if the wash platform roof is connected to or shared with the shop.

3-2.6.3 Provide for collection/treatment of graywater and prevention of stormwater entry to sanitary sewers. Slope paving to prevent stormwater flow into the wash platform drain, and provide containment curbs or depression of the slab to contain graywater.

3-2.6.4 Wash platform design must comply with federal, state and local environmental requirements. Walls along the long axis may be required. In order to build a fully enclosed wash platform structure, the wash platform must be designated as a primary facility on the 1391. A fully enclosed wash platform is considered a wash building.

3-2.6.5 The designer should verify whether any package pressure or heating wash system will be Tenant-supplied or a part of the construction contract. If such a system is portable, it will be necessary to provide sufficient storage space to accommodate it in the maintenance shop. The designer will verify that sufficient power is provided for such systems.

3-2.6.6 Consider recycling of graywater, possibly with a package system. Cost, sustainable design goals, and water availability will be factors in the consideration. If provided, a heated building for the equipment will be provided where climate requires.

3-2.6.7 Provide wash platform with an electrical service receptacle on each side of the platform to support miscellaneous electrical requirements beyond the pressure washer. The interior of the facility shall also be lit to support low light periods. Evenly distribute the light to establish a minimum of 40 fc, and place fixtures such that sides, front and back of the vehicles are illuminated. Design all electrical systems for wet service.

Figure 3-6
Bi-Level Loading
Ramp



3-2.6.8 Water provided to exterior wash platforms shall be provided by freeze-proof fixtures. Investigate placement of wash platform facility near heated facilities to increase ability to provide hot and cold water to support the cleaning operation, while minimizing water line freezing. Where freeze-proof yard hydrants with drain holes are provided, the water piping supplying these fixtures must be protected with a backflow device; the vacuum breaker on the hydrant is not sufficient protection.

3-2.7 Loading Ramps

3-2.7.1 Loading ramps for military equipment may be authorized in the project documents, or requested by the Tenants for Project Officer approval. The Louisville District Corps of Engineers has a site-adaptable standard design for a free-standing bi-level loading ramp that can be

found on the [Army Reserve website](#). Confirm width is sufficient for Tenant's widest vehicle. Where practical, the loading ramp may incorporate site contours to reduce construction cost of free-standing ramp.

3-2.7.2 Loading ramps should be adjacent to or near the MEP; location within the MEP is discouraged due to circulation requirements and loading ramp use for other purposes. Sufficient maneuvering room must be provided for both transport and loading vehicles. The necessary amount of paving may not be part of the project paving authorization or construction budget; these additional costs must be identified and approved by the OCAR Engineer Office.

3-2.7.3 If tracked vehicles are to be loaded, the design must provide for concrete, articulated concrete block, or aggregate approaches and circulation paths to appropriate roads or parking areas.

3-2.7.4 Removable pipe guardrails are required on the side of the loading ramp in order to ensure worker safety.

3-2.8 MKT and CK Pads

3-2.8.1 Mobile Kitchen Trailer (MKT) or Containerized Kitchen (CK) pads are 30 ft x 50 ft (9100 mm x 15200 mm) pads, typically reinforced concrete, but other surfaces may be considered. Coordinate pad location with training center kitchen. Pads may be located within the unobstructed space since the equipment is used during battle assembly, then returned for storage in the MEP. MKT pads should shed surface drainage, but not be too steep so as to prevent proper positioning and placement of the unit.

3-2.8.2 Design access drive and maneuvering space to accommodate MKT or CK equipment that PDT thinks most likely to be provided to project.

3-2.8.3 Provide electrical service as described in [Section 3-10](#). Locate an exterior hose bibb on the building exterior if the pad is located near the building, and locate a freeze-proof yard hydrant if located remotely. A sanitary sewer drain is to be provided at pad locations. The drain will be designed to not drain stormwater, and must pass through a grease trap prior to discharge from the site.

3-3 LANDSCAPE ARCHITECTURE

3-3.1 Landscape design and materials must reflect an understanding of the guidelines outlined in the Department of Defense's most recent Antiterrorism/Force Protection manual. Selection of deciduous, coniferous and/or herbaceous trees, shrubs, and ground covers must be responsive to aspects of maintenance, irrigation concerns, year-round color and visual impact, simplicity of design and value-added benefits to be derived by landscape installation.

3-3.2 Appropriate planting design incorporates landscapes that positively modify microclimatic conditions, provides habitat for wildlife where desirable, and deters unwanted fauna when appropriate. Plant material selection depends upon as-found soils, plant communities, and hydrological conditions. Whenever possible, incorporate resource management practices to preserve existing stands of mature landscape, and to utilize indigenous plantings and native grasses.

Figure 3-7
ARC, Ft. Allen,
Puerto Rico



3-3.3 Quality plant material selection will afford a permanent, low maintenance and aesthetically pleasing landscape appropriate to the facility's geographical location. The use of native and or adapted drought tolerant vegetation that is naturally resistant to pests and disease is strongly encouraged. The landscape should only require temporary irrigation to establish and be designed to eliminate the use of potable water for ongoing irrigation demand. Greater species diversity will reduce susceptibility of infestations and disease. Choose and locate plant material to prevent the adverse effects of seasonal seed dispersal, leaf drop, shallow root systems, low wind resistance, etc. on adjacent equipment, utilities and site features. Native ground cover must maintain a mature height as to not interfere with the security of the facility. On some Government installations, the department of public works (DPW) may have a list of preferred plant materials.

3-3.4 LID and best management practices (BMP) features must require minimal maintenance, i.e. pruning, fertilizing, weeding, etc., once the plant material is established. Design LID and BMP features with plant material able to withstand periodic inundation, dry conditions, and capabilities to enhance the treatment of stormwater runoff. The low maintenance landscape should minimize the use of turf grass and maximize the use of native and/or adapted trees, grasses and forbs as permanent ground cover to improve stormwater management.

3-3.5 Site furnishings and related amenities need to address issues of vandal resistance, minimal maintenance, and handicapped accessibility. Coordinate in a manner that reflects the architecture and context in which the facility is situated. While not all-inclusive, the following site components may be considered to complement landscaping when designing outdoor spaces: facility sign, flagpoles, tables and chairs for outdoor dining, benches, trash receptacles, ash urns, bike racks, bollard posts, tree grates, appropriate mulches, fencing and trash enclosures for screening, shelters, and specialty paving surfaces for accent and focus.

3-3.6 At a minimum, lighting should be incorporated at all facilities for functional and safety/security purposes. Lighting may be building-mounted, pole-mounted or ground-mounted. Lamps for accent, ornamentation and focus, when considered, must accommodate a consistent visual character, be vandal resistant, and require minimal maintenance.

3-3.7 Signage supported by site furnishings, plant materials and lighting provides both immediate and subtle references to reinforce aspects of wayfinding at a facility. Signs serve informational, interpretive, directional, and regulatory purposes. Visual consistency, scale and clarity of organization promote a comprehensive aesthetic at main entry gates, facility and building entries, parking lots, and along paths and roadways.

3-3.8 Utilities and infrastructure required for support of the landscape include subsurface drainage to control hydrological aspects, water lines to address irrigation mechanical system needs, and gas and electrical lines to supply power to site amenities that may be incorporated as part of a comprehensive site improvement package.

3-4 FIRE PROTECTION/LIFE SAFETY

3-4.1 General

3-4.1.1 Fire protection and life safety are paramount in the design of Army Reserve facilities. Consider exceeding minimum requirements in certain instances. For instance, NFPA 101 allows some exit corridors in fully-sprinkled buildings to be built without one-hour ratings; the designer may wish to provide one-hour corridors based on the size of the building, number of occupants, and ease of exit.

3-4.1.2 In order for a facility to be occupied by Department of Defense personnel, the design and construction must meet specific requirements. The Government's primary guidance on building codes, fire protection and life safety is UFC 1-200-01. Design and construction of Army Reserve real property improvements shall comply with UFC 1-200-01, and shall comply with the specific applicable requirements of IBC, NFPA101, UFC 3-600-01, and other codes and standards that are referenced in UFC 1-200-01. If on an Installation, obtain and comply with any specific code/life safety/fire protection criteria that apply.

3-4.1.3 Some state and local code and regulatory agencies may not have jurisdiction over Federal Government construction on Federal property. However, the Army Reserve wishes to comply with state and local codes and regulations, and the Design Agency remains responsible for such compliance. Design and construction of Army Reserve facilities shall comply with all current and applicable state and local codes, and with all other applicable laws and

regulations governing development, design and construction at the site. If certain of such requirements appear particularly onerous, or hamper Army Reserve required functionality of the project, the Design Agency may recommend the Government waive the requirement or implement a lesser requirement. The Government's approval of such recommendations is not assured.

3-4.1.4 Where any of the applicable requirements conflict, the most stringent shall govern. In no case shall building code, fire protection or life safety requirements be reduced below those required in UFC 1-200-01 and this document.

3-4.1.5 Fire extinguishers shall be provided in accordance with UFC 3-600-01, which requires compliance with NFPA 101 and NFPA 10. A fire extinguisher is required in arms vaults.

3-4.1.6 If a facility authorization includes a SCIF or similar secured space, it may have a single controlled point of entry, most likely with an electronic lock. If necessary, a separate exit (or exits, if two are required) can be provided to satisfy life safety/exiting requirements. The Army Reserve security personnel will want any such exits to include an audible alarm, and possibly a short delay, for security reasons. No hardware should be provided on the exterior side of such exit doors.

3-4.2 Fire Sprinkler System

3-4.2.1 Fire sprinkler system design for Army Reserve projects is normally accomplished through a performance specification, with the contractor's design engineer responsible for a detailed system design.

3-4.2.2 The design criteria identified in UFC 3-600-01 must be provided to the contractor's sprinkler system designer on the contract documents; by explicitly calling out the design criteria requirements, rather than by referencing the UFC. Note that the hose stream and remote areas for various hazard classifications are more stringent than NFPA 13 requirements.

3-4.2.3 Identify design densities for water flow and sprinkler types on a room-by-room basis so hydraulic calculations may be performed. Flow test data must be provided for hydraulic design calculations.

3-4.2.4 UFC 3-600-01 requires that every portion of a sprinkled building be sprinkled; it does not allow exceptions for computer or electrical rooms, or arms vaults.

3-4.2.5 In addition to UFC 3-600-01, other design criteria may be applicable. ETL 1110-3-446 provides thrust block design guidance. For aircraft hangar projects, ETL 1110-3-481 covers AFFF clean up requirements, ETL 1110-3-484

covers fire protection for fixed wing aircraft, and ETL1110-3-485 covers fire protection for helicopter hangars.

3-4.3 Fire Alarm System

3-4.3.1 An addressable Class B fire alarm system shall be provided, consisting of manual dual action stations at exits, combination audible/visual signals located in accordance with ABA-DoD and UFC 4-021-01 requirements, duct smoke detectors in air-handling units as required by code, and magnetic hold-open devices with smoke detectors for corridor fire doors. The system must be addressable, zoned, non-coded and fully supervised.

3-4.3.2 Provide a fire alarm riser diagram in the construction documents. Feed the control panel from a panelboard to provide 120V, 1-phase, 2-wire plus ground to the control panel. The breaker to the fire alarm circuit shall be red and have a locking device.

3-4.3.3 Install a remote annunciator panel at an entrance designated by the Tenant and per NFPA 72.

3-4.3.4 Any kitchen equipment below hoods must be shut down upon activation of the kitchen fire suppression system per NFPA96.

3-4.3.5 Provide photoelectric smoke detectors in electrical, EF, TR, and TER rooms as a result of customer-specific needs, as well as where required by code.

3-4.3.6 Connect all water flow switches, tamper switches and post indicator valves to the fire alarm panel.

3-4.3.7 Audible requirements shall meet NFPA 72 requirements.

3-4.3.8 All conduits for the fire alarm system should be 1/2 inch (13 mm) minimum.

3-4.3.9 Provide remote station signal transmitter with a digital alarm communicator capable of transmitting alarm and trouble signals over telephone lines (telephone dialer) or radio transmitter to a remote security monitoring stations/base fire department. Verification of current practices for fire alarm signal monitoring at the existing base/site is necessary.

3-4.3.10 Provide mass notification in accordance with UFC 4-010-01, UFC 4-021-01, and Army Reserve Implementing Guidance memo for AT/FP.

3-5 ARCHITECTURAL

3-5.1 Army Reserve Approved Systems and Materials

3-5.1.1 The Army Reserve, through past experience, has established some preferred systems and materials for the design and construction of Army Reserve facilities. These are to be used, when practical. Review recommendations for departures from these systems and materials with the OCAR Engineer Office.

3-5.1.2 The approved exterior wall systems for Army Reserve facilities are listed below. The first three systems listed are equally preferable to the others; consider Support Installation preferences in selection. All exterior wall systems must incorporate air barriers; see Paragraph 3-13.2.2. Exterior wall system selection affects AT/FP standoff distance; siting must be considered in conjunction with wall system selection.

3-5.1.2.1 CMU back-up with brick or other masonry veneer and an insulated cavity.

3-5.1.2.2 Tilt-up or precast concrete panels; may have masonry or similar veneer, may have integral insulation.

3-5.1.2.3 Insulated concrete form; may have masonry or similar veneer, exterior and interior wall finishes required.

3-5.1.2.4 Steel stud backup with brick or other masonry veneer.

3-5.1.2.5 Other exterior wall systems that provide equivalent performance may be used with Project Officer approval.

3-5.1.2.6 Exterior Insulation Finish Systems and metal panels may not be used as primary exterior finish materials without Project Officer approval. Metal panels may be used sparingly as accent materials.

3-5.1.2.7 Discuss wall type selection as part of the energy charettes that will occur early in the design process. Energy considerations will have an impact on wall and roof type selections.

3-5.1.3 The interior finish of the exterior wall will be gypsum board over furring or steel studs in finished spaces, and painted CMU; precast or plywood wainscot in more utilitarian areas.

3-5.1.4 Preferred exterior doors are insulated hollow metal in hollow metal frames, with aluminum doors in aluminum storefront systems for major entries.

Exterior windows should be steel or aluminum frame units, or storefront or curtainwall assemblies where large areas of glazing are desired. AT/FP requirements must be considered for all exterior envelope glazed openings.

3-5.1.5 The Army Reserve approved roofing systems are listed below, and include both sloped and low-slope systems. All systems are equally acceptable, but Support Installation preferences must be considered. Low-slope roofs are typically provided over the kitchen area to accommodate associated rooftop equipment. See guidance on all preferred roofing systems in [Appendix I](#). Thermoplastic olefin (TPO) roof systems are not permitted on Army Reserve projects.

3-5.1.5.1 Preferred sloped roofing systems are standing seam metal and 50-year shingle system.

3-5.1.5.2 Preferred low-slope roofing systems are EPDM, modified bitumen, and thermoplastic.

3-5.1.5.3 For pre-engineered metal, unheated storage and similar unoccupied buildings without space conditioning, a standard pre-engineered metal roofing system is acceptable.

3-5.1.5.4 RSCs and Tenants may have strong opinions on their preferred roof types. Discuss roof selection as part of the energy charrettes that will occur early in the design process. Energy considerations will have an impact on roof selections.

3-5.1.5.5 Provide permanent access provisions for maintenance of rooftop equipment, specifically at the kitchen. Provide additional ladders at any parapets between roof areas of different heights. AT/FP requires internal access to roof for new construction.

3-5.1.5.6 Some RSCs may desire that roof access be provided for periodic inspection of roof condition. Consider potential for roof damage and personnel injury in determining whether and how to provide such access.

3-5.1.6 Preferred interior walls are steel stud with gypsum board for spaces where a more finished appearance is desired, or CMU, precast or plywood wainscot. CMU walls may be glazed, burnished or painted. Consider space function and volume of traffic; in high traffic areas and areas where wear and tear can be anticipated, it may be desirable to use glazed or burnished CMU if a nicer finish is desired. It may be helpful to consider wear and tear in a training center to be similar to that anticipated in a high school or college building, and use in an OMS to be similar to a repair garage.

3-5.1.7 Most spaces with ceilings will be suspended acoustical tile; the preference is for 24 in x 24 in (600 mm x 600 mm) tiles to avoid sagging of tiles. For kitchen and shower areas with the possibility for moisture presence, see [Chapter 4](#) Individual Space Criteria.

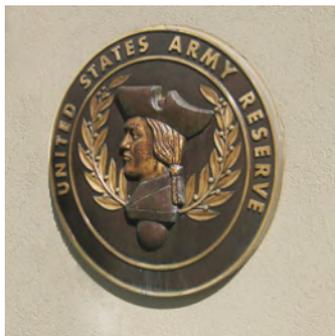
3-5.1.8 In general, the materials and methods of construction proposed for use on Army Reserve facilities should be of high quality and will have been used (preferably by the Design Agency) in several projects which can be researched to ascertain the product's performance characteristics. Materials, as well as the design, should be of good quality and able to stand the test of time.

3-5.2 Image/Aesthetics

3-5.2.1 Both the exterior and the interior image of Army Reserve facilities should reflect military values, such as dignity, tradition, discipline, and order. At the same time, they should provide the Tenants a functional and comfortable workplace, and an atmosphere which will promote feelings of pride and ownership. Make the training center main entrance prominent and apparent to visitors.

3-5.2.2 The Army Reserve is seeking a level of standardization in their built facilities, but is not seeking "cookie-cutter" design solutions. Many of the spaces and features of the facilities will be the same throughout the Army Reserve system, and design efficiencies can be gained through reuse of standard space modules or groupings. However, the Design Agency should seek to give each project its own identity, based on Tenant input and local/regional influences.

Figure 3-8
ARC, Honolulu,
Hawaii



3-5.2.3 Provide a level of finish and detail in a training center that would be appropriate for an office building of good quality, with additional emphasis on durability and maintainability. For an OMS or AMSA building, finish and detail can be more utilitarian in the maintenance areas, but similar to a training center in the office areas.

3-5.2.4 Each Army Reserve facility will have two "Minuteman" plaques, one for exterior display (aluminum) and one for interior display (bronze); the exterior plaque should be located with the "U.S. Army Reserve Center" signage. These are Government-furnished and contractor-installed (GFCI); designer will determine locations with Tenant input, in locations of maximum visibility. See the [Army Reserve website](#) for contact information to obtain a minuteman plaque.

3-5.2.5 Consider developing high-visibility locations for the Tenants to display their trophies and other memorabilia. In centers housing more than one unit, multiple locations may be appropriate.

3-5.3 Room Numbering

3-5.3.1 The Design Agency should work with the RSC to develop a room numbering scheme for the construction documents that will also be functional for the room signage and later operation of the facility. Spaces that are typically not given signage (such as corridors, lobbies, vestibules, stairs, etc.) should use a separate numbering system to keep rooms with signage numbered consecutively.

3-5.3.2 Some Tenants prefer that the offices around the unit common be numbered with a letter suffix to the overall room number in order to group the suite together.

3-5.4 Stairs and Elevators

3-5.4.1 For more information, see Paragraph 4-2.45.

3-5.4.2 Elevators must meet accessibility requirements of ABA-DoD: provide hooks and pads for occasional moving of furniture. Elevators are a minimum of 2,500 lbs (1,130 kg) capacity.

3-5.4.3 Elevator Power Supply: Refer to [Section 3-10](#) below.

3-5.5 Doors and Windows

3-5.5.1 Locate windows where functionally appropriate and as an element of sustainable design for daylighting purposes. Consider the use of operable windows, with screens, for administrative and similar areas, for sustainable design reasons, and to provide ventilation flexibility. Provide blinds or exterior shading to minimize glare. Provide interior window sills of solid surface material, minimum thickness of ½ in (12 mm), not gypsum board.

3-5.5.2 Consider daylighting strategies for the unit or administrative common areas, offices, classrooms, corridors, assembly hall, lobby, OMS workbays, OMS offices, and unit storage area. Due to security concerns, unit storage daylighting may require clerestory glazing or glass block.

3-5.5.3 In areas where windows are not commonly provided (such as storage areas or toilets and locker rooms), consider introducing indirect sunlight space, using glass block, skylights, solar tubes, “high windows”, or other creative solutions.

3-5.5.4 Coordinate with the Installation to develop appropriate door hardware and keying. There are security restrictions prohibiting master key systems; the designer should review keying requirements with Installation security personnel. Weapons areas, storage areas, and secure spaces, at a minimum, will not be part of any master key system. Specify eased edges for push plates and similar hardware.

3-5.5.5 Doors in office and similar administrative or educational areas are typically solid-core wood; doors in more utilitarian areas may be hollow metal: both with hollow metal frames. Doors to administrative areas may have lights or sidelights for sustainable design purposes, to provide visibility for the Tenants, and a view into the space from the corridors. Doors to individual offices should not require closers or kickplates. All doors must have a minimum width of 3 ft (900 mm) and a minimum height of 7 ft (2100 mm).

3-5.5.6 See [Section 2-13](#) for additional information on hardware and security.

3-5.6 Caging and Shelving – See Paragraph 4-2.20.

3-5.7 Trash/Recycling Enclosure

3-5.7.1 Provide an enclosure of sufficient height to fully screen the dumpster(s). The exterior materials of the dumpster enclosure should match the materials of the training center. Provide a 10 ft (3000 mm) deep concrete apron in front of all trash/recycling pads. Provide at least two bollards per dumpster in the rear of the pad to provide stops for dumpster return placement by the removal equipment. Provide bollards to protect the exterior of the enclosure. Provide full-height operable gates with gate keeper devices to hold gates in open and closed positions. Verify size of dumpster and/or recycling containers with Tenants.

3-5.8 Flagpole

3-5.8.1 All Army Reserve Centers should have a flagpole, unless located on a larger Federal installation. Army Reserve Centers on Army installations do not normally have a flagpole since the Army installation has one. However, a flagpole could be requested if the Army Reserve Center is significantly remote from the main part of the installation. For joint facilities, that include the National Guard, a second flagpole for a state flag may be appropriate.

3-5.8.2 The standard flagpole will be tapered mill finish aluminum, fitted with a gold anodized finish “ball” finial. The mounting detail is to be simple with a concrete base flush at grade. A concrete or sustainable paver pad must be used when poles are located in lawn areas. In plaza areas, flagpole locations and mounting detail will be integrated into the paving pattern. Flagpoles may be accented with planting beds around the base of the flagpole. Light the flagpole if

it is determined that the flag will not be removed at night; the default is that the flag will not be removed. The height of the flagpole is dependent on the size of the flag flown. For Army Reserve Centers, the flag is typically the field flag (6 ft 8 in hoist x 12 ft fly (2000 mm x 3650 mm)) which would require a 40 ft (12200 mm) flagpole.

3-5.9 Sound Transmission Control

3-5.9.1 Certain spaces in Army Reserve facilities require effective sound transmission control (offices, SIPRNet Cafe, classrooms, weapons simulator, etc.) either to minimize noise disruption in adjacent spaces or to assure privacy of discussions within the space. Such spaces have Sound Transmission Class (STC) rating requirements indicated in their space design information in Chapter 4.

3-5.9.1.1 Achieving an effective STC rating requires special attention to the details of construction of the wall, floor or ceiling assembly. Of primary importance is minimizing penetrations or discontinuities in the construction that would allow sound waves to find an uninterrupted transmission path around the assembly. Such paths can reduce the effectiveness of the assembly by up to 50%.

3-5.9.1.2 Transmission paths can be addressed by using sealants to assure that construction gaps are eliminated, offsetting and sealing required penetrations such as electrical openings, and other methods. The construction drawings must clearly convey the measures required to attain the desired STC rating. Detailing the head and sill of the wall is especially important to ensure a proper “air-tight” seal for the wall assembly.

3-5.9.1.3 Lay-in ceilings offer another potential transmission path between adjacent spaces; there is little reliable information available about their ability to provide effective sound control. High ceiling attenuation class (CAC) ceiling materials are available, and sound attenuation batts can be placed atop the ceiling, but exactly what level of sound reduction these provide is unclear. The most reliable strategy for preventing ceiling to ceiling sound transmission is to continue the wall between the spaces up to structure, and seal the joint.

3-5.9.1.4 Provide ducted returns or lined transfer air sound traps for spaces that require STC ratings.

3-5.9.1.5 Keep spaces with high levels of noise away from quiet spaces, whenever possible.

3-5.9.2 For spaces in Chapter 4 where no STC rating is indicated, normal wall, floor and ceiling construction is adequate.

3-6 INTERIOR DESIGN

3-6.1 Army Reserve Approved Materials and Systems

3-6.1.1 The approved finish materials for the various spaces are described, by space, in Chapter 4. A list of approved furnishings for each space is also located there.

3-6.2 Colors

3-6.2.1 The Army Reserve has approved four basic interior finish schemes for its projects: green, blue, rust, and red. These four schemes shall serve as a baseline denoting range of color, style, quality, and overall character expected by the Army Reserve. Finish boards were created to illustrate the desired project look and feel for the Army Reserve but they are minimums; innovative and creative solutions are encouraged. The finish boards are available at the [Army Reserve website](#).

3-6.3 Flooring

3-6.3.1 The Army Reserve is moving away from vinyl composition tile (VCT) as a primary flooring material due to maintenance and cleaning issues.

3-6.3.2 Ease of maintenance and durability make rubber tile an excellent flooring choice for many spaces that require functional flooring. It has excellent underfoot comfort and sound absorption properties. Recycled rubber is not recommended, with an exception for physical readiness rooms, the use of vulcanized rubber tiles is preferred. Make Tenants aware that rubber will exhibit less sheen than other hard flooring products they are accustomed to. Select rubber tile to avoid tiles that have deep grooves or other hard-to-clean textures. When rubber is used in areas that are prone to oils, animal fats, or petroleum products, an oil-resistant rubber must be specified.

3-6.3.3 Resinous flooring (examples are StonHard, Dex-O-Tex, or BASF performance flooring) stands up well to abuse and requires minimal amounts of maintenance. An integral base makes it an excellent choice for areas that are frequently wet. When specifying resinous flooring for wet areas, a membrane must be used in conjunction with the system. Acceptable resinous systems include decorative, seamless flooring system consisting of epoxy, methyl methacrylate (MMA), urethane or hybrid resinous systems, and multi-color decorative chips or colored quartz broadcast to excess (100 percent coverage). Solid color systems or random coverage flakes are not acceptable. Systems must be 3-part application, minimum. Ensure manufacturer has single source responsibility for flooring including all components of the system, and require a warranty for products and labor. Resinous flooring is to be installed by

manufacturer-trained and certified installers. Systems should have a surface hardness of 70 or greater as tested per ASTM D-2240.

3-6.3.4 Linoleum may be used in some areas as an alternative to other flooring choices. In addition to its long product life and the lack of required waxing, linoleum is composed of all natural raw materials, which makes it a good choice for sustainable flooring. As linoleum becomes more available in tile form, it will become an increasingly viable option for flooring in large areas.

3-6.3.5 In office areas and office-type spaces, carpet tiles are standard; carpet tiles aid in noise reduction and reduce fatigue when standing for long periods. Fiber, construction, and cleanability must be considered in selection of carpet tiles. Carpet tiles are more easily maintained and require replacement only of damaged portions.

3-6.3.6 Certain areas of the building may require specialty floorings. Ceramic tile or porcelain pavers are used in select areas. All ceramic tile must be grouted and sealed. In the kitchen, quarry tile is used because it is impervious to water, grease and most liquids. In TER/TR rooms and other rooms where electrical equipment is in use, a static dissipative tile is used to reduce the effects of static electricity.

3-6.3.7 Provide entrance walk-off mat systems at all major training center entrances to minimize tracking of dirt, mud and snow into the building.

3-6.3.8 All areas that have exposed concrete will use a concrete sealer.

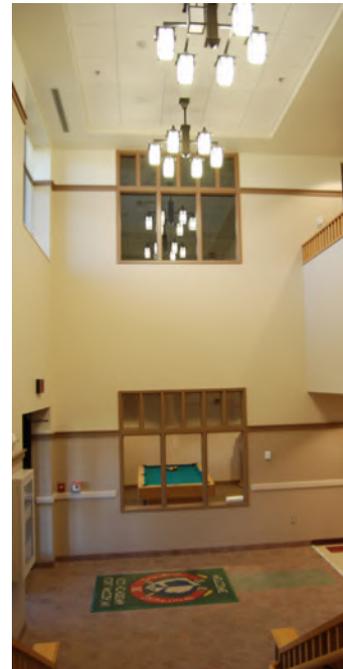
3-6.3.9 The designer is responsible for ensuring that the proper type of chair caster is specified on chairs for compatibility with specified flooring material.

3-6.4 Wall Finishes

3-6.4.1 Paint is the preferred finish for wall surfaces. Specify paints of high quality, durable and easily cleaned. Use epoxy paint in wet areas such as toilet rooms.

3-6.4.2 When chair rails are placed in areas with movable furniture, the height and depth must address both tables and chairs.

Figure 3-9
NCO Academy,
Ft. McCoy,
Wisconsin



3-6.4.3 In corridors surrounding high-use areas, consider wainscoting between the wall base and the chair rail. Possible wainscoting materials (in order of preference) are: acrylic sheet covering, plastic laminate sheet covering, flexible vinyl wallcovering, a linoleum sheet product, a tile or stone wainscoting, burnished block, or wood paneling.

3-6.4.4 Consider protective continuous bumper moldings and corner guards for corridors located in main paths of circulation, high use areas, or areas of utility use to minimize damage to walls. Mount continuous bumpers, when required, at base height, at a minimum. Use corner guards in all these locations.

3-6.4.5 For areas where enhanced appearance is desired, such as conference rooms and command suites, consider wood wainscot. Wallpaper should not be used for an interior wall finish except when specifically approved for the command suite.

3-6.4.6 Horizontal blinds are provided for most windows. Room-darkening horizontal blinds are required in classrooms, conference rooms, and other areas where audio/visual equipment might be used.

3-6.5 Furniture

3-6.5.1 All Army Reserve projects are designated as a UNICOR or non-UNICOR project to determine the furniture vendor to be specified. The designer must verify the designation with the Louisville District Corps of Engineers.

3-6.5.2 The majority of the furniture in Army Reserve facilities is administrative, and will be either freestanding metal desk-based furniture or panel based system furniture. The Army Reserve has determined that suspended pedestals will not be used. Coordinate furniture with the Tenants so that it supports the intended functions and equipment. Verify with Louisville District Corps of Engineers current furniture specifications.

3-6.5.2.1 Freestanding metal desk-based furniture is used in the private and shared offices. The desk-based furniture will be capable of structurally supporting overhead desk storage. Army Reserve has selected freestanding metal desk-based furniture for offices for its greater flexibility and minimal effort when changes are required. The supports for the overhead desk storage should not exceed approximately 6 in (150 mm) in depth.

3-6.5.2.2 Panel-based system furniture is used in the unit common areas. All of the major components of the system will be suspended from the panels. The panels provide some acoustical and visual privacy in the open office spaces.

3-6.5.2.3 Provide desk units, workstation and common-use storage pieces with keyed locks; coordinate keying with Tenants. Normally, desk unit storage pieces

in each private office are keyed alike; unit common workstation storage may require more than one key per workstation due to multiple Tenants.

3-6.5.3 Seating

3-6.5.3.1 Desk seating for the private, shared and unit common workstations will have ergonomic adjustments to fit the Tenant and the task. Ergonomic adjustments include overall height, lumbar support and arm height adjustments which help the Tenant to more efficiently complete the task and prevent injury.

3-6.5.3.2 Provide visitor or guest chairs that can easily be pulled up to the desk or table.

3-6.5.3.3 Classroom chairs will be stackable for ease of reconfiguring the furniture within the room, as well as for ease of storage. The stacking chairs will have upholstered seats and backs, and a sled base.

3-6.5.3.4 Break room chairs will be stackable, sled base, plastic shell chair.

3-6.5.3.5 Lounge seating will be fully upholstered.

3-6.5.3.6 Adjustable stools used in conjunction with workbenches in armorers' room and repair rooms will have woven "Crypton" upholstery with a finish that will protect against grease and oils. Adjustable stools, with arms, will be used in conjunction with lecterns in assembly rooms and classrooms, and are optional in training rooms.

3-6.6 Shelving and Workbenches

3-6.6.1 Steel shelving and steel cabinets for unit storage areas and maintenance shops are considered equipment rather than furniture, and are provided as part of the construction contract under OMAR funding. Shelving for library and facility maintenance storage areas is typically part of the furniture package. Workbenches for unit storage areas, maintenance shops and armorer's rooms are typically part of the furniture package.

3-6.7 Electrical Coordination

3-6.7.1 Furniture design must be closely coordinated with electrical and communication design; this is especially true for the open office panel system workstations. The workstations will be furnished and installed by the Government, but the construction contractor will be responsible for wiring them once they are installed, and for cutting the Government furnished electrical base feed whip to the appropriate length and connecting it to the building's power source. The construction contractor shall provide and install all conduit, fittings, cables, coverplates, and jacks necessary to complete the communications

system installation with the panel systems furniture workstations. Thorough direction in the construction documents should reduce the conflict inherent in this situation.

3-6.8 Markerboards, Projection Screens and Presentation Boards

3-6.8.1 Markerboards, projection screens and presentation boards need to be sized for the individual room and its use. Markerboards are porcelain enamel on sheet metal to allow use of magnets and magnetic presentation devices. Presentation boards in conference rooms are enclosed in a cabinet. Projection screens are powered and recessed mounted in the ceiling; an exception can be made for screens in the assembly hall.

3-6.9 Existing Tenant Furniture

3-6.9.1 Ask the RSC and Tenants if they have furniture standards of their own. In case of conflicts with typical Army Reserve standards, the OCAR Engineer Office will make a determination.

3-7 STRUCTURAL

3-7.1 Army Reserve Approved Systems and Materials

3-7.1.1 Reference UFC 1-200-01 and UFC 3-301-01 for further structural design information.

3-7.1.2 The structural system should be the most cost effective design without restricting the architectural and engineering aspects of the building, such as flexibility, function, character, and symmetrical configuration for seismic resistance. A variety of systems should be considered, and the one selected must satisfy the site, flexibility, future expansion, program, economic, and availability requirements.

3-7.1.3 The following are typical structural framing systems preferred by Army Reserve, in no order of preference. Refer to Paragraph 3-5.1 for additional information on approved systems and materials.

3-7.1.3.1 Preferred exterior walls systems are concrete masonry, precast concrete, tilt-up concrete, insulated concrete forms or steel studs with a masonry veneer. Concrete and concrete masonry wall types are preferred due to durability and stiffness for masonry veneer backup. If studs are considered for masonry veneer backup, design should limit stud lateral deflection to $L/600$.

3-7.1.3.2 Roof framing should consist of steel beams, steel bar joists, and steel roof deck. Depending on local soil conditions, the lower level floor is reinforced concrete slab on grade or structurally reinforced concrete slab. The remaining

levels should consist of either steel composite deck filled with concrete supported by steel beams and columns or precast plank supported on load-bearing concrete masonry or concrete walls. Consider pre-engineered buildings for unheated storage structures.

3-7.1.3.3 Use of wood in Army Reserve projects is covered by OCAR Engineer Office memorandum "Use of Wood for Military Construction, Army Reserve (MCAR) Projects" dated 10 September 2002. The memorandum states on a project-by-project basis, if aesthetically acceptable, economically feasible, and approved by the Project Officer, heavy timber or glued-laminated columns, beams, and trusses may be used in Army Reserve Facilities. The memorandum specifically states that light (2x) wood framing is not acceptable.

3-7.2 Design Loads

3-7.2.1 Design loads (live, snow, wind, seismic, etc.) are determined according to the latest DoD guidance set forth in UFC 1-200-01 and UFC 3-301-01. Some local building codes or design requirements may be more stringent and will take precedence.

3-7.2.2 Some Tenants have concentrated loads in the form of banks of files or safes; the designer should inquire as to whether there are special loads which need to be accommodated in the design.

3-7.2.3 A geotechnical engineer should determine the seismic Site Classification during the site evaluation and prior to the project feasibility study.

3-7.2.4 Assign an Importance Factor of 1.0 to the design of training centers, but this shall be confirmed on a case-by-case basis for the usage of the building.

3-7.2.5 Show wind pressures (components and cladding) on roof and wall systems on construction documents.

3-7.3 Structural Ceiling Grid System

3-7.3.1 Below a sloped roof, consider providing a U-shaped cold-formed channel grid system for ceiling, mechanical/electrical equipment support, and lateral support of non-load-bearing partition walls. Grid system should be laterally braced for site-specific seismic conditions. Minimum lateral design load will be 5 psf (0.25 kPa) applied to supported elements.

3-7.4 Wall Elevations

Figure 3-10
ARC, Wilmington,
North Carolina



3-7.4.1 Structural wall elevations will be provided in the construction documents. Concrete masonry wall elevations will note the reinforcing steel, steel or masonry lintels and other pertinent information. Wall elevations should reference architectural and mechanical drawings for actual dimensions of wall openings.

3-7.4.2 Structural designer may consider a key plan (building footprint) for referencing wall elevations.

3-7.5 Antiterrorism/Force Protection (AT/FP) Considerations

3-7.5.1 All designs and components of design shall conform to AT/FP criteria in UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings and UFC 4-023-03 Design of Buildings to Resist Progressive Collapse. The Army Reserve prefers that buildings be limited to two stories to avoid additional construction costs associated with buildings designed to resist progressive collapse. Refer to [Section 2-5](#) of this document for further information.

3-7.6 Foundation

3-7.6.1 Concrete masonry foundation walls below grade will be filled solid with corefill concrete to prevent water from accumulating.

3-7.6.2 Provide a typical foundation and ground floor slab detail within the construction documents. This detail will note the geotechnical soils report recommendations for preparation of soils to support the building foundation and concrete slab.

3-7.7 Renovations/Alterations

3-7.7.1 Refer to the latest DoD guidance set forth in UFC 1-200-01 for seismic evaluation and upgrading of existing structures.

3-7.7.2 When altering an existing structure, consult the OCAR Engineer Office for extents of structural upgrading for current code compliance and life safety requirements.

3-7.7.3 In addition to structural design criteria, the seismic capability of existing structures must be evaluated per the latest DoD guidance set forth in UFC 1-200-01.

3-7.7.3.1 The seismic evaluation analysis will be carried to the extent necessary to determine a reasonable estimate of the life safety requirement (safety of personnel, i.e., to prevent collapse of building).

3-7.7.3.2 The investigation should include, but not be limited to, the analysis of

representative frames or load-bearing shear walls in both directions of the structure. Seismic forces will be carried to the foundations.

3-7.7.3.3 Consult the OCAR Engineer Office regarding lateral resisting systems redundancy according to AT/FP guidelines.

3-7.7.3.4 Roof and floor diaphragms will be investigated to transfer the lateral load to the frames or shear walls, particularly the connections.

3-7.7.3.5 Non-reinforced masonry filler walls will be assumed to have no resistance capacity and will be susceptible to damage. However, if there are many of these walls that appear to provide substantial lateral load restraint without exceeding the allowable stresses, they may be considered as part of the seismic resisting system.

3-7.7.3.6 When the strength of materials in concrete construction or the strength of the load-bearing masonry walls is critical for the investigation or in determining the necessary remedial measures, core samples will be taken and tested to determine the values to be used for developing the conclusions.

3-7.7.3.7 Life safety of the existing structure is defined as meeting 75% of the lateral resistance (strength requirements) required by code. However, any strengthening or remedial measures to be provided will be designed to meet 100% of the lateral resistance of the code.

3-7.7.3.8 Refer to the latest DoD guidance set forth in UFC 1-200-01 for detailed requirements for ductility in frames, connections to account for walls, isolation of nonstructural masonry walls, clearances to account for story drift, and support of nonstructural and mechanical/electrical elements. Existing partitions and walls without lateral support at the top, or without straying from a relatively rigid ceiling system near the top, will be provided with lateral support against seismic forces. Mechanical and electrical equipment will be anchored to resist seismic forces. All new partitions, suspended ceilings, mechanical and electrical elements, and systems must be designed in accordance with the latest DoD guidance set forth in UFC 1-200-01.

3-8 MECHANICAL

3-8.1 Choosing Mechanical Systems: Choose mechanical systems to balance the functionality of the selected systems with the Army Reserve's desire to improve the energy performance of their buildings while maintaining Tenant operability and maintainability. Minimizing long-term costs must be one focus of system selection. Systems listed within this section have been implemented successfully on many projects. With the recent efficiency and system innovations, the Army Reserve will consider alternative systems that will enhance the energy performance of the project without compromising the ability to operate

and maintain their facilities. Review alternative systems being considered in detail with the Support Installation early in the design for their input, historical experience, and acceptance. Army Reserve facilities experience limited occupancy during the typical week due to the weekend nature of the facility's operation. Consider systems that allow the Tenants to isolate areas or otherwise minimize energy usage during the week in unoccupied zones.

3-8.1.1 HVAC materials are of commercial quality, leaning toward the industrial end of the scale. In most cases, equipment is floor mounted in a mechanical room or installed outside on a housekeeping pad. Rooftop equipment is discouraged except for kitchen applications. Serve TR and TER with small split system cooling units to allow the central cooling plant to be deactivated in the unoccupied mode. Select HVAC systems and equipment which are life cycle cost effective while balancing reliability, maintenance, and energy savings performance. When selecting equipment and systems, consideration should also be given to keeping the service aspects of the installation simple. There are some general HVAC system types typically used on Army Reserve projects, but the listing is not intended to limit the HVAC systems to only those indicated below, as there may be geographic regional system preferences or other system types that could be considered for their energy savings potential:

Figure 3-11
Air Handling Unit



3-8.1.1.1 Variable Air Volume (VAV) Systems include a central package air handler that utilizes chilled water, and hot water coils, package chiller and boilers, a four-pipe heating and cooling water distribution system, and VAV boxes with reheat. If a chilled water system cannot be justified by life cycle costs, air-cooled condensing units may be used. Use condensing boilers in a parallel arrangement utilizing multiple boilers to maximize part load effectiveness and energy efficiency. Consider RSC preferences and regional considerations with respect to utilizing multiple boilers for redundancy and improved part load operation. Select water temperatures to maximize system efficiency.

3-8.1.1.2 Split Systems include furnaces with condensing units or small air handlers with condensing unit/heat pumps. These are normally single zone units. Consider condensing furnaces for energy savings.

3-8.1.1.3 Fan Coil Units Systems can be used for multi-zone situations in lieu of VAV boxes. This system requires central chiller and boilers and four-pipe heating and cooling piping systems feeding the fan coil units in each zone. This system also requires dedicated outdoor air systems for ventilation. Use condensing boilers as indicated above.

3-8.1.1.4 Vehicle maintenance bays are normally served by either infrared heaters or forced air unit heaters or make-up air units. In climates with more than 5000 heating degree days, in-floor hot water heat used in conjunction with infrared heaters is the standard.

3-8.1.1.5 Kitchens are normally served by a rooftop makeup air unit and cooled by either a packaged cooling rooftop unit or by a central VAV system.

3-8.1.1.6 Ground coupled heat pump systems are being considered for use as an energy conservation measure if project budget allows. These systems can either utilize distributed water source heat pumps serving dedicated zones, or can be centrally located in the mechanical room and produce hot and chilled water for the facility.

3-8.1.2 It is standard practice to apply direct digital controls (DDC) to Army Reserve building projects. The size of the projects is generally such that digital controls are warranted for energy savings. Off-post facilities, buildings not intended to be connected to energy-management control systems (EMCS), and facilities where the Tenant specifically directs the design, are facilities where DDC is permitted to be used and must be decided on a case-by-case basis. The DDC system should collect energy consumption data from the advanced energy meters in the facility and store a minimum of three years' worth of information to allow Installation to create energy consumption reports. The designer should review the Support Installation's preferences regarding DDC system components, features, operation, and interface requirements to enhance the overall operability and maintainability. DDC wiring system shall be completely separate from the internal Army Reserve Network (ARNET) wiring system except for a single point of connection to the ARNET at the DDC head end equipment. The contractor shall submit a request in writing through the Contracting Officer to obtain a Certificate to Operate (CTO) from the USARC G2/6 in order to have the DDC system operate over the external ARNET. The request should occur in conjunction with shop drawing submittals which should give the USARC G2/6 the six months they require to process the request for a CTO.

3-8.1.3 Select and design mechanical systems in accordance with UFC 3-410-01FA. For weather data use UFC 3-400-02 and other "authoritative sources of weather data and tapes". Equipment shall be Energy Star or Federal Energy Management Program (FEMP) designated, and if not covered shall have an energy efficiency in the upper 25% of available equipment.

3-8.1.4 Use mechanical ventilation to meet the building's cooling requirements, when practical. Air cooled condensing units and chillers should utilize multiple compressors for improved part load performance and redundancy. Consider the use of heat recovery equipment in areas with high ventilation requirements. Size pipes and ducts using lower than industry standard friction rates and velocities for additional energy savings. Design ducts and piping with smooth transitions to

reduce friction losses. Specify insulation thickness to meet applicable energy efficiency standards. UFC 3-450-01 provides noise criteria requirements and design guidance for controlling noise and vibration.

3-8.2 Ventilation: Provide mechanical ventilation that allows the buildings to conform to sustainable design standards. This includes applying the latest version of ASHRAE Standard 62.1.

3-8.2.1 Assembly hall, classrooms, reading rooms, conference rooms, physical training, etc. will have widely varying occupancy rates during occupied periods. Pollutants in these spaces, and therefore the outside air requirements for these spaces, will be directly related to the number of occupants. Controlling the amount of outside air based on CO₂ sensors can be very effective in these cases saving significant amounts of energy while ensuring a healthy environment for the occupants. However, these devices require regular maintenance and calibration. Review the desirability and use of this strategy with the RSC and Tenants.

3-8.2.2 Many of the offices and similar spaces will be occupied only part of the time the building is occupied during the regular work week. The designer, in coordination with the Support Installation and maintenance staff, should consider occupancy sensors for those spaces to control both the lights and to reset the terminal units to a standby setting with temperature and air flow outside of the occupied set point requirements. Other zoning considerations should also be discussed and reviewed.

3-8.3 Automatic Temperature Controls: Provide automatic temperature controls for maintaining occupied and unoccupied temperature conditions. Use temperature controls with setback and time-of-day provisions that allow building temperatures to drift during unoccupied hours. Provide protective shields for sensors and thermostats in high-traffic and exposed areas such as corridors and assembly hall.

3-8.4 Zoning and System Considerations: Emphasize the occupancy profile for various areas of the building when analyzing systems. Discuss with the RSC, and balance with cost, energy savings, reliability, and maintenance considerations. Consider isolating zones based on occupancy profiles to allow independent zone operation and reduce energy consumption. This strategy could utilize multiple air systems. Allow unoccupied zones to drift to the unoccupied space temperature limits. Ventilation requirements listed in individual space criteria are minimums. Humidification systems are discouraged due to cost and maintenance considerations, with the exception of TER and TR rooms where specific humidity levels are maintained. Dedicated dehumidification

systems are required only in arms storage vaults. Base additional design decisions on the recommendations stated in the latest editions of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbooks.

3-8.5 Mechanical Room: Provide dedicated mechanical room space for floor-mounted equipment. Access doors must be lockable. Include adequate space for the equipment, duct and piping connections, removal and replacement access, and manufacturer's recommended service clearances around each piece of equipment. Equipment may share service access space to minimize mechanical room floor area. Ventilation air intakes and exhausts must be a minimum of 15 ft (4600 mm) apart. Intakes must be 10 ft (3000 mm) above grade due to AT/FP requirements. Intakes must also be as far as possible from cooling towers, plumbing vents and any other source of contamination, see Air Intake Minimum Separation Distance Table in ASHRAE 62.1. Army Reserve policy is to minimize roof penetrations and roof-mounted mechanical equipment for both practical and aesthetic reasons. Fresh air intakes will be located to maintain this intent while complying with AT/FP requirements.

3-8.6 Building Commissioning: Building commissioning is required; tailor to the buildings and systems provided to ensure that the design intent is met.

3-9 PLUMBING

3-9.1 Choosing Plumbing Systems: Choose plumbing systems to balance the functionality of the selected systems with the Army Reserve's desire to improve the energy performance of their buildings while maintaining Tenant operability and maintainability. Minimizing long-term costs should be one focus of system selection. The Sustainable Design and Development Policy Update requires sustainable and energy efficient approaches to projects.

3-9.2 Hot Water Systems: Solar domestic hot water heating systems are required for projects that have an average daily hot water demand of 50 gallons or more and are located in an area receiving an annual average of 4kWh/m²/day. Design system to provide a minimum of 30% of the facility's hot water demand. Waste heat harvesting, integrated co-generation systems, or a combination may be used to achieve equivalent energy savings.

3-9.3 Plumbing Equipment

3-9.3.1 Design the facility to utilize fixtures and strategies that result in a minimum of 30% less potable water usage than the 1992 EPA Act baseline calculated for the building. Consider low-flow water closets, ultralow flow one pint urinals, low-flow shower heads, and sensor operated flush valves and faucets. Faucets for public lavatories should deliver a minimum flow rate of 0.5 gpm. The Army Reserve does not prefer the use of waterless urinals due to

maintenance considerations. For LEED water savings calculations, verify that weekend reservists are classified as partial FTE occupants, and not transients, for LEED credit purposes.

3-9.3.2 The plumbing materials are those typically used for commercial construction where the building owner intends to occupy the building. Include a compressed air piping system for maintenance bay service tools. Typically, the air compressor is located in the mechanical room. Other maintenance building options may include hard piped lube/oil and AT fluid distribution systems, compressed air drops, battery charging, emergency safety fixtures, and water drops. These options may be shared by adjacent workbays to reduce cost.

3-9.3.3 Provide factory fabricated plumbing equipment. This includes grease traps, oil/water separators, compressed air plants and trench drains. Select piping materials that will provide 25 years of service. Consider the durability required to withstand periodic and emergency cleaning with plumbing snakes. Select plumbing fixtures and equipment which are life cycle cost effective while balancing reliability, maintenance, and water savings performance. Consider condensing gas-fired tank type water heaters, or the use of heat pump or instantaneous water heaters for increased energy savings. Utilize domestic hot water circulation pumps to serve remote fixtures. In addition, consider the use of remote point-of-use water heaters or separate domestic hot water systems that serve full time Tenant areas. Also utilize advanced water meters able to communicate and provide data to the DDC control system for reporting purposes. UFC 3-420-02FA, UFC 3-420-01 and TM 5-810-6 provide design guidance for compressed air, plumbing, and gas piping systems respectively. UFC 3-230-10A provides design guidance for water supply systems. Communication with the Tenants is important to establish the appropriate level of design for the vehicle maintenance areas.

3-10 ELECTRICAL

3-10.1 General

3-10.1.1 The primary goal of electrical systems design is to provide a safe, reliable, flexible, economical, comfortable, and energy efficient facility.

3-10.1.2 The project design should include power distribution, interior and exterior lighting, exit and egress lighting, fire alarm system, fire alarm signal transmitters, security system, arms vault intrusion detection system, public address system, cathodic protection, lightning protection, open office furniture wiring, kitchen equipment wiring, elevator equipment wiring, and telecommunication system.

3-10.1.3 Electrical and communication design must be closely coordinated with furniture design. See Paragraph 3-6.5 Furniture for more information.

3-10.1.4 The design and construction of the electrical systems shall be in compliance with the latest NFPA 70-National Electrical Code, NFPA 101-Life Safety Code, ASHRAE 90.1, and IES Lighting Handbook: Reference and Application.

3-10.1.5 Provide materials and equipment from the standard catalogued products of manufacturers regularly engaged in the production of such equipment and material, and the manufacturer's current design. All equipment and material should conform to the requirements of American National Standards Institute (ANSI), American Society of Testing and Materials (ASTM), National Electrical Manufacturer's Association (NEMA), National Fire Protection Association (NFPA), or other national trade association as applicable. Where standards exist, materials and equipment should bear the label and be listed by Underwriters Laboratories, Inc. (UL) or other nationally recognized testing laboratory (NRTL) per the NEC.

3-10.1.6 The designer should prepare lighting calculations, electrical load calculations, electrical short circuit calculations, arc flash hazard analysis, and protective device coordination analysis. The short circuit, arc flash, and protective device coordination analysis must be done using industry-standard computer software and the reports shall be furnished for Government review.

3-10.2 Exterior Electrical Systems

3-10.2.1 Obtain the main electric power service from the local power provider or the Government installation.

3-10.2.2 A/E should confirm in writing the service requirements from the utility or installation to provide primary underground electrical service, pad-mounted transformer. Locate pad-mounted transformer in accordance with requirements of power company, installation and AT/FP. A/E should confirm in writing the metering requirements from the utility or installation. This should include net metering and utility interconnection requirements and limitations for on-site renewable power generation.

3-10.2.3 The empty conduits from the service transformers to the primary power source, for service cables and transformer pad, should be provided by the contractor in accordance with the NEC and utility company standards. Provide transition cabinet on transformer pad in accordance with utility company standards. Secondary underground electrical service, including trenching and backfilling, conduits and conductors should be provided by the contractor. Provide a spare conduit with pull cord from the transformer to the main switchboard. Provide a current transformer (CT) cabinet for utility-furnished CTs. Utility company normally provides meter. Route a 1 inch (21 mm) conduit from the CT cabinet to the meter.

3-10.2.4 Provide a total electrical service including all cable, pad, transformer, meter and underground conduit, etc. in the project design for facilities on Government installations. Coordinate with Government facility DPW. UFC 3-400-01 requires the utilities to be monitored through connection to a base wide energy and utility monitoring and control system directly or via the building HVAC control system. This may require installing a meter separate from the billing meter.

3-10.2.5 Provide dedicated electrical service to the DEPMED. The service should consist of a weatherproof, 200 amp, 208 volt, 3-phase, 4-wire disconnect switch mounted on a pedestal within the DEPMED. Serve the disconnect by a 208 volt, 3-phase, 200 amp circuit breaker; the feeder must include a properly sized equipment grounding conductor.

3-10.2.6 Provide dedicated electrical service to the MKT pad. The service should consist of a weatherproof, 100 amp, 208 volt, 3-phase, 4-wire disconnect switch mounted on a pedestal immediately adjacent to the service end of the MKT. Serve the disconnect by a 208 volt, 3-phase, 100 amp circuit breaker; the feeder must include a properly sized equipment grounding conductor.

3-10.2.7 Light project exterior monument sign using fixtures furnished with glare control. Provide programmable lighting control system and a photocell. Control is photocell on-timer off-timer on-photocell off. Flagpole is lighted (unless it is determined that flag will be removed at night) with photocell on - photocell off control.

3-10.2.8 Provide exterior vandal-resistant lighting fixtures (wallpacks, canopy lights) at building entrances/exit doors. Provide programmable lighting control system with a photocell. Control is photocell on/photocell off. Locate the lighting controller and time clocks in the main electrical room.

3-10.2.9 Provide DEPMED and MEP area with full cut-off, LED (preferred), cold cathode fluorescent or metal halide (when pre-approved) light fixtures mounted on 30-foot steel poles for area lighting. Provide programmable lighting control system with a photocell. Basic control is photocell on/photocell off. Locate the lighting controller and time clocks in the main electrical room. Maintain a minimum lighting level of 0.2 foot-candles with a uniformity ratio (max-to-min) of 20:1 throughout the area. Consider the use of motion sensor control for high-low light levels. See Paragraph 3-13.3.1 for use of solar to power lighting. The sequence of operations for metal halide lamps should be:

- 1) Photocell ON.
- 2) Lamps brought to 100% light output and allowed to warm up per manufacturer's recommendations.
- 3) Lamp brought to 50% light output after warm up.

- 4) When motion detected, lamps brought immediately to 100% output.
- 5) Fifteen minutes after last motion detected lamps reduced to 50% output.
- 6) Photocell OFF.

3-10.2.10 Provide POV parking area with full cut-off light-emitting diode (LED) (preferred), cold cathode fluorescent or metal halide (when pre-approved) light fixtures mounted on 30-foot steel poles for area lighting. Provide programmable lighting control system with a photocell. Control is photocell on – timer off – timer on – photocell off. Maintain minimum lighting level of 0.1 foot-candles with a uniformity ratio (max-to-min) of 20:1. See Paragraph 3-13.3.1 for use of solar to power lighting. Consider the use of motion sensor control for high-low light levels.

3-10.2.11 Wash platform lighting control should be an on/off timer switch with 60-minute maximum on time.

3-10.2.12 Design light pole bases to accommodate local soil and wind conditions. For poles in locations in POV parking lots protected by a curb or wheel stop, the pole base should extend 3 inches (75 mm) above final grade. For poles in POV parking lots in locations not protected by a curb or wheel stop, make pole base a minimum of 24 inches (600 mm) in diameter and extend 36 inches (900 mm) above final grade. For poles located in MEP areas, make pole base a minimum of 36 inches (900 mm) in diameter and extend 48 inches (1200 mm) above final grade. Locate light pole bases a minimum of 5 feet (1500 mm) from the MEP fence.

3-10.3 Interior Electrical

3-10.3.1 Interior Electric Power Distribution

3-10.3.1.1 Serve buildings from main switchboards in the electrical rooms. Select service voltage based on the facility loads as described in UFC 3-520-01.

3-10.3.1.2 Dedicated Electrical Equipment Space. Size and organize main electric room to accommodate the main switchboard, space for an additional (future) distribution section, metering equipment, distribution transformer(s), distribution board(s), panelboard(s), space for 20% (not less than one) additional (future) panelboard(s), fire alarm control panel, lighting control equipment, and additional equipment as required. Coordinate access and egress requirements and location relative to the service transformer. Electrical equipment dedicated space and working space shall comply with the NEC.

Figure 3-12
ARC, Omaha,
Nebraska



3-10.3.1.3 Size conductors for feeders to prevent a voltage drop exceeding 3 percent at the farthest outlet of power, heating, and lighting loads, or combinations of such loads, and where the maximum total voltage drop on both feeders and branch circuits to the farthest outlet does not exceed 5 percent, should provide reasonable efficiency of operation.

3-10.3.1.4 Specify main switchboard as service entrance rated, with integral Type 1 Surge Protective Device (SPD/TVSS), and the neutral bus connected to the ground bus by a properly sized main bonding jumper. The main switchboard should have copper buses and circuit breakers serving large loads such as distribution boards, panelboards, motor control centers, elevators, and large equipment. Provide combination starters with disconnect switches and breakers to serve motors in HVAC equipment. Branch circuit panels should be circuit breaker panelboard type with copper buses and plug-in breakers.

3-10.3.1.4.1 Locate panelboards to minimize voltage drop, to efficiently serve equipment, and to provide system flexibility. For long runs to 208 volt panelboards, consider 480 volt feeders with stepdown transformers at the panelboard to minimize voltage drop and provide flexibility. Coordinate locations with other disciplines to avoid conflicts. Electrical equipment dedicated space and working space shall comply with the NEC.

3-10.3.1.4.2 Distribution Transformers. Size for the load calculated per the NEC plus 25% excess capacity. Nonlinear Loads: In all areas with raised floors and in areas (including, but not limited to, open office spaces and computer center) where nonlinear load type equipment predominates, such as computers, printers, uninterruptible power supply (UPS), motors with variable speed drives, electronic ballasts and dimmers and other similar loads, use IEEE Std. 1100 Power and Grounding Sensitive Electronic Equipment, and IEEE Std. 519 Practices and Requirements for Harmonic Control in Electrical Power Systems as design guides. Provide "K" factor rated transformers as required for the anticipated harmonic load. Identify the "K" factor rating for each transformer. Locate in electrical rooms and provide proper ventilation and cooling. Provide energy efficient transformers meeting CSL-3 Standards. If a required size is not available in a CSL-3 type, then it should meet NEMATP-1 Standards. Distribution transformers constitute separately derived systems and should have the neutral bonded at the transformer or at the first overcurrent device in accordance with the NEC. The bonding point will be connected to the nearest suitable standing electrode with a grounding electrode conductor per the NEC.

3-10.3.1.4.3 Smart Meters: The Government requires the ability to measure and monitor hourly electrical consumption for each occupied building that is 15,000 sf and larger. Provide metering that communicates electrical data to a remote location in formats that can be easily integrated into an advanced metering system. The meters should measure, as a minimum, power in kW average demand over 15-minute intervals and energy consumption in kWh, as well as

voltage, current, frequency, reactive power, and power factor with an accuracy of 0.5% in accordance with ANSI C12.20. The output should be Modbus RTU/RS485 and LonTalk ANSI/CEA-709 protocol. The meter should store data for 30 days, including peak demand recording and time-of-use logging with battery backup and provide alarm outputs for over/under voltage and phase loss. Provide signal cable from meter to HVAC DDC system head end controller for monitoring.

3-10.3.1.5 Provide interior conductors of type THHN/THWN or THW conforming to UL83 or RHW conforming to UL44. Provide copper conductors. Install all conductors in conduit, with the exception that Metal Clad (MC) type cable may be used in accordance with the NEC as follows: for concealed, branch circuits to a single outlet, and for switched legs to the light fixtures they supply, as long as the distance between the last junction box fed by conduit and the electrical device does not exceed 25 feet. Use minimum conductor size of #12 AWG, with the exception that conductors for fire alarm system may be #16 for initiation circuits. Install a separate green ground conductor, size per NFPA 70 Article 250 Grounding, in all conduits containing receptacle and lighting circuits, and in all feeders from main switchboard to panelboards and motor/equipment.

3-10.3.1.6 Connect the main electrical service switchboard ground bus to a grounding electrode system in accordance with NFPA 70, Article 250 Grounding. Provide grounding and bonding in IT spaces in accordance with the Army Reserve IT Manual.

3-10.3.1.7 Base final sizing for the service(s) for the facility for the load calculated per the NEC plus 25% excess capacity, rounded up to the next standard service size, for future growth. Assume the following minimum loads to determine the preliminary size of electrical service to the building:

Lighting Load	3 VA/sf (26.9VA/sq m)
Site Lighting	465 VA per HID fixture or 230 VA per LED fixture
HVAC Load	6.5 VA/sf (64.6 VA/sq m)
Elevator	40 HP/elevator
Computer Load	1.0 VA/sf (10.8 VA/sq m)
General Purpose Receptacles	0.5 VA/sf (5.4 VA/sq m)
Miscellaneous Loads	1.0 VA/sf (10.8 VA/sq m)
Future Spare Capacity	+25%
Minimum Power Factor	0.9
Transformer Impedance	5.75%

3-10.3.2 Power

3-10.3.2.1 Specify motors 1/2 HP and larger as 3-phase. Provide overload protection in the motor starters and short circuit protection for the motor and its feeder. Provide combination motor starter-disconnect controllers for polyphase motors. Provide reduced voltage starters for motors over 25 HP. Coordinate starter type with motor design and starting torque requirements. Provide phase loss protection.

3-10.3.2.1.1 120 volt motors should have integral thermal overload protection when available. If integral thermal overload protection is not available, provide manual thermal overload starters. If four or more 3-phase motors are located within a room or area, consider a motor control center (MCC) for motors requiring a starter.

3-10.3.2.1.2 Motor Efficiencies. Provide minimum motor efficiencies, either Energy Star or in accordance with DOE Buying Energy Efficient Products Recommendations (refer to <http://www.eere.energy.gov/> for recommended efficiencies). Provide premium efficiency motors where possible. Premium efficiencies should meet or exceed the specifications of Baldor Super-E Products. Applications which require definite purpose, special purpose, special frame, or special mounted polyphase induction motors are excluded from these efficiency requirements.

3-10.3.2.2 Provide disconnect switches for motors and equipment in accordance with the NEC. Provide motor-rated toggle switches for 120 volt motors with integral thermal overload protection. The manual starter may serve as the disconnect for 120 volt motors without integral thermal overload protection when properly located. Combination motor starter-disconnect controllers may serve as the disconnect for polyphase motors when properly located. Provide additional non-fused disconnect switches within sight of the motor when the starter-disconnect cannot be placed within sight of the motor.

3-10.3.2.3 In branch circuit, feeder and service calculations, compute receptacle loads at not more than 180 volt-amperes per outlet with demand factors according to NFPA 70 Article 220.

3-10.3.2.4 Provide general purpose receptacles of 20 amps, NEMA WD 1. Provide ground fault circuit interrupter receptacles for bathrooms, kitchens, maintenance bays, and outdoor receptacles.

3-10.3.2.5 General Purpose Receptacles. General purpose receptacles are in addition to the special purpose and dedicated outlets for special equipment.

3-10.3.2.6 Provide a minimum of one general purpose 120 volt, 20 ampere duplex receptacle in each room.

3-10.3.2.7 Offices. Provide a minimum of one general purpose convenience receptacle each wall. In offices where walls exceed 12 ft, provide an additional duplex receptacle for each additional 12 ft of wall or fraction thereof. Receptacle spacing should not exceed 12 ft. Mount receptacles in offices at 15 in (375 mm) above finished floor.

3-10.3.2.8 Provide receptacles or power connections for utilization equipment included in the project, as well as equipment furnished by the Government. Government-furnished utilization equipment may include (but is not limited to) computers, fax machines, printers, photocopy machines, office equipment, vending machines, kitchen equipment, computer network equipment, security system equipment, motorized gates, general maintenance equipment, vehicle maintenance equipment, battery chargers, and military equipment.

3-10.3.2.9 Provide GFCI receptacles with weatherproof while in use covers adjacent to each exterior door and as required by code.

3-10.3.2.10 In areas where natural disasters are frequent, the OCAR Project Engineer Office may authorize a GFGI generator to serve a specific emergency space. The following criteria apply:

3-10.3.2.10.1 The following are spaces for which complete power, lighting and HVAC would be provided: specific offices for the emergency space and adjacent open office space (this should be limited to the space required to command and control locally deployed forces); specific conference room adjacent to the emergency office space; restrooms adjacent to the emergency office space; break room adjacent to the emergency office space; and EF, TER, TR to support IT services to the emergency space.

3-10.3.2.10.2 The following are spaces for which emergency lighting only would be provided: Corridors leading to and connecting emergency spaces, stairs leading to and connecting emergency spaces, exits, and mechanical and electrical rooms serving the spaces.

3-10.3.2.10.3 The following are additional systems for which emergency power would be provided: Entry control systems; IDS; fire alarm and mass notification system; other mechanical and plumbing equipment necessary to support the emergency space.

3-10.3.2.10.4 Address sanitary sewer lift stations and fire pumps on a case-by-case basis.

3-10.3.3 Interior Lighting

3-10.3.3.1 The lighting system should consist of 2 ft x 4 ft (600 mm x 1,200 mm) lensed lay-in light fixtures in offices, classrooms, corridors, toilets and general areas. Provide mechanical, electrical, and small storage rooms with strip lighting. Individual offices may be provided with a single light fixture, centered over the work surfaces, providing an average-to-minimum uniformity ratio that should not exceed 10:1. The average-to-minimum uniformity ratio should not exceed 5:1 in multiple occupant office spaces.

3-10.3.3.2 Provide emergency lighting per NFPA 101, utilizing either battery emergency lighting fixtures or emergency battery backup ballasts in the fluorescent fixtures. Use exit lights with battery backup. Connect all emergency and exit lights to the room lighting circuit, ahead of any local switching. Install an emergency lighting fixture in all EF, TER, TR, SIPRNET, mechanical, and electrical rooms.

3-10.3.3.3 Lighting foot-candle levels for individual areas should conform to levels indicated in Chapter 4 and IES recommendations.

3-10.3.3.4 In calculating foot-candle levels in the office areas, use the following criteria for surface reflectance unless the actual finishes used dictate lower values: floors-20%, ceilings-80%, and walls-50%. Use a maintenance factor of 0.7 in the calculations.

3-10.3.3.5 Lighting systems should be highly energy efficient. Provide a minimum of 90 lumens per watt and a minimum Color Rendering Index (CRI) of 85. Fluorescent lamp/ballast combinations should provide expected lamp life of 30,000 hours, LED/driver combinations 50,000 hours, and induction lamp/ballast combinations 100,000 hours.

3-10.3.3.6 Provide light switches in lobby areas, utility/equipment spaces, and special function rooms. Provide dual level switching in conference rooms and classrooms.

3-10.3.3.7 Provide wall or ceiling mounted combination light switch and passive infrared motion sensor for light control in private offices. Consider ceiling-mounted motion sensors for large rooms. Some Tenants may prefer manual-on, sensor-off type.

3-10.3.3.8 Provide ceiling-mounted ultrasonic or dual technology motion sensors for light control in open office areas, corridors, toilets, locker rooms, storage rooms, and physical fitness rooms. Switch lighting in unit storage cages at the end of each row of cages, rather than within each cage.

3-10.3.3.8.1 Light stairwells using bi-level fixtures with either an integral or external occupancy sensor.

3-10.3.3.9 Consider automatic dimming system, utilizing dimming ballasts in fixtures, at spaces or portions of spaces where significant daylighting can reduce artificial lighting requirements. Review lobbies, unit common, unit storage, corridors, and assembly hall.

3-10.3.3.10 Provide light switches of 20 amp, 120/277 volt AC, specification grade.

3-10.3.3.11 Provide arms vault lighting as specified in Paragraph 4-2.12.

3-10.3.4 Special Requirements

3-10.3.4.1 Verify geotechnical report for soil resistivity. Provide cathodic protection or wrapping of ferrous metals as required.

3-10.3.4.2 Provide UL Master Label lightning protection system the calculations indicate that the facility lightning risk index $N_d > N_c$ based on NFPA 780. Coordinate lightning protection and grounding with information systems requirements. Flagpole must be grounded regardless of need for lightning protection system.

3-10.3.4.3 Provide power and data for video projector, and consider including public address system with a microphone in any large conference room.

3-10.3.4.4 Provide multi-outlet raceway above workbenches with receptacles 12 in (30 mm) on center in photo lab, IT work room, armorers' room, weapons repair, and electrical/communication repair rooms.

3-10.3.4.5 Provide a minimum of four receptacles in reproduction rooms.

3-10.3.4.6 Provide receptacles for vending machines, faxes, printers, photocopy machines, and special office equipment. Verify whether Tenants have any equipment with special electrical requirements.

3-10.3.4.7 Electronic Security Systems. There are two separate security systems for a typical Army Reserve Center project: a Government-furnished Intrusion Detection System (IDS) and a contractor-provided Entry Control System (ECS).

3-10.3.4.7.1 Intrusion Detection System (IDS): Provide conduit and power provisions for a Government-furnished, Government-installed IDS in arms vaults, SIPRNET, and AGCCS in accordance with the Army Reserve IT Manual.

3-10.3.4.7.2 Entry Control System (ECS): Provide a complete Common Access Card (CAC) system in accordance with the Army Reserve IT Manual. Provide hardware, software, wiring, devices, control interfaces, and testing as required for a complete system acceptable to the Government.

3-10.4 Communications

3-10.4.1 Provide a minimum of two voice/data outlets in each private office, one at the workstation and one adjacent to the visitor seating location. On the "U" configured desk units, place the workstation outlets centered at the bridge location, and on the "L" configured desk units, place the workstation outlets centered at the return location. Coordinate the location of the visitor outlets as some users may want them on an opposite wall or adjacent to a separate table. Mount outlets at 15 in (375 mm) above finish floor.

3-10.4.2 Public Address (PA) Systems: Provide a PA system required by individual space criteria paragraphs for the assembly hall with two-channel high-fidelity stereo components including: AM/FM radio and compact disc music sources, separate mixer/pre-amp and power amplifier, desk and floor stand microphones, speaker switching panel, and roof-mounted AM/FM antenna. Provide enough RCA type input jacks so that there is at least one set available to the user after all connections are made. Mount components in an enclosed rack in the chair storage room. Mute system by activation of the fire alarm and mass notification system.

3-10.4.3 Provide a weatherproof telephone outlet or annunciation/bell system at the main, and at other building entrances, and access control gates as approved by Project Officer. Training centers have no receptionist, and are frequently locked during business hours; visitors will need a way to contact someone within the building.

3-10.4.4 For projectors in classrooms, assembly hall, conference rooms and similar spaces, provide power at the projector, as well as flush boxes at the projector and instructor location with conduit with pull string connecting the boxes. If televisions or similar communication/graphic devices are provided by project or Tenant or presentations or instruction, provide appropriate mounting provisions, power and data connections.

3-11 SPECIFICATIONS

3-11.1 Unified Facilities Guide Specifications (UFGS)

3-11.1.1 The OCAR Engineer Office typically requires that Army Reserve projects utilize UFGS. UFGS is a standardized specification system (somewhat like MasterSpec and other master systems), and is regularly updated by DoD. It is available at no cost.

3-11.1.2 UFGS is a performance-based specification system, rather than a products-based system; references to manufacturers are discouraged in most cases. It is intended to identify salient features and requirements, and to permit any manufacturer or vendor to provide materials or products which comply with those requirements in accordance with Government mandates for nonrestrictive solicitation.

3-11.1.3 Some USACE Districts and their clients provide versions of UFGS specifically tailored for their needs; Army Reserve is one of these. In most cases, the tailored versions do not include all specification sections. Standard UFGS versions may be required for a complete Army Reserve project specification (links to all of these can be found at the [Army Reserve website](#)).

3-11.1.3.1 UFGS is the base document from which all versions are adapted, and includes almost all specifications which will be required for a complete specification. It will be the source for sections not included in the Army Reserve-tailored version, and may be obtained at www.wbdg.org/ccb/browse_org.php?o=70.

3-11.1.3.2 UFGS Army Reserve Support Guide Specifications (RST) are the UFGS sections modified and edited to reflect minimum standards of quality for Army Reserve projects. They may also contain references to manufacturers and model numbers, as well as additional technical and quality assurance features. These are the preferred specification sections for use on Army Reserve projects and may be downloaded from [Army Reserve website](#).

3-11.1.3.3 Some USACE Districts also have UFGS versions tailored to their preferences and experience, such the UFGS Louisville District Guide Specifications (LRL). These may be preferred for non-Army Reserve sections by the districts that maintain them. They may be requested from the appropriate district. For Louisville District, see the [Army Reserve website](#).

3-11.1.3.4 Occasionally, a project may require a specification section not provided by UFGS. In such cases, the designer may use commercial or in-house specifications.

3-11.2 SpecsIntact

3-11.2.1 The OCAR Engineer Office generally requires that their specifications be prepared from UFGS using SpecsIntact software. SpecsIntact is free software and can be downloaded at www.wbdg.org/ccb/browse_org.php?o=70.

3-11.2.2 SpecsIntact (Specifications-Kept-Intact) is an automated system for preparing standardized facility construction specifications used worldwide by NASA, the U.S. Naval Facilities Engineering Command (NAVFAC), and the U.S.

Army Corps of Engineers (USACE). Use of the SpecsIntact software is intended to reduce the time and expense required to produce facility technical specifications, and reduce costly construction changes due to omissions, discrepancies or improper quality control.

3-11.2.3 When setting up SpecsIntact for the first time, all specifications will go into subdirectories called MASTERS directories. If using base UFGS, RST and district spec sections, three of these directories will be required (i.e., UFGS, RST and LRL for Louisville District). The specification writers will “pull” the necessary specification sections out of these three MASTERS directories into a project JOBS directory where they will be edited for the project.

3-11.2.4 The project submittal register should also be prepared using SpecsIntact.

3-12 COST ESTIMATING

3-12.1 The Army Reserve typically requires a cost estimate prepared using the cost-estimating software specified in the designer’s scope of work. The designer should verify with the Design Agency the particular software version required. The Design Process and Submittal Requirements manual has an excellent description of the desired scope of the estimate.

3-12.2 For requirements on separation of MCAR and OMAR funding in cost estimates, see [Section 1-10](#) of this Guide.

**Figure 3-13 ARC,
Binghamton, New York**



3-13 SUSTAINABILITY AND RESOURCE CONSERVATION

3-13.1 DoD Goals. The DoD, along with the rest of the Federal government, is focused on reducing resource use, for economic, sustainability, and security reasons. The Army Reserve fully supports DoD goals, and intends to continue to be a leader in conservation efforts and strategies. Tremendous potential exists for reducing resource use and operating costs in both new and existing buildings, and this is a high priority in project development. Energy conservation measures are incorporated in the Sustainable Design and Development Policy Update, which is applicable to Army Reserve projects. UFC 3-400-01 also applies to all new and renovated facility design.

3-13.1.1.1 Net-Zero. DoD has set a goal to achieve “net-zero” energy use in the future. The Army Reserve’s general strategy to reduce resource consumption is to employ passive measures first, active measures second, and

energy generation measures last. Although the Army Reserve has set energy generation as the last priority, they still want their facilities to be “net-zero energy ready”. Net-zero energy ready in this context means that the use of passive and active measures has been optimized so that the total annual energy consumption of the facility may, at some future date, be made up with minimal on-site renewable energy generation.

3-13.1.1.1.1 Passive measures such as building siting and layout, increased insulation, air barriers, solar walls, better windows, and similar measures have long-term resource conservation benefits with little or no RSC or Tenant action or additional maintenance.

3-13.1.1.1.2 Active measures such as high efficiency boilers, high efficiency chillers, advanced controls, high performance lighting systems, etc., typically have a higher initial cost and require additional RSC or Tenant action and maintenance over time.

3-13.1.1.1.3 Energy generation measures such as wind turbines and photovoltaic arrays are the last priority due to the significantly higher initial cost, increased RSC or Tenant action, and maintenance, as well as the increased physical space required.

3-13.1.2 Mandates: The Government, DoD, and the Army Reserve have issued a number of mandates and policies regarding sustainable design, energy use and energy reduction; additional requirements are anticipated in the future.

3-13.1.3 Policy guidance for energy efficiency goals for Army Reserve projects is included in the Department of the Army Sustainable Design and Development Policy Update Memorandum, and in the Army Reserve Sustainability and Energy Efficiency Policy. These memoranda summarize sustainability, water and energy conservation, and renewable energy objectives. New construction projects will be planned, designed, and constructed to achieve reduced energy consumption at or below the levels specified. The renewable energy components of this section may not be practical on all installations or on all projects, and compliance shall be to the extent allowed by project funds and technology. For a listing of additional applicable documents, see Paragraph 2-2.2. These documents and an energy criteria checklist can be found on the [Army Reserve website](#).

3-13.1.4 At all sites, the Design Agency must check if local authorities have green initiatives, such as use of low VOC coatings, requirements for specific fuel types, etc., and recommend to Project Officer if such requirements should be incorporated into project.

3-13.1.5 Some resource conservation and sustainability measures may require periodic maintenance which differs from or exceeds “normal” facility maintenance practices. The designers must communicate the likely maintenance

requirements for such measures to the PDT, and especially the RSC and Tenants, so that practical decisions can be made regarding the inclusion or exclusion of such measures.

3-13.2 Resource Reduction Measures: A list of resource and energy conservations measures (ECM) that may be considered during project development and design follows. PDTs should identify other measures for consideration, including measures that are site or project-specific.

3-13.2.1 Site Related

Locate buildings to utilize winter sun, prevailing winds, and natural land forms.

Landscaping and planting to shade the building from summer sun and to block winter winds.

East/west orientation of long axis of buildings.

Native/low maintenance planting.

3-13.2.2 Building and Envelope Design

All new Army Reserve buildings with conditioned space require a continuous air barrier, around all six sides of the exterior of the building to withstand air barrier test required in the Louisville District Masterformat 04 Specification Section 07 25 00.00 06. The [Army Reserve website](#) has guidance for the drawings and this specification for the air barrier. Ensure that all air barrier materials lap sufficiently over one another. Use weather stripping, sealing, and caulking to reduce air infiltration at penetrations.

New or replacement insulation: thicknesses, insulating values, insulation placement, and air and vapor barriers. Maximize wall and roof insulation in a cost-effective manner to meet or exceed commercial requirements indicated in ASHRAE 189.1.

Energy efficient windows: reduced glass area, light transmission and reflectivity, type of window construction, window placement, double/triple glazed windows, etc. Protection of windows from direct summer sun: overhangs, shades, blinds, solar films, tinted glass, solar screens, and plantings.

Entrance vestibules.

Building massing informed by project energy charette and local conditions.

Maximize advantage of winter solar heat gain and natural daylight.

Earth contact design, such as full or partial wall berms.

Cool roofs.

Green roof – only with Project Officer approval.

Building internal organization.

Building commissioning; enhanced commissioning with Project Officer approval.
Natural ventilation.
Task lighting.
Solar walls.

3-13.2.3 Energy Use Reduction

3-13.2.3.1 Distribution System

Increased duct and pipe sizes that improve efficiency and reduce energy consumption.
Pipe and duct insulation.
Variable frequency drives on fans and pumps that modulate and adjust flow to match load.

3-13.2.3.2 HVAC Equipment

System zones based on the Tenant profile of the building.
High-efficiency condensing boilers, furnaces and unit heaters.
Geothermal heat pump systems.
Multiple boilers for better part load efficiencies.
Utilize a minimum of three boilers for improved part-load control.
Standby modes of operation during periods of reduced occupancy.
Exhaust and waste heat energy recovery devices.
High-efficiency air conditioning equipment.
Time clocks and setback thermostats.
Low leakage dampers.
Economizers.
High-efficiency filters to reduce ventilation and power usage.
Tempered air to exhaust hoods.
Computer-based DDC energy management systems.

3-13.2.3.3 Lighting

Occupancy sensors in every space practical.
Decreased light levels in noncritical areas.
High- performance lamps and ballasts.
More efficient fixtures and better lenses.
Task lighting with reduced ambient light levels.
Switching to allow for more individual control in unoccupied areas or naturally lit areas.
High-efficiency LED exterior lighting with time clock or photocell control.
Daylighting harvesting where possible in conjunction with daylighting systems.
High efficiency LED interior lighting with high color rendering index.

- 3-13.2.3.4** Power
 Design of distribution system to minimize voltage drop.
 Use of energy-efficient CSL-3 transformers.
 Automatic means to disconnect power to equipment when not in use.
- 3-13.2.3.5** Water Use Reduction
 Rainwater harvesting is rarely cost effective for Army Reserve facilities.
- 3-13.2.3.5.1** Domestic Water
 Condensing and/or instantaneous water heaters.
 Point-of-use instantaneous water heaters.
 Solar domestic water preheating systems. See UFC 3-440-01.
 Insulated water heaters and storage tanks.
 Water conserving and sensor-operated fixtures.
 Time clocks on water heaters.
 Waste heat recovery for water heating.
 Separate water heaters for kitchen and toilets.
 Low-flow fixtures.
- 3-13.2.3.5.2** Site water
 No irrigation.
 The addition of secondary on-site water for reuse may be considered and is desirable to meet LID objectives.
 Rainwater harvesting is rarely cost effective for Army Reserve facilities.
 Graywater recycling.
- 3-13.2.4** Recycling. Make provisions for recycling programs in each facility. Verify requirements for space with the RSCs, Tenants, and local collection agencies to ensure that facility use patterns, waste stream volume, and full-time population are fully accommodated. Place scattered collection points in areas that are convenient to the building occupants throughout the facility; place a recycling station in all break rooms.
- 3-13.2.4.1** Provide a central location for the consolidation of recyclables in each facility. Examples of exterior space provided could be: additional space in the trash enclosure, weather-tight dumpsters, or other space of the designer's choosing. Examples of interior space are: an alcove in the hallway, a space set aside close to the staging area of unit storage, or other creative use of building area suited for such use. Protect any space used for the collection of recyclables from wind and moisture. Area provided must be proven to be sufficient to meet

the intent of the LEED prerequisite. When a building has a significant number of full-time Tenants, additional recycling space or an indoor space may be appropriate. Any consolidation area should also include signage to prevent contamination.

3-13.3 Renewable Energy: Design projects with renewable energy in mind in accordance with the net zero energy initiative described above, even if the installation of renewable energy systems is not specifically authorized for a particular project.

3-13.3.1 Solar. Provide photovoltaic (PV) arrays to offset POV and MEP lighting energy consumption, as a percentage of building energy consumption, or to achieve net zero energy as appropriate for the project. Current guidance requires POV and MEP lighting to be provided with stand-alone PV systems integral with each light pole, including batteries or a grid tied PV array that makes up for the energy consumption of the POV and MEP lighting. Ground-mounted PV arrays are the Army Reserve's first choice. If PV arrays are to be mounted on buildings, careful attention must be paid to avoiding roof penetrations and to providing access for maintenance. Provide PV systems that are state-of-the-art, commercial quality systems that have proven performance and maintenance histories.

3-13.3.2 Wind. Wind turbines may be provided to make up for a percentage of building energy consumption or to help achieve net zero energy as appropriate for the project. Wind turbines may be appropriate in an industrial or rural setting, but often are problematic in an urban environment due to permitting and potential complaints from neighbors. Thoroughly investigate the feasibility of installing a wind turbine before proceeding with the design; wind turbines must be approved in advance by the Project Officer.

3-13.3.3 Other measures. Measures such as biomass or geothermal power must be discussed and approved by the Project Officer and Tenants.

3-13.4 Strategic Uses and Measures

3-13.4.1 Pollutants and chemicals. Providing indoor environmental quality through: assessing indoor pollutants, managing air contaminant, and specifying materials that release fewer and less harmful chemical compounds. Availability of materials with reduced off-gasses is increasing; these should be used whenever practical. Consider extending pollutant collection flooring systems through inner vestibule door as a possible alternative to increased vestibule sizes.

3-13.4.2 Indoor air quality for Army Reserve facilities shall be maintained by providing ventilation in accordance with ASHRAE Standard 62.1. To reduce ventilation air energy usage, consider utilizing energy recovery wheels or heat

exchangers. Demand controlled ventilation should also be considered due to the variable occupancy of the facility.

3-13.4.3 Daylighting. Daylighting is a sustainable strategy used to provide natural light to work areas. To be effective, the system must include control of glare and heat gain while distributing the light uniformly and deeply into the space. Ideally, daylighting windows are kept separate from view windows so their function can be optimized for daylighting. High ceilings and light shelves or louvers can be used to reflect light deep into a space uniformly while controlling glare. Consider window glass characteristics carefully to maximize visible light transmittance while minimizing solar heat gain.

3-13.4.4 Daylight harvesting. Daylight harvesting is the process of actively reducing artificial illumination in concert with daylighting to reduce energy consumption. It can be accomplished with manual switching or dimming, but the Army Reserve prefers that the system be automatic. Automatic systems incorporate daylight sensors that automatically dim or switch light fixtures in a space in response to changes in natural daylight.

3-13.4.5 Operability and Maintainability. Maintenance costs and ease of operation must be considered for each system selected. Discuss operation and maintenance requirements with Project Officer, RSC and Tenants during design, and provide sufficient information for informed decisions about inclusion of various resource reduction and/or renewable energy measures.

3-13.5 LEED. DoD policies also require that all climate-controlled buildings meet or exceed established sustainability goals required in LEED. The processes for implementing the sustainable design portion of this policy may be found in the [USACE Army LEED Implementation Guide](#).

3-14 ENVIRONMENTAL

3-14.1 Non-Contaminated Site Issues

3-14.1.1 Wetlands

3-14.1.1.1 The OCAR Engineer Office or the Design Agency will provide a delineation and survey the limits of wetlands identified on the site, if any. The first consideration is to avoid wetland areas and to direct on-site drainage to stormwater treatment or storage ponds prior to discharge into wetlands. In addition to meeting Federal regulations regarding wetlands, designer should coordinate with state and local agencies with water resources/wetlands jurisdictions. Consult RSC and USACE District Office for points of contact with such agencies. State and local regulatory agency websites are also critical sources of information and contacts.

3-14.1.1.2 The first approach to on-site wetland is to avoid impacts to the wetlands. If the area of wetlands impacted is over the regulatory maximum, wetland mitigation will be accomplished according to the standards of the local or state water resources agency. The site size may not have sufficient area to accommodate wetland mitigation. Off-site mitigation or purchase of wetland mitigation credits from established wetland mitigation banks may be required; avoid if possible due to associated costs and complications of off-site work.

3-14.1.1.3 Site development may modify the existing hydrology of on-site or adjacent wetlands. The intent is to maintain the existing hydrology without causing undue harm to these wetlands.

3-14.1.2 Noise and Air.

3-14.1.2.1 Any noise and air impacts identified in the Environmental Assessment which require mitigation or permitting, will be incorporated into the design. Typical emissions from a site might include boilers and other equipment that emit heat, fumes or particles.

3-14.1.2.2 Typically, site locations are in areas which permit commercial or industrial type uses with corresponding noise and air quality standards. The general layout of the site should consider locating areas of concentrated vehicle operations and associated noise away from neighboring properties for which noise may be an issue.

Figure 3-14
ARC, Camden,
New Jersey



3-14.1.3 Groundwater

3-14.1.3.1 Groundwater is not a substantial issue on most sites. However, some sites may have shallow groundwater tables which may affect the methodology of construction, and require measures such as temporary dewatering to install items such as deep utilities and foundations. The contractor will be required to obtain the necessary state and local permits for dewatering operations and to control its appropriation and discharge. Items such as French drains or infiltration wells should not be used.

3-14.1.3.2 Other site uses such as wash platforms and refueling points, which may introduce contaminants to the groundwater, must be controlled to contain potential releases of contaminants, and the design must address the control measures.

3-14.1.3.3 If the site is near a municipal well, wellhead protection provisions may be in effect. The utility or well owner will be contacted regarding these provisions. Wellhead protection provisions may also be required by state rules in some locations.

3-14.1.4 Water Quality

3-14.1.4.1 Surface water runoff quality is addressed in Paragraph 3-2.1 above. Facilities which could affect the quality of runoff water, such as wash racks and fueling stations, will be connected to a local sanitary sewer through on-site gravity oil/water separators or mechanical separators. It is recommended that the designer coordinate with state and local agencies regarding water quality issues. The RSC and USACE District Office should also be consulted for points of contact with such agencies. State and local regulatory agency websites are also a valuable source of information and contracts. The regulatory aspects of water quality are continually in a state of revision. Some states are classifying water from wash racks and fueling stations as industrial or hazardous waste, depending on the jurisdiction. Conventional use of oil/water separators or other devices may not comply with the latest rules. The designer should consult the latest state and local rules governing water quality and inform the Government of stricter requirements.

3-14.1.4.2 Exterior connected drains to sanitary sewers shall be under roofed areas or contain valves to control discharge into the sewer. Containment areas may also be provided for contaminants, which may affect surface or groundwater quality, to provide for its control prior to being safely collected and removed and disposed of by hazardous material teams or contractors.

3-14.1.5 Temporary Construction Impacts

3-14.1.5.1 Temporary erosion and sediment control design requirements will comply with Federal, state and local regulations governing the NPDES program for construction related activities. Other requirements may include use of flag persons and/or special control signs during site construction, for access to the site and on-site routing of construction traffic.

3-14.1.5.2 Fugitive dust from construction shall be controlled by use of application of water or dust retardant chemicals to earthwork areas. Air omissions and noise due to construction are recognized as temporary environmental impacts and generally do not require mitigation or special permits other than the normal licenses or permits required by construction contractors.

3-14.1.6 It is not unusual for Army Reserve sites to harbor protected wildlife. The design will address any measures identified in the project environmental documentation.

3-14.1.7 Preserve areas with natural vegetation to the extent possible.

3-14.2 Contaminated Site Issues

3-14.2.1 Asbestos/Lead/PCBs

3-14.2.1.1 New construction will not incorporate materials which contain asbestos, lead or PCBs, or will only incorporate them in environmentally acceptable forms. Designs for existing facility alterations will normally include mitigation provisions. Mitigation design is typically based on previously accomplished environmental assessments, and feasibility and mitigation studies, but occasionally may require the designer to perform environmental investigations.

3-14.2.1.2 Mitigation design will comply with Federal, state and local rules and regulations, and will normally be completed with regulatory closure approval prior to other construction. Make construction contractor responsible for control and use of potentially contaminating materials used in their operations.

3-14.2.2 Petroleum Products

3-14.2.2.1 Any environmental studies conducted prior to development should identify whether there are on-site petroleum contamination issues. If petroleum contamination consists of surface spills or shallow concentrated areas, the areas are normally mitigated by removal and disposal of the fuel and any adjacent contaminated soil. Underground tanks should be removed and contaminated soils disposed of, with regulatory closure, prior to construction on the site.

3-14.2.2.2 Certain Government sites, usually on existing Government installations, may be included in a larger zone of petroleum contamination. In such cases, the Government may make a determination that the site is developable even with the presence of petroleum contamination. Site design should address possible vapor emissions and accommodate any existing monitoring wells, extraction wells or treatment facilities. Contractors will be required to have approved health and safety operating plans in place prior to commencing work on the site.

3-14.2.3 Munitions

3-14.2.3.1 Some Government sites will have had munitions storage, training, manufacturing, or handling facilities. In such cases, the site should be cleared of all munitions by Government ordinance disposal teams or contractors.

3-14.2.3.2 Soil and groundwater sampling programs should identify any contamination issues from munitions, chemicals or related materials. The site should be cleared of contamination, and have regulatory closure prior to construction on the site.

3-14.2.4 Ongoing Site Contamination: Identification of ongoing site contamination due to off-site actions beyond control of the Government will be identified and measures to address the contamination developed.

CHAPTER 4

INDIVIDUAL SPACE CRITERIA

4-1 GENERAL

4-1.1 The individual space design criteria and information in this Chapter reflects typical guidance on usage and code compliance; the Design Agency should verify that it meets the Tenants' needs and complies with the specific code and other requirements of their project. Refer to the most current Army Reserve IT Manual for more information regarding coordination between electrical and furniture.

4-1.2 This Chapter delineates the functional and environmental requirements for most individual spaces within the training center and maintenance buildings. Not all projects include all of the spaces, nor are all of the possible types of spaces included in this Design Guide. Specific information regarding the types and sizes of spaces authorized are determined by the project documents. The OCAR Engineer Office will supplement the information herein at the initial design conference, within the control of the Project Officer.

4-1.3 Space sizes noted below reflect current Army Reserve authorizations for the spaces. The OCAR Engineer Office will provide the actual authorized area for each space in the project documents; where there are differences between the areas in this Guide and the project documents, the project documents govern. Since the Government building authorization includes an allowance for structure, these are assumed to be net space authorizations. The Design Agency should endeavor to match the design to the authorized spaces, but it is acceptable for actual area of any space to vary from the authorization by plus or minus 10%, except for the assembly hall and the weapons simulator, which cannot be larger than authorized.

4-1.3.1 The size of some spaces, such as the kitchen, weapons simulator, maintenance bays, and distance learning center, are established as minimums, based on equipment or other factors, and must be maintained.

4-1.3.2 Space authorizations for arms vault, EF, TER, TR, and SIPRNET Cafe cannot be reduced without Project Officer approval.

4-1.4 The spaces listed in this Chapter are those common to most Army Reserve units and facilities. There are additional spaces which are authorized only for certain types of Reserve Units. Information on the spaces, and their authorized area, can be found in AR 140-483.

4-1.5 Additional guidance can be found on the websites for the Corps of Engineers, including drawings and guidance on spaces specific to the Army Reserve. See the [Army Reserve website](#).

4-1.6 Occasionally, Tenants will identify what they believe is a requirement for a space or function that is not in the project authorization documents. When such a requirement is approved by the OCAR Engineer Office, the space must come “out of hide”; the Design Agency must borrow the necessary space from other spaces. One example of such a space is a photo identification room for making facility or installation identification cards for the Tenants and their dependents.

4-1.7 Provide mortise-type locksets; functions are shown by specific space below.

4-1.8 All equipment indicated for spaces below is part of the design and construction, unless noted as provided by Government or Tenants.

4-1.9 Ventilation for all spaces shall comply with the ventilation requirements indicated in ASHRAE 62.1, unless noted otherwise. Some spaces may indicate additional requirements based on Army Reserve preferences and experience.

4-1.10 Contact the Louisville District furniture team for the most current furniture standards.

4-2 TRAINING CENTER BUILDING

4-2.1 Administrative Offices (Full-Time and Exclusive)

4-2.1.1 Administrative offices are used by full and part-time Army Reserve military and civilian personnel for the daily administration tasks associated with the unit’s mission. The full-time staff typically works 8-hour days from Monday to Friday. The Reservists generally work battle assembly weekends and some weekday evenings. Design of these spaces will be similar to a private-sector business office.

4-2.1.2 Administrative offices may be designed for single or multiple occupants, based on Tenant requirements and functional efficiency. Avoid room arrangements that have the occupants’ back to the door.

4-2.1.3 Private offices are authorized to the following positions: all O-6 and higher-ranking Officers, Command Sergeant Major, Commander, First Sergeant, Chaplains, and Civilian Command Executive Officer. Legal sections/units are authorized at least one private office. Unit maintenance sections and supply sections are authorized private offices. Project Officers can recommend additional private offices if it will enhance the unit’s mission.

4-2.1.4 Private offices with wood furniture shall distinguish the General Officer and staff suite, including all Colonels, Lieutenant Colonel Commanders, and Command Sergeant Major offices. Grade of wood furniture is based on occupant rank. Contact the Louisville District furniture team for the current standards regarding the use of wood furniture in these spaces.

4-2.1.5 Provide one quad receptacle and one voice/data outlet at each desk location. On the "U" configured desk units, place these receptacles and outlets centered at the bridge location; on the "L" configured desk units, place them centered at the return location (approximately 6 ft out from the back wall +/- 6 in). On the "U" configured desk units place a convenience power receptacle centered on the credenza. Mount these receptacles 15 in (300 mm) above the finish floor (15 in is to be measured from finish floor level to center of the receptacle). Refer to the most current Army Reserve IT Manual for more information regarding coordination between electrical and furniture.

4-2.1.6 There may be GFGI safes in some offices (safes are not part of the furniture package; verify weight and dimensions with Tenants). Provide an eye bolt set into the floor as a safe anchor at the appropriate office(s).

4-2.1.7 Space Design Information

General/Code

Size – 100 sf (9.3 sq m) to 120 sf (11 sq m) each typical; larger for higher ranks; construct room with no dimension below 9 ft - 6 in (2900 mm) to accommodate furniture

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45 (see Paragraph 3-5.9)

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – carpet tile; rubber tile as an alternative

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat rack mounted on the wall behind the door and wall-mounted door stop

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied – ambient

Electrical

Lighting – 30 fc ambient, 50 fc on desktop

Receptacles – convenience receptacles as described in Chapter 3 and quad power receptacles as described in Paragraph 4-2.1.5

Voice/data – one telephone/data outlet per workstation and one at the visitor seating location

Furniture

Metal desk unit (U-Shaped or L-Shaped) with work surface supporting box/box/file and file/file pedestals (one each per desk). Desk is also to include a center drawer, monitor arm, overheads w/ task-lights, and a tack-board (refer to Louisville District's approved typicals)

Task chair

Guest chair(s)

Guest chair(s)

(1) ~7 gal trash can per desk

(1) ~7 gal recycling bin per desk

(1) Energy saving power strip per desk

Specific layouts and components can be obtained by contacting the Louisville District furniture team

Equipment

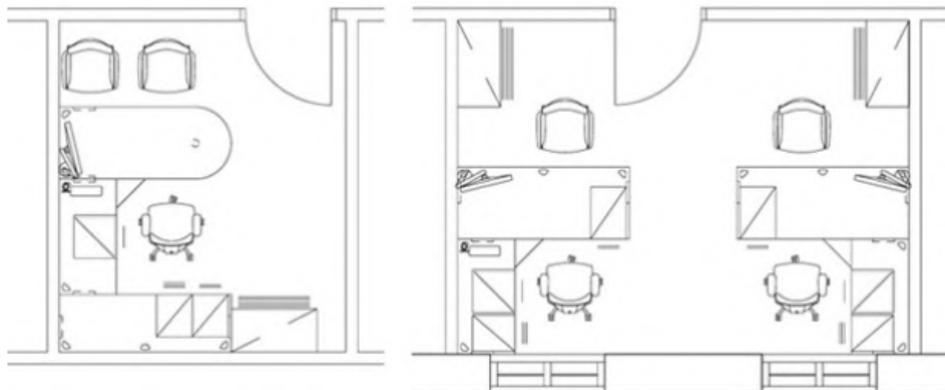
Verify if additional equipment, such as a safe, is required

Special features or considerations

Refer to Paragraph 4-2.1.5 for coordination requirements between electrical and furniture

Figure 4-1
Single Office

Figure 4-2
Shared Office



4-2.2 General Officer Suite

4-2.2.1 If a General Officer (O-7/8) is included in a project, he/she is authorized a command suite. A command suite typically includes a small lobby/reception area with panel-based furniture for administrative workstations; a conference room; and private and/or possibly shared offices. The command suite spaces, regardless of occupant rank and position, receive higher grade finishes than other office spaces.

4-2.2.2 Panel-based systems furniture workstations in the suite are typically used for reception and clerical duties. Additional counters or furniture may be required to accommodate special equipment, such as printers and similar items. This special equipment should not be powered from the panel-based systems furniture or the metal desk-based furniture. Contact Louisville District Corps of Engineers for latest information on GO Unit Common workstation requirements. Refer to the most current Army Reserve IT Manual and Paragraph 4-2.3.3 for more information regarding coordination between electrical equipment and furniture.

4-2.2.3 Space Design Information

General/Code

Size – 120 sf (11 sq m) each typical; larger for higher ranks;
construct room with no dimension below 9 ft - 6 in (2900 mm)
to accommodate furniture

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45 – see Paragraph 3-5.9

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – carpet tile; rubber tile as an alternative

Base – rubber

Walls – painted gypsum board

Ceiling – suspended
acoustical ceiling tile
(ACT)

Trim – coat rack mounted
on the wall behind the
door and wall-
mounted door stop

Lockset – office

Mechanical

Heating, occupied – 68°F
(20°C); unoccupied –
55°F (13°C)

Cooling, occupied – 78°F
(25°C); unoccupied –
ambient

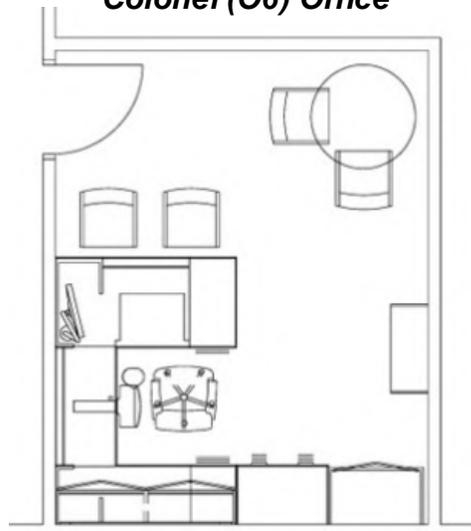
Electrical

Lighting – 30 fc ambient, 50
fc on desktop

Receptacles – convenience receptacles as described in Chapter 3
and quad power receptacles as described in Paragraph 4-
2.1.5

Voice/data – one telephone/data outlet per workstation and one at
the visitor seating location or at the separate table

Figure 4-3
Colonel (O6) Office



Furniture

Standard Wood Furniture

Wood desk unit with surface supporting box/box/file and file/file pedestals. Desk also includes a keyboard tray with mouse pad, overheads with task-lights, and a tack-board (refer to Louisville District's approved typicals).

Task chair

Wood guest chair(s)

Wood lateral file(s) and/or

Wood bookcase(s)

(1) ~7 gal trash can per desk

(1) ~7 gal recycling bin per desk

(1) Energy saving power strip per desk

(1) Desk pad per desk

Small meeting table with guest chairs

Wood wardrobe cabinet

GO (07 and 08) Offices,

furniture additions

Small meeting table with guest chairs

Lounge chairs

Wood side and/or wood coffee table(s)

GO Command Suite, furniture

variations

Systems furniture workstations w/wood trim –

- Each workstation should include (1) mobile box/box/file with pencil tray and (1) mobile file/file pedestal (keyed alike), center drawer, keyboard tray w/mouse pad, overheads w/task-lights (if panel height allows), and a tack-board

Guest chair(s)

Wood side and/or coffee table(s)

Recycling receptacle (single unit divided into multiple compartments, one compartment is to be designated for trash) for overall common area

Optional additional furniture

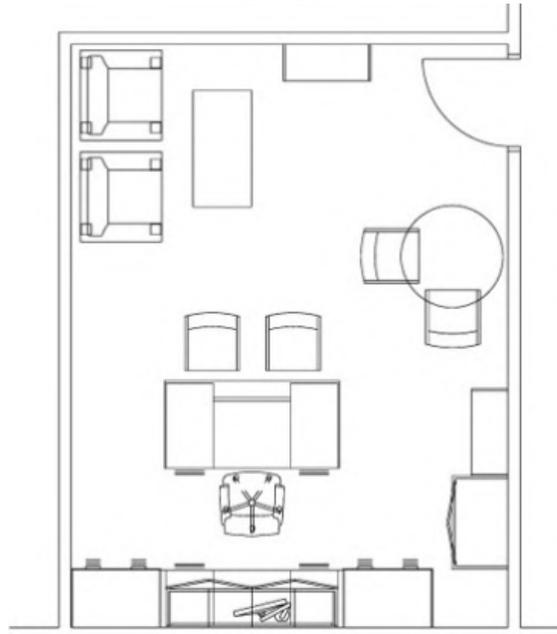
Extra wood lateral files and/or wood bookcases and/or wood Kiosks for storage

Sofa, loveseat, and/or lounge chairs

Equipment

Verify if additional equipment, such as a safe, will be provided by Tenants

Figure 4-4
General Officer (07/08)
Office



4-2.3 Unit Common

4-2.3.1 Unit common provides administrative work areas. A common-use workstation is authorized 60 sf (5.5 sq m) plus 15 percent circulation. However, additional general building circulation is normally provided to bring the total authorization to approximately 100 sf (9.0 sq m) per workstation.

4-2.3.2 Panel-based systems furniture workstations are typically used in unit common areas. Metal desk-based furniture workstations may be used in smaller offices such as in the OMS admin common area. Workstations for common offices may be configured for individual, group or clusters of workstations. Additional counters or furniture may be required to accommodate special equipment, such as printers, coffee makers, and similar items. Ask Tenants to provide information on special equipment and space needs. Contact the Louisville District Corps of Engineers for latest information on unit common workstation requirements.

4-2.3.3 Where systems furniture is against walls or columns, provide power and telecommunications services through junction boxes mounted in the wall or column. In other areas, provide power and telecommunications services through adjustable, multi-service floor boxes. For each pair of systems furniture workstations, provide one dedicated 20A/120V power circuit. Each systems furniture power feed shall contain a maximum of three circuits. For systems furniture workstation clusters greater than six, provide multiple wall (and/or floor) junction boxes. Junction boxes shall not be collocated but evenly distributed along the systems furniture spine according to the systems furniture circuit breaks. Run systems furniture telecommunication services in concert with the systems furniture power services in placement and division. Conceal wall boxes designated for systems furniture behind the free-standing panels. For planning purposes, leave a 3 inch gap between the wall and systems furniture panels for telecommunications conduit and electrical whip relief. Floor junction boxes designated for systems furniture shall be located underneath a work surface, 6 inches o/c from the systems furniture spine, and 6 inches o/c from the systems furniture return where the spine and return meet. Ensure the junction box placement does not interfere with systems furniture pedestal file placement. Convenience receptacles shall be provided for teaming area tables (one duplex receptacle and two data outlets per table seat) either in an adjacent wall or column or in a flush-mount floor box. Also consider providing convenience duplexes in flush-mounted floor boxes for counters and cabinets not adjacent to fixed walls or columns (one duplex receptacle for each 12 linear feet).

4-2.3.4 In addition to the files provided in the workstations, try to provide sufficient space for common-use file cabinets. Verify number and type required with Tenants.

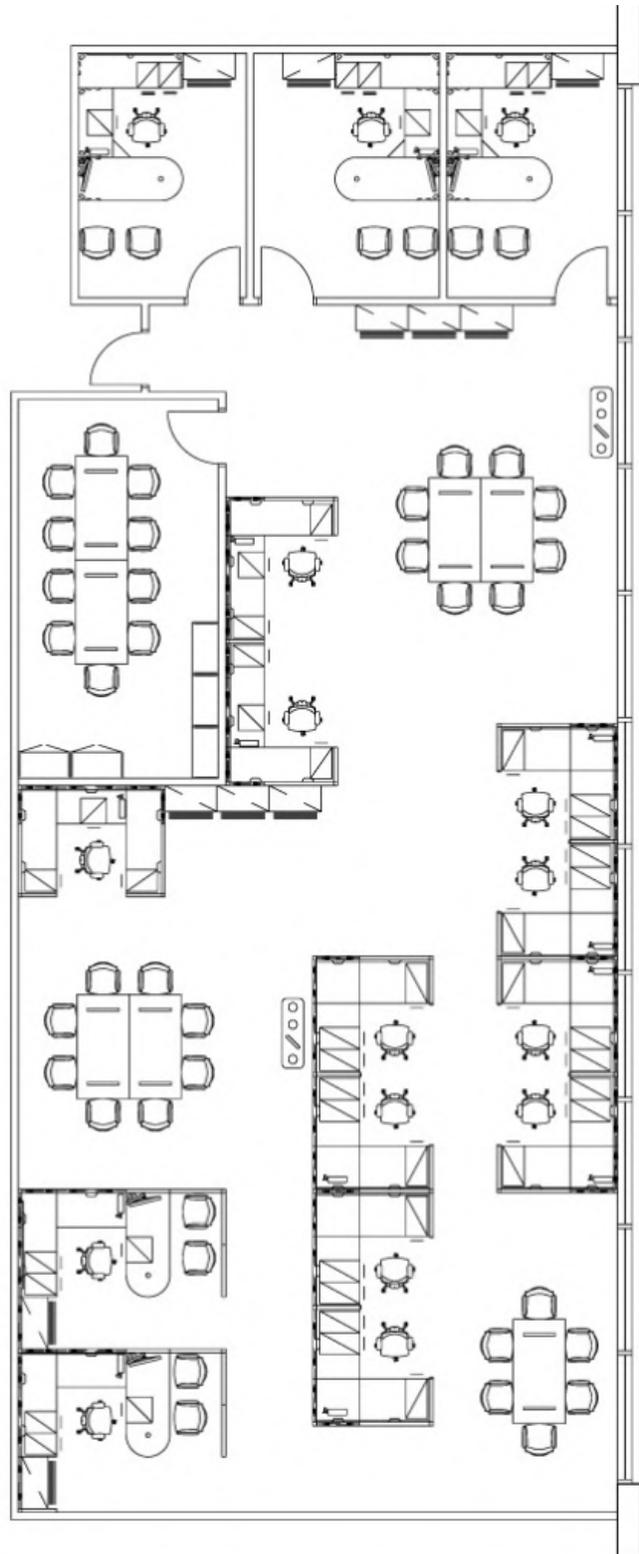
4-2.3.5 Make use of daylighting in this space; consider the use of glazed doors, sidelights or other glazing.

4-2.3.6 An enclosed collaborative workspace, a team room, can be taken as “borrowed” space from unit common area, if desired.

4-2.3.7 Space Design Information

- General/Code**
- Size – 60 sf (5.6 sq m) each authorized unit common space, plus 15% of total for circulation
- Occupancy – business
- Architectural/Interiors**
- Minimum STC rating – 40
- Ceiling height – 8 ft - 8 in (2600 mm)
- Floor – carpet tile
- Base – rubber
- Walls – painted gypsum board
- Ceiling – suspended acoustical ceiling tile (ACT)

Figure 4-5
Unit Common



Trim – coat racks mounted on wall or freestanding coat racks - appropriate number for room occupants and wall-mounted door stop

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied – ambient

Electrical

Lighting – 30 fc ambient, 50 fc on desktop

Receptacles – convenience receptacles as described in Chapter 3 and quad power receptacles as described in Paragraph 4-2.1.5, and additional receptacles for common use copiers, printers, and fax machines; and dedicated 20A circuits for copiers and printers as required

Voice/data- one telephone/data outlet per workstation, wall phone outlet for common use areas, voice/data outlet for common area copiers, printers and fax machines as required; in Teaming Rooms – two voice/data outlets per room

Furniture

Workstation furniture

Common use workstations are approximate 6.5 ft x 6.5 ft, 42.25 sf (1.98 m x 1.98 m, 3.93 sq m) – Refer to Louisville District's approved typicals

Each common use workstation should include three mobile box/box/files with pencil trays (keyed separately), surface mounted LED desk lamp, energy saving power strip, and tack-board (no overheads).

Full-time workstations may be used from time to time and generally as an exception, being located in the unit common area. Full-time systems furniture workstation sizes vary from approximately 6 ft x 8 ft (1800 mm x 2400 mm), 48 sf (4.5 sq m) to 9 ft x 11 ft (2750 mm x 3350 mm), 103.5 sf (9.5 sq m)

Each full-time workstation should include (1) mobile box/box/file with pencil tray and (1) mobile file/file pedestal (keyed alike), overheads with task-lights (if panel height allows), surface mounted LED desk lamp (if no overheads are provided), energy saving power strip, and a tack-board

Task chair(s)

Guest chair(s) and additional storage can be added to workstations

(1) ~7 gal trash can per full-time and shared workstation

(1) ~7 gal recycling bin can per full-time workstation

Common Furniture

Freestanding coat rack(s)

Recycling receptacle (single unit divided into multiple compartments, one compartment is to be designated for trash)

Optional additional furniture

A few folding table(s)/chair stations which can also function as meeting areas

Extra lateral files (keyed differently) and/or bookcases and/or Kiosks (wardrobe, keyed differently) for storage

Equipment

Verify if printers, faxes, coffee makers, etc., will be provided by Tenants

Special features or considerations

Consider sinks with goose neck faucets for coffee stations in larger common

Some Tenants prefer to have team groupings of workstations, or a few table/chair stations which can also function as meeting areas

4-2.4 Recruiting/Retention Office

4-2.4.1 This space is for unit retention personnel and is used primarily for administrative purposes. Potential members and re-enlistees are also interviewed here. The retention office must be easy to locate, adjacent to the main entrance, and adjacent to any fulltime recruiting personnel. This space is shared by all assigned units.

4-2.4.2 There may be a separate office to accommodate full-time recruiting personnel, as part of the full-time office space authorization. Locate adjacent to the recruiting/retention office. Glazed panels (door or sidelight) may be used to emphasize public accessibility.

4-2.4.3 Space Design Information

General/Code

Size – 250 sf (23.25 sq m) each typical

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm)

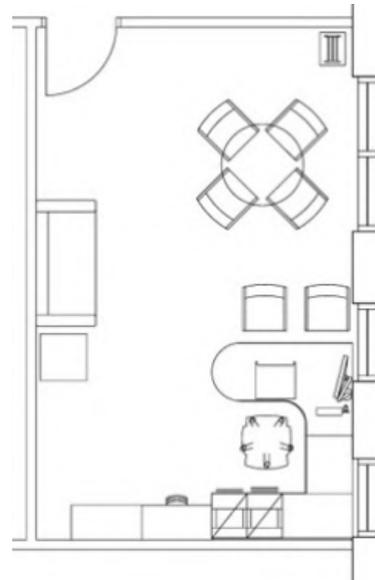
Suspended acoustical ceiling tile (ACT)

Walls - painted gypsum board.

Floor – carpet tile

Base – rubber

**Figure 4-6
Recruiting/Retention
Office**



Trim – coat rack mounted on the wall behind the door and wall-mounted door stop

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc ambient, 50 fc on desktop

Receptacles – convenience receptacles as described in Chapter 3 and quad receptacles as described in Paragraph 4-2.1.5

Voice/data – one telephone/data outlet per workstation and one at each visitor seating location

Furniture

Desk unit (U-Shaped or L-Shaped) with surface supporting box/box/file and file/file pedestals. Desk is also to include monitor arm, overheads with task lights, and tack board (refer to Louisville District's approved typical)

Finish level of desk is to be higher than full-time offices, lower than GO 06 office furniture. Desk shall be metal chassis with wood top. Contact the Louisville District furniture team for most current standards for furniture in this space

Metal chassis lateral file w/wood front and/or kiosk (wardrobe)

Wood bookcase(s)

(2) Freestanding literature rack

Task chair

Guest chair(s) – Due to the high traffic in this space; consider “Crypton” upholstery.

Meeting table with guest chairs

(1) desk pad per desk unit

(1) ~7 gal trash can per desk

(1) ~7 gal recycling bin per desk

(1) Energy saving power strip per desk

Equipment

Verify if printers, fax machines, coffee machines, etc., will be provided by Tenants – provide stands or counters

Dedicated 20A circuit for any large printer

Special features or considerations

Space for Tenants' literature racks may be required

Verify personnel with Project Officer

Refer to section 4-2.1.5 for coordination requirements between electrical and furniture

4-2.5 Career Counselor Office

4-2.5.1 This office is used by all Army Reserve Career Counselors associated with the facility. The space authorization is based on the total center population. It is best located near the building entry most used by the Tenants.

4-2.5.2 The base space authorization will accommodate two career counselor positions, one full-time and one Reservist. A storage closet is typically authorized with this space, and should open into the office.

4-2.5.3 Space Design Information**General/Code**

Size – 250 sf (23.25 sq m) each typical

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm)

Suspended acoustical ceiling tile (ACT)

Walls - painted gypsum board.

Floor – carpet tile

Base – rubber

Trim – coat rack mounted on the wall behind the door and wall-mounted door stop

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc ambient, 50 fc on desktop

Receptacles – convenience receptacles as described in Chapter 3 and quad receptacles as described in Paragraph 4-2.1.5

Voice/data – one telephone/data outlet per workstation and one at each visitor seating location

Furniture

Two desk units (U-Shaped or L-Shaped) with surface supporting box/box/file and file/file pedestals. Desk is also to include monitor arm, overheads with task lights, and tack board (refer to Louisville District's approved typicals)

Finish level of desk is to be higher than full-time offices, lower than GO 06 office furniture. Desk shall be metal chassis with wood top. Contact the Louisville District furniture team for most current standards for furniture in this space

Metal chassis lateral file w/wood front and/or kiosk (wardrobe)

One lockable 5-drawer file

Wood bookcase(s)

- (2) Freestanding literature rack
- Task chair
- Guest chair(s) – Due to the high traffic in this space; consider “Crypton” upholstery.
- (1) desk pad per desk unit
- (1) ~7 gal trash can per desk
- (1) ~7 gal recycling bin per desk
- (1) Energy saving power strip per desk

Equipment

Verify if printers, fax machines, coffee machines, etc., will be provided by Tenants – provide stands or counters

Dedicated 20A circuit for any large printer

Special features or considerations

Verify personnel with Project Officer

Refer to section 4-2.1.5 for coordination requirements between electrical and furniture

4-2.6 Family Support Office

4-2.6.1 This space is for the use of the Tenants’ family support groups, and for unit members’ families to meet with the family support groups. It should be located near the main entry to be easily accessible to the visiting family members. The space authorization is typically 200 sf (18.6 sq m).

4-2.6.2 Consider providing a window or door sidelight into an adjacent lobby or corridor, but provide blinds to allow for privacy when needed.

4-2.6.3 Coordinate furniture with the Tenants, most prefer some workspaces with visitor chairs, and a seating group around a coffee table. Consider a small refrigerator for drinks for visiting family members.

4-2.6.4 Electrical and telecommunication requirements are to match administrative offices.

4-2.6.5 Space Design Information: Design these spaces similar to the recruiting/retention offices above, with the exception of furniture requirements listed below.

Furniture

Desk unit (U-Shaped or L-Shaped) with surface supporting box/box/file and file/file pedestals. Desk is also to include monitor arm, overheads w/task lights, and tack board (refer to Louisville District’s approved typicals)

Finish level of desk is to be higher than full-time offices yet lower than GO 06 office furniture. Desk shall be metal chassis with wood top

- Task chair
- Metal chassis lateral file w/wood front and/or kiosk (wardrobe)
- Guest chair(s) - due to the high traffic in this space, consider "Crypton" upholstery.
- Wood bookcase(s)
- (1) Desk pad per desk unit
- Freestanding literature rack
- (1) ~7 gal trash can per desk
- (1) ~7 gal recycling bin per desk
- (1) Energy saving power strip per desk
- Optional additional furniture
- Sofa, loveseat, and/or lounge chairs
- Meeting table with guest chairs
- Wood side and/or coffee table(s)
- Special features and considerations**
- Verify furniture with tenant and/or Project Officer
- Refer to Paragraph 4-2.1.5 for coordination requirements between electrical and furniture

4-2.7 Administrative Support

4-2.7.1 Mail Room

4-2.7.1.1 It is essential for the designer to reference UFC 4-010-01 for AT/FP requirements that affect mail room layout and construction.

4-2.7.1.2 The mail room is the point for receipt and distribution of all interoffice and intra-office correspondence. This space will not be staffed full-time, but will provide a mail sorting and pickup area.

4-2.7.1.3 The mail room shall be located on an exterior wall to provide for an outward opening exterior. Divide the mail room authorization into two spaces: a sorting room and a mailbox vestibule where Tenants can collect their mail.

4-2.7.1.4 The mailbox vestibule may be a room or may be located in an alcove off a corridor; accessing mailboxes should not obstruct corridor. Equip the sorting room with a lockable interior door and design the vestibule to maximize wall space. Provide a postal service approved mailbox unit. Coordinate number and size of slots required with Tenants; most prefer some mail slots that will accommodate 9 in (225 mm) x 12 in (300 mm) envelopes without folding.

4-2.7.1.5 The sorting room will be the outermost room. Provide a 12 in (300 mm) deep counter the length of the mailboxes to be used for sorting mail.

Figure 4-7
Mail Boxes



4-2.7.1.1 Provide cabinets in the sorting room for storage of postal meter, tape, boxes, or other supplies required to support mail room operations. A data outlet would also be required if a mail machine is provided by the Tenants.

4-2.7.1.2 Avoid routing utility, electrical, and mechanical provisions which do not serve the mailroom in the floor, walls or ceiling of the mailroom.

4-2.7.1.3 Space Design Information

General/Code

Size – varies
Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable
Ceiling height – 8 ft - 8 in (2600 mm)
Floor – rubber tile or linoleum
Base – rubber
Walls – painted gypsum board/CMU
Ceiling – ACT
Trim – none
Lockset – office

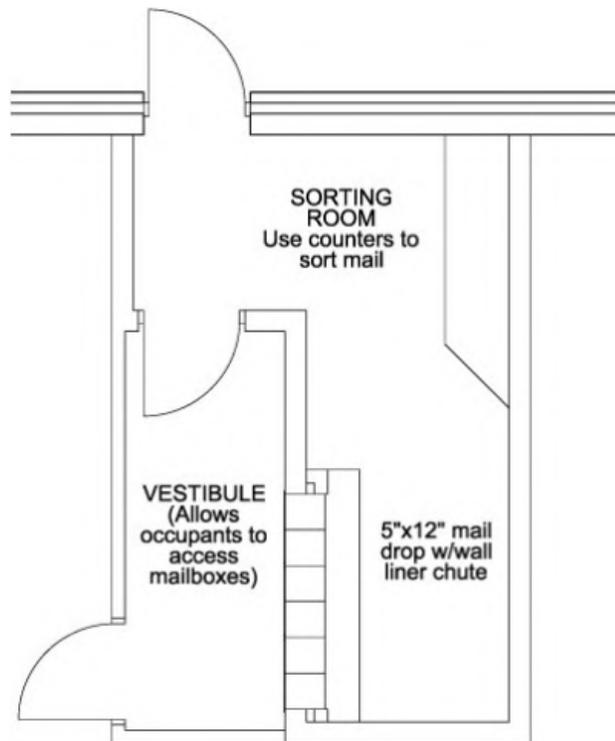
Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)
Cooling, occupied – 78°F (25°C); unoccupied – ambient
HVAC system shall comply with UFC 4-010-01

Electrical

Lighting – 30 fc ambient, 50 fc on work surface
Receptacles – convenience receptacles as described in Chapter 3 and quad power receptacles as described in Paragraph 4-2.1.5, some at counter height
Voice/data – one telephone/data outlet minimum, data outlet for mail machine

Figure 4-8 Mail Room



Furniture

Recycling receptacle (single unit divided into multiple compartments. One compartment is to be designated for trash)

Chair or stool upon Tenant request

Equipment

Verify if postage or other machines require power

Upper and lower cabinets with counters for work space and storage

Special features or considerations

An exterior lockable box may be included for mail drop when building isn't occupied, at Tenant request

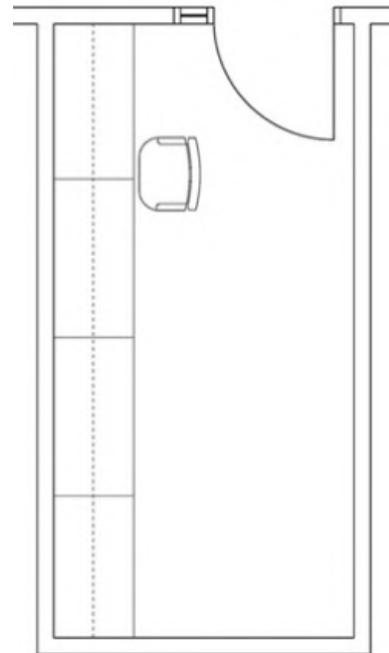
Some units locate a large copier in this space

4-2.7.2 Reproduction

4-2.7.2.1 This space provides for the reproduction and collating of administrative correspondence, bulletins, orders, and similar paperwork. The space may also house hard copy printers connected to computers in the office space or to the local area network.

4-2.7.2.2 Locate the reproduction space adjacent to the administrative space. The space must be large enough to accommodate the Tenants' copiers, and have table or counter space for collating and binding. Provide sufficient storage space for operating quantities of paper, toner, ink, office supplies, forms, etc. The size of this area will be relative to the size of the unit and specific reproduction requirements. Some units prefer to have "repro islands" distributed throughout the administrative space, with base cabinets and counters.

Figure 4-9
Copy Room



4-2.7.2.3 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – classroom

Cabinets with counters for work space and storage

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied – ambient

Electrical

Lighting – 30 fc ambient, 50 fc on work surface

Receptacles – convenience receptacles as described in Chapter 3, additional receptacles for fax machines, and dedicated 20 amp circuits for copiers and printers as required

Voice/data – wall-mounted telephone outlet

Furniture

Verify equipment by Tenants and power/data requirements

Recycling receptacle (single unit divided into multiple compartments. One compartment is to be designated for trash)

Equipment

Office equipment to be verified with Tenant

Special features or considerations

Floor mat

4-2.8 Information Technology (IT) Spaces

4-2.8.1 IT Spaces - General Information

4-2.8.1.1 The Army Reserve IT spaces described below are the spaces in an Army Reserve facility that are dedicated to housing telecommunication service and distribution provisions for the facility, or to providing space solely for Tenant data processing and telecommunications operations. Almost all Army Reserve spaces have some IT provisions to allow Tenant access to data or communications; the spaces described below have data access and telecommunication as their primary purpose.

4-2.8.1.2 Descriptions and requirements for most Army Reserve IT spaces are found below. The information for IT spaces listed here is in addition to what is specified in the Army Reserve IT Manual. Detailed floor plans for the Entrance Facility (EF) Telecommunications Equipment Room (TER) and Telecommunications Room (TR) are in the Army Reserve IT Manual. The Manual is available at the [Army Reserve website](#).

4-2.8.1.3 The space sizes listed below are typical or minimum sizes for Army Reserve facilities. Authorized areas for spaces for individual projects will be provided in the project documentation, particularly in the 1391.

4-2.8.1.4 The IT spaces described require a space allocation equal to approximately 1.1% of the net training center area (net area equals gross building area minus structural, circulation, mechanical, toilets, and similar support

areas). This 1.1% allocation provides unoccupied space for operating and distribution of the IT system and infrastructure. It is intended to provide sufficient space for EF, TR, TER, and similar IT operation and distribution spaces.

4-2.7.1.4.1 As of the date of this edition, the 1.1% allocation has not been incorporated into AR 140-483, Army Reserve Land and Facilities Management, [Appendix B](#), and so may not be reflected in the individual project 1391 at present. The Army Reserve Project Officer must authorize deviations from the project 1391 for compliance with this Guide. If authorized by the Project Officer, the space will come from 1391 authorizations for Network Ops Center and Entrance Facility; it's likely some space may come "out of hide".

4-2.8.1.5 The light levels called for in the TER and TR are minimum horizontal illumination levels measured at the front and back faces of the IT racks. Closely coordinate light fixture locations to avoid conflicts with IT racks and cable tray. Do not block access to IT racks or cable tray, and do not block light fixtures from providing the required illumination levels.

4-2.8.1.6 Provide fire protection systems for the EF, TER, and TR spaces. Coordinate the location of the sprinkler heads in the rooms with the equipment in the rooms. Comply with TIA-569-B Fire Protection.

4-2.8.2 Entrance Facility (EF)

4-2.8.2.1 The purpose of this room is to isolate telecommunication service provider equipment and provisions from the remainder of the facility telecommunications infrastructure. Due to Government servers and other equipment in the TER, the EF is required to be a separate space to maintain security of TER from service provider personnel.

4-2.8.2.2 This space is optimally located on the perimeter of the building, and on the side of the building closest to utility connection point. Provide access to the space from outside the building; no windows are desired. Provide a minimum of 47 in (1200 mm) of separation between the EF walls and any transformer, motor, or device that is rated at 5 kVA or greater.

4-2.8.2.3 Space Design Information

General/Code

Size –80 sf (7.5 sq m) typical
Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable
Ceiling height – 10 ft (3050 mm) minimum height to structure
Floor – static-dissipative VCT
Base – rubber

Walls – painted gyp board or painted CMU continuous to structure

Ceiling – none; painted structure

Trim – none

Lockset – storeroom or classroom

Mechanical

Heating – maintain 64°F (18°C)

Cooling – maintain 78°F (25°C) when active devices are present;
otherwise ambient

Electrical

Lighting – 30 fc vertical on racks

Receptacles – convenience receptacles as described in Chapter 3
and quad power receptacles for service entrance equipment
as required

Voice/data – one wall telephone jack

Furniture

No furniture required

Equipment

Refer to Army Reserve IT Manual for requirements

Special features or considerations

Fire-resistant plywood backboards on two adjacent walls

No special security requirements

Provide wire cages over sprinkler heads and drainage troughs
below sprinkler pipes. Consider indicating side wall heads.

4-2.8.3 Telecommunications Equipment Room (TER)

4-2.8.3.1 This space is provided to house file and print servers, data switches and the telephone switch. It will typically be located in the main building of a multi-building facility, normally the training center building. It is the main telecommunications distribution point for its building and the facility.

4-2.8.3.2 The TER may serve as the TR for the floor it occupies; larger buildings or building configuration may require additional TRs on that floor. No TER is typically required for an OMS; only a TR.

4-2.8.3.3 A central location is optimal for efficiency of cable distribution. Provide access into the space from the interior of the building; the TER may not provide access to any other spaces. Buffer the space from electrical and mechanical rooms and equipment in order to minimize the potential for signal interference and ductwork/cable tray conflicts. Provide a minimum of 47 in (1200 mm) of separation between the TER walls and any transformer, motor, or device that is rated at 5 kVA or greater. No windows are desired.

4-2.8.3.4 Space Design Information**General/Code**

Size – 120 sf (11.2 sq m) minimum; provide adequate space to accommodate facility IT requirements

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 10 ft (3050 mm) minimum height to structure

Floor – static-dissipative VCT

Base – rubber

Walls – painted gyp board or painted CMU, continuous to structure

Ceiling – none; painted structure

Trim – none

Lockset – storeroom or classroom

Mechanical

Heating – maintain 64°F (18°C)

Cooling – maintain 78°F (25°C)

Humidity – maintain between 30 and 55 percent relative humidity

Electrical

Lighting – 30 fc vertical on racks

Receptacles – convenience receptacles as described in Chapter 3 and power to racks as described in the Army Reserve IT Manual

Voice/data – one wall telephone jack

Furniture

30 in x 36 in table

Equipment

Refer to Army Reserve IT Manual for requirements

Special features or considerations

Fire-resistant plywood backboards on two adjacent walls for service punch-down and termination

No special security requirements

Provide wire cages over sprinkler heads and drainage troughs below sprinkler pipes. Consider indicating side wall heads.

4-2.8.4 Telecommunications Room (TR)

4-2.8.4.1 These spaces serve as distribution points for workstation voice and data cables, and other terminations.

4-2.8.4.2 Provide TRs as necessary to maintain compliance with EIA/TIA link distribution length limit, at a minimum, and as building configuration dictates. One TR per building floor is required, except in buildings with minimal telecommunications provisions, such as unheated storage buildings. Unit storage buildings with supply offices require TRs.

4-2.8.4.3 A location near the center of the building is optimal for distribution, and TRs in multi-story buildings will be stacked unless there is a strong reason not to do so. No windows are desired. Buffer from electrical and mechanical rooms and equipment, in order to minimize the potential for signal interference and ductwork/cable tray conflicts. Provide a minimum of 47 in (1200 mm) of separation between the TR walls and any transformer, motor, or device that is rated 5 kVA or greater.

4-2.8.4.4 Space Design Information

General/Code

Size – 80 sf (7.5 sq m) minimum; provide adequate space to accommodate zone IT requirements

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 10 ft (3050 mm) minimum height to structure

Floor – static-dissipative VCT

Base – rubber

Walls – painted gyp board or painted CMU, continuous to structure

Ceiling – none

Trim – none

Lockset – storeroom or classroom

Mechanical

Heating – maintain 64°F (18°C)

Cooling – maintain 78°F (25°C)

Humidity – maintain between 30 and 55 percent relative humidity

Electrical

Lighting – 30 fc vertical on racks

Receptacles – convenience receptacles as described in Chapter 3 and power to racks as described in the Army Reserve IT

Manual

Voice/data – one wall telephone jack

Equipment

Refer to Army Reserve IT Manual for requirements

Special features or considerations

Fire-resistant plywood backboards on two adjacent walls for service punch-down and termination

No special security requirements

Provide wire cages over sprinkler heads and drainage troughs below sprinkler pipes. Consider indicating side wall heads.

4-2.8.5 IT Work Space

4-2.8.5.1 This room is provided only for General Officer command facilities. It is intended to provide space for set-up, testing and repair of IT equipment. It is not intended to provide IT storage space, which can be accommodated in unit storage.

4-2.8.5.2 The room is best located adjacent to G6 administrative space, but as a separate, lockable room.

4-2.8.5.3 Space Design Information

General/Code

Size – 100 sf (9.3 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – static-dissipative VCT

Base – rubber

Walls – painted gyp board or painted CMU

Ceiling – suspended acoustical ceiling tile

Trim – none

Lockset – storeroom

Mechanical

Heating – occupied 68°F (20°C): unoccupied 55°F (13°C)

Cooling –78°F (25°C);

unoccupied - ambient

Electrical

Lighting – 30 fc on work surface

Receptacles – convenience receptacles as described in Chapter 3 and continuous metal raceway extending the full length of the work surface with power receptacles at 6 in (150 mm) on center

Voice/data – one wall

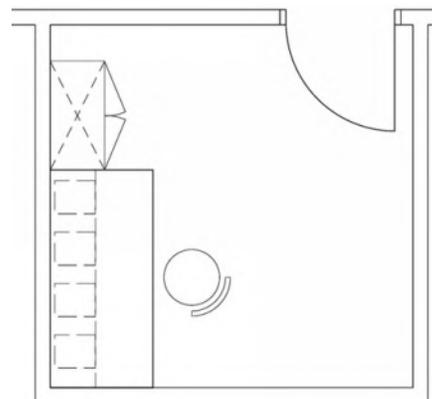
telephone jack, and continuous metal raceway extending the full length of the work surface with data outlets at 6 in (150 mm) on center

Furniture

Static dissipative workbench with shelf

ESD stool with woven upholstery

Figure 4-10
IT Work Space



- Lockable metal storage cabinet
- (1) ~7 gal trash can per bench
- (1) Energy saving power strip per bench

Equipment

None

Special features or considerations

None

Figure 4-11
Display Case



4-2.9 Lobby

4-2.9.1 The lobby provides an entryway and reception area for unit personnel and visitors. It is one of the first images observed by visitors, and should reflect feelings of pride and commitment characteristic of the Army Reserve.

4-2.9.2 As the primary public entrance to the training center building, the entry must be readily identifiable from the parking lot and pedestrian access routes. The entrance should have an adequate exterior overhang or vestibule, and the design should provide an ordered, warm, friendly invitation to the public.

4-2.9.3 The lobby must accommodate circulation, traffic patterns and waiting space. Place graphic displays, such as Minuteman and units' plaques, trophies and awards, in a visually prominent location. There is not a receptionist; if an administrative area is adjacent to the lobby, it is preferred that one full-time office overlook the lobby.

4-2.9.4 Space Design Information

General/Code

Size – 480 sf (44.6 sq m);
may augment from
circulation space

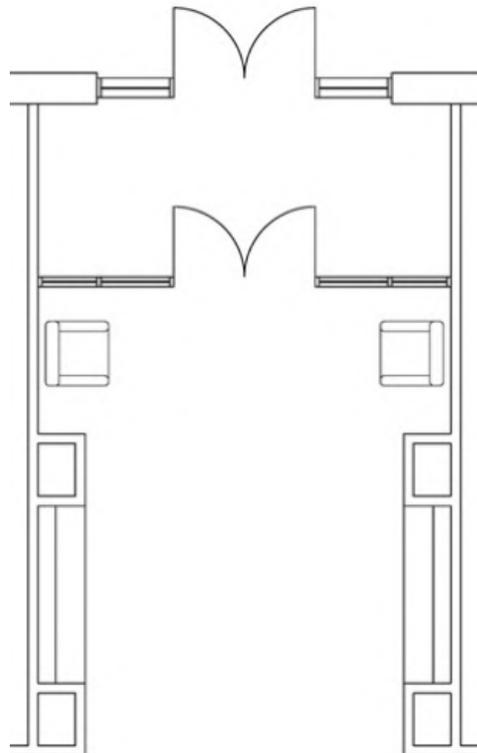
Occupancy – business;
may be assembly if
associated with
assembly hall

Architectural/Interiors

Minimum STC rating – not
applicable

Ceiling height – 9 ft (2750 mm) minimum

Figure 4-12
Lobby



Floor – porcelain paver
Base – porcelain tile
Walls – painted gypsum board
Ceiling – gypsum board; suspended ACT as an alternative
Trim – guardrail and wall or corner guards to protect walls
Lockset – panic hardware; CAC card reader at exterior or interior of vestibule

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)
Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 10 fc on floor
Receptacles – convenience receptacles as described in Chapter 3
Voice/data – verify if Tenants desire voice/data

Furniture

Sofa, loveseat, and/or lounge chairs with “Crypton” upholstery
Wood occasional tables
Freestanding literature rack (wall mounted optional, if wall mounted is used, wall mounted literature rack is to be CFCI)
Recycling receptacle (single unit divided into multiple compartments. One compartment is to be designated for trash)

Equipment

Built-in trophy and display cases

Special features or considerations

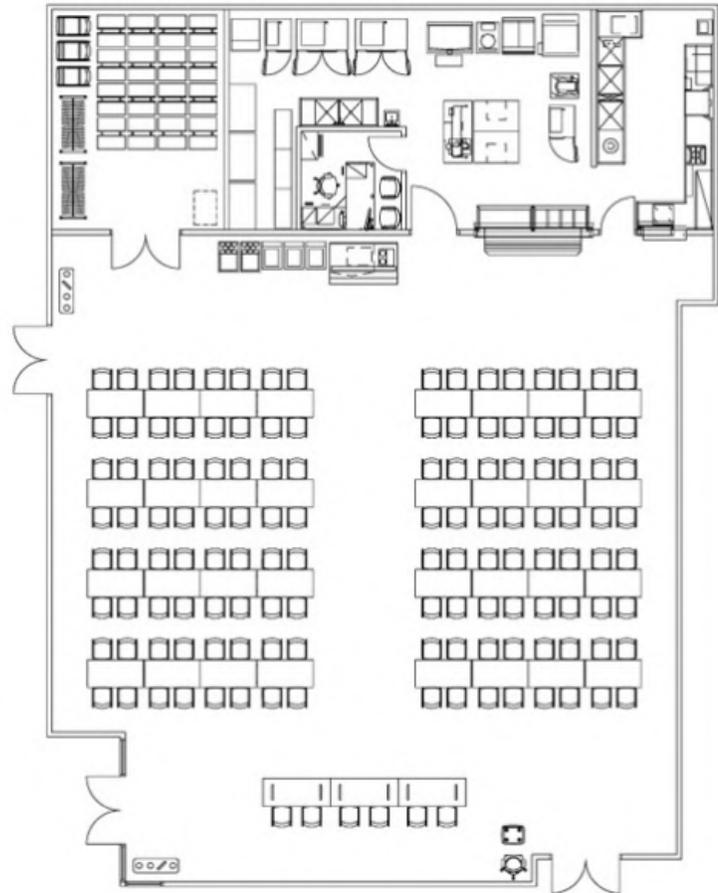
Verify if Project Officer or Tenants desire additional door security, CCTV, etc. – for CCTV, if approved by OCAR Engineer Office, the project provides power, conduit and stubs at camera and control locations; others must provide equipment and cabling
Special lighting for displays
Building directory
Finishes in this space may be upgraded for image reasons
Exterior building finishes may be incorporated into the area to provide a transition into the building
Army Reserve does not want wall vinyl due to difficulty of repair
Concealed sprinkler heads for aesthetics
Provide recessed walk-off mat in vestibule between entry doors

4-2.10 Assembly Hall

**Figure 4-13
Assembly Hall and Kitchen**

4-2.10.1 The assembly hall provides space for troop formations, maintenance of equipment, personnel assemblies, food service seating and large group assemblies for instructional training. It is a multi-purpose space which will be used for any large indoor events associated with the facility. The Assembly Hall shall be an open space with no internal columns or supports.

4-2.10.2 Tenants occasionally request that the assembly hall be divided with operable panel partitions to enable its use as additional classrooms or a conference center; this requires OCAR Engineer Office approval. In this configuration, consider an adjacency to the other classrooms.



4-2.10.3 Overhead doors are prohibited.

4-2.10.4 Space Design Information

General/Code

Size – varies

Occupancy – assembly

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 14 ft (4300 mm)

Floor – rubber tile or resinous flooring

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – panic hardware

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc on table tops; dual-level switching

Receptacles – convenience receptacles as described in Chapter 3

Voice/data – two telephone/data outlets per wall

Provide power for projectors with conduit to instructor location for video

CATV – two CATV outlets

Furniture

Fold up mobile cafeteria tables (with or without attached seating, verify preference with Tenant) and sled-base stackable chairs (if no seating is attached to the fold up mobile tables). Chairs are to be non-upholstered, armless, and have a unique color to differentiate them from the rest of the chairs in the facility.

1-4 folding tables and sled based stackable chairs for registration/banquet functions upon Tenant's request

Mobile floor lectern

Adjustable stool with arms

Recycling receptacles (single unit divided into multiple compartments. One compartment is to be designated for trash). If fold up mobile cafeteria tables are used, no additional chairs are to be ordered for assembly seating

Equipment

Public address system speakers and microphone outlets – CFCI

Ordinary hazard sprinklers

Markerboards and projection screens may be added if Tenants desire – size appropriate for the size of the space

Special features or considerations

Additional acoustical treatment may be required for this space

Ratio of room should be approximately 1.6:1 to allow formations to be performed

Consult with Tenants for maximum number of occupants for which to provide furniture

4-2.11 Chair and Table Storage

4-2.11.1 This space is for the storage of the assembly hall tables and chairs when not in use. The equipment for the PA system for the assembly hall is also typically located here.

4-2.11.2 This space should not be used for mechanical equipment or electrical panels due to the potential for damage or obstruction by the stored furniture.

4-2.11.3 Space Design Information

General/Code

Size – 10% of assembly hall authorized area

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 10 ft (3050 mm)

Floor – rubber tile or sealed concrete

Base – rubber

Walls – painted gypsum board; painted CMU as alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – plywood wainscot to 48 in AFF to protect walls

Lockset – storeroom on active leaf; flush bolts inactive

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling, occupied – none; unoccupied – none

Electrical

Lighting – 10 fc on floor

Receptacles – one convenience receptacle and a quad receptacle on a dedicated power circuit for PA

Voice/data – none

Furniture

Table caddies for assembly hall folding tables (if regular folding tables are specified)

Chair dollies for assembly hall stacking chairs

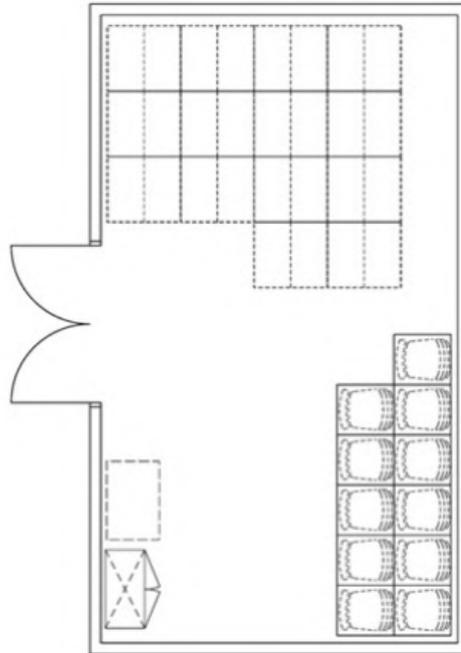
Freestanding mobile coat rack(s)

Equipment

PA system for assembly hall with amplifier and minimum of two each hand-held and wireless clip-on type microphones

Provide PA system with its own wall mounted cabinet

**Figure 4-14
Chair and Table Storage**



**Figure 4-15
PA System**



Special features or considerations

Conduit to wall -mounted AM/FM antenna may be desired

Double doors - ensure that the door into chair storage is wide and tall enough to accommodate the height of furniture items in their mobile configuration

Doors should swing outward to allow full capacity for storage of chairs, consider hold-opens

4-2.12 Kitchen

4-2.12.1 The Army Reserve kitchen plan and its associated equipment have been approved by the OCAR Engineer Office for inclusion in all Army Reserve training center projects with kitchens. Updates to the standard kitchen by the kitchen proponent do occur.

4-2.12.2 The designer must obtain a copy of the current standard kitchen drawings from the [Army Reserve website](#), along with current equipment data sheets. Kitchen specifications are linked on the web page..

4-2.12.3 An administrative office is an integral part of the kitchen. This room should adhere to the requirements for administrative offices referenced in Paragraph 4-2.1, except as noted in the following Space Design Information.

4-2.12.4 The kitchen module provides space for training of cooks and for preparation of meals. It includes space for food preparation, cooking, serving, and for the storage and cleaning of cookware and serving ware. This is a standard kitchen; any changes to the kitchen or equipment must be approved by the Project Officer, after consultation with kitchen proponent (G4).

4-2.12.5 Code analysis may require these coiling doors to be fire-rated doors and on smoke-detector-activated hold-opens.

4-2.12.6 Depending on building size and number of units, separate, secured areas may be required for dry storage items; solutions may vary. For centers with multiple units this may be accounted for inside of unit storage.

4-2.12.7 See [Appendix D](#) for the list of kitchen equipment.

4-2.12.8 Space Design Information

General/Code

Size – 846 sf (78.6 sq m),

Office Occupancy – business

Architectural/ Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – textured quarry tile in walk area to include kitchen office, smooth quarry tile under equipment; with epoxy grout

Base – Quarry tile with epoxy grout

Walls – Ceramic tile with epoxy grout on CMU; ceramic tile with epoxy grout on cement board as an alternative; epoxy-painted water resistant gypsum wall board as an alternative for the kitchen office only

Ceiling – Ceramic faced 2 x 2 ACT ceiling tile in aluminum grid, USDA-FSIS (Food Safety and Inspection Services) approved

Trim – stainless steel corner guards, door kick plates; coat rack mounted on the wall behind the kitchen office door

Locksets – office, classroom, and storeroom

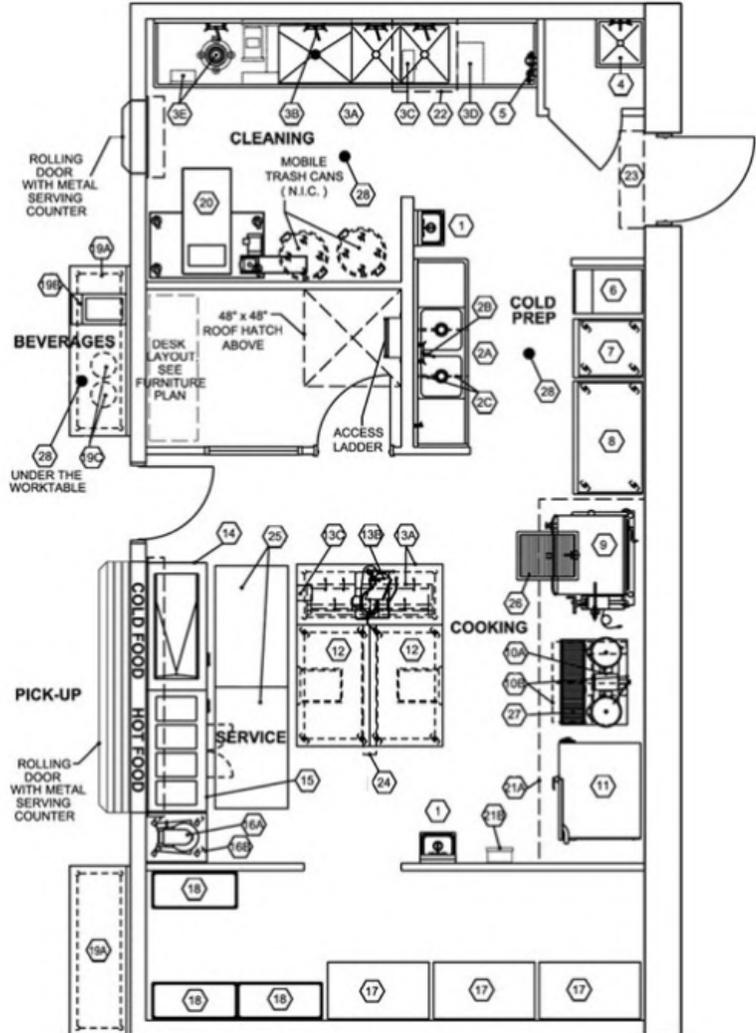
Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling, occupied – 80°F (27°C); unoccupied – ambient

Ventilation – comply with ASHRAE 62.1 and NFPA 96

**Figure 4-16
Kitchen Equipment Plan**



Electrical

Lighting – 30 fc ambient, 50 fc on desk top for office; 50 fc for kitchen; 30 fc for scullery and food storage

Receptacles – convenience receptacles as described in Chapter 3 in addition to equipment requirements

Voice/data – one voice/data outlet for office workstation and one at the visitor seating location

Furniture, Kitchen Office

Metal desk unit (L-Shaped or double pedestal). Desk is to include keyboard tray with mouse pad, overheads with tasklights, and tack-board

Task chair Guest chair(s)

Metal lateral file(s)

(1) ~7 gal trash can per desk

(1) ~7 gal recycling bin per desk

(1) Energy saving power strip per desk

Equipment

See [Army Reserve website](#)

Special features or considerations

Exhaust hood over cooking equipment – verify fire protection requirements, limited to wet chemical or automatic sprinkler system installed in accordance with NFPA 96

Direct-fired makeup air unit per NFPA96 wet location light fixtures

Contact to shut down power to equipment under hood – coordinate with fire protection

An exterior grease interceptor must be provided

Locate fire suppression pull station along path of egress

4-2.13 Arms Vault

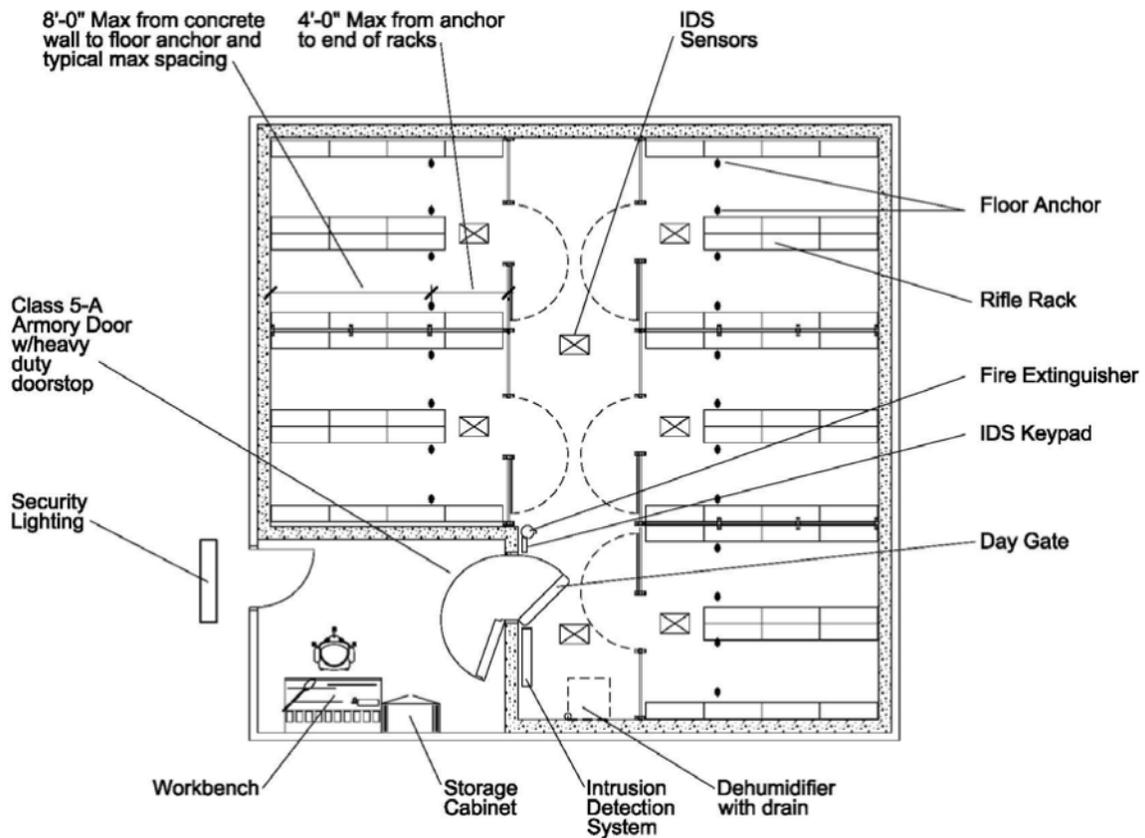
4-2.13.1 The arms vault provides secure storage of all weapons assigned to units at the facility. Ammunition may be stored in small amounts in some instances. The arms vault shall not be located on an exterior wall.

4-2.13.2 Construction of the vault is governed by AR 190-11, and will be cast-in-place, reinforced concrete. It is critical that designers refer to Chapter 4 and Appendix G in AR 190-11 for additional vault construction requirements. The structural documents must prominently display the following note: *“Concrete placement for arms vault walls, floor, and roof may not proceed until written security certification and Contracting Officer approval is received. Certification can only proceed after reinforcing steel is in place. The contractor shall provide the Contracting Officer a two week notice, minimum, prior to concrete placement for the security inspection to take place. Be aware that separate concrete placements for various portions of the vault require separate inspections. It is the Contracting Officer’s responsibility to obtain security certification for the arms vault.”* See [Army Reserve website](#) for details for floor and wall anchors.

4-2.13.3 A GSA approved Class 5-A armory door, with a clear opening of 3 ft-4 in x 6 ft -6 in, and capable of swinging open 180 degrees with a heavy duty doorstop, shall be provided. Lockable day gates, with a pass-through capability for issuing weapons shall be provided.

4-2.13.4 Provide for an intrusion detection system (IDS), including sensors, as described in the Army Reserve IT Manual. Provide floor and wall anchors for weapons racks.

Figure 4-17
Armorer's Room and Arms Vault



4-2.13.5 Provide battery backup, vandal-resistant fluorescent fixtures above the vault door if it opens into a corridor or other space other than the armorer's room, such as the assembly hall or unit storage. If the vault door opens into the armorer's room, this security lighting should instead be provided above the armorer's room door. These lights will be connected directly to the panel board.

4-2.13.6 Coordinate lighting and caging layout to allow caging walls to extend to ceiling. In laying out arms vaults, use a 5 ft (1525 mm) module for width to allow a 3 ft (915 mm) aisle between 10-1/4 in (260 mm) wide rifle racks. Use a 3 ft (915 mm) module for length to allow for 3 ft (915 mm) rifle racks. Other weapons may require other caging arrangements, verify requirements with Tenant. Cages may be sized in a standard 5 ft (1500 mm) or 10 ft (3000 mm) by 12 ft (3650 mm), or may be tailored to the Tenants' requirements. Doors for arms vault cages shall be of the swinging type, 4 ft (1200 mm) minimum in width, and must swing outward. Vault caging must be woven wire fabric. For further requirements on caging, see Paragraphs 4-2.20.4 and 4-2.20.9.

4-2.13.7 Weapons racks and containers are Government-supplied and installed. GSA approved Class 5 containers (safes) are approved for use instead of small arms storage racks and where small quantities of weapons, central firing components and related ammunition are stored. Specific cabinets authorized for use are listed in AR 190-11.

4-2.13.8 Provide a wall mounted dehumidifier and two in (50 mm) floor drain outside the caged area, with hard piping to a floor drain. Locate a fire extinguisher adjacent to the motion detection control box; both outside caged areas.

4-2.13.9 Anchors for securing racks to the facility shall be provided in the walls and floor and must be coordinated with floor and wall construction and reinforcing. Floor anchorments should not protrude from floor, and must be coordinated with slab thickness and reinforcing; consider using airport mooring eyes as manufactured by Neenah Foundry and others. Standard Army Reserve arms vault configurations and wall anchor details (available on the [Army Reserve website](#)) indicate anchor placement for typical rifle racks. Coordinate anchor placement if Tenant utilizes a different weapons rack.

Figure 4-18
Weapons Racks



4-2.13.10 For restoration programs, modular arms vaults are acceptable if they meet the criteria of AR 190-11 and are approved by GSA in accordance with Federal Specification AA-V-2737 Modular Vault Systems. Some vaults must be installed in humidity-controlled environments. A new floor may be required, depending on condition of existing floor. The final proposed design must be approved in writing prior to construction.

4-2.13.11 Provide reinforced walls along the path from the arms vault to the unit storage area to prevent gouging of walls during the transfer of weapons between spaces.

4-2.13.12 Space Design Information

General/Code

Size – varies

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 2 in (2500 mm) minimum

Floor – sealed concrete

Base – none

Walls – sealed concrete

Ceiling – sealed concrete

Trim – none

Lockset – by vault door supplier (Fed Spec FF-L-2937 combination lock)

Mechanical

Heating – none

Cooling – none

Ventilation –0.5 cfm/sf (2.5 l/s/sq m) through transfer ducts; duct openings must comply with AR 190-11

Electrical

Lighting – 30 fc on floor

Receptacles – one convenience receptacle outside cages; one dedicated 20A circuit for dehumidifier and one for IDS panel

Voice/data – one telephone and one data wall outlet and dedicated telephone/data connection to IDS panel, in conduit

Provide emergency light inside vault

Vault door security lighting – see Paragraph 4-2.12.5

Furniture

None

Equipment

None

Special features or considerations

Power, conduit and boxes for intrusion detection system (IDS)

Minimize penetrations in vault envelope; comply with AR 190-11
 Extend cages from floor to ceiling
 Guards shall be provided for sprinkler heads within the vault;
 provide note on sprinkler drawings to coordinate sprinkler
 design with weapons rack layout
 Consider partitioning off any space above the vault to avoid
 possibility of storage above vault

4-2.14 Armorer's Room

4-2.14.1 The armorer's room provides a space for weapons issue, inspection, training, cleaning, and repair. It is a separate space from the arms vault; the armorer does not perform the majority of his/her work in the vault. It is typically located so that the arms vault door opens into the armorer's room.

4-2.14.2 If the arms vault door opens into the armorer's room, a physical security light is required outside the armorer's room door - see Paragraph 4-2.12.5. Provide a 4 ft (1220 mm) wide door from the access corridor into the armorer's room, and provide a pathway from the armorer's room to the staging area that maintains a minimum 4 ft (1220 mm) clear width.

4-2.14.3 Space Design Information

General/Code

Size – 100 sf (9.3 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board

Ceiling – gypsum board

Trim – none

Lockset – office

Mechanical

Heating, occupied – 68°F (20°F); unoccupied – 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied – ambient

Electrical

Lighting – 30 fc on work surface; surface mount light on ceiling

Receptacles – convenience receptacles as described in Chapter 3
 and quad power receptacles as described in Paragraph 4-2.1.5

Continuous 110-volt power strip above the workbenches

Voice/data – one voice/data outlet per workstation

Vault door security lighting – see Paragraph 4-2.12.5

Furniture

Workbench with laminated hardwood top to include shelf risers, pick rack, and plastic bins (10 per workbench)

Adjustable stool with woven “Crypton” upholstery

Lockable metal storage cabinet

(1) ~7 gal trash can

(1) Energy saving power strip per workbench

(1) LED surface mounted desk lamp

Equipment

None

Special features or considerations

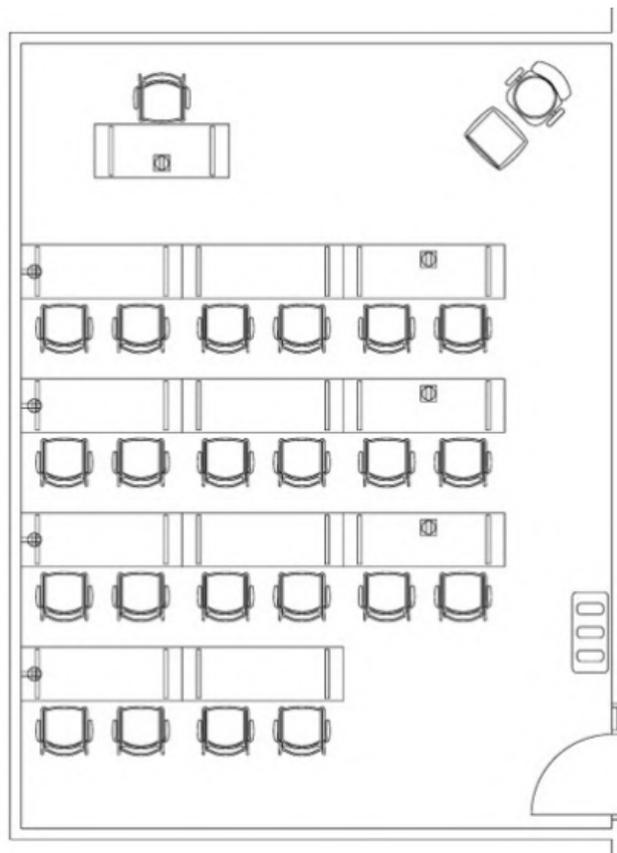
Dutch door with shelf, if Tenants desire

4-2.15 Classrooms

**Figure 4-19
Classroom**

4-2.15.1 This space is used primarily for instructional training of unit personnel, but may also be used as a conference/meeting room on occasion. Sound transmission control is important; see Paragraph 3-5.9. Extend classroom walls to structure or provide equivalent sound control to adjacent spaces.

4-2.15.2 Classrooms are authorized based on the population of the largest battle assembly weekend. If the authorization allows, provide some larger and some smaller classrooms. To minimize disruptions, arrange classrooms so that the instructor is located opposite the entrance.



4-2.15.3 When multiple classrooms are provided, some can be subdivided with a quality operable panel partition, with an STC rating of 48-52. Extend the sound attenuation above the ceiling to eliminate flanking points. For subdivided rooms, provide equipment for both sides of the partition. Specifications for operable partition should include provision of multiple sets of any required operating hardware.

4-2.15.4 Provide room-darkening shades or blinds for classrooms with windows.

4-2.15.5 Space Design Information

General/Code

Size – varies; the default size is a 400 sf classroom

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – carpet tile or rubber tile

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail to protect walls at both chair and table heights,
appropriate number of coat racks for room occupants
(mounted to the wall) and wall-mounted door stop

Lockset – classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 50 fc; dual-level switching throughout and broken down
into two zones, front one-third and rear two-thirds of the room;
provide additional controls at markerboard

Receptacles – convenience receptacles as described in Chapter 3
and duplex power receptacles at each data outlet

Receptacle at the instructor table

Provide receptacle for ceiling-mounted projector

One classroom per Reserve Center can be configured with power
and data in the tables if desired by the unit – typically two
students per table

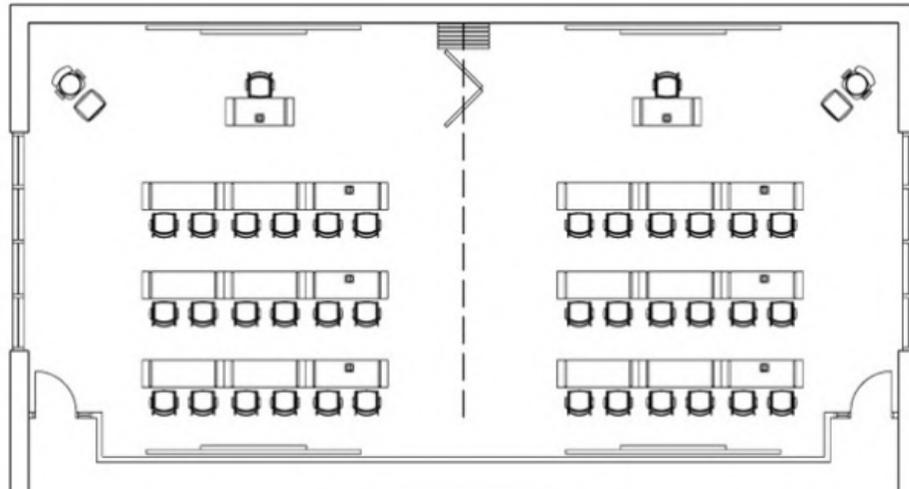
- If wall receptacles can be located within 12 ft laterally of student seats, then provide one duplex wall receptacle on the wall for every two student seats
- If wall receptacles cannot be located within 12 ft laterally of student seats, then provide floor boxes containing a single receptacle (combined with data) for each student seat

Voice/data – two voice/data outlets at the instructor location

- If wall data outlets can be located within 12 ft laterally of student seats, then provide one data wall outlet on the wall for every student seat
- If wall data outlets cannot be located within 12 ft laterally of student seats, then provide floor boxes containing a data jack (combined with power)for each student seat

- Two conduits, with pull strings, from the overhead projector location - one to the instructors location, the other to center of the wall at the rear of the classroom (if rear of classroom is a moveable partition locate outlet box in wall at either end of the partition)
- CATV – two CATV outlets in each classroom

Figure 4-20
Classroom with Operable Partition



Furniture

- Folding tables with “T” or “C” legs
- Sled-base upholstered stacking chairs with or without arms
- Full height mobile floor lectern
- Adjustable stool with arms
- Recycling receptacle (single unit divided into multiple compartments. One compartment is to be designated for trash)

Equipment

- Minimum 4 ft high (1200 mm) x 8 ft wide (2400 mm) markerboard; multiple markerboards provided where appropriate
- 2 in (50 mm) map rail with integral tack strip with end stops and hanger clips continuous around the perimeter of room
- Powered 6 ft x 6 ft (1800 mm x 1800 mm) projection screen

Special features or considerations

- Consider fluorescent or LED
- Provide room-darkening shades or blinds for windows
- Verify if Tenants require CATV or permanent mount for LCD projection (TV and projector would be Tenant provided)
- Provide sufficient data outlets for computer training, and appropriate lighting

4-2.16 Library Reading Room

4-2.16.1 The library reading room, or library, provides the Tenants a place to review training publications and other reading material. It is occasionally used as a meeting or conference room.

4-2.16.2 Library materials are stored in the library storage room.

4-2.16.3 Space Design Information**General/Code**

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – carpet tile

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail to protect walls, coat rack mounted to the wall

Lockset – classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied –55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied – ambient

Electrical

Lighting – 50 fc on work surface; dimmable overhead lighting

Receptacles – convenience receptacles as described in Chapter 3
and quad power receptacles as described in Paragraph 4-
2.1.5

- Provide receptacle for ceiling-mounted overhead projector

- Provide duplex receptacle in floor under the table

Voice/data –two telephone/data outlets located in floor under the
table

- Provide conduit from overhead projector location to wall box
opposite projection screen location

- CATV – one outlet

Furniture

Meeting room table or folding tables with “T” legs

- Sled-base upholstered stacking chairs w/arms or guest chairs with casters
- Metal bookcases
- Credenza storage unit.
 - Credenza is to consist of (2) 36 in wide metal storage cabinets with a 72 in laminate top piece, or lockable metal storage cabinet
- Recycling receptacle (single unit divided into multiple compartments. One compartment is to be designated for trash)

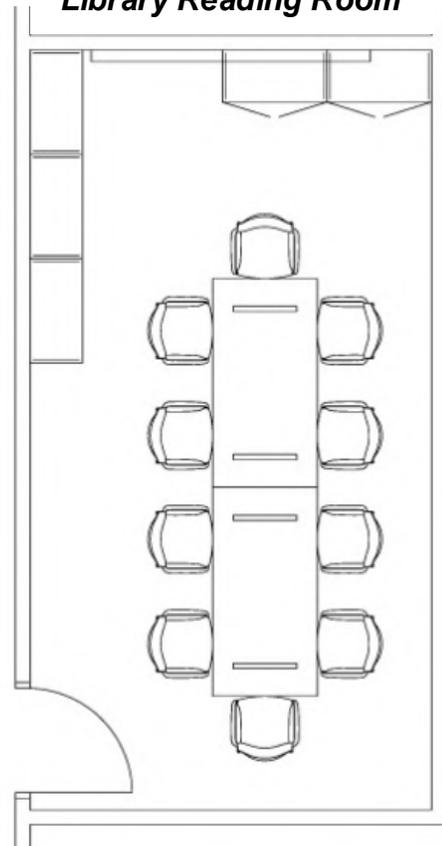
Equipment

- Minimum 4 ft high (1200 mm) x 8 ft wide(2400 mm) markerboard
- 2 in (50 mm) map rail with integral tack strip and hanger clips
- Powered projection screen, 6 ft x 6 ft (1800 mm x 1800 mm) minimum

Special features or considerations

- Verify whether Tenants require computer power, voice/data receptacles, markerboards, etc., for use as a conference or meeting room
- Provide blocking and overhead projector mount in ceiling

**Figure 4-21
Library Reading Room**



4-2.17 Library Storage

4-2.17.1 This space is for the storage of the graphic aids, training modules, bulk training modules, and other materials to support the training function. Design space to maximize storage space and shelving. This room is sometimes combined with training aids storage for a larger overall storage space.

4-2.17.2 Space Design Information

General/Code

- Size – 10 % of classroom authorization
- Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable
 Ceiling height – 8 ft - 8 in (2600 mm)
 Floor – rubber tile or linoleum
 Base – rubber
 Walls – painted gypsum board
 Ceiling – suspended acoustical ceiling tile (ACT)
 Trim – none
 Lockset – storeroom

Mechanical

Heating, occupied – 68°F (20°C);
 unoccupied - 55°F (13°C)
 Cooling – none

Electrical

Lighting – 30 fc vertical on bookcases
 Receptacles – convenience receptacles as described in Chapter 3
 Voice/data – wall telephone outlet

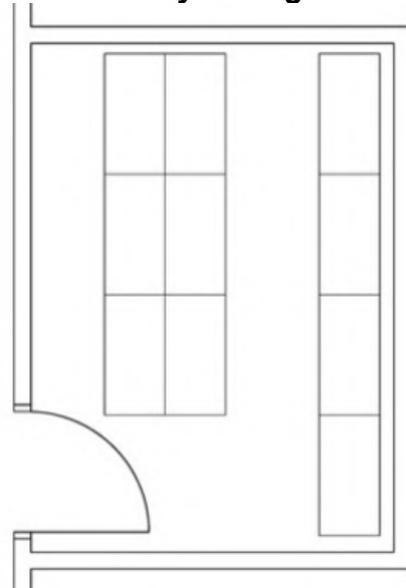
Furniture

Metal bookcases and/or metal storage cabinets

Special features or considerations

Ordinary hazard sprinklers

**Figure 4-22
 Library Storage**



4-2.18 Learning Center

4-2.18.1 This space is used as a computer training space, for individual testing or study.

4-2.18.2 Space Design Information

General/Code

Size – varies
 Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable
 Ceiling height – 8 ft - 8 in (2600 mm)
 Floor – carpet tile or rubber tile
 Base – rubber
 Walls – painted gypsum board
 Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none
 Lockset – classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)
 Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 50 fc on work surface; dimmable overhead lighting
 Receptacles –

convenience
 receptacles as
 described in Chapter
 3 and duplex power
 receptacles at each
 workstation

Voice/data –one data
 outlet per student
 workstation

Furniture

Tables with wire
 management
 baskets, (1) sling
 type CPU holder per
 student location, (1)
 keyboard tray with mouse pad per student location, and
 privacy screens. Table surface is to be 30 in deep.

Task chairs

(1) Energy saving power strip per student location

Lockable metal storage cabinet with shelves

Recycling receptacle (single unit divided into multiple
 compartments; one compartment is to be designated for trash)

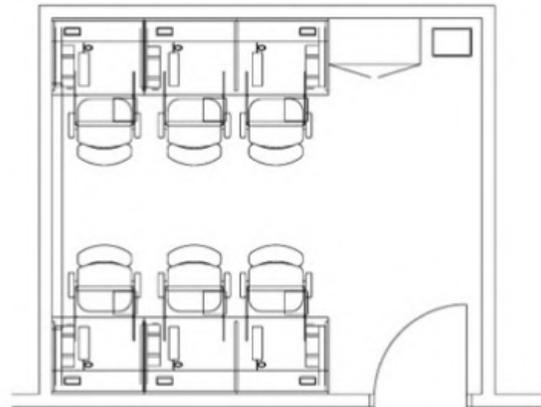
Equipment

Minimum 4 ft high (1200 mm) x 8 ft wide (2400 mm) markerboard

Special features or considerations

Floor receptacles and outlets may be required if wall outlets are not
 accessible per table layout

Figure 4-23
Learning Center



4-2.19 Training Aids Storage

4-2.19.1 This space is for the storage of teaching aids (including A/V equipment), manuals, publications, and models. The designer should verify the types of materials to be stored, and design the space accordingly.

4-2.19.2 Space Design Information**General/Code**

Size – 10% times total classroom area authorization

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – storeroom

Mechanical

Heating, occupied – 68°F (20°C),
and unoccupied – 55°F (13°C)

Cooling – none

Electrical

Lighting – 10 fc on shelves

Receptacles – convenience duplex receptacles as described in Chapter 3

Voice/data – wall telephone outlet

Furniture

Lockable metal storage cabinets with shelves

Utility cart, one for every two classrooms; minimum one per project; to be stored in training aid storage rooms

Bookcases and/or metal storage cabinets upon tenants request

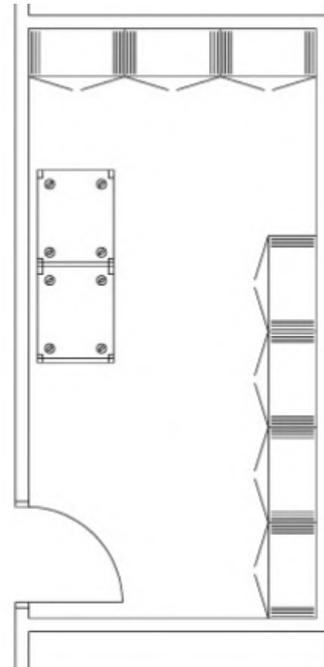
Equipment

Open shelving

Special features or considerations

Ordinary hazard sprinklers

Figure 4-24
Training Aids Storage

**4-2.20** COMSEC Storage

4-2.20.1 This space provides storage area for sensitive communication devices. Avoid exterior wall locations and heavily traveled corridors for this space, if possible. Windows are not desired due to requirements for protecting them from surveillance.

4-2.20.2 A security safe may be placed within the COMSEC storage room. If a safe is utilized, then the room design must provide sufficient space surrounding

the safe for circulation and door operation. For certain safes, the safe must be offset from the wall 12 in (300 mm) in order to open on two sides and swivel. Safes are provided by the Tenants, and weigh approximately 100 psf. Verify weight, size and configuration of safe with Tenants.

4-2.20.3 The door to a COMSEC storage room must be solid-core wood or internally reinforced hollow metal industrial, lockable and without glazing. The strike plate must be heavy-duty, high-security, and hinge screw length must be sufficient to resist removal by prying. Hinge pins must be within the space, or non-removable.

4-2.20.4 The room must be secure against surreptitious entry. Provide gypsum board walls from floor to ceiling, and a gypsum board ceiling, to provide visual evidence of any attempted entry.

4-2.20.5 Air vents, ducts and similar openings that breach the room envelope must be secured to prevent penetration; if greater than 96 sq in (2,000 sq mm), provide hardened steel bar grates or IDS supervision. In addition, such openings must have acoustical baffles to prevent audible voice transmission from the room; coordinate with room STC rating below.

4-2.20.6 Space Design Information

General/Code

Size – varies

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – 45; walls and openings must be audio tested along several points to assure STC rating is achieved

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board

Ceiling – painted gypsum board

Trim – none

Lockset – electromechanical lock meeting Federal Specification FF-L-2740

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling – none

Electrical

Lighting – 10 fc on shelves

Receptacles – convenience receptacles as described in Chapter 3

Voice/data – none

Furniture

Metal bookcases upon tenants request; designer shall verify

Equipment

Any safe(s) will be provided by the Tenants

Special features or considerations

Ordinary hazard sprinklers

Verify whether IDS for the space is required

4-2.21 Unit/Individual Storage

4-2.21.1 This space permits storage and inventory management of organizational equipment, such as Organizational Clothing and Individual Equipment (OCIE), radios, sets, kits and outfits (SKO), etc., in a separate and secure area. The issue and return of organizational equipment is also conducted here or in the staging area.

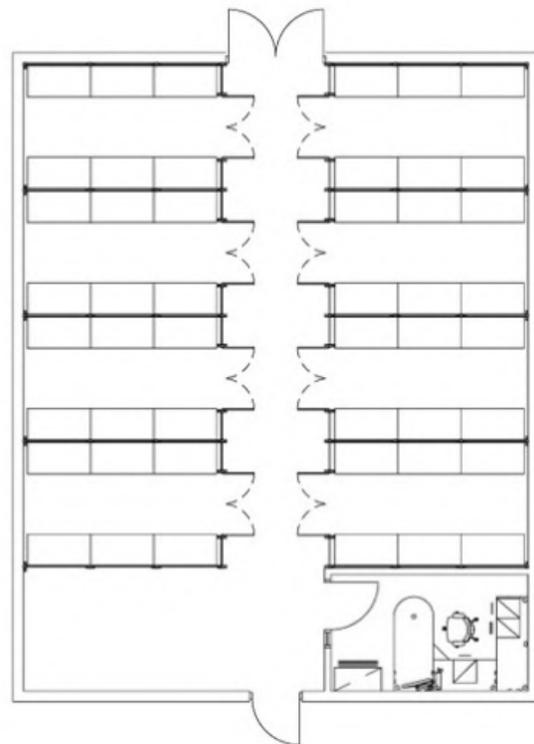
4-2.21.2 The unit storage space is typically subdivided into 8 ft - 2 in x 12 ft - 2 in (2500 mm x 3700 mm) cages constructed of 1 in x 2 in (25 mm x 50 mm) woven or welded wire fabric.

4-2.21.3 The Tenants may wish to combine one or more typical cages into a larger cage, or simply provide one or more large caged areas depending on their equipment storage needs.

4-2.21.4 Woven or welded wire fabric cages are generally required in storage areas such as unit storage, tools storage, and parts storage (and may be provided in unheated storage buildings), to provide individual units the ability to secure their equipment – the arms vault requires woven wire for caging. The partitions will be 10-gauge steel wire, 1 in by 2 in (25 mm by 50 mm) mesh panels welded to a frame of steel angles. Provide framing at structural steel, pipes, ducts and other obstructions running through the partition to provide security and to prevent intrusion.

4-2.21.5 The minimum height of the cage is 9 ft (2700 mm) with a wire fabric ceiling. If it is more economical or practical, extend the cage walls to the roof deck or floor slab above. If ceilings are provided, ensure that shelving units will fit both horizontally and vertically.

**Figure 4-25
Unit Storage with Supply Office**



4-2.21.6 There should be no placement of any items above cages that may obstruct the effects of the fire sprinklers from reaching through the cages. Post signs stating, "No storage above the cages." Place lighting inside of the cage, with one light per 8 ft x 12 ft (2400mm x 3650 mm) cage.

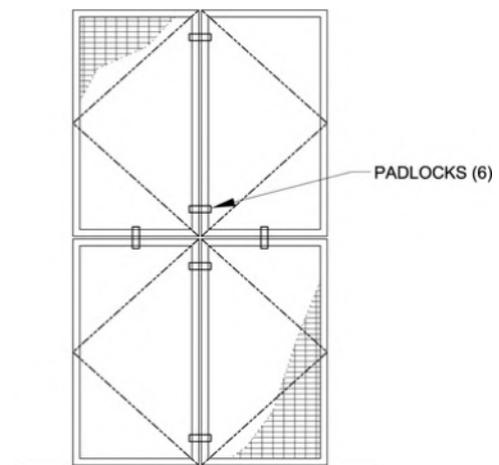
4-2.21.7 Provide each cage unit with a small sign identifying each cage sequentially (ex. 82 cages would be numbered 1 thru 82).

4-2.21.8 Aisles and vestibules between the secured areas should allow for efficient circulation and movement of stored equipment. Circulation space is not included within the total area authorization. The aisle width between cages shall be no less than 7 ft (2100 mm) wide.

4-2.21.9 Security is a key element of the design of cages. The cage frames shall be no more than 1 in (25 mm) from the floor and no more than 2 in (50 mm) from walls or ceilings. All bolted cage frame connectors shall be made with tamperproof hardware in lieu of peening or tack welding in place. No opening in caging or a caged area shall exceed 96 sq in (60,000 sq mm); the least dimension shall not exceed 6 in (150 mm). This includes spaces in the building structure when the caging is extended to the structure, including web spaces of bar joists. If caging is provided for different units, assure that there are no gaps or spaces between the caging and the wall or structure of the storage building in order to assure security of all stored items

4-2.21.10 Doors may be single swing or bi-parting, providing a minimum clear opening in one of the narrow ends of the cage of 4 ft x 7 ft (1200 mm x 2100 mm). Doors should fit tightly in their frames and where they meet. Doors shall be provided with two padlock hasps; specify padlocks with other door hardware. Swinging doors padlock hasps shall be provided at third points. Sliding doors are allowable at Unit Storage if approved by Project Officer, but require special attention to assure security. Some Tenants prefer a few cages in unit storage with Dutch doors; each half of the Dutch door shall have two padlock hasps. The mechanism to fasten the Dutch door halves together shall not be accessible from the outside of the cage.

Figure 4-26
Dutch Door
Configuration



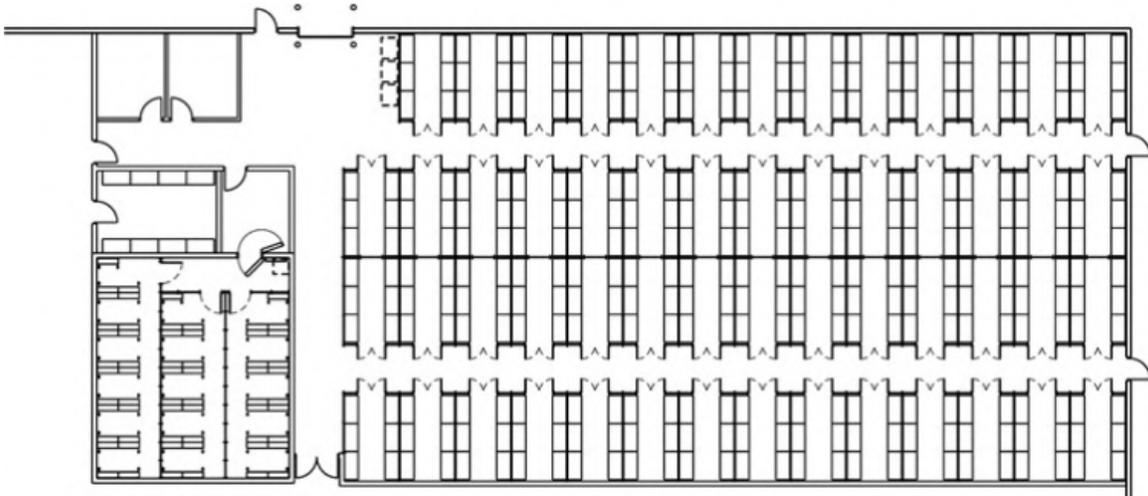
4-2.21.11 Shelving for the unit storage caged areas shall be heavy-duty open steel shelving units with five adjustable shelves. The units are typically 4 ft wide by 2 ft deep by 7 ft tall (1200 mm wide, 600 mm deep and 2100 mm tall). Shelving for maintenance shop tool and parts storage cages is the same width

and height, but 18 in (450 mm) deep. The units may be wider than their nominal width, and the Design Agency must ensure that the typical cages are of sufficient size to accommodate three shelving units end to end. A minimum of 6 units per typical cage is normally provided, 3 along each side, but Tenants should be asked for their shelving layout preference.

4-2.21.11.1 Most facilities do not require space for duffle bag storage as soldiers are now required to take their duffle bags home. The duffle bag storage information has been archived by the Louisville District if it's needed in the future.

4-2.21.12 See "Typical Caging Layout Plans" on the [Army Reserve website](#) for more details.

Figure 4-27
Unit Storage with Staging and Supply Office



4-2.21.13 Space Design Information

General/Code

Size – varies

Occupancy – storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 10 ft (3050 mm) minimum to ceiling or bottom of structure if no ceiling

Floor – sealed concrete

Base – none; rubber when gypsum walls are used

Walls – painted CMU; painted gypsum board as an alternative; provide ½ in (12 mm) minimum painted plywood wainscot to 4 ft (1200 mm) above floor if walls are not concrete or CMU

Ceiling – none; paint structure

Trim – none

Lockset – classroom; padlocks at cages

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling – none; outdoor air ventilation

Ventilation – one air change per hour

Electrical

Lighting – 10 fc on floor; motion sensors for aisles

Receptacles – convenience duplex receptacle in each cage;
convenience duplex receptacles along aisles

Voice/data – wall telephone outlet

Furniture

None

Equipment

Steel shelving

Caging

Special features or considerations

Very limited occupancy; ventilation required only when occupied

Ordinary hazard group 2 sprinklers with storage below 12 ft (3.7 m)

Locate lights at cage ceilings, as well as in aisles, to provide
sufficient light for cages and allow for ease of bulb

replacement – provide guards for lights in cages

Provide padlocks for all cage door hasps

4-2.22 Staging Area

4-2.22.1 The staging area provides space for issue and return of the units' organizational equipment, and for marshaling and loading for movement off-site.

4-2.22.2 Space Design Information

General/Code

Size – 10% of authorized area for unit storage

Occupancy –storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 10 ft (3050 mm) minimum

Floor – sealed concrete

Base – none; rubber when gypsum walls are used

Walls – painted CMU; painted gypsum board as an alternative;
provide ½ in (12 mm) minimum painted plywood wainscot to 4
ft (1200 mm) above floor if walls are not concrete or CMU

Ceiling – exposed structure, painted

Trim – none

Mechanical

Heating, occupied - 68°F (20°C); unoccupied– 55°F (13°C)

Cooling – none; outdoor air ventilation

Ventilation – one air change per hour

Electrical

Lighting – 30 fc on floor

Receptacles – convenience receptacle

Voice/data – wall telephone outlet

Special features or considerations

Overhead door to the exterior, typically 10 ft x 10 ft (3 m x 3 m);
automatic door with sensors to prevent door from closing on
items in the path of closure

Provide 6 in (150 mm) diameter concrete filled with a concrete
dome top, steel protective bollards inside and outside of
overhead door jams

If site conditions allow, consider a raised or depressed loading dock
at the overhead door

Ordinary hazard sprinklers

Very limited occupancy; ventilation required only when occupied

4-2.23 Supply Office

4-2.23.1 These offices are used by the supply personnel for administration and training purposes. They should be located to have a view of the unit storage and staging areas, possibly through a window, sidelight or door light, since they have air conditioning and the spaces around them do not. An exterior window overlooking the service drive to the staging area, and any vehicle barrier, are also desirable.

4-2.23.2 There is typically a GFGI safe (safe is not part of the furniture package, verify dimensions with Tenants) in at least one supply office; provide an eye bolt set in the floor as a safe anchor at the appropriate office(s).

4-2.23.3 Electrical and telecommunications requirements are to match full-time/unit exclusive offices.

4-2.23.4 Space Design Information**General/Code**

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc ambient; 50 fc on desktop

Receptacles – convenience receptacles as described in Chapter 3 and two quad power receptacles as described in Paragraph 4-2.1.5

Voice/data – one telephone and four data outlets per workstation

Furniture

Metal desk unit (“U” shaped or “L” shaped) with surface supporting box/box/file and file/file pedestals. Desk is also to include a monitor arm, overheads with tasklights, and a tack-board (refer to Louisville District’s approved typicals)

Task chair

Guest chair(s)

Metal lateral file(s) and/or kiosk (wardrobe)

(1) ~7 gal trash can per desk

(1) ~7 gal recycling bin per desk

(1) Energy saving power strip per desk

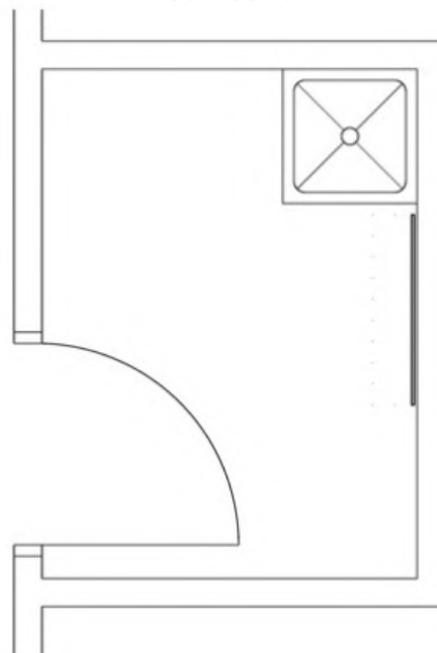
Equipment

Verify if additional equipment required in some offices

Special features or considerations

Refer to Paragraph 4-2.1.5 for coordination requirements between electrical and furniture

**Figure 4-28
Janitorial**



4-2.24 Janitorial

4-2.24.1 Janitorial closets provide space and plumbing for the cleaning and storage of mops, janitorial supplies and related cleaning equipment. The authorization may be distributed throughout larger or multi-story buildings for maintenance convenience.

4-2.24.2 Space Design Information**General/Code**

Size – varies

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – sealed concrete

Base – rubber

Walls – epoxy-painted water resistant gypsum board; epoxy-painted CMU as an alternative

Water resistant wainscot, such as FRP, to 4 ft AFF on the walls adjacent to the mop sink

Ceiling – epoxy-painted water resistant gypsum board

Trim – Mop hooks; At least 10 lineal feet (3 m) of shelving

Lockset – storeroom

Mechanical

Heating – passive, through transfer air

Cooling – passive, through transfer air

Ventilation – ventilate with exhaust at 10 air changes per hour; maintain negative pressure

Electrical

Lighting – 10 fc on floor

Receptacles – GFCI duplex receptacle

Voice/data – none

Furniture

None

Equipment

None

Special features or considerations

Floor sink with spout with pail hook

Ordinary hazard sprinklers

4-2.25 Flammable Storage**4-2.25.1** These rooms are rarely provided in training centers; see OMS Flammable Storage, Paragraph 4-3.8.**4-2.26** Controlled Waste Storage**4-2.26.1** These rooms are rarely provided in training centers; see OMS Controlled Waste Storage, Paragraph 4-3.9.

4-2.27 Facility Maintenance Storage

4-2.27.1 This space is provided for storage of maintenance equipment and supplies, and general building storage. The authorization may be distributed throughout larger buildings for operational convenience.

4-2.27.2 Space Design Information

General/Code

Size – 200 sf (18.6 sq m)

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – sealed concrete

Base – rubber

Walls – painted gypsum board; painted CMU as an alternative

Ceiling – exposed structure, painted

Trim – none

Lockset – storeroom

Mechanical

Heating – 55°F (13°C)

Cooling - none

Ventilation – exhaust to maintain negative pressure

Electrical

Lighting – 10 fc on shelves

Receptacles – convenience duplex receptacles as described in Chapter 3

Voice/data – wall telephone outlet

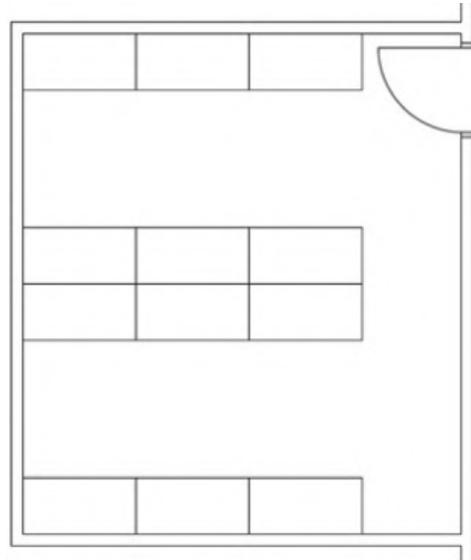
Equipment

Steel shelving and or storage cabinets

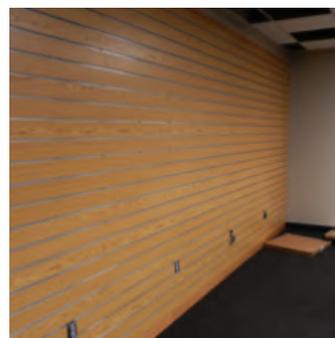
Special features or considerations

Ordinary hazard sprinklers

**Figure 4-29
Facility Maintenance Storage**



**Figure 4-30
Target Wall**



4-2.28 Weapons Simulator

4-2.28.1 The weapons simulator space can accommodate both a Laser Marksmanship Training System (LMTS) or an Engagement Skills Trainer (EST) to provide simulator-type weapons training.

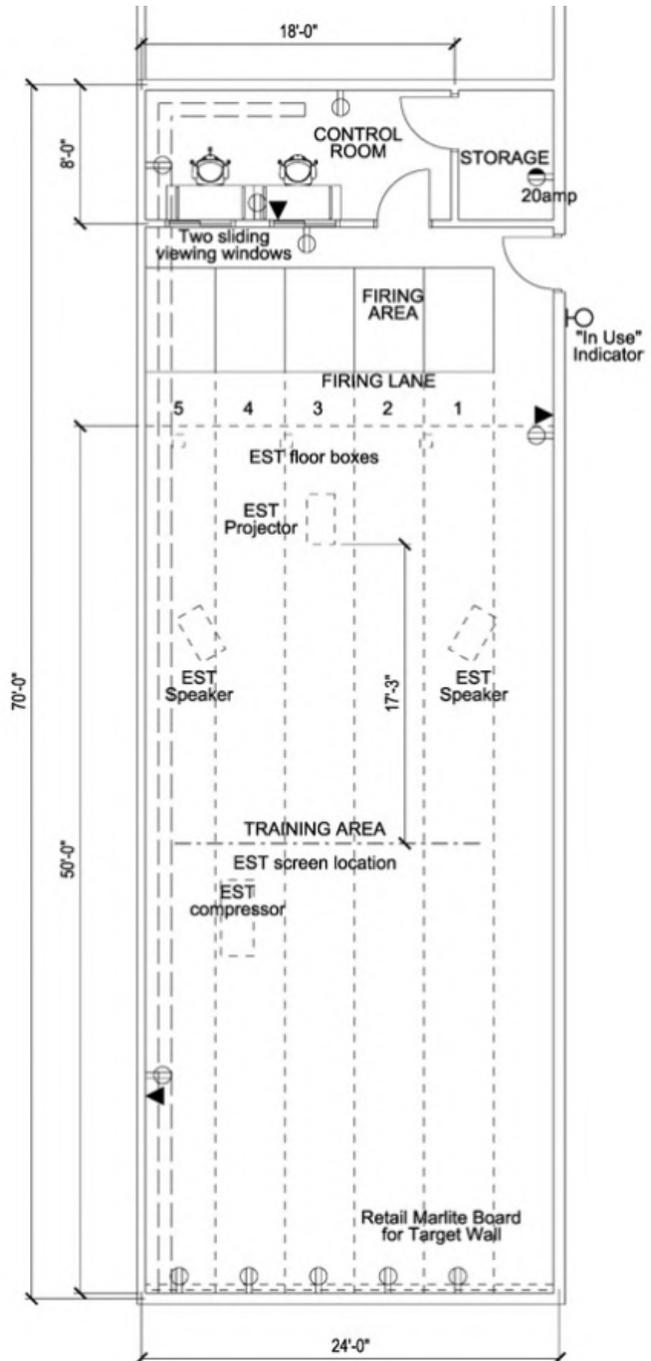
4-2.28.1 The weapons simulator space is sub-divided into three rooms: a simulator room, a control room, and a lockable storage room. The control room and storage room are for the simulator weapon controls, computers and other support equipment. A layout of the room is available on the [Army Reserve website](#). The space is sized to accommodate both systems; obtain Project Officer approval if changes to the room sizes are contemplated.

**Figure 4-31
Weapons Simulator**

4-2.28.2 Weapons simulations rooms should eliminate excessive light; avoid reflective paint and white or very light-colored walls. Windows are not typically desired in this space; if windows are approved, provide blackout shades.

4-2.28.3 Room should have a single in-swinging door with a sign posted stating, "maximum occupancy is 49." The room normally accommodates five trainees, three or four trainers, and may have five additional trainees observing.

4-2.28.4 The designer should verify the type of weapons simulator system to be provided, or both, with the OCAR Engineer Office and Support Installation, and obtain the current specifications for the system(s). The weapons simulator system is typically Government provided and installed, but the designer will need to develop the proper room layout for the system, as well as appropriate electrical, communications and mechanical systems to support the equipment.



4-2.28.5 The location should be noise isolated as the EST 2000 is capable of producing noise levels up to 107 dB. When located near typically occupied spaces, provide 60 STC for Weapons Simulators Room walls, as well as the ceiling when there is occupied space above. Reduce STC rating to 48 when adjacent to unoccupied spaces. STC rating for weapons simulator doors is 55.

4-2.28.6 A shooting platform is not typically required; if desired, see vendor literature for recommended height.

4-2.28.7 Space Design Information

General/Code

Size – 24 ft x 70 ft

Occupancy – business

Architectural/Interiors

Minimum STC rating – 48/60 (see discussion above)

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – rubber tile or carpet tile

Base – rubber

Walls – painted high-impact gypsum board in simulator room

- Wall opposite control room in simulator room to have full height/full width retail display board (Marlite Board) for suspension of targets and control devices. Wall behind display board shall receive grade one select wood blocking for display board support
- Control room and storage room shall have painted gypsum board walls

Ceiling – suspended acoustical ceiling tile (ACT). Ceiling to have a 12 in x 10 in high raised cove along simulator room wall between control room and target wall for an exposed cable tray to be inserted. Top and side of raised notch shall be ACT

Trim – none

Locksets – classroom style, except storage room is storage

Two 36 in high x 48 in wide sliding operable windows with locking device and single pane safety glazing in hollow metal frame mounted between control room and simulator room. Bottom of window frame 34 in AFF

Two 8 in x 8 in operable access doors. One access door between storage room and simulator room, and another between control room and simulator room. Access doors are for running cables and air lines between the rooms

Mechanical

Heating, occupied – 68°F (20°C); unoccupied–55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Air movement shall not cause targets or projection screen to ripple, special emphasis for EST screen location

Electrical

Lighting – 50 fc on floor; provide dimmers for room darkening

- Provide track lighting over firing line with five directional halogen fixtures, light control provided with dimmer in control room
- Zone fluorescent with multiple switch control and three tube fixtures with one tube on a separate switch. (Dimmer control may be used)
- Lighting controls for simulator room located at entry behind firing line into room as well as in control room
- Provide “range-in-use” light outside main entry door, with an associated pilot light switch in the control room

Receptacles – convenience receptacles as described in Chapter 3 and quad power receptacles as described in Paragraph 4-2.1.5

- Provide a receptacle at each target location
- Provide a dedicated 20 amp circuit with standard duplex outlet for air compressor in the simulation space beyond the screen location
- Provide double duplex receptacles by telephone/data outlets in simulator room
- Two power duplex receptacles in control room located below viewing windows.

Voice/data – two telephone/data outlets in control room located below viewing windows. Locate telephone data outlets along walls in simulator room per proposed furniture layout (minimum of six locations).

- 6 in wide by 4 in high aluminum, cable tray in ceiling notch. Bottom of the cable tray shall be flush with bottom of adjacent acoustical ceiling tile.

LMTS target switches in the control room

Weapons simulator PA system – provide PA system such that control room can give one-way instruction to shooters. If a building wide PA system is used, continue it throughout the weapons simulator space but have a PA silence switch in control room to silence building wide PA system in simulator room only. Building wide PA silence switch will not disable mass notification or fire alarms in simulator room

No mercury vapor fixtures

Furniture

Exercise (floor mats) for comfort at firing area and to cover cables/air lines on floor connecting targets and equipment

Control Room:

- (2) Folding tables
- (2) task chairs
- (1) ~7 gal trash can

Equipment

None

Special features or considerations

Verify equipment power or data needs with Tenants

Quiet air distribution

Ventilation – comply with ASHRAE 62.1

4-2.29 Band Room – See [Appendix E](#)

4-2.30 Medical Section

4-2.30.1 Units with medical sections assigned to them will normally be authorized a 400 sf (37.2 sq m) space to be used for training and storage. The designers should coordinate layout and furnishing for the space with the Tenants.

4-2.30.2 Space Design Information: This area may house functions similar to office, unit common, or physical exam spaces; see space design information for those functions as appropriate.

4-2.31 Physical Exam Wing – See [Appendix G](#)

4-2.32 Sensitive Compartmented Information Facility (SCIF) –See [Appendix F](#)

4-2.33 Soils Testing Lab

4-2.33.1 This space is authorized for units with soils testing functions, and is best located near an exterior door to allow for venting requirements and minimize tracking of dirt by field personnel.

4-2.33.2 Space Design Information

General/Code

Size – 150 sf (13.9 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc on table top

Receptacles – convenience receptacle; GFCI receptacle above counters

Voice/data – wall telephone outlet above counter

Furniture

Verify with Tenants

Equipment

Soils testing equipment by Tenants

Special features or considerations

Chemical-resistant counter space 8 ft (2.4 m) in length

Two-compartment, chemical-resistant stainless steel sink

Consider filtered return registers

4-2.34 Conference Room

4-2.34.1 This space is used for meetings by the General and his/her staff, and is only authorized if there is a General officer in one of the Tenant units. It will be near, or in, the General's suite. A higher level of finishes is appropriate.

4-2.34.2 The conference room must be capable of accommodating 20 people, with good sight lines from all seats and sufficient space for ease of circulation during meetings. If space allows, additional seating can be provided along one or more walls of the room.

4-2.34.3 Coordinate location of drop down screens, TVs, and/or tack-boards in relation to the furniture – any TVs are provided by Tenants

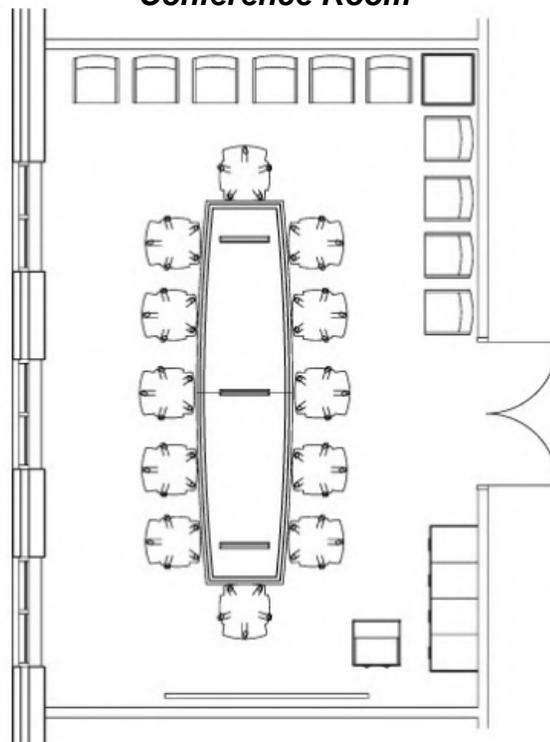
4-2.34.4 Space Design Information

General/Code

Size – 600 sf (55.7 sq m)

Occupancy – business

**Figure 4-32
Conference Room**



Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – carpet tile

Base – rubber

Walls – painted gypsum board; vinyl as an alternative – consider wood wainscot

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – chair rail

Lockset – classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc on table top with dual-level switching; provide dimmers

Receptacles – convenience receptacles as described in Chapter 3

- Provide receptacle for ceiling mounted projector

- Provide duplex receptacle in floor under the table

Voice/data – telephone/data outlets on each wall and in floor under the table

- Provide conduit from ceiling mounted projector to wall box opposite the projection screen

Furniture

Large wood conference table

Task chairs around conference table

Upholstered wood guest chairs with upholstered top around the perimeter of the room as space permits

Full height mobile wood floor lectern

Wood credenza storage unit.

Recycling receptacle (single unit divided into multiple compartments; one compartment is to be designated for trash)

Equipment

Powered projector screen, minimum 4 ft height by 8 ft width (1200 mm height by 2400 mm width) wired to lectern to allow computer screen to be projected

4 ft x 4 ft (1200 mm x 1200 mm) markerboard

2 in (50 mm) map rail on one wall, including end stops and hanger clips

Verify with Tenants if CATV, LCD projection, video teleconferencing, etc., are desired– (TV and projector by Tenants) OCAR Engineer Office approval is required

Special features or considerations

Optional built-in casework may be appropriate for storage and counter space

Provide structural support and mount for ceiling mounted projector

4-2.35 Drafting Room

4-2.35.1 This space is used for drafting training and operations (primarily electronic), printing, and storage of drawings and media. In most cases, it will be set up for one or more CAD drafting station. Verify typical drafting practice with Tenants.

4-2.35.2 Space Design Information**General/Code**

Size – 250 sf (23.25 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – office

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Ventilation – adequate ventilation for printer

Electrical

Lighting – 30 fc ambient; 50 fc on desk top

Receptacles – quad receptacle at each workstation and convenience receptacles as described in Chapter 3.

Dedicated receptacle for plotters

Voice/data – one telephone/data outlets per workstation and data outlets for each printer and plotter

Furniture

One or more small computer stations similar to full-time offices above (plain desk, no pedestals)

Upholstered mid-back task chairs with adjustable seat height and arms

Additional work tables available upon Tenant request

Drawing storage flat files - optional verify with Tenant

Lockable storage cabinet with shelves to be used as printer stand

Equipment

CAD terminals by Tenants

Printers provided by Tenants

Line one wall with tack boards and a markerboard, tack board sized to accommodate standard “E-size” drawing paper, minimum of 36 in high x 48 in wide (900 mm high x 1200 mm wide)

Special features or considerations

Verify Tenant equipment power/data needs

Provide floor space for Tenant's freestanding plotter and large freestanding printer

4-2.36 Physical Readiness Training

4-2.36.1 This space is for the Tenants' physical training (PT); the athletic/training equipment is included in the design, and is provided and installed by the Government as part of the project furniture package.

4-2.36.2 A 6 ft wide (minimum) access path, including doorways, must be provided from one exterior door of the building to this space.

4-2.36.3 Locate a water cooler in or near this space.

4-2.36.4 Space Design Information**General/Code**

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – vulcanized rubber flooring, 1/2 in (12 mm) minimum thickness

Base – rubber

Walls – painted gypsum board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Ventilation – 20 cu ft per minute (10 L/S) per person minimum; sufficient ventilation for rigorous activity – do not recirculate to other spaces

Electrical

Lighting – 30 fc on floor

Receptacles – convenience receptacles as described in Chapter 3; outlets for powered equipment

Voice/data – wall telephone outlet

Electrical outlet and data or CATV outlet, at TV mounting bracket

Furniture

A matrix of equipment has been developed based on room size.

See matrix in [Appendix J](#)

A dedicated 20A/120V electrical receptacle is required for each treadmill

~10 gal trash can

Equipment

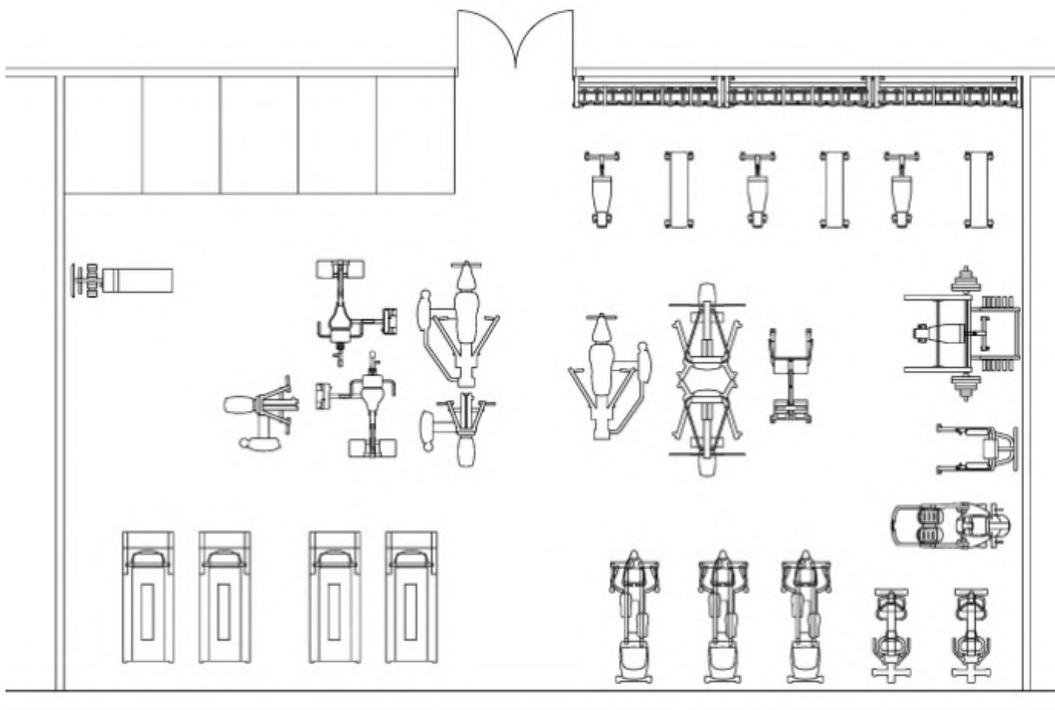
Mirrors on at least one wall with low exercise bar

One generic TV wall mount bracket, with appropriate mounting support, if Tenants desire (TV provided by Tenants)

Special features or considerations

Verify if Tenants want CATV or data jacks

Figure 4-33
Physical Readiness Training Room



4-2.37 Army Global Command Control System (AGCCS)

4-2.37.1 This space is used for training and operations with secure information. Its location in a facility is a command decision; it is optimally located adjacent to the SIPRNET Cafe, but some Tenants may want it with the G3 staff section. It will always be a separate space.

4-2.37.2 Design and construct the room in accordance with secure room construction requirements of AR 380-5, including provisions for IDS system as described in the Army Reserve IT Manual. Some secure room construction requirements are listed for COMSEC space above, but must be verified with AR 380-5 to assure they are current and complete.

4-2.37.3 Space Design Information

General Code

Size - 150 sf (13.9 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm)

Floor – carpet tile or rubber tile

Base – rubber

Walls – painted gypsum board;
painted CMU as an alternative

Ceiling – painted gypsum board

Trim – none

Lockset – GSA-approved
combination lock meeting
Federal Specification FF-L-
2740A

Mechanical

Heating, occupied – 68°F (20°C);
unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C);
unoccupied– ambient

Electrical

Lighting – 30 fc on work surface

Receptacles – convenience receptacles as described in Chapter 3
and quad power receptacles as described in Paragraph 4-
2.1.5

Voice/data – one telephone/data outlet per workstation

Furniture

One double pedestal desk with keyboard tray and mouse pad

Task chair

Conference table and four chairs

Verify tables or stands for USARC provided equipment

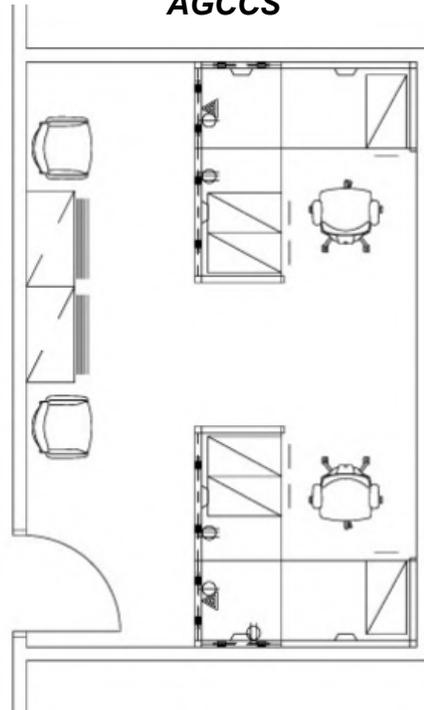
Equipment

Verify secure equipment, GSA containers and other operational
items to be provided by USARC, not project

Special features or considerations

Refer to Paragraph 4-2.1.5 for coordination requirements between
electrical and furniture

Figure 4-34
AGCCS



4-2.38 Distance Learning Center

4-2.38.1 This space is provided, when authorized, to allow delivery of remote training and education resources. There may be an associated office for a contract operator/instructor. Distance learning centers are typically sponsored by U.S. Army Training and Doctrine Command (TRADOC), and TRADOC provides the furniture.

4-2.38.2 The space will be similar to a computer learning lab, with voice/data links. The OCAR Engineer Office will provide and install all equipment, hardware and software; the designer must obtain the current design criteria from the OCAR Engineer Office, and coordinate the design of the mechanical and electrical building systems required to support the space and equipment.

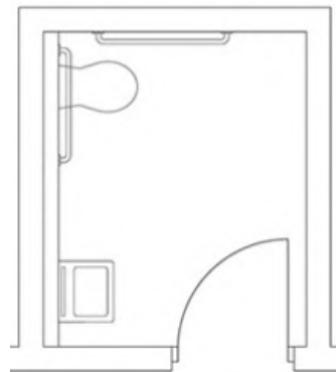
4-2.38.3 Space Design Information: Similar to classroom above. Designer must verify whether projection screens, markerboards, map rails and similar accessories are required. For remodel or revitalization projects, or if space is not sponsored by TRADOC, contact TRADOC to obtain their current standards for furniture and equipment.

4-2.39 Male and Female Toilets and Showers

4-2.39.1 Provide toilet rooms on each floor, and distribute throughout larger buildings for personnel convenience; coordinate locations with Tenants. In general, provide toilets in proximity to administrative areas, classrooms, physical training, and assembly hall – see also Paragraph 2-7.2.1.11.1. Toilets should be provided within 150 ft (45 m) of typically occupied spaces.

4-2.39.2 The total fixture count shall be based on IBC requirements; allot for male and female toilet rooms as noted below. Calculate occupancy for fixture count based on business classification for majority of building, assembly classification for assembly hall, and storage classification for storage spaces. If local codes require more fixtures, review with the OCAR Engineer Office. Additional fixtures may be provided with Project Officer approval; space will have to come “out of hide”. Obtain ratio of male to female personnel from Tenants, and apportion fixtures accordingly; a reasonable default is 2/3 male.

Figure 4-35
Unisex Single Room
Toilet



4-2.39.3 Provide modesty screening to ensure no lines of sight from adjacent spaces or corridors.

4-2.39.4 Shower rooms are provided primarily for weekend battle assembly and physical training purposes. Locate shower rooms with a toilet room, but only one shower room for each sex is provided. Provide one shower stall for each 15 soldiers or fraction thereof, for the largest battle assembly weekend. Allocate one-third for females unless unit roster suggests another ratio. For larger Reserve Centers, the 1 per 15 allotment may produce more showers than the Tenants believe necessary. Fewer showers may be provided with Project Officer approval. Reducing the number of showers may help reduce water use and water service infrastructure. All showers will be individual units; no gang showers. Standard shower stall is 36 in x 36 in (900 mm by 900 mm); accessible stalls in accordance with ABA-DoD. When drop-in showers are used, the preferred material is fiberglass or plastic. Modesty considerations in female showers strongly encourage some partitioned changing areas within proximity of the showers; changing areas built into the lockers, separate partitioned changing stations, and a partitioned stall adjacent to a shower stall are all acceptable solutions.

4-2.39.5 Tile assemblies in shower areas should follow methods outlined by the Tile Council of North America.

4-2.39.6 Consider providing one or two toilet rooms (possibly unisex) near the lobby. The restroom closest to the family support center should include a wall-mounted baby changing station.

4-2.39.7 Provide distinctly different color schemes for walls and/or floors for male, female, and unisex toilets, for ease of building occupant wayfinding.

4-2.39.8 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – Toilet areas - resinous flooring; ceramic tile as alternate

Shower areas - resinous flooring; ceramic tile as alternate

Base – ceramic tile

Walls – in shower areas – solid surface, ceramic tile or one-piece drop-in assembly over a fluid-applied membrane applied to the entire shower; in toilet areas – ceramic tile

Ceiling – in shower areas - cement board with a skim coat and epoxy-paint; in toilet areas – mold-resistant suspended acoustical ceiling tile (ACT) with an aluminum grid

Trim – none

Lockset – passage or push/pull

Mechanical

Heating - passive, from transfer air

Cooling - passive, from transfer air

Ventilation – Use the largest of 2 cfm/sf (10 l/s/sq m), 10 air changes/hour, or ASHRAE 62.1; negative air pressure.

Electrical

Lighting – 10 fc at floor in toilet areas, 10 fc at floor in showers, recessed, wet location, lensed fluorescent downlights

Receptacles – convenience receptacles as described in Chapter 3 – GFCI in wet areas; GFCI duplex at sinks

Furniture

None

Equipment

Towel hooks or racks at showers

All water closet stalls to receive coat hook

Provide a full length mirror near the exit

Consider a hat shelf in the toilet area near the sinks and mirrors

Soap dish in showers

Special features or considerations

Commercial grade, flush valve, low-flow water closets and ultralow flow pint urinals

Corrosion-resistant registers

Consider benches at drying areas

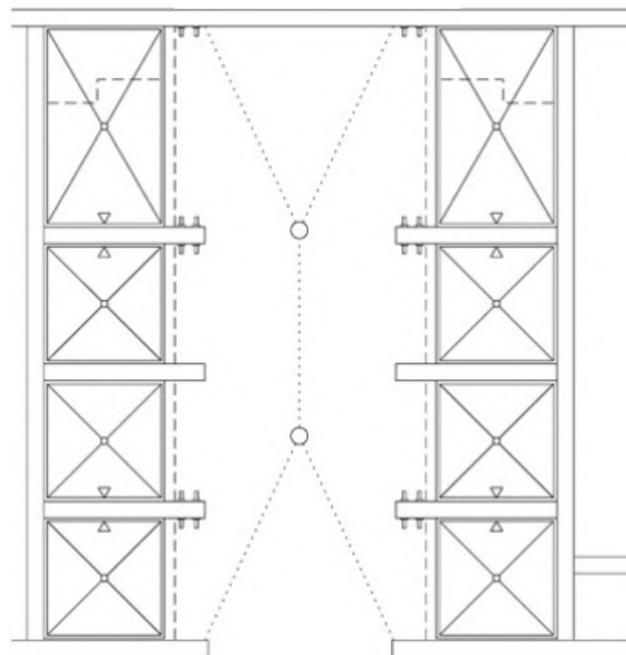
Countertop sinks are preferred for large toilet areas. Use solid surface material for the countertops and backsplash. Use solid surface undermount bowls.

Consider reduction of exhaust ventilation from peak weekend requirements due to very low weekday usage and occupancy

Provide floor drains outside of shower area

Darker grout may be preferred for ease of maintenance

**Figure 4-36
Shower Room**



Provide high capacity trash cans, toilet paper dispensers, and paper towel dispensers to accommodate heavy weekend use without service; verify with RSC if they prefer to provide their own paper towel dispenser and provide mounting accommodations
 Countertop mounted soap dispensers are preferred

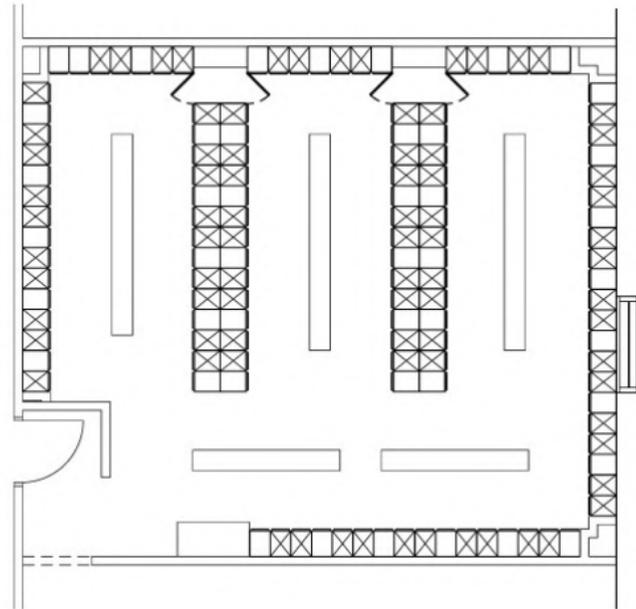
4-2.40 Male and Female Locker Rooms

4-2.40.1 Locker room space provides support for physical readiness training.

4-2.40.2 Provide full-height lockers for full-time personnel and all Commanders, and half-height lockers to accommodate the number of Reservists on the largest battle assembly weekend. Provide one-third female lockers unless unit roster suggests another ratio.

4-2.40.3 Provide modesty screening provided to ensure no lines of sight from adjacent spaces or corridors.

**Figure 4-37
 Locker Room**



4-2.40.4 Space Design Information

General/Code

Size – varies
 Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable
 Ceiling height – 8 ft - 8 in (2600 mm) minimum
 Floor – resinous floor or ceramic tile
 Base – ceramic tile
 Walls – painted gypsum board
 Ceiling – mold-resistant suspended acoustical ceiling tile (ACT) with an aluminum grid
 Trim – none
 Lockset – classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)
 Cooling, occupied – 78°F (25°C); unoccupied– ambient
 Ventilation – Use 1 cfm/sf (5 l/s/sq m) in locker area; air pressure to be negative

Electrical

Lighting – 10 fc on floor
 Receptacles – convenience receptacle - GFCI
 Voice/data – wall telephone outlet

Furniture

None

Equipment

Benches

Special features or considerations

Consider reduction of exhaust ventilation from peak weekend requirements due to very low weekday usage and occupancy

4-2.41 Vending Alcove

4-2.41.1 This space is provided for vending machines for the convenience of the Tenants, and is typically located off a corridor or in the break area, and occasionally in the assembly hall. Large facilities may justify multiple locations, but the space will have to come “out of hide”.

4-2.41.2 Space Design Information

General/Code

Size – 28 sf (4.5 sq m)
 Occupancy – business

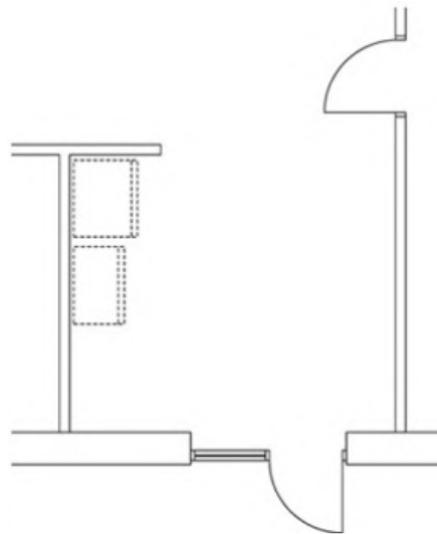
Architectural/Interiors

Minimum STC rating – not applicable
 Ceiling height – 8 ft - 8 in (2600 mm) minimum
 Floor – rubber tile or linoleum
 Base – rubber
 Walls – painted gypsum board
 Ceiling – suspended acoustical ceiling tile (ACT)
 Trim – none
 Lockset – none

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)
 Cooling, occupied – 78°F (25°C); unoccupied– ambient
 Ventilation –return air in proximity to remove heat from vending machines

**Figure 4-38
 Vending Alcove**



Electrical

Lighting – 20 fc on floor

Receptacles – dedicated 20A receptacle for each vending machine

Voice/data – none

Furniture

Recycling receptacle (single unit divided into multiple compartments; one compartment is to be designated for trash)

Equipment

Vending machines are by the Tenants

Special features or considerations

None

4-2.42 Break Area

4-2.42.1 This space is provided for break and meal activities; it may occasionally be used as a meeting or training space.

4-2.42.2 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – 40

Ceiling height – 8 ft - 8 in
(2600 mm) minimum

Floor – rubber tile or linoleum

Base – rubber

Walls – painted gypsum
board

Ceiling – suspended
acoustical ceiling tile
(ACT)

Trim – none

Lockset – passage

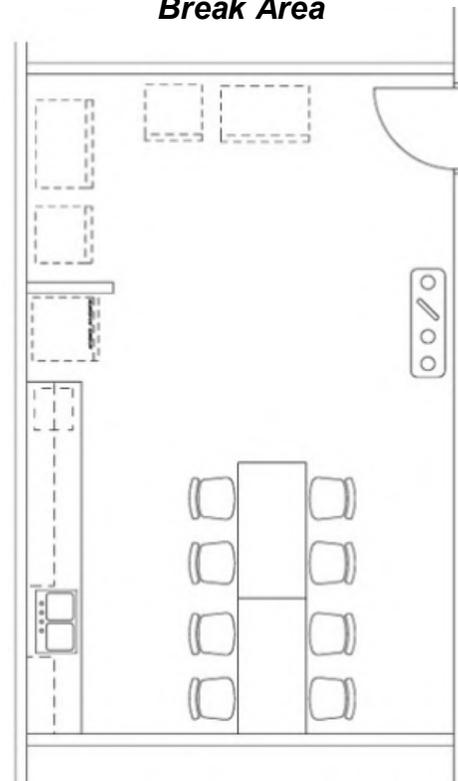
Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Ventilation exhaust with local control for intermittent ventilation

**Figure 4-39
Break Area**



Electrical

Lighting – 30 fc on table top

Receptacles – convenience receptacles as described in Chapter 3;
dedicated 20A for appliances; GFCI duplex at sink

Voice/data – wall telephone outlet

Furniture

Folding tables and plastic shell stack chairs

Recycling receptacle (single unit divided into multiple
compartments; one compartment is to be designated for trash)

Equipment

Bulletin board

4 ft (1200 mm) x 4 ft (1200 mm) markerboard

2 in (50 mm) map rail with integral tack strip, end stops and hanger
clips

Special features or considerations

Refrigerator and microwave are CFCI

Plastic laminate counter with upper and lower cabinets and two-
compartment stainless steel sink and gooseneck faucet

6 ft (600 mm) minimum length for cabinetry

Verify with Tenants if they will provide large coffee maker

4-2.43 Mechanical

4-2.43.1 Mechanical space for HVAC equipment and ductwork will be distributed through the building for efficient operation of the mechanical systems.

4-2.43.2 The main mechanical space should have double doors to the exterior for access for maintenance and repair. Verify whether RSCs desire an interior door to access to the room.

4-2.43.3 The space authorization for the mechanical space may be insufficient for small buildings, and overly generous for large ones. Designers are encouraged to design mechanical rooms that provide reasonable equipment space, and safe working and circulation space to access, service and maintain the equipment. If authorized space is insufficient to do so, the necessary additional space will come “out of hide”. If authorized space is more than sufficient, the excess space may be re-purposed for other use in the building, or deleted from the project as a cost savings; either requires Project Officer approval.

4-2.43.4 Space Design Information**General/Code**

Size – 9% of authorized building functional area or as required

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – 45 if adjacent to occupied spaces

Ceiling height –

Floor – sealed concrete

Base – rubber

Walls – sealed and painted CMU; painted gypsum board as an alternative

Ceiling – none, paint structure

Trim – none

Lockset – storeroom at interior door; entrance at exterior door

Mechanical

Heating – 55°F (13°C)

Cooling – sufficient to remove excess equipment heat

Ventilation – sufficient to satisfy combustion air and cooling requirements; one air change per hour minimum

Electrical

Lighting – 30 fc on floor

Receptacles – convenience receptacles as described in Chapter 3

Voice/data – wall telephone outlet

Furniture

Folding table with “T” legs

Task chair with “Crypton” upholstery

Metal Storage cabinet or lateral file for O&M manuals

~7gal trash can

Equipment**Special features or considerations**

Connections to flow switches, tamper switches, and fire alarm

Provide Ordinary Hazard Group 2 sprinklers if mechanical room includes gas-fired equipment, and Ordinary Hazard Group 1 sprinklers otherwise.

Floor drains for relief valves and condensate, hose bibb, eyewash if water treatment chemicals in room

Power and data connections for DDC computer

4-2.44 Electrical

4-2.44.1 The authorization for electrical space is intended to provide the main electrical distribution room, but electrical closets or panels may be located throughout the building for efficient operation of the facility. Space for the closets will have to come from authorization or “out of hide”.

4-2.44.2 It is strongly preferred that the main electrical room be dedicated, and not share space with mechanical equipment.

4-2.44.3 Space Design Information**General/Code**

Size – 360 sf (33.5 sq m)

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – sealed concrete

Base – rubber

Walls – sealed and painted CMU; painted gypsum board as an alternative

Ceiling – none, paint structure

Trim – none

Lockset – storeroom

Mechanical

Heating – 55°F (13°C)

Cooling – ventilate sufficient to remove excess equipment heat

Ventilation – sufficient to maintain suitable temperatures for equipment

Electrical

Lighting – 30 fc on floor

Receptacles – convenience receptacles as described in Chapter 3; and receptacle for building temperature control system

Voice/data – wall telephone outlet, data outlet for building temperature control system

Furniture

None

Equipment

Electrical service equipment

Special features or considerations

Main ground bar

Provide Ordinary Hazard Group 2 sprinklers if electrical room includes switchgear, and Ordinary Hazard Group 1 sprinklers otherwise

Maintain required clearances at electrical equipment

4-2.45 Circulation

4-2.45.1 Main corridors are 8 ft (2400 mm) in width, allowing two people abreast to circulate comfortably. In small Reserve Centers, or in lightly populated portions of larger centers, it may be possible to reduce the width to 6 ft (1800 mm) or 7 ft (2100 mm), with Project Officer approval. Minor corridors serving a few lightly populated rooms, and less than 25 ft (7600 mm) in length may be 4 ft wide (1200 mm), if approved by Project Officer.

4-2.45.2 Corridors should be planned to be a maximum of 150 ft (45700 mm) straight in one direction. Consider changing corridor direction and providing views to adjacent spaces or the exterior. Permanent wall-mounted fixtures such as drinking fountains or fire extinguishers must not project into the corridor; if column enclosures project into corridor, figure minimum corridor width from face of enclosures.

4-2.45.3 Provide magnetic hold-open devices for doors in high-traffic corridors.

4-2.45.4 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – resinous flooring or rubber tile; carpet tile as an alternative in more formal and administrative areas with low foot traffic

Base – rubber

Walls – painted impact resistant gypsum board; painted CMU as an alternative in more utilitarian spaces

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – wall and corner guards

Lockset – varies; may include hold-opens

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 10 fc on floor

Receptacles – convenience receptacles as described in Chapter 3

Voice/data – wall telephone outlet

Furniture

Display cases, bulletin boards; if space allows, seating areas with lounge chairs

Equipment

None

Special features or considerations

Electric water coolers for each floor, minimum

Consider concealed sprinkler heads for aesthetics

Army Reserve does not want vinyl wall covering in circulation spaces due to difficulty of repair

4-2.46 Stairs

4-2.46.1 Typical stairs are concrete-filled metal pan construction, unless a monumental stair is part of the design. Army Reserve prefers wire mesh infill panels for open stair and landing rails. Design stairs with proper rise and run with required landings. Provide exterior exit and area of refuge to support code application.

4-2.46.2 Primary stairs shall receive rubber flooring on steps and landings with secondary stairs being sealed concrete. All stairs, including fire stairs, should be nicely detailed and finished, in keeping with finishes in the rest of the project.

4-2.46.3 Ceremonial stairs are not considered in providing project space allocation. They may have to come “out-of-hide” and are regulated by NFPA 101.

4-2.46.4 Some Tenants may wish to have stairs wider than codes require; if approved by Project Officer, the space required may have to come “out of hide”.

4-2.46.5 Space Design Information**General/Code**

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – rubber tile

Base – rubber

Walls – painted gypsum board; painted CMU as an alternative in more utilitarian spaces

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – wall and corner guards

Lockset – varies; may include hold-opens

Mechanical

Heating, 55°F (13°C)

Cooling—ambient

Electrical

Lighting – bi-level, lower level in accordance with code, higher level 20 fc on the floor.

Receptacles – convenience receptacle at each landing

Furniture

None

Equipment

None

Special features or considerations

- Consider concealed sprinkler heads for aesthetics
- Army Reserve does not want vinyl wall covering in circulation spaces due to difficulty of repair
- Ceremonial stairs will be conditioned similar to the spaces served

**Figure 4-40
SIPRNET Cafe**



4-2.47 SIPRNET Cafe

4-2.47.1 This room provides space for secure/SIPRNET communications as mission or training cycle demands, in lieu of bringing SIPRNET to individual desktops. The Cafe is intended to operate during normal business hours, not 24/7, with closed storage. In Reserve Centers without SIPRNET missions, this space may be used for other purposes during those times when SIPRNET equipment is not installed.

4-2.47.2 The preferred location for the Cafe is at a ground floor point central to the Army Reserve units and personnel in the facility. It is also desirable that the Cafe is adjacent to the TER to minimize backbone requirements, and adjacent to any other secure communications spaces for efficiency of security and oversight. In a facility with a General Officer, functional and operational efficiency may dictate a location adjacent to the command suite. Ensure that the computer screens are placed so they are not visible from the corridor or any other adjacent area. Provide wing walls or vestibule to block vision to computer screens from open door.

4-2.47.3 Design and construct the room in accordance with “secure room” construction requirements of AR 380-5, as well as the Army Reserve IT Manual. Some provisions are listed below, but must be verified with AR 380-5 to assure they are current and complete. When constructed in accordance with AR 380-5, the room will meet definitions of both secure room and controlled access area (CAA). Provide both a combination lock and a supplemental card-key system.

4-2.47.4 Provide for an intrusion detection system (IDS) to monitor the SIPRNET Cafe as described in the Army Reserve IT Manual.

4-2.47.5 The Cafes are designated as small or large; provide size as indicated below.

Small	Center population less than 400 authorized strength
Large	Center population 400 or more authorized strength

4-2.47.6 Space Design Information**General/Code**

Size – small = 250 sf (14 sq m), and large = 400 sf (51.1 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 10 ft (3050 mm) minimum height to structure

Floor – carpet tile

Base – rubber

Walls – painted gypsum board or painted CMU from true floor to structure above constructed in accordance with AR 380-5

Ceiling – painted gypsum board

Trim – none

Lockset – GSA-approved combination lock meeting Federal Specification FF-L-2740A and FF-L-2890A (LKM7000), plus supplemental card-key reader compliant with AR 380-

Mechanical

Heating – Occupied - 68°F (20°C); unoccupied 55°F (13°C)

Cooling –78°F (13°C); unoccupied - ambient

Electrical

Lighting – 30 fc on desk top

Receptacles – See Army Reserve IT Manual Chapter 3

Voice/data – See Army Reserve IT Manual Chapter 3

Furniture

Six computer stations for small room, and twelve in large room
Fixed leg tables with “C” legs, (1) mobile CPU holder per seat, (1) keyboard tray with mouse pad per seat, and privacy screens.

Table is to be 30 in deep and 36 in wide

(1) Task chair per user location

(1) Energy saving power strip per seat

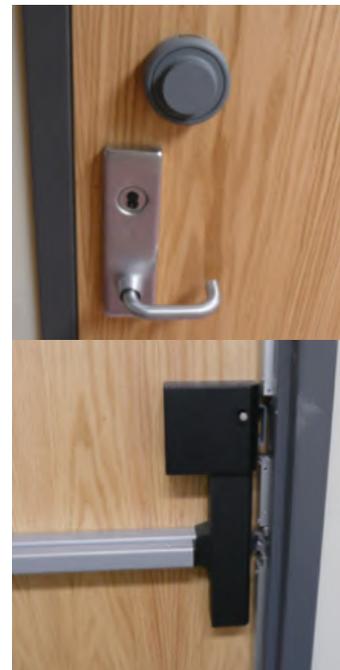
~10 gal trash can

Verify tables or stands for USARC provided equipment

Equipment

Verify fax machines, safes, servers, secure files, encryption devices, secure telephones and similar items specific to the operation of the Cafe to be provided by USARC, not the project

Figure 4-41
SIPRNET Hardware



Special features or considerations

- Walls and ceiling must be constructed to offer resistance to and show evidence of attempted unauthorized entry. Wall studs and gyp board must extend from floor to structure above
- Door must be solid-core wood or metal industrial. Hinge pins of out-swinging doors must be pinned, brazed or spot-welded to prevent removal. Interior-swinging doors must allow accessible exiting.
- Mechanical, electrical and other openings into this space must be smaller than 96 sq in (2450 mm), or must be hardened in accordance with requirements of MIL HDBK 1013/1A. Do not route utilities or other infrastructure not associated with this space through or above this space
- Provide doorbell or buzzer in Cafe, with activating button outside space entry door
- Extend SIPRNET data line in PDS from Cafe to one conference or classroom, and to COMSEC space if one is authorized for facility
- Verify weight of equipment to determine appropriate design floor loads
- Provide power, conduit and boxes for a Government-provided IDS system
- Tenants and security personnel normally prefer no windows in this space. If windows are provided, comply with requirements of AR 380-5

4-2.48 Lactation Room

- 4-2.48.1** This room provides space for Reservist mothers to express and store milk for their infants. It should be located near, but not in or through, a women's restroom.

4-2.48.2 Space Design Information**General/Code**

Size – 100 sf (9.3 sq m)

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – carpet tile; rubber tile as an alternative

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat rack mounted on the wall behind the door and wall-mounted door stop

Lockset – privacy

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied – ambient

Electrical

Lighting – more subdued than office spaces; consider direct/indirect ceiling fixtures, wall sconces, or lensed ceiling troffer with switch for table lamp

Receptacles – at each chair, the refrigerator and the counter, minimum

Voice/data – one telephone/data outlet

Furniture

Two lounge chairs with vinyl covering – rocking or reclining

Side table for each chair

(1) ~7 gal trash can

(1) ~7 gal recycling

Artwork – provide two to three pictures, approximately 20' by 30" (500 mm by 760 mm), minimum

Equipment

Special features or considerations

Under-counter refrigerator

Microwave oven for sterilizing breast pump equipment

Plastic laminate counter with upper and lower cabinets, and two-compartment stainless steel sink and gooseneck faucet

6 ft (600 mm) minimum length for cabinetry

Provide wing or screen wall at room entry to ensure no lines of sight from adjacent spaces or corridors

4-3 ORGANIZATIONAL MAINTENANCE SHOP

4-3.1 General OMS Information

4-3.1.1 The Army Reserve has developed three conceptual layouts for their OMS shops, based on the workbays that are similar to maintenance/repair bays in the Army standard TEMF. These conceptual layouts have been approved by USARC G4. These layouts will serve as a point of departure for the development of OMS shops for individual projects, since space authorizations may vary between projects. They are intended to illustrate arrangements and adjacencies which are generally functional for Army Reserve maintenance operations. CAD files for the three OMS concepts can be obtained from the [Army Reserve website](#).

4-3.1.1.1 The workbays adhere closely to the maintenance/repair bays described in the Army TEMF standard, but the OMS does not follow UFC 4-214-

02 for other building and site criteria. The OCAR Engineer Office has obtained USARC G4 endorsement for departures from that standard, particularly in the administrative and support areas.

4-3.1.1.2 The minimum OMS is based on a single TEMF bay, and does not include fluid distribution or extraction. The bay length is increased to 40 ft to better accommodate the typical Army Reserve equipment inventory. If site conditions or paving authorizations dictate, the minimum OMS could be designed for a single overhead door, rather than in a drive-through configuration, with Project Officer approval.

4-3.1.1.3 The mid-size OMS is based on two TEMF bays.

4-3.1.1.4 The standard OMS includes three TEMF bays in a drive-through configuration. For larger projects, additional building extensions of three bays may be authorized; these are added alongside the first set of three bays, shifting the equipment alcove to remain along the exterior wall.

4-3.1.2 All of the conceptual layouts accommodate roofed wash platforms alongside the maintenance bays, and can accommodate SATS trailers adjacent to the one side of the building, when dictated by the Tenant's inventory. The Department of Emergency Services (DES) has determined that placement of the SATS adjacent to the building is consistent with the intent of UFC 4-010-01.

4-3.1.2.1 Provide a canopy at SATS trailer parking to shelter the path from a building exterior door to access the trailers – minimum clear height of 14 ft (4250 mm), extending 10 ft (3050 mm) from building.

4-3.1.2.2 If canopy construction is non-combustible or flame retardant, and no storage occurs beneath it, sprinklers should not be required. Provide a sign under canopy – NO STORAGE ALLOWED IN COVERED AREA.

4-3.1.3 Two-fluid extraction capability (waste POL and antifreeze) are required in the workbay area of the mid-size and standard OMS and AMSA. Provide separate collection tanks, normally of 100 gallons for each fluid for OMS and 200 gallons for each for AMSA. Verify if these sizes would change the facility to a large quantity generator; if so, provide smaller tanks if that would avoid the change.

4-3.2 Shop Office

4-3.2.1 The shop office provides space for the performance of administrative functions relating to dispatch records, maintenance records and scheduling.

4-3.2.2 Provide maximum visibility of workbays; Tenants generally desire that the offices overlook the workbays, through a window. A non-operable window is preferable for visibility.

4-3.2.3 .Maintenance common areas in shop offices shall utilize the space design information in Paragraph 4-2.3, with the exception that the floor material shall be rubber tile in lieu of carpet tile.

4-3.2.4 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum STC rating – 45

Ceiling height – 8 ft - 8 in (2600 mm) minimum

Floor – oil-resistant rubber or linoleum

Base – rubber

Walls – painted gypsum board; painted CMU as an alternative

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat rack mounted on wall behind the door appropriate for population

Lockset – office or classroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)

Cooling, occupied – 78°F (25°C); unoccupied– ambient

Electrical

Lighting – 30 fc ambient; 50 fc on desk top

Receptacles – convenience receptacles as described in Chapter 3 and two quad power receptacles as described in Paragraph 4-2.1.5

Voice/data – one telephone and four data outlets at each workstation

Furniture

Metal desk unit (“U” shaped or “L” shaped) with surface supporting box/box/file and file/file pedestals. Desk is also to include a monitor arm, overheads with task-lights, and a tack-board (refer to Louisville District’s approved typicals)

Task chair with “Crypton” upholstery

Guest chair(s) with “Crypton” upholstery

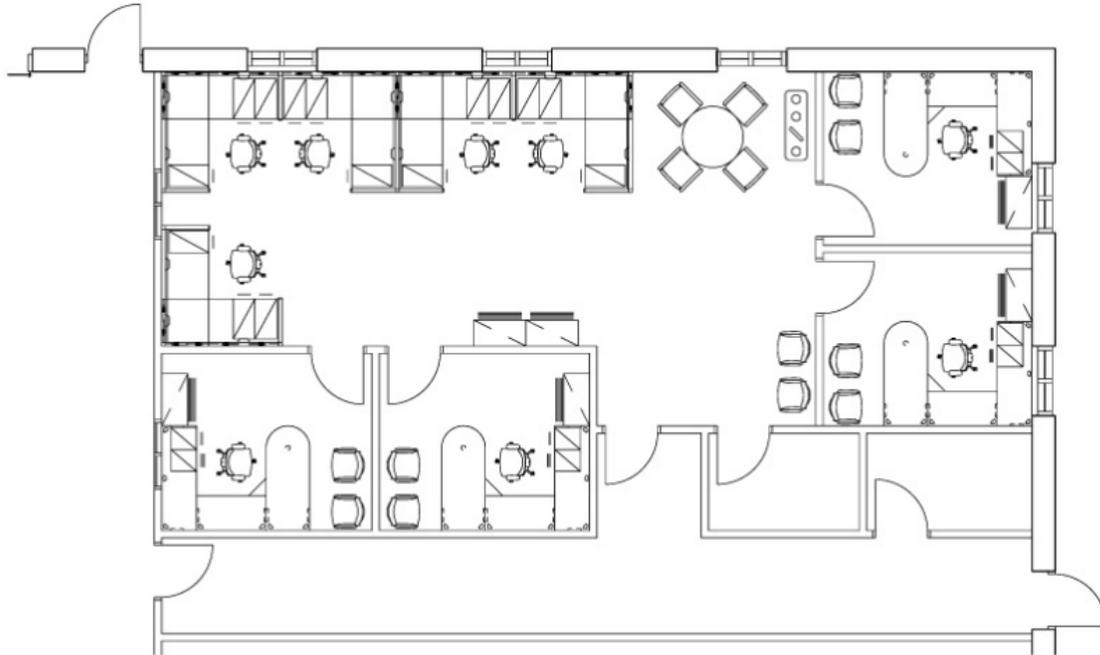
Metal lateral file(s) and/or metal bookcase(s)

(1) ~7 gal trash can per desk

(1) ~7 gal recycling bin per desk

(1) Energy saving power strip per desk

Figure 4-42
Shop Office



4-3.3 Male and Female Toilets

4-3.3.1 The toilet authorization for the OMS is typically sufficient for separate male and female toilet rooms. Where only a unisex toilet is authorized provide a toilet, urinal and sink.

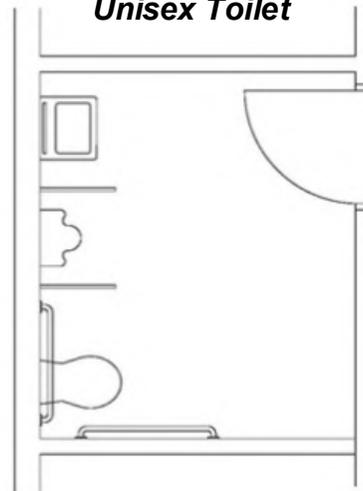
4-3.3.2 Space Design Information: See Paragraph 4-2.38.

4-3.4 Tools and Parts Room

4-3.4.1 This space is the storage and issue area for spare parts and tools, especially mechanics' tool sets and organizational maintenance sets.

4-3.4.2 The Tenants typically want the tools and parts areas of this room separated by caging or a hard wall, and may want the two areas further divided by caging for an individual unit's use. Room walls should extend to hard ceiling or structure to prevent entry. The designer should verify whether a Dutch door with shelf, or sliding

Figure 4-43
Unisex Toilet



window, is required for issue of parts and tools, and whether one or more workstations are desired in the room.

4-3.4.3 Steel shelving units are typically provided under the construction contract, and some floor space is typically left open for storage of larger items. Verify the Tenants' shelving requirements.

4-3.4.4 Space Design Information

General/Code

Size – 96 sf (8.9 sq m) per authorized workbay

Occupancy – low hazard storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – sealed concrete

Base – none if CMU; rubber if gypsum board

Walls – painted CMU; painted gypsum board as an alternative;
provide ½ in (12 mm) minimum painted plywood wainscot to 4
ft (1200 mm) above floor if walls are not concrete or CMU

Ceiling – exposed structure, painted

Trim – none

Lockset – storeroom

Mechanical

Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)

Cooling - none

Electrical

Lighting – 10 fc on floor

Receptacles – convenience
receptacles as described in
Chapter 3; duplex power
receptacles if automated
inventory

Voice/data – wall telephone
outlet; data outlet if
automated inventory

Furniture

Workbench with wood top and
stool provided upon
Tenant's request

Equipment

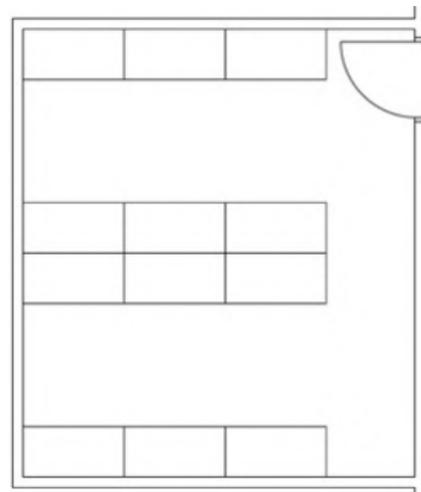
Open steel shelving

Special features or considerations

Ordinary hazard sprinklers

Consider paired doors or single 4 ft (1200 mm) door for ease of
access

Figure 4-44
Tools and Parts Room



4-3.5 Storage Room

4-3.5.1 This space is provided for storage of ancillary equipment issued with vehicles, including operators' vehicle maintenance tools, canvas, canvas bows, seats, sideboards, etc. It is usually combined with tool and parts storage into one room and divided with a cage for each unit. If kept as a separate room, it is best located adjacent to tool and parts storage. For security reasons, this room should have either a full height wall to bottom of roof deck or a gypsum board ceiling to prevent access from above.

4-3.5.2 Provide wire mesh caging to segregate areas per units. Cages may be the same module as the basic unit storage cage (see Paragraph 4-2.20), or may be tailored to the Tenants' requirements.

4-3.5.3 Steel shelving units are typically provided under the construction contract, and some floor space is typically left open for storage of larger items. The designer should verify the Tenants' shelving requirements.

4-3.5.4 Space Design Information

General/Code

Size – 96 sf (8.9 sq m) per authorized workbay

Occupancy – low-hazard storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – sealed concrete

Base – none if CMU; rubber if gypsum board

Walls – painted CMU; painted gypsum board as an alternative;

provide ½ in (12 mm) minimum painted plywood wainscot to 4 ft (1200 mm) above floor if walls are not concrete or CMU

Ceiling – exposed structure, painted

Trim – none

Lockset – storeroom

Mechanical

Heating – 55°F (13°C)

Cooling – none

Electrical

Lighting – 30 fc on shelves

Receptacles – convenience receptacles as described in Chapter 3; duplex power receptacles if automated inventory

Voice/data – wall telephone outlet; data outlet if automated inventory

Furniture

None

Equipment

Open steel shelving

Special features or considerations

Ordinary hazard sprinklers

Consider paired doors or single 4 ft (1200 mm) door for ease of access

4-3.6 Special Equipment Alcove

4-3.6.1 The Tenants typically have GFGI equipment which is in frequent use, but cannot be located within the maintenance bays. A space authorization is provided to accommodate this equipment. This 7 ft (2100 mm) deep alcove is located adjacent to the workbay area, convenient to the workbays, and with sufficient space for storage of the equipment. Coordinate specific equipment that will be housed in this space with the Tenant. All utility connections for this equipment must be verified and provided.

4-3.6.2 Equipment that Tenants may store or use in the alcove include tire changers, parts washers, wheel balancers, portable lifts, alternator and radiator test stands, welding equipment, drill press, pressure washers, can crusher, etc.

4-3.6.3 Space Design Information: Refer to the space design information for the workbays; this space is treated as part of the workbays.

4-3.7 Battery Room

4-3.7.1 This space is provided for servicing, charging, and storage of lead-acid batteries. Some Tenants may not currently service or charge batteries, instead storing them before exchange or after delivery. However, the room will be constructed for battery charging operations, unless deviations are approved by the proponent, USARC G4.

4-3.7.2 Provide battery shelving under the construction contract, typically of redwood, cedar or fiberglass, and along the side of the room opposite the door. The shelves are usually tiered from front to back, with the lowest shelf at 18 in (460 mm) AFF.

4-3.7.3 Provide a hose bibb; no floor drain is required.

4-3.7.4 Provide an electrical interlock system for the battery room exhaust fan/receptacle power wiring to eliminate the possibility of an explosion in the battery room caused by plugging a battery charger into a live receptacle in a room filled with explosive gas. The system shall include the following:

- Light switch on outside of the battery room shall energize the lights and exhaust fan in the room simultaneously. This switch shall have a pilot light activated when the switch is in the “on” position.
- Within the duct for the exhaust fan, provide a sail switch connected to the receptacle power wiring.
- Interlock exhaust fan sail switch with battery charger receptacles to deactivate and prevent charging upon loss of airflow.

4-3.7.5 Provide eyewash/deluge showers in the room.

4-3.7.6 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – sealed concrete

Base – none

Walls – painted CMU

Ceiling – none, paint structure

Trim – none

Lockset – storeroom

Mechanical

Heating – 55°F (13°C)

Cooling – none

Ventilation – explosion proof exhaust to keep hydrogen gas below 5% concentration; consider a hood above batteries

Electrical

Lighting – 20 fc on shelves; explosion-proof, fluorescent fixtures on pilot-lighted switch outside room

Receptacles – Continuous metal raceway with duplex receptacles at 24 in (600 mm) o.c. above battery racks; see Paragraph 4-3.7.4

Voice/data – none

Furniture

Workbench with laminate top and stool provided upon Tenant’s request

Equipment

Battery shelving

Special features or Considerations

Ordinary hazard sprinklers

4-3.8 Flammable Storage

4-3.8.1 This space is provided for storage of petroleum-based lubricants, paints, solvents, etc. for use in the OMS. Due to the volatile nature of the contents, it will have exterior access only, and CMU or pre-cast walls to structure or a concrete ceiling.

4-3.8.2 The room should have a depressed well under a metal grate floor for collection of any spills: no drain. Slope well to allow convenient suction of spills at a low point. The well should be capable of containing 150% of the stored materials; verify likely amount of stored materials with Tenants. Construct well monolithically or provide joints with chemical-resistant waterstop and joint sealer. Provide high density polyethylene (HDPE) liner with welded joints, or liner of similar material appropriate for materials stored.

4-3.8.3 Some steel shelving is typically provided, with some floor area left open for larger containers.

4-3.8.4 OSHA requires emergency eyewash and showers where an employee's eyes or body could be exposed to injurious corrosive materials. For that reason, this space is typically located with ready access to an emergency eyewash and shower unit where a worker would be able reach the unit within 10 seconds or approximately 55 ft (16750 mm) of travel. Where ready access to an emergency eyewash and shower is not available, install such a unit.

4-3.8.5 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – concrete with liner below metal grate

Base – none

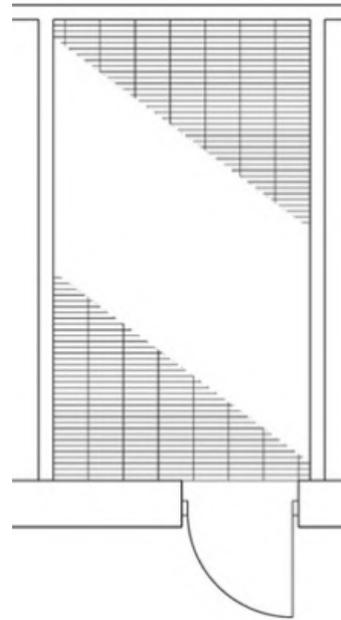
Walls – painted CMU or pre-cast

Ceiling – fire rated

Trim – none

Lockset – entrance

Figure 4-45
Flammable Storage



Mechanical

Heating - 40°F (4.4°C); explosion proof hot water or electric heater

Cooling - none

Ventilation – 6 air change per hour, 1 cfm/sf (5 l/s/sq m) or 150 cfm (4 cu m/min) whichever is greatest. Inlets and outlets located 12 in above top of grating and positioned as far apart as practicable, to provide air movement across all portions of the floor. Fans shall be explosion/spark proof. Ventilation system shall be tied to lights unless dispensing of Class I fluids is planned for space. If dispensing Class I fluids is planned for the space, continuous ventilation shall be provided and shall have an airflow switch or other equally reliable method that is interlocked to sound an audible alarm upon failure of the ventilation system

Electrical

Lighting – 10 fc on floor; minimum of two explosion-proof fluorescents on exterior weatherproof pilot-lighted switch.

Provide low temperature ballasts

Receptacles – none

Voice/data – none

Equipment

Open steel shelving

Special features or considerations

Extra hazard sprinklers; a dry pipe sprinkler system or dry heads shall be provided for locations with more than 4,500 heating degree days

Open grating aluminum flooring over spill-collection basin

Design room to NEC Article 500 for a Class I Division II location

Hazardous storage shall comply with NFPA 30, 9.9.1

4-3.9 Controlled Waste Storage

4-3.9.1 This space is provided for storage of waste materials or items for environmental protection, while awaiting recycling or other disposal. Due to the nature of the contents, it will have exterior access only, and fire-rated CMU or pre-cast walls to structure or a concrete ceiling.

4-3.9.2 The room should have a depressed well under a metal grate floor for collection of any spills. Slope well to allow convenient suction of spills at a low point: no drain. The well should be capable of containing 150% of the stored materials; verify likely amount of stored materials with Tenants. Construct well monolithically or provide joints with chemical-resistant waterstop and joint sealer. Provide HDPE liner with welded joints, or liner of similar material appropriate for materials stored.

4-3.9.3 Some steel shelving is typically provided, with some floor area left open for larger containers.

4-3.9.4 OSHA requires emergency eyewash and showers where an employee's eyes or body could be exposed to injurious corrosive materials. For that reason, this space is typically located with ready access to an emergency eyewash and shower unit in the maintenance bay where a worker would be able reach the unit within 10 seconds or approximately 55 ft (16750 mm) of travel. Where ready access to an emergency eyewash and shower is not available, install such a unit.

4-3.9.5 Space Design Information

General/Code

Size – varies
Occupancy – high hazard storage, unoccupied

Architectural/Interiors

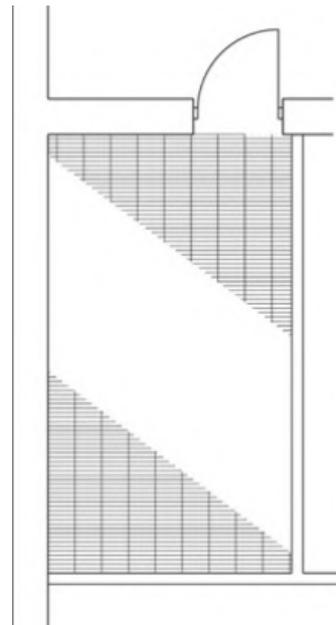
Minimum STC rating – not applicable
Ceiling height –
Floor – concrete with liner below metal grate
Base – none
Walls – painted CMU or pre-cast
Ceiling – fire rated
Trim – none
Lockset – entrance; code may require panic

Mechanical

Heating - 40°F (4.4°C); explosion proof hot water or electric heater
Cooling - none

Ventilation – 6 air change per hour, 1 cfm/sf (5 l/s/sq m) or 150 cfm (4 cu m/min) whichever is greatest. Inlets and outlets located 12 in above top of grating and positioned as far apart as practicable, to provide air movement across all portions of the floor. Fans shall be explosion/spark proof. Ventilation system shall be tied to lights unless dispensing of Class I fluids is planned for space. If dispensing Class I fluids is planned for the space, continuous ventilation shall be provided and shall have an airflow switch or other equally reliable method that is interlocked to sound an audible alarm upon failure of the ventilation system

Figure 4-46
Controlled Waste Storage



Electrical

Lighting – 10 fc on shelves; minimum of two explosion-proof fluorescents on exterior weatherproof pilot-lighted switch.
Provide low temperature ballasts

Receptacles – none

Voice/data – none

Equipment

Open steel shelving

Special features or considerations

Extra hazard sprinklers; a dry pipe sprinkler system or dry heads shall be provided for locations with more than 4,500 heating degree days. Open grating aluminum flooring over spill collection basin

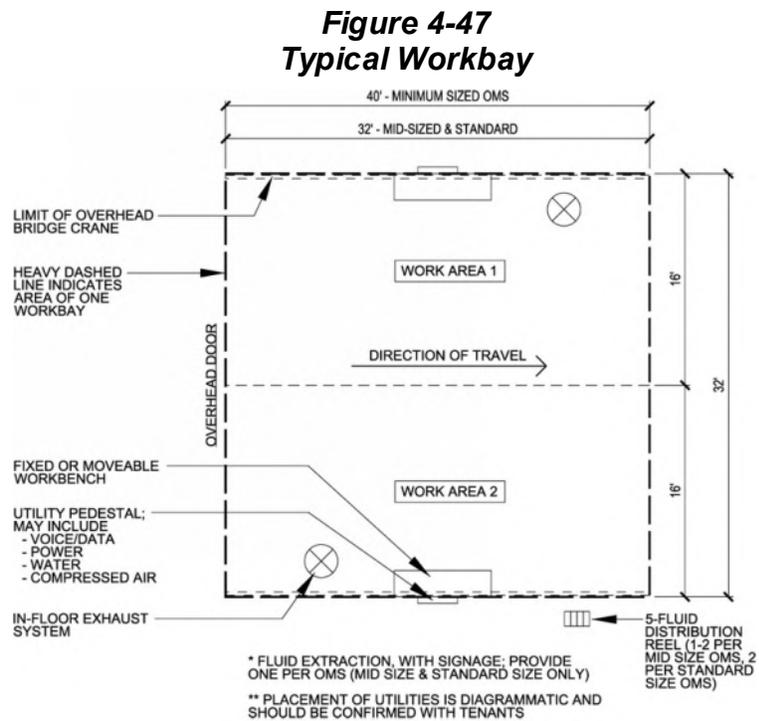
Design room to NEC Article 500 for a Class I Division II location
Hazardous storage shall comply with NFPA 30, 9.9.1

4-3.10 Workbays

4-3.10.1 The workbay provides space for training and for the performance of services and repairs of assigned equipment (mobile and stationary). Include drive-through workbays whenever possible.

4-3.10.2 The workbays are the heart of the OMS. The other support areas are normally located as closely adjacent to the workbays as possible; consider locating most of them off a corridor into the workbay. The functional layout should allow for the future addition of workbays, if possible.

4-3.10.3 The basic dimensions of the workbays are 32 ft clear (9750 mm) wide by 32 ft clear (9750 mm) long, and free of columns. In the minimum OMS, the bay length is increased to 40 ft (12200 mm) to be able to accommodate most



Army Reserve equipment. Each 32 x 32 bay provides two 16 x 32 work areas; each work area is intended to accommodate two Reservist mechanics. See Figure 4-47 for sketch of a single work bay and its two work areas.

4-3.10.3.1 Each work area requires a workbench, and access to five-fluid dispensing lines, compressed air line, hose bibb, power, power reel/trouble light, and data. Some work areas may share access to a bench and utilities with an adjacent work area. See Figure 4-47 for typical locations for the utilities and other workbay features; see Figures 4-50, 4-51, and 4-52 for recommended locations for one, two and three-workbay configurations.

4-3.10.3.2 The workbench may be a built-in unit of CMU with a stainless steel top, or a free-standing piece of furniture, based on Tenant preference.

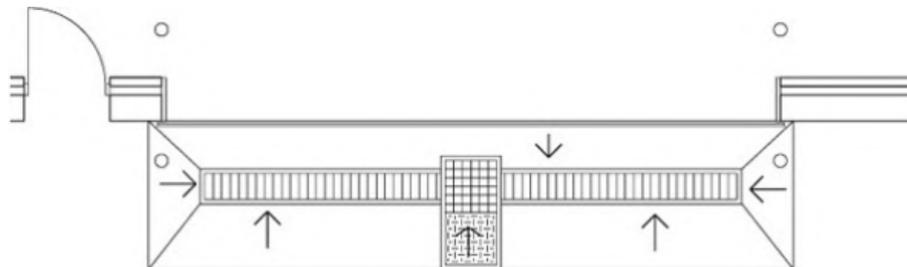
4-3.10.3.3 Utility service lines and drops must remain clear of the overhead crane path of travel. Provide stable, durable mounting provisions at or near workbench – consider a CMU knee wall or well-anchored steel frame. For utilities along safety aisle, maintain 10 feet (3000mm) clear height above aisle.

4-3.10.3.4 Overhead doors are centered on the workbays, and are 24 ft wide by 14 ft high (4900 mm by 7300 mm) insulated vertical lift doors with powered operation.

4-3.10.3.5 Provide 8 in (200 mm) diameter concrete filled with concrete dome top, steel protective bollards inside and outside of overhead door jambs and at corners of OMS.

4-3.10.3.6 All fueled equipment that will be serviced in the shop is diesel-powered; no gasoline-powered equipment will be serviced or stored in shop. Provide one or more signs in the workbay area - NO GASOLINE VEHICLES PERMITTED IN SHOP.

Figure 4-48
“Birdbath” Trench Drain



4-3.10.3.7 Water runoff from the workbay will be collected in trench drains located inside the overhead doors, and will discharge through an outdoor oil/water separator connected to the sanitary sewer. Designer should verify environmental requirements for drainage with the Support Installation, and local

codes and regulations. Due to the use of portable lifts, workbay floors are desired to be largely level; provide a “birdbath” depressed floor area at the trench drains to facilitate collection of runoff from the equipment. Trench drains are centered approximately 5 ft (1500 mm) in from the overhead doors.

4-3.10.3.8 One work area in one bay must be equipped for welding; that work area is located along the equipment alcove and in an end bay of a 32 ft x 96 ft configuration. The welding equipment can be stored in the equipment alcove, and the articulating welding hood will attach to the wall above the alcove. Verify hood and other requirements for welding with guidance and codes. The designer should verify equipment, power, and other requirements with Tenants.

Figure 4-49
Exhaust Arm for Welding



4-3.10.3.9 A 10-ton bridge crane is required in all Army Reserve shops, with hoist access to the full width and length of all workbays, to the extent possible. Extend hoist access as close to doors at end of bays as practical while accommodating overhead door travel and service/utility provisions at the door jambs.

4-3.10.3.9.1 The crane must provide for a minimum hook height of 20 ft; verify whether Tenants have equipment that would require more height or additional lifting capacity. The crane shall be a single-girder, top-running crane, equipped with a low-headroom, bottom-running trolley with a wire rope hoist. Structural columns with a supporting haunch must be strategically placed to support the crane girder and rail, which supports the bridge crane.

4-3.10.3.9.2 The crane will be Class C, moderate service CMAA Duty Classification. Provide push button pendant control station with strain-reliever chain or cable permanently attached to the hoist frame and integral with pendant conductor cable. Minimum and maximum speeds: hoist 15 fpm (.076 m/s) and 25 fpm (.127 m/s); trolley 45 fpm (.229 m/s) and 75 fpm (.381 m/s); and bridge 75 fpm (.381 m/s) and 150 fpm (.762 m/s). Provide warning horn and light activation when crane is in motion, and warning alarm and light when crane malfunctions or is overloaded. Provide positioning sensors on the bridge crane to shut down the infrared heaters when the crane is directly underneath the heater(s). Coordinate control systems to allow other infrared heaters in the area to compensate and maintain proper heating levels in the area.

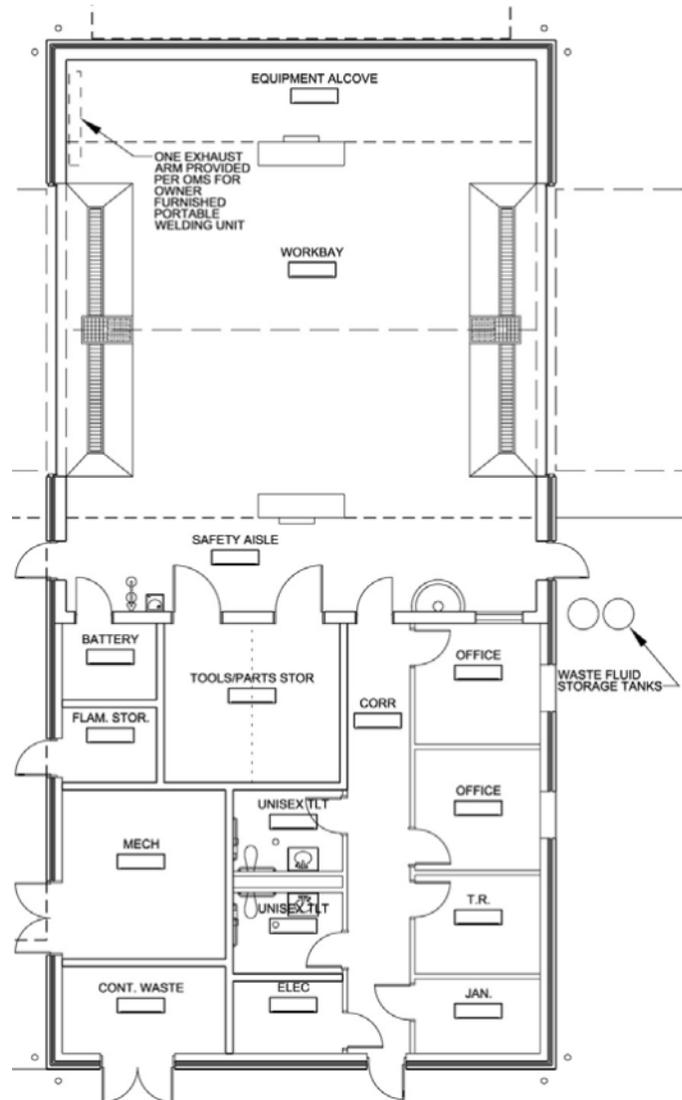
4-3.10.4 An 8 ft (2400 mm) safety aisle is provided between the workbays and the administrative and supporting spaces. The safety aisle must have a 10 ft clear height.

Figure 4-50
OMS Minimum Workbay
Concept Diagram

4-3.10.5 Due to the crane, the workbays typically are appreciably taller than is required for the other OMS supporting spaces, which may result in differing roof and wall heights for the two areas. In instances where it becomes more economical to construct the OMS with one roofline, use of the area above the ancillary shop spaces for additional storage; mechanical equipment space is strongly discouraged. The maintenance bay interior walls from finish floor to roof deck should receive durable material to resist the harsh treatment associated with a shop environment. Provide interior wall finish of concrete, concrete masonry units or other painted material approved by the Project Officer.

4-3.10.6 The concrete aprons serve as outdoor workbays, including use of portable hydraulic hoists - see drawings from [Army Reserve website](#) for dimensions.

4-3.10.7 Vehicle exhaust provisions must be located in each 16 x 32 work area. To avoid interference with the bridge crane, this system will be provided underfloor. The terminal hoses must be of sufficient flexibility and length, and have appropriate terminations to adequately serve the units' vehicles. Provide self-storing hose assemblies, and manifold multiple terminations to a main exhaust pipe. Slope main pipe and pitch to a low point for collection and removal of any fluids accumulating in piping. Provide pump for fluid removal.



4-3.10.8 Pay particular attention to coordination of systems in the space above the workbays. Lights, space conditioning, crane travel, overhead door travel, etc., compete for space and must be coordinated for space functionality. When practical, allow natural light into the workbays.

4-3.10.9 An air sweep exhaust for the entire work area must be located under 12 in (300 mm) above the floor to effectively remove vapor accumulations. Compliance with NFPA 30A is required since Class I liquids are handled in the workbay. Sweep ventilation must be run at a minimum of 1 cfm/sf or 4 air changes per hour when flammable liquids are being used in the occupied workbays; placarding shall be used to ensure compliance.

4-3.10.10 An air compressor and distribution system must be provided. The compressor will normally be located in the mechanical room. Provide quick disconnect outlets in the workbay area.

4-3.10.11 Provide a semi-circular wash fountain and a minimum of one eyewash/deluge shower (with floor drain) in the workbay area. These may be located in the safety aisle if a 4 ft clear travel path is maintained.

4-3.10.12 Provide water coolers in an area that is within close proximity to the workbays. Some Tenants prefer that the water cooler be located outside of the workbay to avoid dirty conditions.

4-3.10.13 Provide a five-line pneumatic pump shop fluids distribution system for Mid-Size, Standard, and larger OMS. Fluids to be pumped are one line for motor oil, one for gear oil, one for grease, one for antifreeze, and one for transmission fluid. System should include elevated five-reel distribution centers arranged in a manner to allow distribution to the workbays. The delivery system drums and pumps will be located in the fluid distribution room.

Figure 4-51
Fluids Distribution System

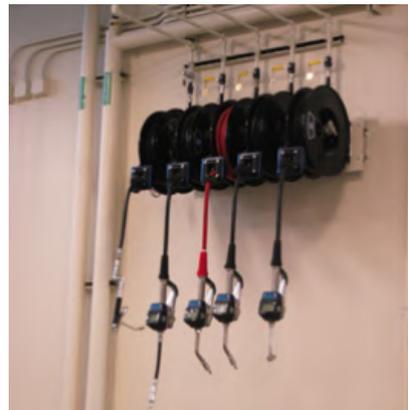


Figure 4-52
OMS Mid-Sized Workbay Concept Diagram

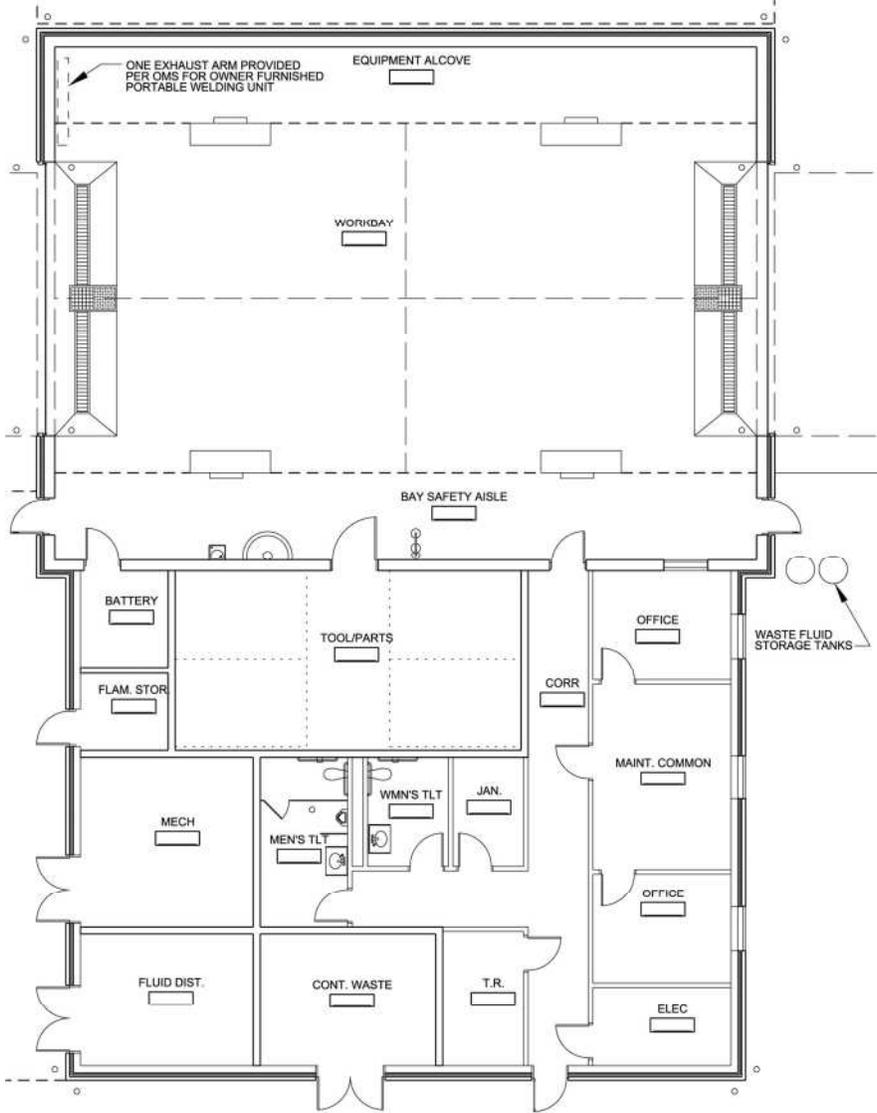
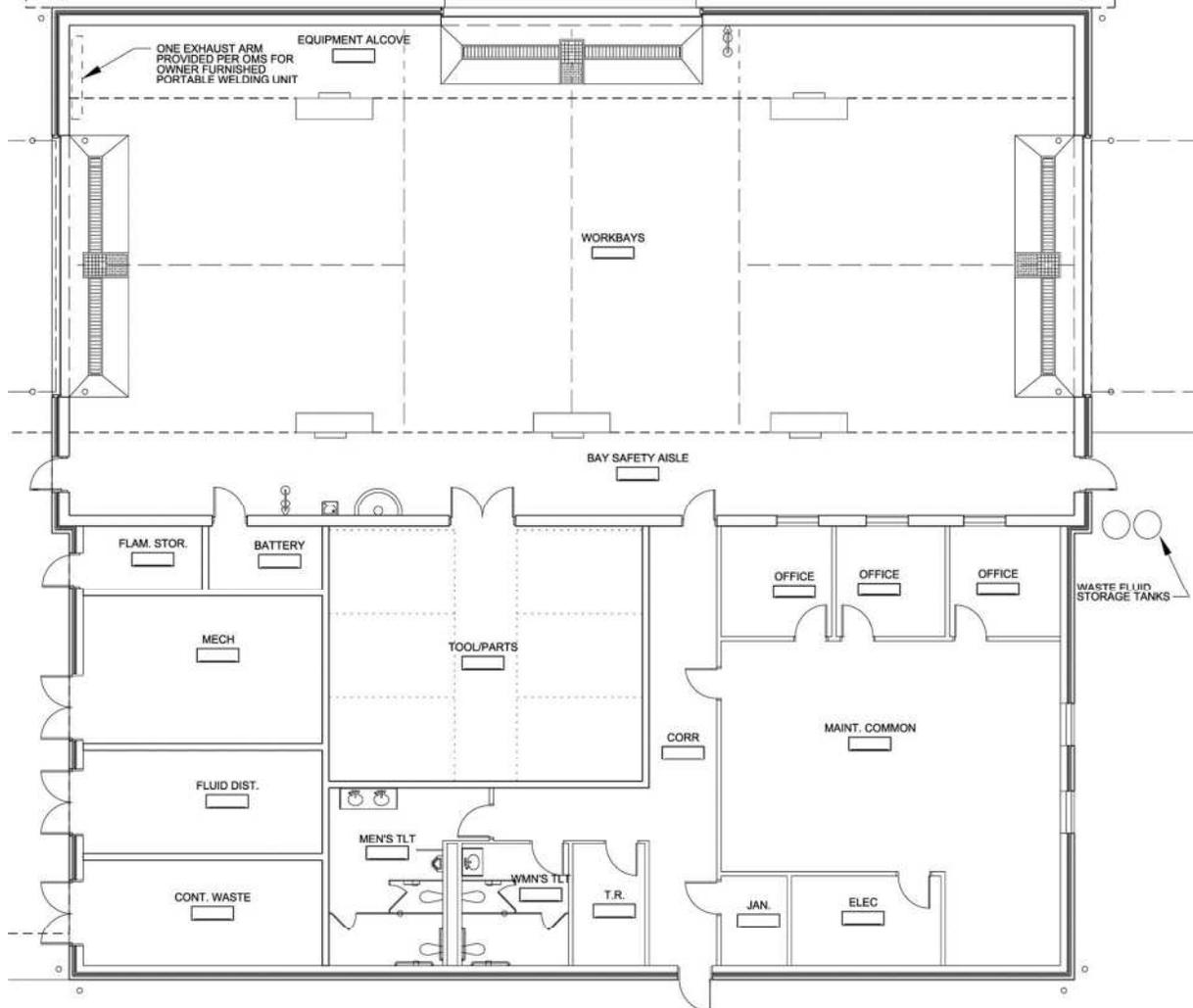


Figure 4-53
OMS Standard Workbay Concept Diagram



4-3.10.14 Space Design Information

General/Code

Size – varies; base workbay is 1,024 sf (95 sq m), bay for minimum OMS is 1,280 sf (120 sq m)

Occupancy – repair garage; no fueling; all fueled vehicles are diesel – no gasoline-powered vehicles will be serviced

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height – as required to accommodate clearances and systems

Floor – sealed concrete

Base – none

Walls – painted CMU or concrete; provide 3/4 in (19 mm) minimum painted plywood wainscot to 8 ft (2400 mm) above floor if walls are not concrete or CMU

Ceiling – none, paint structure

Trim – none

Lockset – entrance

Mechanical

Heating – occupied 68°F (20°C); unoccupied - 55°F (13°C)

In climates exceeding 5,000 degree days, hydronic in-floor heating shall be provided. Where in-floor heating cannot provide sufficient heat or rebound, utilize overhead infrared radiant heating or temporarily adjust delivery temperature of make-up air unit. Coordinate in-floor heating with concrete slab on grade. Since other heating sources are included within the maintenance bay, only one boiler is required for the in-floor heating system

Cooling – none

Ventilation – general workbay exhaust and vehicle exhaust provisions as indicated above

Electrical

Lighting – 50 fc on floor; high efficiency fluorescents or pendant 250W pulse start metal halide with wide distribution and acrylic lens

Trouble light/power reel as noted on conceptual layouts

Receptacles – GFCI duplex receptacles at 48 in (1220 mm) AFF

Voice/data – telephone/data outlets as noted on conceptual layouts

Ground - provide a static ground receptacle readily available for each bay

Furniture

Workbenches with with laminated hardwood top (one workbench per 32 x 32 workbay). If freestanding workbenches are used, each workbench is to include a drawer, lower shelf, energy saving power strip with surge protector and back and end stops; verify with Tenant if freestanding or built-in benches are preferred

~7 gal. Trash can per workbench

Special features or considerations

Carbon monoxide and nitrogen dioxide detectors

Ordinary Hazard Group 2 sprinklers

Design grade-supported slabs to comply with UFC 3-320-06A

4-3.11 Mechanical/Electrical

4-3.11.1 Separate spaces are provided for the location of electrical panels, water heaters, heating equipment, air compressors, etc. Access may be exterior only.

4-3.11.2 Space Design Information

General/Code

Size – varies

Occupancy – business, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – concrete

Base – none if CMU; rubber if gypsum board

Walls – painted CMU; painted gypsum board as an alternative

Ceiling – none; paint structure

Trim – none

Lockset – entrance

Mechanical

Heating – 55°F (13°C)

Cooling –ventilate sufficient to remove excess equipment heat

Ventilation – sufficient to satisfy cooling requirements and to provide combustion air; one air change per hour minimum

Electrical

Lighting – 30 fc on floor

Receptacles - convenience duplex

Voice/data – none

Equipment

Air compressor for workbay

Special features or considerations

Connections to flow switches, tamper switches, and fire alarm

Power and data connections for computer if energy management control system

Provide Ordinary Hazard Group 2 sprinklers if mechanical room includes gas-fired equipment or electrical room includes switchgear; otherwise, Ordinary Hazard Group 1 sprinklers

Floor drains for relief valves and condensate, hose bibb, eyewash if water treatment chemicals in room

Verify with Tenants any special connections for equipment

4-3.12 Information Technology

4-3.12.1 This space authorization is required to provide a dedicated TR for the OMS, with connection typically back to the training center network operations center.

4-3.12.2 Designer should coordinate the equipment requirements with G2/6.

4-3.12.3 Space Design Information – See information for TR at Paragraph 4-2.7.4 above.

4-3.13 Custodial/Janitorial

4-3.13.1 This space provides a mop sink and storage space for building maintenance equipment and supplies.

4-3.13.2 Space Design Information – See Paragraph 4-2.23.

4-3.14 Fluid Distribution Room

4-3.14.1 This room provides space for drum storage for the fluid distribution system, typically one drum in use and one in reserve of each fluid. It also houses the pneumatic pumping equipment for the distribution system. Provide double doors for ease of drum supply and removal. Verify with Tenants if powered material handling equipment will be utilized; design doors and floor grating accordingly.

4-3.14.2 The room should have a depressed well under an aluminum grate floor for collection of any spills. Slope well to allow convenient suction of spills at a low point: no drain. The well should be capable of containing 150% of the stored materials; verify likely amount of stored materials will be ten drums with Tenants. Construct well monolithically or provide joints with chemical-resistant waterstop and joint sealer. Provide HDPE liner with welded joints, or liner of similar material appropriate for materials stored

4-3.14.3 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage, unoccupied

Architectural/Interiors

Minimum STC rating – not applicable

Ceiling height –

Floor – concrete with liner below metal grate

Base – none

Walls – painted CMU

Ceiling – fire rated

Trim – none

Lockset – entrance

Mechanical

Heating - 40°F (4.4°C); explosion proof hot water or electric heater

Cooling - none

Ventilation – 6 air change per hour, 1 cfm/sf (5 l/s/sq m) or 150 cfm (4 cu m/min) whichever is greatest. Inlets and outlets located 12" above top of grating and positioned as far apart as practicable, to provide air movement across all portions of the

floor. Fans shall be explosion/spark proof. Ventilation system shall be tied to lights unless dispensing of Class I fluids is planned for space. If dispensing Class I fluids is planned for the space, continuous ventilation shall be provided and shall have an airflow switch or other equally reliable method that is interlocked to sound an audible alarm upon failure of the ventilation system

Electrical

Lighting – 10 fc on shelves; minimum of two explosion-proof fluorescents on exterior weatherproof pilot-lighted switch.

Provide low temperature ballasts.

Receptacles – none

Voice/data – none

Equipment

None

Special features or considerations

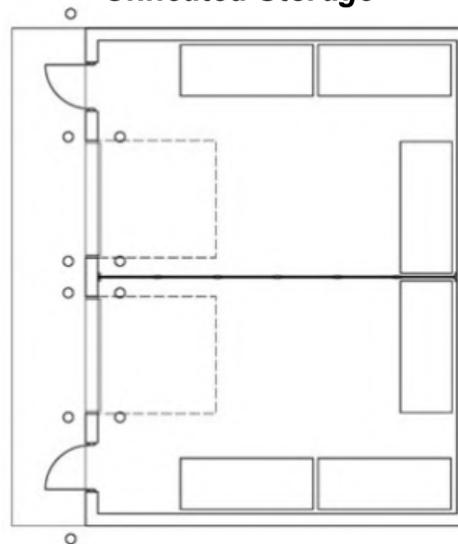
Extra hazard sprinklers; a dry pipe sprinkler system or dry heads shall be provided for locations with more than 4,500 heating degree days.

Design room to NEC Article 500 for a Class I Division I location
 Hazardous storage shall comply with NFPA 30, 9.9.1

4-4 UNHEATED STORAGE (UHS)

4-4.1 An unheated storage building is provided for storage of equipment and supplies that do not require a controlled climate. These buildings are typically simple pre-engineered metal buildings, but may be designed to match other buildings in the facility if the project budget allows. One or more personnel doors and one or more overhead doors are typical; the standard overhead door size is 8 ft by 8 ft (2450 mm by 2450 mm). Provide concrete apron at overhead doors, stoops at man doors, and bollards to protect overhead door jambs and building corners. These buildings are not considered warehouses, and are not typically designed with recessed truck docks, or to accommodate material handling equipment.

**Figure 4-54
 Unheated Storage**



4-4.2 The interior space is also typically quite simple: concrete floor, unfinished walls, service-level (5 fc on floor) lighting, convenience duplex receptacles, and a communications outlet. Finish the inside face of the wall with

a liner panel or similar wainscot 8 ft (2400 mm) tall to protect the structure and walls from damage in the transfer of stored goods. No offices or other spaces are included. Provide sufficient insulation under the roof deck to prevent condensation dripping on stored content. Normally, no sprinklers, plumbing, or HVAC are provided; verify whether sprinklers are required by UFC 3-600-01. The design team should work with the tenants to limit the storage within the building to a maximum height of 10 ft (3000 mm) so that Ordinary Hazard Group 2 sprinkler coverage would apply. Design should provide louvers to support natural convection and heat removal from the building. Consideration can be made in warm climates to include a manual timer-controlled exhaust fan and wall mounted intake for occasional ventilation.

4-4.3 While caging is not mandatory, Tenants may wish to divide the space with caging to provide space for individual units, and may also want individual doors. Shelving may be required, along with open space for bulk or palletized storage.

4-4.4 The space allocation for unheated storage is sometimes added to another building for functionality reasons. If this occurs, this space remains without climate control. The other building may require fire sprinklers, and that may require this space to be sprinkled.

4-4.5 If a pre-engineered building is used, provide applicable design loads and prepare performance specification. Structural design will incorporate details and loads from any pallet rack systems. Consider frost protection in cold weather areas.

4-5 AREA MAINTENANCE SUPPORT ACTIVITY (AMSA)

4-5.1 General: At present, the OCAR Engineer Office is reviewing the appropriate configuration for AMSA shops with USARC G4. Until such time as an approved configuration is developed, Army Reserve AMSA projects will likely follow recent Army Reserve TEMF designs. The project documents, Project Officer, and Design Agency project manager will provide direction for the design of AMSA projects. The Louisville District Reserve Support Team may be able to provide drawings of recent projects for reference.

4-6 DEPLOYABLE MEDICAL SETS (DEPMEDS)

4-6.1 A DEPMEDS area is an exterior space allocated for Reserve units with Deployable Medical Sets: collapsible structures used to create a medical theater in the field.

4-6.2 The DEPMEDS area is typically provided with an aggregate surface, security fencing, and exterior lighting similar to the MEP. The security fence should have both personnel and vehicle gates. Utility provisions typically include

power, water, stormwater provisions to drain the area, and a graywater connection to a sanitary sewer. The Tenants will provide and install grounding rods for their equipment as a part of their training. All the DEPMEDS equipment is provided by the Tenants.

4-7 WAREHOUSE

4-7.1 An Army Reserve warehouse (WHS) is a building to accommodate an Army Reserve unit with a full-time supply function in support of other Army Reserve units or maintenance shops. No standard design or functional space breakdown has been developed for warehouses, as their size and specific functions and capabilities may vary.

4-7.2 The project documents will define the specific functional area breakdown and ancillary support equipment required for each warehouse. The Tenants will provide further definition concerning the various storage and supply functions of the warehouse, and the actual and perceived relationship between the various functions. The functional and physical requirements of the support facilities must be fully defined to ensure correct design and layout.

4-7.3 Unlike an unheated storage building, a warehouse is likely to have raised or depressed loading docks with typical dock accessories such as dock levelers, dock bumpers, and seals. Size dock and dock doors to accommodate the vehicles which will serve it, as well as material handling equipment, if the Tenants have such equipment.

4-7.4 Provide shelving, pallet racking, and similar systems to fit the Tenant's needs. The design team should work with the tenants to determine the commodities being stored and the heights of storage for proper fire protection system design in accordance with UFC 3-600-01.

APPENDIX A

REFERENCES

A-1 REFERENCES: References listed below without dates indicate that the latest version/revision will be used. The following references are directly referenced in this design guide:

GOVERNMENT PUBLICATIONS:

1. Non-DoD Government Agency

ABA Accessibility Standard

Architectural Barriers Act Standards for Department of Defense Facilities- <http://www.access-board.gov/ada-aba/aba-standards-dod.cfm>

ICS 507-1 and 507-2, and the IC Tech Spec

Intelligence Community Standards and Technical Specifications for SCIFs – see [Army Reserve website](#)

EO 13123

Executive Order - Greening the Government Through Efficient Energy Management <http://www-.archives.gov/>

EPA-840-B-92-002

January 1993 - Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters - <http://www.epa.gov/OWOW/NPS/MMGI/index.html>

Federal Specification AA-V-2737

Modular Vault Systems - www.dsp.dla.mil

Federal Specification FF-L-2740

Locks, Combination www-.dsp.dla.mil

2. Department of Defense

UNIFIED FACILITIES CRITERIA (UFC):

http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 1-200-01 General Building Requirements

UFC 1-110-03 Roofing

UFC 3-120-01 Air Force Sign Standard

UFC 3-210-05FA	Landscape Design and Planning Criteria
UFC 3-230-10A	Water Supply: Water Distribution
UFC 3-240-07FA	Sanitary and Industrial Wastewater Collection
UFC 3-250-01FA	Pavement Design for Roads, Streets, Walks, and Open Storage Areas
UFC 3-250-04	Standard Practice for Concrete Pavements
UFC 3-260-02	Pavement Design for Airfields
UFC 3-301-01	Structural Engineering
UFC 3-310-04	Seismic Design for Buildings
UFC 3-320-06A	Concrete Floor Slabs on Grade Subjected to Heavy Loads
UFC 3-400-01	Energy Conservation
UFC 3-400-02	Design: Engineering Weather Data
UFC 3-410-01FA	Heating, Ventilating and Air Conditioning
UFC 3-420-01	Plumbing Systems
UFC 3-420-02FA	Compressed Air
UFC 3-440-01	Active Solar Preheat Systems
UFC 3-450-01	Noise and Vibration Control
UFC 3-520-01	Interior Electrical Systems
UFC 3-600-01	Fire Protection Engineering For Facilities
UFC 4-010-01	DoD Minimum Antiterrorism Standards for Buildings
UFC 4-021-01	Design and O&M: Mass Notification Systems
UFC 4-214-02	Tactical Equipment Maintenance Facilities (TEMF)

2.1 Department of the Army

ARMY REGULATIONS (AR):

www.usapa.army.mil/USAPA_PUB_search_P.asp

- | | |
|------------|---|
| AR 140-483 | Army Reserve Land and Facilities Management |
| AR 190-11 | Physical Security of Weapons, Ammunition and Explosives |
| AR 190-13 | The Army Physical Security Program |
| AR 190-16 | Physical Security |

ENGINEER TECHNICAL LETTER (ETL):

www.hnd.usace.army.mil/techinfo/engpubs.htm

- | | |
|----------------|--|
| ETL 1110-3-446 | Revision of Thrust Block Criteria in TM 5-813-5/AFM 88-10, Vol 5, Appendix C -- Note TM 5-813-5 is now UFC 3-230-10A this ETL applies to the UFC |
| ETL 1110-3-466 | Alternatives for Secondary Treatment at Central Vehicle Wash Facilities |
| ETL 1110-3-481 | Containment and Disposal of Aqueous Film-Forming Foam (AFFF) Solution |
| ETL 1110-3-484 | Aircraft Hangar Fire Protection Systems |
| ETL 1110-3-485 | Fire Protection for Helicopter Hangars |

MILITARY HANDBOOK (MIL HDBK):

http://www.wbdg.org/ccb/browse_doc.php?d=2813

- | | |
|------------------|---|
| MIL HDBK 1013/1A | Design Guides for Physical Security of Facilities |
|------------------|---|

TECHNICAL INSTRUCTION (TI):

www.hnd.usace.army.mil/techinfo/engpubs.htm

- | | |
|-----------|-----------------|
| TI 800-01 | Design Criteria |
|-----------|-----------------|

TECHNICAL MANUALS (TM):

www.hnd.usace.army.mil/techinfo/engpubs.htm

- | | |
|------------|----------------------------------|
| TM 5-810-6 | Nonindustrial Gas Piping Systems |
|------------|----------------------------------|

TECHNICAL BULLETINS (TB):

TB 55-46-1 Standard Characteristics (Dimensions, Weight, and Cube)
Overweight Equipment (in TOE line item number sequence
for Transportability of Military Vehicles and Other Outsize/
www.tea.army.mil/ (Permission required from web site to
view publications)

TECHNICAL CRITERIA:

I3A Technical Criteria for the Installation Information
Infrastructure Architecture

2.1.1 Headquarters United States Army Corps of Engineers (USACE)

USACE Army LEED Implementation Guide
(http://en.sas.usace.army.mil/enweb/httproot/ae/spreadsheet/USACE_LEED_ImpI_Guide_21Aug11.pdf)

2.1.2 Army Reserve Support Team Documents
[Army Reserve website](#)

Army Reserve Design Process and Submittal Requirements

Army Reserve IT Manual - Information Technology Design and Construction
Guide

Army Reserve Tailored Specifications for SpecsIntact

Army Reserve Tailored Specifications for Design Build Contracts

Army Reserve Design Build RFP Instruction Manual

2.1.3 USACE Louisville District Documents - [Army Reserve website](#)

Louisville District Tailored Specifications for SpecsIntact

Fire Protection/Life Safety Code Submittal

NON-GOVERNMENT PUBLICATIONS:

1. American Society of Civil Engineers
(ASCE) 1801 Alexander Bell Drive
Reston, VA 20191-4400
Ph: 703-295-6300 - 800-548-
2723 Fax: 703-295-6222
E-mail: marketing@asce.org
Internet: <http://www.asce.org>

ASCE 7 Minimum Design Loads for Buildings and Other Structures

2. American Society of Heating Refrigeration and Air Conditioning Engineers

(ASHRAE)
Atlanta, GA
30329
Ph: 800-527-4723 or 404-636-
8400 Fax: 404-321-5478
E-mail: ashrae@ashrae.org
Internet: <http://www.ashrae.org>

ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality

ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential
Buildings

ASHRAE Handbooks Four Volume Set including Fundamentals, Refrigeration,
HVAC Applications, and HVAC Systems and Equipment

3. International Code Council (ICC), Incorporated
5203 Leesburg Pike, Suite 708
Falls Church Virginia 22041-3401
Ph: 703-931-4533
Fax: 703-379-1546
E-mail: webmaster@iccsafe.org
Internet: <http://www.iccsafe.org>

IBC International Building Code

IPC International Plumbing Code

4. Illuminating Engineering Society (IES)
120 Wall Street, 17th Floor
New York, NY 10005
Ph: 212-248-5000
Fax: 212-248-5017
E-mail: iesna@iesna.org
Internet: <http://www.iesna.org>

IES Lighting Handbook: Reference and Application

5. National Electrical Manufacturers Association (NEMA)
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209
Ph: 703-841-3200
Fax: 703-841-5900
E-mail: webmaster@nema.org
Internet: <http://www.nema.org>

NEMA WD 1 General Color Requirements for Wiring Devices

6. National Fire Protection Association (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 617-770-3000
Fax: 617-770-0700
E-mail: webmaster@nfpa.org
Internet: <http://www.nfpa.org>

NFPA 10 Portable Fire Extinguishers

NFPA 13 Installation of Sprinkler Systems

NFPA 30A Code for Motor Fuel Dispensing Facilities and Repair
Garage

NFPA 51B Fire Prevention During Welding, Cutting, and Other Hot
Work

NFPA 70 National Electrical Code (NEC)

NFPA 72 National Fire Alarm Code

NFPA 96 Ventilation Control and Fire Protection of Commercial
Cooking Operations

NFPA 101 Life Safety Code

NFPA 780 Installation of Lightning Protection Systems

7. Telecommunications Industry Association/Electronic Industries Alliance
 (TIA/EIA) Electronic Industries Alliance (EIA)
 2500 Wilson Boulevard
 Arlington, VA 22201-3834
 Ph: 703-907-7500
 Fax: 703-907-7501
 Internet: <http://www.eia.org>

TIA/EIA-568 Commercial Building Telecommunications Cabling Standard

TIA/EIA-569 Commercial Building Standard for Telecommunications
 Pathways and Spaces

TIA/EIA-607 Commercial Building Grounding and Bonding Requirements
 for Telecommunications

APPENDIX B

ACRONYMS AND MILITARY RANK DESIGNATIONS

B-1.1 The Army Reserve frequently uses acronyms. Here is a list of those most commonly used. See website http://www.dtic.mil/doctrine/dod_dictionary/.

A/E	Architect/engineering
AC	Asphalt cement
ARIMD	Army Reserve Installation Management Directorate
ACT	Acoustical ceiling tile
ABA-DoD	Architectural Barriers Act Standard for Department of Defense Facilities
AFFF	Aqueous film forming foam
AGCCS	Army Global Command Control System
AMSA	Area maintenance support activities
AR	Army regulation
ARNET	Army Reserve Network
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
AT/FP	Antiterrorism/Force Protection
BIM	Building information model or Building information modeling
BMAR	Backlog of maintenance and repair
BMP	Best management practices
BOD	Beneficial occupancy date
BRAC	Base realignment and closure
CAA	Controlled access area
CAC	Common access card or ceiling attenuation class
CAD	Computer-aided design
CATV	Cable access television
CCTV	Closed circuit television
CCL	Construction cost limit
CE-R	Corps of Engineers Regulation
CFCI	Contractor-furnished/contractor-installed
CFM	Cubic feet per minute
CFR	Code of Federal Regulations
CK	Containerized kitchen
CMU	Concrete masonry unit
COMSEC	Communications security
CT	Current transformer

CTO	Certificate to operate
CWE	Current working estimate
DAAR-EN	Department of the Army, Army Reserve Engineering
Design Agency	Corps of Engineers and supporting architectural/engineering firms
DIA	Defense Intelligence Agency
D/B	Design/build
D/B/B	Design/bid/build
D/B RFP	Design/build request for proposal
DCID	Director of Central Intelligence Directive
DDC	Direct digital controls
DDG	District design guide
DEPMEDS	Deployable medical system
DES	Department of Emergency Services
DoD	Department of Defense
DOT	Department of Transportation
DPW	Department of Public Works
DRC	Direct reporting command
EA	Environmental assessment
EBS	Environmental baseline survey
ECM	Energy conservation measure
ECP	Environmental condition of property
ECS	Equipment concentration site or Entry control system
EF	Entrance facility
EFS	Engineering feasibility study
EPA	Environmental Protection Agency
EST	Engagement skills trainer
ETL	Engineering technical letter
FEMA	Federal Emergency Management Agency
FFR	Full facility restoration
FONSI	Finding of no significant impact
FPI	Federal prison industries
FPM	Feet per minute
GFCI	Government-furnished/contractor-installed or Ground-fault circuit interrupter
GFGI	Government-furnished/government-installed
GSA	Government Service Administration
HDPE	High-density polyethylene
HID	High intensity discharge (lighting)
HVAC	Heating, ventilating, and air conditioning
IBC	International Building Code

IDS	Intrusion detection system
IES	Illuminating Engineering Society
I-P	Inch-pound
ISEC	Information systems engineering command
IT	Information technology
LAN	Local area network
LCC	Life cycle cost
LCD	Liquid crystal display
LED	Light emitting diode
LEED-NC	Leadership in Energy and Environmental Design-New Construction and Major Renovations
LID	Low impact development
LMTS	Laser marksmanship training system
LP	Lump sum
LRL	Louisville District, Corps of Engineers
M&R	Maintenance and repair
M-CACES	Military computer-aided cost estimating system
MCAR	Military Construction Army Reserve
MDS	Modular design system
MEP	Military equipment parking
MILCON	Military construction
MKT	Mobile kitchen trailer
MMCAR	Minor Military Construction Army Reserve
MMR	Minor maintenance and repair
MOS	Military occupational specialty
MTOE	Modification table of organization and equipment
NASA	National Aeronautics Space Administration
NAVFAC	U.S. Naval Facilities Engineering Command
NBS	National Bureau of Standards
NEC	National Electrical Code - NFPA 70
NEMA	National Electrical Manufacturing Association
NFPA	National Fire Protection Association
NOC	Network operations center
NOI	Notice of intent
NPDES	National pollutant discharge elimination system
OCAR	Office of the Chief Army Reserve
OCE	Office of the Corps of Engineers
OMAR	Operation and Maintenance Army Reserve
OMS	Organizational maintenance shops
OPA	Other program Army
OSHA	Occupational Safety and Health Administration

PA	Programmed amount or Project architect or Public address
PCC	Portland cement concrete
PDT	Project delivery team
PF	Protection factor
PMO	Provost Marshal Office
POV	Privately-owned vehicles
POTS	Plain old telephone service
PRV	Plant replacement value
PT	Physical training
PV	Photovoltaic
PVC	Polyvinyl chloride
RCAS	Reserve component automation system
RCC	Roller compacted concrete
REPR	Real estate planning report
RFP	Request for proposal
RPX	Real property exchange
RSC	Regional Support Command
RST	Reserve support team
SATS	Standard automotive tool set
SCIF	Sensitive compartmented intelligence facility
SDD	Sustainable design and development
SF	Square foot
SGML	Standard generalized markup language
SLDC	Single line digital control
SSMRS	Standing seam metal roof systems
SSO	SCIF security officer
STC	Sound transmission class
SWPPP	Storm water pollution prevention plan
TASS	Total army school system
TEMF	Tactical equipment maintenance facility
TER	Telecommunications equipment room
TB	Technical bulletins
TC	Training center
TI	Technical instruction
TM	Technical manual
TPO	Thermoplastic olefin
TR	Telecommunications room
UBC	Uniform Building Code
UFAS	Uniform Federal Accessibility Standards
UFC	Unified Facility Criteria
UFGS	Unified Facility Guide Specifications

UFGS RST	UFGS - Reserve Support Team
UNICOR	Federal prison industry
USACE	U.S. Army Corps of Engineers
USAR	United States Army Reserve
USARC	United States Army Reserve Center; U.S. Army Reserve Command
USGBC	U. S. Green Building Council
OCAR Engineer Office	Army Reserve Installation Management Directorate (ARIMD)
VAV	Variable air volume
VCT	Vinyl composition tile
WAN	Wide area network
WBS	Work breakdown structure

B-1.2 Staff Designations - The following designations are used in the United States Armed Forces to designate different staff positions:

G-1	Deputy Chief of Staff for Personnel
G-2	Deputy Chief of Staff for Intelligence
G-3	Deputy Chief of Staff for Operations and Plans
G-4	Deputy Chief of Staff for Logistics
G-5	Civil Affairs or Public Affairs Officer
G-6	Director of Information Systems for Command, Control, Communications, and Computers (DISC4)
G-7	Joint Operations Staff Officer
G-8	Deputy Chief of Staff for Programs

The "G" designation is used for General Officer Headquarter level positions. At lower command levels the "G" designations are replaced by "S" designations.

B-2 MILITARY RANK DESIGNATIONS

B-2.1 Military rank is frequently referred to by pay grade designations; such designations are listed below with their applicable rank insignia

OFFICER RANKS

Pay Grade	Name	Abbreviation	Insignia
O1	Second Lieutenant	2LT	
O2	First Lieutenant	1LT	
O3	Captain	CPT	
O4	Major	MAJ	
O5	Lieutenant Colonel	LTC	
O6	Colonel	COL	
O7	Brigadier General	BG	
O8	Major General	MG	
O9	Lieutenant General	LTG	
O10	General	GEN	

WARRANT OFFICER RANKS

Pay Grade	Name	Abbreviation	Insignia
W1	Warrant Officer	WO1	
W2	Chief Warrant Officer	CW2	
W3	Chief Warrant Officer	CW3	
W4	Chief Warrant Officer	CW4	
W5	Chief Warrant Officer	CW5	

ENLISTED RANKS

Pay Grade	Name	Abbreviation	Insignia
E1	Private	PV1	(No Insignia)
E2	Private	PV2	
E3	Private First Class	PFC	
E4	Corporal / Specialist	CPL/ SPC	
E5	Sergeant	SGT	
E6	Staff Sergeant	SSG	
E7	Sergeant First Class	SFC	
E8	Master Sergeant / First Sergeant	MSG / 1SG	
E9	Sergeant Major / Command Sergeant Major	SGM / CSM	

APPENDIX C
SAMPLE 1390, 1391, AND 5034R –
FUNCTIONAL SPACE DETAIL
D Sample 1390

Certified Final Submittal November 15, 2012

1. COMPONENT AR	FY 2014 MILITARY CONSTRUCTION PROJECT DATA		2. DATE Apr 12
3. INSTALLATION AND LOCATION SSG Frederick J. Ill Jr. USARC Bullville, NY		4. PROJECT TITLE Army Reserve Center	
5. PROGRAM ELEMENT 0505978A	6. CATEGORY CODE 171	7. PROJECT NUMBER CAR 14-67690	8. PROJECT COST (\$000) 14,500

9. COST ESTIMATES				
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)
<u>PRIMARY FACILITIES:</u>				10350
Training Building	SF	31,248	209.48	(6546)
Maintenance Building	SF	12,344	254.65	(3144)
Unheated Storage	SF	2,886	114.06	(330)
Sustainability/Energy Measures	LS	-	-	(203)
Building Information Systems	LS	-	-	(127)
				<u>2714</u>
<u>SUPPORTING FACILITIES:</u>				
Site Improvement	LS	-	-	(1344)
Paving - MEP/Apron/Roads	SY	11,035	41.81	(462)
POV Parking	SY	6,300	32.53	(205)
Sewage Upgrades/Pump	LS	-	-	(250)
Well Water System Upgrade	LS	-	-	(150)
Information Systems	LS	-	-	(144)
Demolition	SF	16,429	-	(1337)
Antiterrorism/Force Protection	LS	-	-	(26)
TOTAL CONSTRUCTION COST				<u>13064</u>
Contingencies (5.0%)				654
Supervision and Administration (5.7%)				782
TOTAL PROJECT COST				14500
Equipment Funded Other Appropriations			Non-Add)	(1168)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Construct a 400-member Army Reserve Center (ARC). Primary facilities include construction of an ARC training building and Organizational Maintenance Shop (OMS). Buildings will be of permanent construction with reinforced concrete foundations, concrete floor slabs, structural steel frames, masonry veneer walls, standing seam metal roof, Heating, Ventilation, and Air Conditioning (HVAC), plumbing, mechanical systems, security systems, and electrical systems. Supporting facilities include land clearing, paving, fencing, general site improvements, and extension of utilities to serve project. Accessibility for the disabled will be provided. Physical security measures will be incorporated into design including maximum standoff distance from roads, parking areas, and vehicle unloading areas. Berms, heavy landscaping, and bollards will be used to prevent access when standoff distances cannot be maintained.

<p>1. COMPONENT AR</p>	<p>FY 2014 MILITARY CONSTRUCTION PROJECT DATA</p>	<p>2. DATE Apr 12</p>
<p>3. INSTALLATION AND LOCATION SSG Frederick J. Ill Jr. USARC Bullville, NY</p>		
<p>4. PROJECT TITLE Army Reserve Center</p>		<p>5. PROJECT NUMBER CAR 14-67690</p>
<p>10. DESCRIPTION OF PROPOSED CONSTRUCTION (CONT) Sustainability/Energy measures will be provided. Facilities will be designed to a minimum life of 50 years and energy efficiencies meeting, on average, American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 189.1 standards through improved building envelope and integrated building systems performance. MISSION : Existing A/C Tonnage : 105</p>		
<p>11. REQUIREMENT: 46,478 SF Adequate: 0 SF Substandard: 0 SF</p> <p>PROJECT: Construct a 300-member ARC training building and OMS. (Current Mission)</p> <p>REQUIREMENT: This project will be constructed on 15 existing acres of government land at the existing Army Reserve Center location at Bullville, NY and a 400-member training facility with adequate administrative, educational, assembly, library, learning center, vault, weapons simulator, and physical fitness areas to support the requirements and operations of two Army Reserve units. The Operational Maintenance Shop (OMS) will provide work bays and maintenance administrative support. The project will also provide adequate parking space for military and privately-owned vehicles (POV). This project will demolish 16,429 SF of the existing center.</p> <p>CURRENT SITUATION: The existing SSG Frederick Ill Jr. US Army Reserve Training Building was constructed in 196land is over utilized at 176% and the OMS is over-utilized at 291%. Units are unable to effectively train due to the size and configuration of the facility. In addition, it does not meet current antiterrorism requirements for setback distances.</p> <p>IMPACT IF NOT PROVIDED: Insufficient storage, administrative, and training space as described above adversely affect the units' ability to train for wartime tasks and impedes mobilization planning and training. Continued occupancy in clearly substandard facilities is tenuous. If a new facility is not built, leased facilities will have to be procured to correct the deficiencies inherent in the existing facility and to assure unit readiness and mission accomplishment.</p> <p>ADDITIONAL:</p>		

1. COMPONENT AR	FY 2014 MILITARY CONSTRUCTION PROJECT DATA	2. DATE Apr 12																																										
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<p>A parametric cost estimate based upon project engineering was used to develop this budget estimate. Sustainable principles will be integrated into the design, development, and construction of the project in accordance with Executive Order 13123 and other applicable laws and Executive Orders.</p> <p>This project has been coordinated with the installation physical security plan, and all physical security measures are included. All required anti-terrorism/force protection measures are included. Alternative methods of meeting this requirement have been explored during project development. This project is the only feasible option to meet the requirement. The Deputy Assistant Secretary of the Army (Installation and Housing) certifies that this project has been considered for joint use potential. The facility will be available for use by other components.</p>																																												
<p>12. SUPPLEMENTAL DATA</p> <p>a. Estimated design data:</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">(1) Status:</td> <td></td> </tr> <tr> <td style="padding-left: 40px;">(a) Date Design Started.....</td> <td style="text-align: right;"><u>Aug 2012</u></td> </tr> <tr> <td style="padding-left: 40px;">(b) Percent Complete As Of</td> <td></td> </tr> <tr> <td style="padding-left: 40px;">(c) Date Design 35% Complete.....</td> <td style="text-align: right;"><u>Mar 2013</u></td> </tr> <tr> <td style="padding-left: 40px;">(d) Date Design Complete.....</td> <td style="text-align: right;"><u>Dec 2013</u></td> </tr> <tr> <td style="padding-left: 40px;">(e) Parametric Cost Estimating Used to Develop Cost.....</td> <td style="text-align: right;"><u>Yes</u></td> </tr> <tr> <td style="padding-left: 40px;">(f) Type of Design Contract.....</td> <td style="text-align: right;"><u>Design - Bid - Build</u></td> </tr> <tr> <td colspan="2" style="padding-left: 20px;">(g) An energy study and life cycle cost analysis will be documented during the final design.</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td colspan="2">(2) Basis:</td> </tr> <tr> <td style="padding-left: 40px;">(a) Standard or Definitive Design.....</td> <td style="text-align: right;"><u>No</u></td> </tr> <tr> <td style="padding-left: 40px;">(b) Where Design Was Most Recently Used.....</td> <td style="text-align: right;"><u>N/A</u></td> </tr> <tr> <td colspan="2">(3) Total Cost (c) = (a) + (b) or (d) + (e) (\$000):</td> </tr> <tr> <td style="padding-left: 40px;">(a) Production of Plans and Specifications.....</td> <td></td> </tr> <tr> <td style="padding-left: 40px;">(b) All Other Design Costs.....</td> <td></td> </tr> <tr> <td style="padding-left: 40px;">(c) Total.....</td> <td style="text-align: right;"><u>1307</u></td> </tr> <tr> <td style="padding-left: 40px;">(d) Contract.....</td> <td style="text-align: right;"><u>1045</u></td> </tr> <tr> <td style="padding-left: 40px;">(e) In-house.....</td> <td style="text-align: right;"><u>262</u></td> </tr> <tr> <td style="padding-left: 40px;">(4) Construction Award.....</td> <td style="text-align: right;"><u>Mar 2014</u></td> </tr> <tr> <td style="padding-left: 40px;">(5) Construction Start.....</td> <td style="text-align: right;"><u>Apr 2014</u></td> </tr> <tr> <td style="padding-left: 40px;">(6) Construction Completion.....</td> <td style="text-align: right;"><u>Apr 2016</u></td> </tr> </table>			(1) Status:		(a) Date Design Started.....	<u>Aug 2012</u>	(b) Percent Complete As Of		(c) Date Design 35% Complete.....	<u>Mar 2013</u>	(d) Date Design Complete.....	<u>Dec 2013</u>	(e) Parametric Cost Estimating Used to Develop Cost.....	<u>Yes</u>	(f) Type of Design Contract.....	<u>Design - Bid - Build</u>	(g) An energy study and life cycle cost analysis will be documented during the final design.				(2) Basis:		(a) Standard or Definitive Design.....	<u>No</u>	(b) Where Design Was Most Recently Used.....	<u>N/A</u>	(3) Total Cost (c) = (a) + (b) or (d) + (e) (\$000):		(a) Production of Plans and Specifications.....		(b) All Other Design Costs.....		(c) Total.....	<u>1307</u>	(d) Contract.....	<u>1045</u>	(e) In-house.....	<u>262</u>	(4) Construction Award.....	<u>Mar 2014</u>	(5) Construction Start.....	<u>Apr 2014</u>	(6) Construction Completion.....	<u>Apr 2016</u>
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1. COMPONENT AR	FY 2014 MILITARY CONSTRUCTION PROJECT DATA	2. DATE Apr 12																												
3. INSTALLATION AND LOCATION SSG Frederick J. Ill Jr. USARC Bullville, NY																														
4. PROJECT TITLE Army Reserve Center		5. PROJECT NUMBER CAR 14-67690																												
<p>b. Equipment associated with this project which will be provided from other appropriations:</p> <table style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Equipment</u></th> <th style="text-align: left; border-bottom: 1px solid black;"><u>Procuring</u></th> <th style="text-align: center; border-bottom: 1px solid black;"><u>Fiscal Year</u> <u>Appropriated or</u></th> <th style="text-align: right; border-bottom: 1px solid black;"><u>Cost</u></th> </tr> <tr> <th style="text-align: left;">Nomenclature</th> <th style="text-align: left;">Appropriation</th> <th style="text-align: center;">Requested</th> <th style="text-align: right;">(\$000)</th> </tr> </thead> <tbody> <tr> <td>Collateral Equip</td> <td>OMAR</td> <td style="text-align: center;">2015</td> <td style="text-align: right;">394</td> </tr> <tr> <td>Caging & Shelving</td> <td>OMAR</td> <td style="text-align: center;">2015</td> <td style="text-align: right;">343</td> </tr> <tr> <td>Furniture</td> <td>OMAR</td> <td style="text-align: center;">2015</td> <td style="text-align: right; border-bottom: 1px solid black;">293</td> </tr> <tr> <td>IT Equipment</td> <td>OMAR</td> <td style="text-align: center;">2015</td> <td style="text-align: right;">138</td> </tr> <tr> <td colspan="3" style="text-align: right; padding-right: 20px;">Total:</td> <td style="text-align: right;">1168</td> </tr> </tbody> </table> <p style="margin-top: 20px;">Point of Contact: LTC Dickerson, 703-806-6796</p>			<u>Equipment</u>	<u>Procuring</u>	<u>Fiscal Year</u> <u>Appropriated or</u>	<u>Cost</u>	Nomenclature	Appropriation	Requested	(\$000)	Collateral Equip	OMAR	2015	394	Caging & Shelving	OMAR	2015	343	Furniture	OMAR	2015	293	IT Equipment	OMAR	2015	138	Total:			1168
<u>Equipment</u>	<u>Procuring</u>	<u>Fiscal Year</u> <u>Appropriated or</u>	<u>Cost</u>																											
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1. COMPONENT AR	FY 2014 GUARD AND RESERVE MILITARY CONSTRUCTION	2. DATE Apr 12																															
3. INSTALLATION AND LOCATION SSG Frederick J. Ill Jr. USARC, Bullville, NY		4. AREA CONSTR COST INDEX 1.05																															
11. PERSONNEL STRENGTH AS OF 30 Apr 2012																																	
	<table style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td colspan="3" style="text-align: center; border-bottom: 1px solid black;">PERMANENT</td> <td colspan="3" style="text-align: center; border-bottom: 1px solid black;">GUARD/RESERVE</td> </tr> <tr> <td></td> <td style="text-align: center; border-bottom: 1px solid black;">TOTAL</td> <td style="text-align: center; border-bottom: 1px solid black;">OFFICER</td> <td style="text-align: center; border-bottom: 1px solid black;">ENLISTED</td> <td style="text-align: center; border-bottom: 1px solid black;">CIVILIAN</td> <td style="text-align: center; border-bottom: 1px solid black;">TOTAL</td> <td style="text-align: center; border-bottom: 1px solid black;">OFFICER</td> <td style="text-align: center; border-bottom: 1px solid black;">ENLISTED</td> </tr> <tr> <td>AUTHORIZED</td> <td style="text-align: center;">16</td> <td style="text-align: center;">1</td> <td style="text-align: center;">11</td> <td style="text-align: center;">4</td> <td style="text-align: center;">382</td> <td style="text-align: center;">12</td> <td style="text-align: center;">370</td> </tr> <tr> <td>ACTUAL</td> <td style="text-align: center;">4</td> <td style="text-align: center;">0</td> <td style="text-align: center;">4</td> <td style="text-align: center;">0</td> <td style="text-align: center;">186</td> <td style="text-align: center;">6</td> <td style="text-align: center;">180</td> </tr> </table>		PERMANENT			GUARD/RESERVE				TOTAL	OFFICER	ENLISTED	CIVILIAN	TOTAL	OFFICER	ENLISTED	AUTHORIZED	16	1	11	4	382	12	370	ACTUAL	4	0	4	0	186	6	180	
	PERMANENT			GUARD/RESERVE																													
	TOTAL	OFFICER	ENLISTED	CIVILIAN	TOTAL	OFFICER	ENLISTED																										
AUTHORIZED	16	1	11	4	382	12	370																										
ACTUAL	4	0	4	0	186	6	180																										
12. RESERVE UNIT DATA																																	
	ASGD/AUTH	49%	STRENGTH																														
UNIT DESIGNATION	AUTHORIZED	ACTUAL																															
RETENTION OFFICE NY011	1	1																															
417 PLT 1 CO (HORIZ CONST)	39	30																															
417 PLT 2 CO (HORIZ CONST)	39	33																															
417 PLT 3 CO (EQUIP SPT)	42	33																															
417 PLT 4 CO (FLD MAINT TM)	25	30																															
417 HQ DET (HORIZ CONST)	12	15																															
SPT OPS, 947 QM CO	8	2																															
1 PLT 947 QM CO	53	6																															
UNITS NOT SHOWN	163	36																															
Totals	382	186																															
Total Units Not Shown = 4																																	
13. MAJOR EQUIPMENT AND AIRCRAFT																																	
TYPE	AUTHORIZED	ACTUAL																															
Wheeled Vehicles	171	106																															
Trailers	115	74																															
Tracked Vehicles	13	9																															
Totals	299	189																															
14. OUTSTANDING POLLUTION AND SAFETY DEFICIENCIES																																	
		(\$000)																															
Air Pollution		0																															
Water Pollution		0																															
Safety and Occupational Health		0																															

Project Number : 67690
Project Title : Army Reserve Center
FACID : NY011

Project Validation

The Reserve manpower potential to meet and maintain authorized strengths of all Reserve units in the area in which this facility is to be located has been reviewed in accordance with DOD Directive 1225.7. It has been determined, in coordination with all other Services having Reserve units in the area, that the number of units of the Reserve components of the Armed Forces presently located in the area and those which have been allocated to the area for future activation, is not and will not be larger than the number that reasonably can be expected to be maintained at authorized strength.

RSC/Installation Commander

Information Systems

Description	Authorized	Approved	Criteria
1. Administrative Area:			
Full Time:	11	11	1 per full time employee
Unit Exclusive:	4	4	1 per auth excl space
Unit Common:	4	4	1 per 6 on largest drill
Retention:	1	1	1 per center
2. Supply Areas:			
Supply Offices:	2	2	1 per supply office
3. Maintenance Shop Areas:			
OMS Shop Office:	2	3	1 per 2 desks
AMSA Shop Office:	0	0	1 per desk
AMSA Classrooms:	0	0	1 per AMSA
AMSA Commo/Elec Shop:	0	0	1 per shop
AMSA Instrument Repair:	0	0	1 per shop
AMSA Small Arms Repair:	0	0	1 per shop
OMS/AMSA Shop/Workbay Area:	1	1	1 per shop
AMSA Supply Room:	0	0	1 per shop
AMSA Tool Room:	0	0	1 per shop
4. Support Areas:			
Fire Alarm:	1	1	1 per center
IDS/JSIDS:	1	1	1 per center
Special:	0	0	as justified on encl.
Total Instruments:	27	28	as justified on encl.

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

UFC 4-171-05
Certified Final Submittal November 15, 2012

Information Systems

Description	Authorized	Approved	Criteria
Construction Primary Funded (\$000)		\$127	
Construction Support Funded (\$000)		\$144	
Equipment Funded (\$000)		\$138	
ISCE Last Modified Date		6/03/2012	
ISCE Last Modified Date			

Basic Project Data - Actual/ English

UFC 4-171-05

Project Number: 67690
Project Title: Army Reserve Center
Date: Jul 16, 2012

Certified Final Submittal November 15, 2012

All Dates are in (DD/MM/YYYY) Format

Basic Information

RSC/Arcom : 99TH RSC FACID NY011
Facility Name : Ssg Frederick J. III Jr. Usarc
Street : NY 17k Rte
City : Bullville State : NY Zip : 10915-0277

Preparation Date of Documents : 11/04/2012

* Pattern of Facility Usage

Full Time Personnel 5 Days/Week
Reservist 2 Nights/Week
Reservist 2 Weekend/Month

* State Facility Review Board Recommendation

Date of Recommendation 06/12/2011
Recommendation is Modernization Construction

* Existing Sizes

Administrative 0
Assembly 0
Kitchen 0
Weapons 0
Education 0
Storage 0
Special Training 0
Support 0

Total Facility (existing/avail) : 0 / 0
Total Shop (existing/avail) : 0 / 0
Unheated Storage (existing/avail) : 0 / 0

* Land Acquisition and Additional Projects

Acres Required For Land Acquisition : 0 AC
Type Interest/ Acquisition Method : None
Acres Available : 152.92 AC

* Additional Project Planned in Next Years

Project 1)

Project 2)

* Nearest Six Military Installations

Component	Activity	City	STATE	Milt Act Dist	Size	U/M	Year Built
1	ARNG Armory	Stewart	NY	34	0	SF	
2	USAR Center	Newburgh	NY	36	0	SF	
4	USAR Center	Poughkeepsie	NY	51	0	SF	

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : RETENTION OFFICE NY011
 UIC : W8BYRS
 Drill Weekend : 0
 Type of Unit : TDA OTHER
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons N
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	0	0	1	
Authorized	0	0	1	
Assigned	0	0	1	
Full Time Personnel				
Authorized	0		1	0
Assigned	0		1	0

* Full Time Distribution

Administrators 1
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 4
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Special Training Areas

Band Room N
 Weapons Simulator Room N
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	0	0
Trailers	0	0
Crew Served Weapons	0	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization N
 Replacement N
 New Construction Y

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 417 PLT 1 CO (HORIZ CONST)
 UIC : WRCNA1
 Drill Weekend : 2
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	38	
Authorized	1	0	38	
Assigned	0	0	29	
Full Time Personnel				
Authorized	1		0	0
Assigned	0		0	0

* Full Time Distribution

Administrators	1
Supply	0
Automotive/Engineer Mechanics	0
Maintenance Administrative	0
General Staff Civilian Executive Officers	0

* Exclusive Space

General Officers	0
Principal Staff Officers	0
Colonel	0
Lieutenant Colonel	0
Major Or Below	0

* Common-Use Space

Members Requiring Open Office Space	1
Cooks	0
Automotive/Engineer Mechanics	0
Maintenance Administrative Personnel	0
Draftpersons	0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	6	4
Wheeled Vehicles	29	18
Trailers	14	9
Crew Served Weapons	4	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission

Modernization	N
Replacement	N
New Construction	Y

* Special Training Areas

Band Room	N
Weapons Simulator Room	Y
Physical Exam Wing	N
Soil Testing Lab	N
Photo Lab	N
S.C.I.F	N
Medical Section	N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 417 PLT 2 CO (HORIZ CONST)
 UIC : WRCNA2
 Drill Weekend : 2
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	38	
Authorized	1	0	38	
Assigned	1	0	32	
Full Time Personnel				
Authorized	0		1	0
Assigned	0		0	0

* Full Time Distribution

Administrators 1
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 1
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	6	4
Wheeled Vehicles	29	18
Trailers	14	9
Crew Served Weapons	4	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization N
 Replacement N
 New Construction Y

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 417 PLT 3 CO (EQUIP SPT)
 UIC : WRCNA3
 Drill Weekend : 2
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	41	
Authorized	1	0	41	
Assigned	1	0	32	
Full Time Personnel				
Authorized	0		0	0
Assigned	0		0	0

* Full Time Distribution

Administrators 0
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 2
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	1	1
Wheeled Vehicles	24	15
Trailers	14	9
Crew Served Weapons	7	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization N
 Replacement N
 New Construction Y

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 417 PLT 4 CO (FLD MAINT TM)
 UIC : WRCNA4
 Drill Weekend : 2
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	0	0	25	
Authorized	0	0	25	
Assigned	0	0	31	
Full Time Personnel				
Authorized	0		2	0
Assigned	0		3	0

* Full Time Distribution

Administrators	0
Supply	0
Automotive/Engineer Mechanics	0
Maintenance Administrative	2
General Staff Civilian Executive Officers	0
* Exclusive Space	
General Officers	0
Principal Staff Officers	0
Colonel	0
Lieutenant Colonel	0
Major Or Below	0
* Common-Use Space	
Members Requiring Open Office Space	2
Cooks	0
Automotive/Engineer Mechanics	22
Maintenance Administrative Personnel	1
Draftpersons	0

* Special Training Areas

Band Room	N
Weapons Simulator Room	Y
Physical Exam Wing	N
Soil Testing Lab	N
Photo Lab	N
S.C.I.F	N
Medical Section	N

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	9	6
Trailers	4	3
Crew Served Weapons	5	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization N
 Replacement N
 New Construction Y

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 417 HQ DET (HORIZ CONST)
 UIC : WRCNT1
 Drill Weekend : 2
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	2	0	10	
Authorized	2	0	10	
Assigned	2	0	12	
Full Time Personnel				
Authorized	0		2	2
Assigned	0		0	0

* Full Time Distribution

Administrators 3
 Supply 1
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 1
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 1

* Common-Use Space

Members Requiring Open Office Space 3
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	5	3
Trailers	2	2
Crew Served Weapons	7	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization N
 Replacement N
 New Construction Y

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : SPT OPS, 947 QM CO
 UIC : WZN6A1
 Drill Weekend : 1
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	1	6	
Authorized	1	1	6	
Assigned	0	0	3	
Full Time Personnel				
Authorized	0		1	0
Assigned	0		0	0

* Full Time Distribution

Administrators 1
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 4
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	1	1
Trailers	1	1
Crew Served Weapons	1	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization Y
 Replacement N
 New Construction N

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 1 PLT 947 QM CO
 UIC : WZN6A2
 Drill Weekend : 1
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	52	
Authorized	1	0	52	
Assigned	0	0	7	
Full Time Personnel				
Authorized	0		1	0
Assigned	0		0	0

* Full Time Distribution

Administrators 1
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 5
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	20	12
Trailers	18	11
Crew Served Weapons	7	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization Y
 Replacement N
 New Construction N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 2 PLT 947 QM CO
 UIC : WZN6A3
 Drill Weekend : 1
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	52	
Authorized	1	0	52	
Assigned	0	0	2	
Full Time Personnel				
Authorized	0		0	0
Assigned	0		0	0

* Full Time Distribution

Administrators 0
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 6
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	20	12
Trailers	18	11
Crew Served Weapons	7	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization Y
 Replacement N
 New Construction N

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 3 PLT 947 QM CO
 UIC : WZN6A4
 Drill Weekend : 1
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	52	
Authorized	1	0	52	
Assigned	0	0	10	
Full Time Personnel				
Authorized	0		0	0
Assigned	0		0	0

* Full Time Distribution

Administrators 0
 Supply 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

* Common-Use Space

Members Requiring Open Office Space 6
 Cooks 0
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	20	12
Trailers	18	11
Crew Served Weapons	9	
Rcas Workstations	0	

* Mission Information

This is an Existing Mission
 Modernization Y
 Replacement N
 New Construction N

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : 4 PLT 947 QM CO
 UIC : WZN6A5
 Drill Weekend : 1
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	0	1	40	
Authorized	0	1	40	
Assigned	0	1	29	
Full Time Personnel				
Authorized	0		2	0
Assigned	0		0	0

* Full Time Distribution

Administrators	1
Supply	0
Automotive/Engineer Mechanics	0
Maintenance Administrative	1
General Staff Civilian Executive Officers	0
* Exclusive Space	
General Officers	0
Principal Staff Officers	0
Colonel	0
Lieutenant Colonel	0
Major Or Below	0
* Common-Use Space	
Members Requiring Open Office Space	0
Cooks	0
Automotive/Engineer Mechanics	17
Maintenance Administrative Personnel	3
Draftpersons	0

* Special Training Areas

Band Room	N
Weapons Simulator Room	Y
Physical Exam Wing	N
Soil Testing Lab	N
Photo Lab	N
S.C.I.F	N
Medical Section	N

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	11	7
Trailers	5	3
Crew Served Weapons	6	
Rcas Workstations	1	

* Mission Information

This is an Existing Mission
 Modernization Y
 Replacement N
 New Construction N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

* Unit Information

Unit Name : HQ CO, 947 WM CO
 UIC : WZN6T1
 Drill Weekend : 1
 Type of Unit : MTOE
 Accounts :
 Unit Supply N
 COMSEC N
 AGCCS N
 Individual Weapons Y
 Maintenance Office N

* Unit Strengths

Reserve Personnel	Officer	WO	Enlisted	Civilian
Required	1	0	15	
Authorized	1	0	15	
Assigned	1	0	13	
Full Time Personnel				
Authorized	0		1	2
Assigned	0		0	0

* Full Time Distribution

Administrators 2
 Supply 1
 Automotive/Engineer Mechanics 0
 Maintenance Administrative 0
 General Staff Civilian Executive Officers 0
 * Exclusive Space
 General Officers 0
 Principal Staff Officers 1
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 1
 * Common-Use Space
 Members Requiring Open Office Space 3
 Cooks 8
 Automotive/Engineer Mechanics 0
 Maintenance Administrative Personnel 0
 Draftpersons 0

* Special Training Areas

Band Room N
 Weapons Simulator Room Y
 Physical Exam Wing N
 Soil Testing Lab N
 Photo Lab N
 S.C.I.F N
 Medical Section N

* Unit Equipment

	Authorized	Actual
Tracked Vehicles	0	0
Wheeled Vehicles	3	2
Trailers	7	5
Crew Served Weapons	12	
Rcas Workstations	2	

* Mission Information

This is an Existing Mission
 Modernization Y
 Replacement N
 New Construction N

Basic Project Data - Analysis/ English

Project Number: 67690
 Project Title: Army Reserve Center/Land
 Date: Jul 16, 2012
 All Dates are in (DD/MM/YYYY) Format

UIC	Unit Name	Res Strength			Full Time Strength			Drill Weekend
		OFF	WO	ENL	OFF	ENL	CIV	
W8BYRS	RETENTION OFFICE NY011	0	0	1	0	1	0	0
WRCNA1	417 PLT 1 CO (HORIZ CONST)	1	0	38	1	0	0	2
WRCNA2	417 PLT 2 CO (HORIZ CONST)	1	0	38	0	1	0	2
WRCNA3	417 PLT 3 CO (EQUIP SPT)	1	0	41	0	0	0	2
WRCNA4	417 PLT 4 CO (FLD MAINT TM)	0	0	25	0	2	0	2
WRCNT1	417 HQ DET (HORIZ CONST)	2	0	10	0	2	2	2
WZN6A1	SPT OPS, 947 QM CO	1	1	6	0	1	0	1
WZN6A2	1 PLT 947 QM CO	1	0	52	0	1	0	1
WZN6A3	2 PLT 947 QM CO	1	0	52	0	0	0	1
WZN6A4	3 PLT 947 QM CO	1	0	52	0	0	0	1
WZN6A5	4 PLT 947 QM CO	0	1	40	0	2	0	1
WZN6T1	HQ CO, 947 WM CO	1	0	15	0	1	2	1
Totals		10	2	370	1	11	4	

Basic Project Data - Analysis/ English

Project Number: 67690
Project Title: Army Reserve Center/Land
Date: Jul 16, 2012
All Dates are in (DD/MM/YYYY) Format

Project Totals - Actual/ English

	Authorized Size	Approved Size	Existing Size for Alteration	Size of Addition	Size of New Building
Training Building	43,116	31,248	0	0	31,248
Maintenance - Tank and Automotive	10,587	12,344	0	0	12,344
Unheated Storage	2,886	0	0	0	2,886
Total	56,589	43,592	0	0	46,478

Functional Space Details - Actual/ English

171 - Training Building

	Authorized	Approved	Existing	Memo
I. 171 - Training Buildings				
A. Administrative Areas	4,906	4,906	0	
(1) Full Time Office Space	1,320	1,320	0	
(2) Unit Exclusive Space	540	540	0	
(3) Unit Common-Use Space	1,656	1,656	0	
(4) Retention Office	250	250	0	
(5) Family Support Office	200	200	0	
(6) Admin. Support Areas	460	460	0	
(a) General	300	300	0	
(b) Network OPS Center	160	160	0	
(c) Campus Center IT Closet	0	0	0	
(7) Lobby Area	480	480	0	
B. Assembly Area	3,300	3,300	0	
(1) Assembly Areas	3,000	3,000	0	
(2) Chair and Table Storage	300	300	0	
C. Kitchen - STD. Design	811	811	0	
D. Weapons Area	870	870	0	
(1) Arms Vault	770	770	0	
(2) Armorer Work Area	100	100	0	
E. Educational Areas	3,025	3,025	0	
(1) Classrooms	2,000	2,000	0	
(2) Library Reading Room	375	375	0	
(3) Library Storage	200	200	0	
(4) Learning Center	250	250	0	
(5) Training Aids Storage	200	200	0	
(6) COMSEC Training	0	0	0	
(7) COMSEC Storage	0	0	0	
(8) USARF Instruction Room	0	0	0	
(9) USARF Publication Storage	0	0	0	
F. Storage Areas	8,749	250	0	
(1) Unit/Individual Equipment Storage	7,508	0	0	X
(2) Staging Area	751	0	0	X
(3) Supply Office	240	0	0	X
(4) Janitorial Storage	50	50	0	
(5) Flammable Storage	0	0	0	

Functional Space Details - Actual/ English

171 - Training Building

	Authorized	Approved	Existing	Memo
(6) Controlled Waste Storage	0	0	0	
(7) Facility Maintenance/Storage Area	200	200	0	
G. Special Training Areas	3,200	3,450	0	
(1) Weapons Simulator Room	1,600	1,600	0	
(2) Photo Lab	0	0	0	
(3) Band Room	0	0	0	
(4) Medical Section Area	0	0	0	
(5) Physical Exam Wing	0	0	0	
(6) SCIF	0	0	0	
(7) Soil Testing Lab	0	0	0	
(8) G. O. Conference	0	0	0	
(9) Drafting Room	0	0	0	
(10) Physical Readiness Area	1,600	1,600	0	
(11) AGCCS	0	0	0	
(12) Distant Learning Center	0	0	0	
(13) SIPRNet Cafe' - Small	0	250	0	
(14)	0	0	0	
(15)	0	0	0	
(16)	0	0	0	
H. Support Area	7,802	7,060	0	
(1) Mens Toilets & Showers	1,426	1,426	0	
(2) Womens Toilets & Showers	713	713	0	
(3) Locker Room	2,100	2,100	0	
(4) Vending Alcove	48	48	0	
(5) Break Area	218	218	0	
(6) Electrical Space	360	360	0	
(7) Demarcation Telephone Space	240	240	0	
(8) Mechanical Room	2,697	1,955	0	
Total Center Net Training Area	32,663	23,672	0	
Circulation Allowance (15% or 22%)	7,186	5,208	0	
Structural Allowance (10% of Net SF)	3,267	2,368	0	
Total Center Gross Area	43,116	31,248	0	
Outgranted Area			0	
Total Center Available Gross Area			0	

Functional Space Details - Actual/ English

214 - Maintenance - Tank and Automotive

	Authorized	Approved	Existing	Memo
V. 214 - Maintenance - Tank and Automotive				
A. Organizational Maintenance Shop (OMS)	2,499	2,619	0	
(1) Shop Office	621	741	0	X
(2) Tool & Parts Room	576	576	0	
(3) Storage Room	576	576	0	
(4) Flammable Storage	150	150	0	
(5) Controlled Waste Storage	576	576	0	
(6)	0	0	0	
(7)	0	0	0	
B. Area Maintenance Support (AMSA)	0	0	0	
(1) Shop Office	0	0	0	
(2) Locker Room	0	0	0	
(3) Class Room/Break Area	0	0	0	
(4) Tool Room	0	0	0	
(5) Parts Room	0	0	0	
(6) Library	0	0	0	
(7) Battery Room	0	0	0	
(8) Commo/Electronics Shop	0	0	0	
(9) Instrument Repair	0	0	0	
(10) Small Arms Repair	0	0	0	
(11) Small Arms Vault	0	0	0	
(12) Flammable Storage	0	0	0	
(13) Controlled Waste Storage	0	0	0	
(14)	0	0	0	
(15)	0	0	0	
C. DS/GS Maintenance Shop Special Areas	0	0	0	
Maximum Authorized = 5,250 SF/488 m2				
(1)	0	0	0	
(2)	0	0	0	
(3)	0	0	0	
(4)	0	0	0	
(5)	0	0	0	
(6)	0	0	0	
D. Joint Maintenance Areas (OMS/AMSA)	6,709	8,258	0	
(1) Work Bays	5,440	6,912	0	

Functional Space Details - Actual/ English

214 - Maintenance - Tank and Automotive

	Authorized	Approved	Existing	Memo
(2) Mechanical/Custodial	439	516	0	
(3) ARNET/IT Closet	280	280	0	
(4) Equipment Alcove	200	200	0	
(5) Mens Toilets & Showers	200	200	0	
(6) Womens Toilets & Showers	150	150	0	
(7)	0	0	0	
(8)	0	0	0	
Total Shop Net Area	9,208	10,877	0	
Circulation Allowance (15% of Net SF)	458	438	0	
Structural Allowance (10% of Net SF)	921	1,029	0	
Total Shop Gross Area	10,587	12,344	0	
Outgranted Area			0	
Total Shop Available Gross Area			0	

Functional Space Details - Actual/ English

UNH - Unheated Storage

	Authorized	Approved	Existing	Memo
VII. UNH - Unheated Storage				
Equipment Storage				
Unheated Storage				
(1) Unit/Individual Storage	2,098	0	0	X
(2) Staging Area	210	0	0	X
Total Unheated Storage Net Area	2,308	0	0	
Circulation (15% of Net SF)	347	0	0	
Structural Allowance (10% of Net SF)	231	0	0	
Total Unheated Storage Gross Area	2,886	0	0	
Outgranted Area			0	
Total Unheated Storage Available Gross Area			0	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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Functional Space Details - Actual/ English

9LD - Land

Description	Authorized	Approved	Existing	Memo
VIII 9LD - Land	10.5	10.5	152.92	
Outgranted Area			0	
Total Available Acres			153	

Functional Space Details - Actual/ English

SPRT - Support Facilities

	Authorized	Approved	Existing	Memo
X. Supporting Facilities				
A. Privately Owned Vehicle Parking (POV) (SY)	6,300	6,300	2,960	
B. Military Equipment Parking (MEP)	9,450	9,450	2,960	
(1) OMS (SY)	9,450	9,450	2,960	
(2) AMSA (SY)	0	0	0	
(3) ECS	0	0	0	
Number of Vehicles at the ECS	0	0	0	
ECS (SY)	0	0	0	
C. Wash Platforms (EA)	2	2	0	
D. MEP Fencing (LF)	1,168	1,168	0	
E. MEP Lighting (EA)	7	7	0	
F. Access Roads (SY)	945	945	7,736	
G. Sidewalks (SY)	300	300	462	
H. Service/Access Apron (SY)	640	640	0	
(1) Maintenance Shop (SY)	480	480	0	
(2) Unheated Storage (SY)	160	160	0	
I. Fuel Storage and Dispensing (EA)	0	0	0	
J. Equipment Loading Ramp (EA)	0	0	0	
K. Marine Pier/Dock (EA)	0	0	0	
L. Flagpole (EA)	1	1	0	
M. Occupational Safety and Health Equipment (EA)	0	0	0	
(1)	0	0	0	
(2)	0	0	0	
N.	0	0	0	
O. MKT Concrete Pad (EA)	0	0	0	

Functional Space Details - Actual/ English

STAT - Statistics

Description	Center	Shop	UNH Strg	WHS Strg
Total Square Footage For:				
Authorized Size	43,116	10,587	2,886	0
Approved Size	31,248	12,344	0	0
Existing Size for Alteration	0	0	0	0
Size of Addition	0	0	0	0
Size of New Building	31,248	12,344	2,886	0

Center Statistics	Total Personnel	Weekend
Rated Capacity	400	
Largest Drill Weekend	224	1
Largest Admin Weekend	24	1
Largest Maintenance Weekend	22	2
Weekends Per Month	2	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

UFC 4-171-05
Certified Final Submittal November 15, 2012

Functional Space Details - Actual/ English

Project Totals - Actual/ English

	Authorized Size	Approved Size	Existing Size for Alteration	Size of Addition	Size of New Building
171 Training Building	43,116	31,248	0	0	31,248
214-Maintenance-Tank/Automotive	10,587	12,344	0	0	12,344
UNH-Unheated Storage	2,886	0	0	0	2,886
Totals (SF)	<u>56,589</u>	<u>43,592</u>	<u>0</u>	<u>0</u>	<u>46,478</u>

Project Number : 67690
Project Title : Army Reserve Center
Date : Jul 16, 2012

UFC 4-171-05
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Functional Space Details - Actual/ English

171 - Training Building

IF1 Unit/Individual Equipment Storage -
keep in current building 106

IF2 Staging Area -
keep in current building 106

IF3 Supply Office -
keep in current building 106

Project Number : 67690
Project Title : Army Reserve Center
Date : Jul 16, 2012

UFC 4-171-05
Certified Final Submittal November 15, 2012

Functional Space Details - Actual/ English

214 - Maintenance - Tank and Automotive

- 1 VA1
120 SF OFFICE FOR 411 ENG BDE OR LTA TO ALLOW 2ND WEEKEND. (AJB, APRIL 2011)

Project Number : 67690
Project Title : Army Reserve Center
Date : Jul 16, 2012

UFC 4-171-05
Certified Final Submittal November 15, 2012

Functional Space Details - Actual/ English

UNH - Unheated Storage

- 1 VII1 -
keep in current building 106
- 1 VII2 -
keep in current building 106

9LD - Land

APPENDIX D

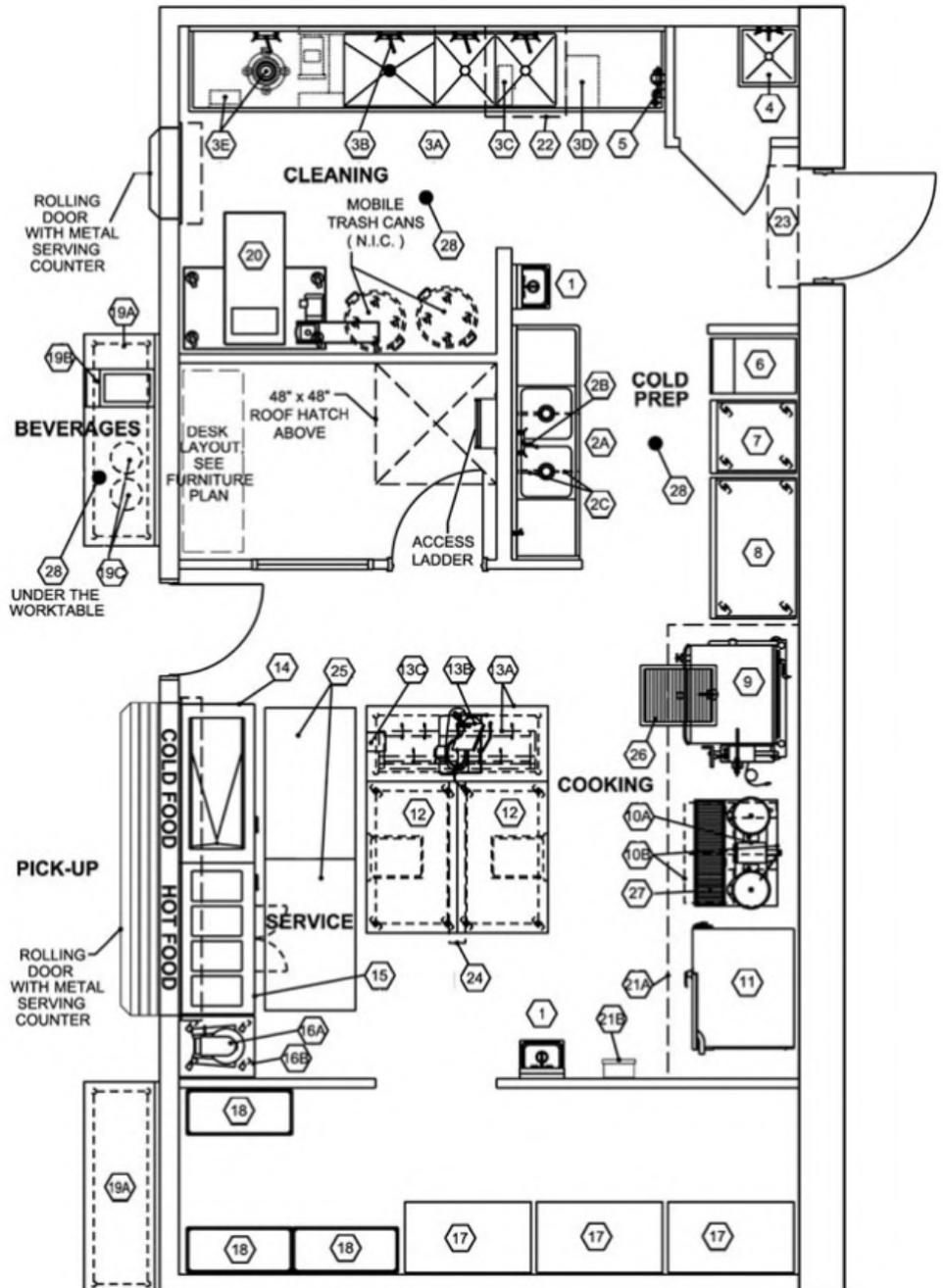
STANDARD KITCHEN PLAN AND EQUIPMENT LIST

D-1 Plan

D-1.1 A standard Army Reserve kitchen plan is shown to the right. This plan and its associated equipment have been approved by the OCAR Engineer Office for inclusion in all Army Reserve training center projects with kitchens. Equipment changes are occasionally made which affect all future projects. See the [Army Reserve website](#) for Army Reserve kitchen updates.

D-1.2 The designer is strongly advised to obtain a copy of the current standard kitchen drawings from the Army Reserve FTP download site, along with current equipment data sheets. Kitchen specifications are linked on the web page listed above.

Figure D-1
Standard Army Reserve Kitchen Plan



D-2 Equipment List

D-2.1 **FOODSERVICE EQUIPMENT LIST**

ITEM	QTY	DESCRIPTION	FUNDING
1	2	Hand Sink, Soap & Towel Disp.	MCAR
2A	1	Vegetable Sink	MCAR
2B	1	Heavy Duty 12" Swing Spout	MCAR
2C	2	Twist Handle Operated Drain With Overflow	MCAR
3A	1	Three-Compartment Sink, Powered	MCAR
3B	1	Pre-Rinse Spray Assembly	MCAR
3C	1	Sanitizing Sink Heater	MCAR
3D	1	Hot Water Booster Heater	MCAR
3E	1	Disposer & Control Panel	MCAR
4	1	Mop Basin & Tool Bar	MCAR
5	1	Water Filter	MCAR
6	1	Ice Maker And Bin	MCAR
7	1	Freezer, 1-Section Mobile	OMAR
8	1	Refrigerator, 2-Section Mobile	OMAR
9	1	Tilting Braising Pan	MCAR
10A	1	Twin Kettles, 6 Gallon	MCAR
10B	1	Twin Kettles Tabletop	MCAR
11	1	Combi-Steamer / Oven	MCAR
12	2	Worktable, Mobile	OMAR
13A	1	Food Preparation Table	OMAR
13B	1	Slicer, Automatic	OMAR
13C	1	Can Opener, Manual	OMAR
14	1	Cold Food Counter, Mobile	OMAR
15	1	Hot Food Counter, Mobile	OMAR
16A	1	12-Quart Mixer	OMAR
16B	1	Mixer Stand	OMAR
17	3	Security Rack	OMAR
18	3	Shelving Unit (18" X 42")	OMAR
19A	2	Worktable With Backsplash	OMAR
19B	1	Ice Dispenser	OMAR
19C	2	Coffee Maker	OMAR
20	1	Shredder	MCAR
21A	1	Hood, Type 1	MCAR
21B	1	Fire Suppression System To Serve Hood, Type 1	MCAR
22	1	Hood, Type 2	MCAR
23	1	Air Curtain	MCAR
24	1	Electrical Raceway, Ceiling Track	MCAR
25	2	Floor Rubber Mats (36" X 60")	OMAR
26	1	Floor Drain Through With Grate (30" X 24")	MCAR
27	1	Floor Drain Through With Grate (42" X 12")	MCAR
28	3	Floor Drain (4" Dia.)	MCAR

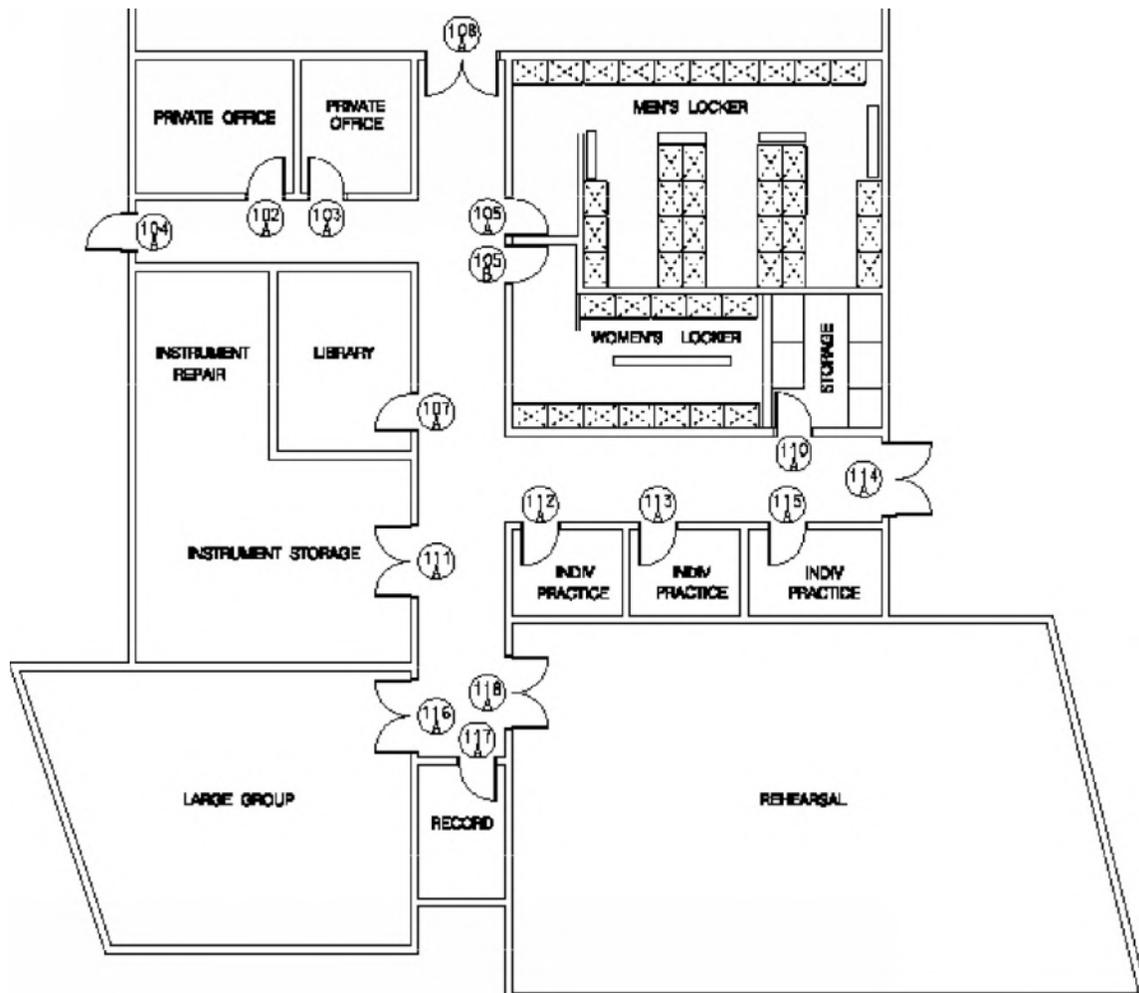
APPENDIX E

BAND ROOM

E-1 General

E-1.1 Band rooms provide practice areas for Army Reserve bands, and storage spaces for instruments, music, uniforms, and other equipment. The rooms may be adjacent to the assembly hall. This usually allows a best fit with the rest of the facility, because the band rooms have varying roof heights and some non-rectangular spaces. It also provides separation from administrative and education areas to minimize distraction to other building occupants.

Figure E-1
Conceptual Band Room Plan



E-1.2 See Technical Instructions (TI) 800-01, Design Criteria, for discussion of architectural and engineering criteria unique to a band's training spaces. Acoustic design considerations are complex and cannot be concisely duplicated here. Do not attempt to follow the space planning criteria given in the TI to size the facility. The Army Reserve has a different system than the active Army to generate project scope.

E-1.3 Walls separating band room areas from other spaces shall be constructed with sufficient STC ratings to prevent disruption of activities in those spaces.

E-2 Space Authorizations

E-2.1 Space authorizations for a band may appear under multiple categories in the Army Reserve's project documentation. This paragraph explains previous authorizations. Verify with the Project Officer and Tenant the authorizations for a specific project.

E-2.2 Administrative spaces total 270 sf (25 sm). There are two private, unit exclusive offices.

Commander's office	= 150 sf (14 sm)
Enlisted bandleader's office	= 120 sf (11 sm)

E-2.3 Storage spaces total 1,004 sf (93 sm). Provide locker and storage rooms in lieu of the standard 8 ft x 12 ft (2400 m x 3600 m) cages normally located in the unit/individual storage area. The standard Army Reserve allowance is one cage per 6 members of a unit organized under a modification table of organization and equipment (MTOE) document, e.g., 7 cages for the band.

Storage: 7 cages x 95.8 sf/cage x 1.15 intrafunctional circulation	= 773 sf	(72 sm)
Staging: 775 sf x 0.1	= 77 sf	(7 sm)
Additional circulation factor (historic experience): 72 sm x 0.2	= <u>155 sf</u>	(14 sm)
Total storage allowance	= 1,001 sf	(93 sm)

Reconfigure this allowance into male and female locker rooms plus a storage room. Provide each band member with a full-height locker (2 ft x 3 ft) (600 mm x 900 mm) for uniforms. Adjust the sizes of the locker rooms as needed to accommodate the actual count of male and female members. Provide a storage room with shelves for unit equipment and members' duffle bags.

E-2.4 Special training spaces total 3,300 sf (307 sm)

Main rehearsal room	=	1,575 sf	(146 sm)
Large group practice room	=	700 sf	(65 sm)
Three individual practice rooms at 70 sf each	=	210 sf	(20 sm)
Recording room	=	80 sf	(7 sm)
Instrument repair/cleaning area	=	175 sf	(16 sm)
Instrument storage area	=	400 sf	(37 sm)
Library	=	160 sf	(15 sm)

E-2.5 Corridors within the band area count against the building's circulation allowance.

E-2.6 Band room suite must have access to exterior doors for loading and unloading purposes.

**SENSITIVE COMPARTMENTED INFORMATION FACILITIES
(SCIF)****F-1** General

F-1.1 A SCIF is an infrequent element of a Reserve Center. When authorized, this space is used for electronic intelligence training activities and operations.

F-1.2 There is no standard design for a SCIF. The project documents will provide the SCIF space authorization; the designer will need to work with the Project Officer, RSC, SCIF Proponent, Support Installation and Tenants to determine what specific spaces and areas are required within that authorization. They will also help define the furnishings, equipment, and mechanical/electrical/communications systems for the SCIF.

F-1.3 The governing criteria for SCIF design and construction is Intelligence Community Directive 507 (ICD 507), and the Intelligence Community Standards and Technical Specifications (ICS 507-1, ICS 507-2, and IC Tech Spec) it mandates. The standards and specifications provide design and construction guidance. However, the designer must ask the SCIF Security Officer (SSO) for any additional current applicable guidance, particularly for communication security. At one time, there were two volumes on the subject from a Defense Intelligence Agency (DIA) Worldwide SCIF Security Officer (SSO) Conference; the SSO may be able to provide information from these or other sources to aid in design.

F-1.4 The SCIF is a secure facility; access to the SCIF must be controlled and monitored, and communications within, to and from the SCIF, must be secure from threat of interception.

F-2 Security Considerations : These come from previous Army Reserve SCIFs their accuracy and applicability must be verified:

F-2.1 There will be security vestibule with CCTV monitoring, most likely with an electronic latch release. Entry into the SCIF will be controlled by the SSO or a designee. If necessary, a separate exit (or exits if two are required) can be provided to satisfy life safety/exiting requirements. The Army Reserve security personnel will want any such exits to include an audible alarm, and possibly a short delay, for security reasons. No hardware should be provided on the exterior side of such exit doors.

F-2.2 There are STC rating requirements, door and wall construction requirements, and requirements affecting all mechanical, electrical, and voice/data penetrations of the SCIF.

F-2.3 The Tenants typically do not want any windows. This might be an area for the core of the building, but remember that no exit path can run through (into and then out of) a SCIF.

F-2.4 Design of the SCIF will include provisions for power, conduit and cable for IDS and other security systems; those security systems will typically be provided and installed by the Government.

F-3 Space Design Information

F-3.1 A typical SCIF might contain office/admin areas, a classroom, an open area with computer workstations, an electronics maintenance space, a server room, storage room, security vestibule, and electrical/telephone room.

F-3.2 Some spaces that are part of the SCIF space authorization may not be within the secure area. Some administrative spaces and the maintenance space might be better located outside of the SCIF.

F-3.3 If the SCIF proponent does not provide individual space design information, refer to similar training center spaces (administrative, classroom, telecommunications spaces, etc.) and model the design of the SCIF spaces on those.

F-3.4 Include furniture and similar equipment as part of the design, similar to the rest of the training center. Fax machines, safes, servers, secure files, encryption devices, secure telephones, and similar items specific to the operation of the SCIF, will likely be provided by the Tenants.

F-3.5 The SCIF HVAC equipment must be separate from other building HVAC systems.

F-3.6 Provide clean power if Tenants do not provide UPS system, and verify grounding required for SCIF.

PHYSICAL EXAM WING

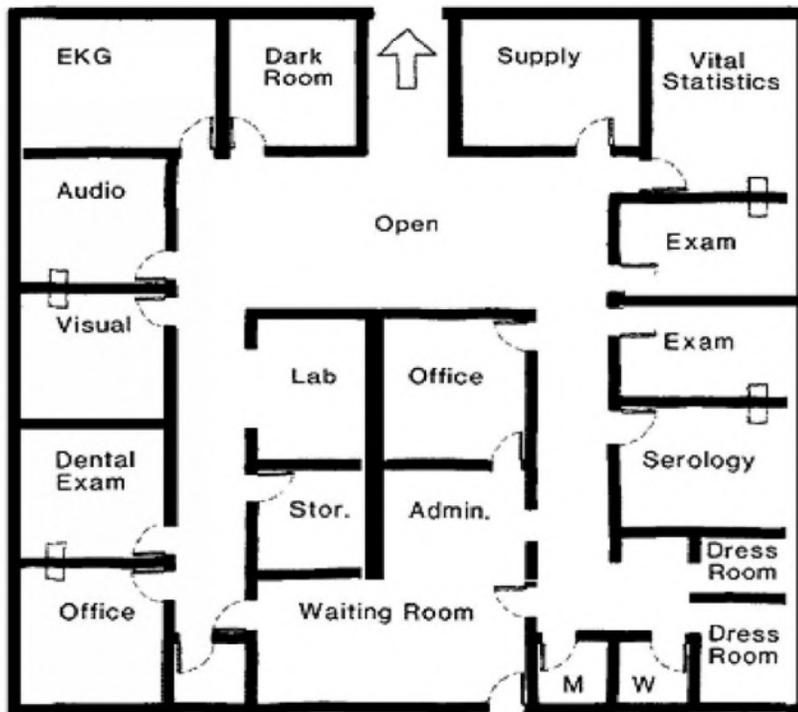
G-1 General

G-1.1 When authorized, medical spaces will be provided for physical exams, treatment and medical training. The project documents will define the authorized space and may provide additional information for the designer.

G-1.2 Locate the medical wing adjacent to dedicated office space that can be assigned to the medical unit. The medical wing will typically have its own entrance from the exterior, as well as an interior access to the remainder of the building. It should be somewhat isolated from the rest of the building for reasons of patient privacy. Planning concepts should allow for privacy of patients when accessing dressing areas and toilets.

G-1.3 The medical wing layout and capabilities may vary to suit the Tenants' training and operational requirements. The designer should work with the Tenants to develop a functional layout.

Figure G-1
Physical Exam Wing Plan



G-1.4 Among the types of spaces that may be required are: waiting rooms, dressing rooms, medical exam rooms, dental exam rooms, supply rooms, lavatories with male and female specimen toilet areas, laboratory, physical exam areas for blood pressure, EKG, X-ray, audio meter, eye exam, and height and weight measurement.

G-1.5 Special purpose training areas such as operating rooms, scrub rooms, two bed wards, sterile supply rooms, and pharmacy will be provided only when justified.

G-2 Space Design Information

G-2.1 Due to the variety of functional areas possible and variance in the medical equipment, the OCAR Engineer Office will provide a list of equipment and proposed locations for any special requirements when the concept design is completed.

G-2.2 Refer to [Chapter 4](#) space design information for office and administrative spaces as a guideline for systems, furniture, equipment, and finishes. Review recommended selections with Tenants, and obtain their input. Finishes should be those appropriate to a civilian medical clinic with attention to durability and maintainability.

G-2.3 The necessary medical equipment, standard medical equipment sets including x-ray machines, will be provided and installed by the Tenants. An x-ray equipment installation certificate will be required. Other furniture and equipment is to be addressed as for the remainder of the training center.

G-2.4 Built-in equipment may include the following:

G-2.4.1 Waiting room: Admissions counter 15 in (400 mm) wide by 49 in (250 mm) high by 12 ft (3650 mm) long. A portion should be accessible.

G-2.4.2 Dressing room: Feed-in clothes hooks - four per dressing room. A seat may be built-in on one side.

G-2.4.3 Medical exam room: Wall hung lavatory or sink in cabinetry.

G-2.4.4 Dental exam room: Wall hung lavatory or sink in cabinetry.

G-2.4.5 Laboratory: Base cabinets 24 in (610 mm) deep by 36 in (915) high with chemical-resistant work counter and a two-compartment stainless steel sink. This unit will be located on one wall or as an island. The total length should not exceed 16 ft (4900 mm).

G-2.4.6 Specimen toilet: One water closet, one lavatory, one shelf, one towel dispenser, and one pass-through door to the laboratory.

G-2.4.7 Dark room: Work counter 24 in (610 mm) wide by 36 in (915 mm) high by 96 in (2450 mm) long with chemical-resistant work surface. This may be located on a wall and/or island.

G-2.4.8 Audio/meter room: One booth 3 ft (915 mm) by 5 ft (1525 mm) with sound treatment to 55 STC, and one counter on one end of the room, 18 in (460 mm) wide and 28 in (715 mm) above the floor. The Tenants may provide a portable booth in lieu of a constructed room.

G-2.4.9 Supply room: 12 in (300 mm) deep wood shelving, 5 shelves high, beginning 18 in (460 mm) from the floor, and epoxy-painted. This shelving may be installed on three walls. This room may also accommodate medical records in file cabinets.

G-2.4.10 Provide divided surface metal raceways above lab counters with 20A, GFCI, duplex receptacles.

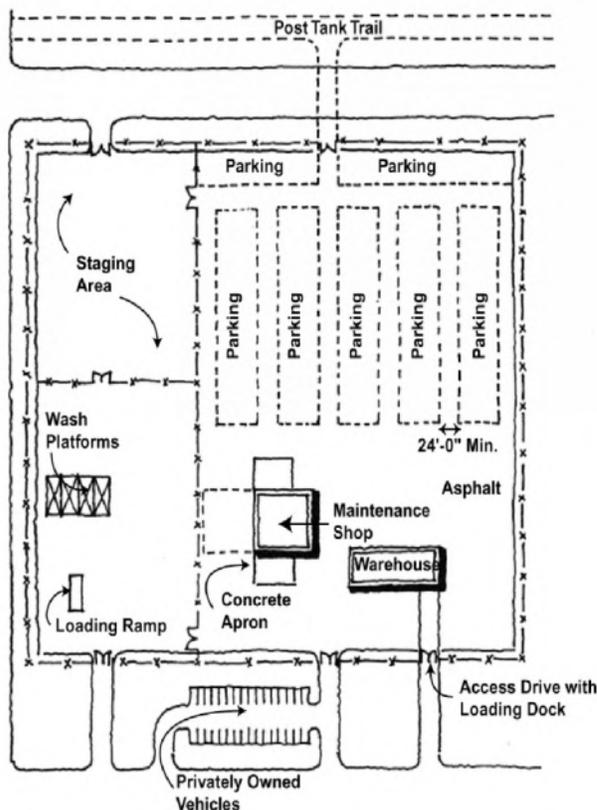
G-2.4.11 Other built-in or installed equipment may be included on a case-by-case basis, provided such equipment is fully justified for the operational training needs.

EQUIPMENT CONCENTRATION SITE (ECS)

H-1 General

H-1.1 An ECS is essentially a large MEP area for the storage of military vehicles and equipment to be used during annual and weekend training periods.

Figure H-1
Typical ECS Layout



instances where asphalt paving or circulation areas are provided around a supporting AMSA, a concrete or aggregate roadway or turning area may be required to provide access for combat vehicles to the AMSA shop bays. Due to the larger size and heavier concentration of vehicles, the ECS traffic is very heavy during annual training periods. Lay out traffic patterns to avoid internal circulation conflicts at the fuel pumps, dispatch and wash platforms. Circulation lanes within the ECS area are a minimum of 24 ft (7400 mm) wide.

H-1.2 With few exceptions, an ECS is located on an active or semi-active military installation, and is collocated with an AMSA dedicated to maintaining the equipment stored at the ECS.

H-1.3 Facilities associated with the ECS will be described in the project documents, and may include parking hardstand, fuel dispensing system, loading ramp, wash platform, indoor equipment storage warehouse, combat vehicle arms vault, fencing, security lighting, and an AMSA.

H-2 Design Information

H-2.1 Factors which affect the layout and design of an ECS are much the same as those for the MEP at an OMS or AMSA, with the following exceptions.

H-2.1.1 Access/Egress and Circulation: Tracked combat vehicles are stored at an ECS and require access to the nearest tank trail on the military installation. In

H-2.1.2 Fuel Dispensing Point: When authorized, locate the fuel point adjacent to a primary circulation area and in proximity to the main entrance and other support facilities. Provide PCC lanes and pump bases for the diesel and gas pumps and drain so that all gas spills and water runoff are collected and emptied into a grease/oil separator. The separator should also serve the AMSA workbays and vehicle wash platform whenever practicable. See [Chapter 3](#) for additional environmental design guidance.

H-2.1.3 Indoor Equipment Storage Warehouse: Since the primary function of this building is bulk storage of equipment, the structure must be noncombustible and as simple as possible. Pre-engineered metal buildings are acceptable. Provide open interior layout for flexibility and provide aisles large enough for material-handling equipment. Design some areas for bulk and palletized storage. Depending on the type and the amount of equipment, a loading dock may be provided at one overhead door. A small portion of the building serves as a work area and should have space conditioning similar to a supply office. An office for the warehouse staff should also be provided. Information about the types and amount of equipment to be stored, and the types of material-handling equipment to be operated within the warehouse, will be provided by the OCAR Engineer Office and Tenants.

ROOF SYSTEMS FOR ARMY RESERVE PROJECTS**I-1** General Direction

I-1.1 There are five approved roofing systems for Army Reserve facilities: standing seam metal roofing systems (SSMRS), modified bitumen membrane system (mod-bit), ethylene propylene diene monomer (EPDM) roof membrane, fiberglass-based asphalt shingle roof systems, and thermoplastic (PVC) membrane systems. Other systems may be acceptable with OCAR Engineer Office approval. The information below offers the primary guidance for roofing designs on Army Reserve projects. TPO roofing is “not allowed”.

I-1.2 Additional guidance is located in UFC 3-110-03, Roofing. Designers should utilize UFC 3-110-03 for items not addressed below.

I-1.3 Reserve Support Team UFGS specification sections for each of the approved roofing systems above are available on the [Army Reserve website](#).

I-2 Specific Guidelines**I-2.1** **Standing Seam Metal Roof System (SSMRS)**

I-2.1.1 Use hydrostatic (water-tight) rather than hydrokinetic ribs (eaves may be either hydrostatic or hydrokinetic depending on the climate).

I-2.1.2 Preferred slope is 4 in 12. Minimum slope shall be 3 in 12. If a 3:12 slope is utilized, then ice and water shield is required for the entire roof.

I-2.1.3 Require #30 felt underlayment for entire roof, and use ice and water shield in eaves, valleys, hips and ridges.

I-2.1.4 Require high temperature ice and water shield over entire roof where appropriate for the locality of the project, such as coastal environments, hurricane-prone areas, etc.

I-2.1.5 Specify and show on the drawings a rigid underlayment.

I-2.1.6 The clip screws should go down through the underlayment and insulation into the metal deck.

I-2.1.7 Require crimping machine to be calibrated daily.

I-2.1.8 Army Reserve preferred roofing details may be found on the EKO website..

I-2.1.9 Reference Reserve Support Team Specification Sections 07 61 13.00 48 and 07 61 14.00 48 available at the [Army Reserve website](#). Require warranties as specified in those sections.

I-2.1.10 Ice/snow guards shall be utilized on SSMRS for locations where the average snowfall is more than 4 in per year and may be considered in other locations. A snow retention system shall be utilized with mechanically fastened snow guards with continuous connectors. The attachment piece shall be a convex fastener. Ice/snow guards shall be either steel rods or extruded aluminum with matching coil stock inserted. No roof penetrations or adhesives shall be utilized. Consider ice/snow guards for the entire roof; at a minimum, place to protect equipment, sidewalks, doorways, and other critical areas. Ice/snow guards shall be designed to withstand ice and snow loads as defined in ASCE Manual 7. More stringent requirements based on manufacturer's recommendations or local building codes may apply. Ice/snow guards shall be designed and installed to meet manufacturer's warranty.

I-2.1.11 In areas with average annual snowfall greater than 50 inches (1275 mm), snow guards need not be continuous if snow must be shed from roof due to potential weight. In such instances, provide snow guards to protect all roof penetrations, building exits, and circulation at the roof's eave area.

I-2.2 Modified Bitumen (Mod-Bit) Membrane System

I-2.2.1 Minimum roof slope is ½ inch (12 mm) per 12 (300 mm).

I-2.2.2 Use a modified bitumen 2-ply system.

I-2.2.3 Require a 20-year, no-dollar-limit warranty.

I-2.2.4 Provide generic NRCA details to help define the quality of the roof.

I-2.3 Ethylene Propylene Diene Monomer (EPDM) Roof Membrane

I-2.3.1 Minimum roof slope is ½ inch (12 mm) per 12 inch (300 mm).

I-2.3.2 Specify a minimum 60 mm thickness.

I-2.3.3 Must be fully adhered, rather than ballasted or mechanically attached.

I-2.3.4 Do not use over kitchens.

I-2.3.5 Should include a coating to save energy.

I-2.3.6 Require Factory Mutual certification for the system.

I-2.3.7 Provide generic NRCA details to help define the quality of the roof.

I-2.4 Fiberglass-Based Asphalt Shingle Roof System

I-2.4.1 Asphalt shingle roofing system shall include shingles, underlayments, and flashing.

I-2.4.2 Provide shingle roofing system ventilation of roof to prevent heat build-up and associated heat damage.

I-2.4.3 Coordinate shingle color and style with architectural design and exterior finishes.

I-2.4.4 Minimum slope for shingles shall be 4 in 12 or manufacturer's recommendation to meet 50-year warranty.

I-2.4.5 Provide continuous top ridge vent connected to roof ventilation system. Also provide non-maintenance vents at the base of the roof system to support the air movement convection process.

I-2.4.6 Provide asphalt shingle manufacturer's standard 50-year warranty for the asphalt shingles (including 110 mph wind up-lift). Provide all accessories and systems to meet the 50-year warranty criteria. Contractor shall warrant for five years that the asphalt shingle roofing system, as installed, is free from defects in workmanship.

I-2.4.7 Provide cross-vented insulation over a vapor retarder in accordance with the manufacturer's instructions.

I-2.4.8 Consider ice and snow guards in northern climates.

I-2.5 Thermoplastic (PVC) Membrane System

I-2.5.1 Minimum roof slope is ½ inch (12 mm) per 12 inch (300 mm).

I-2.5.2 Use an adhered, mechanically fastened, or combination roofing system, or a hot-air-welded PVC membrane. Ballasted PVC systems are not allowed.

I-2.5.3 Required 20-year, no-dollar-limit warranty.

I-2.5.4 Require Underwriters' Laboratories and/or Factory Mutual certification for the system.

I-2.5.5 Provide generic NRCA details to help define the quality of the roof.

I-2.6 Existing projects to be re-roofed

I-2.6.1 Minimum slope is to be ½ inch (12 mm) per 12 inch (300 mm) if the spacing of the roof drains allows sufficient roof expansion joints and it can be accomplished within the project budget.

I-2.7 Requirements for all systems

I-2.7.1 Contractor qualifications: five years minimum in the roofing business, and must be a member of professional roofing association (SMACNA and/or NRCA) for a minimum of three years.

I-2.7.2 Required pre-installation activities.

I-2.7.2.1 Must have a pre-roofing-construction meeting with the designer, supplier, manufacturer, and contractor after award of the construction contract.

I-2.7.2.2 Must have a pre-installation meeting two weeks before starting installation.

I-2.7.3 Required quality control measures.

I-2.7.3.1 Manufacturer's representative must be on site during installation (all week the first week, at least once a week after that, minimum based on A/E's recommendation).

I-2.7.3.2 Manufacturer's representative must be an employee of the manufacturer with a minimum of five years' experience with the type of system being installed, or an employee of an independent installer certified by the manufacturer with the same level of experience.

I-2.7.3.3 Submittals will be for Government approval, and must be reviewed by the designer-of-record.

I-2.7.3.4 Manufacturer and installer must provide a written statement that they have reviewed the plans and specifications, and will provide a 20-year (50-year for fiberglass-based asphalt shingle) premium warranty based on the design. (See next page.)

I-2.7.3.5 The contractor is required to provide Registered Roof Observer services during all roof construction activities. Registered Roof Observers (RRO) will perform daily oversight and quality control on all roof work to assure compliance with the projects plans and specifications.

INSTALLER'S STATEMENT ON ROOF WARRANTY

I _____, THE ROOF INSTALLER FOR THIS PROJECT, HEREBY CERTIFY THAT THE PLANS AND SPECIFICATIONS HAVE BEEN THOROUGHLY REVIEWED AND THAT THE PROPOSED ROOF WILL MEET THE DESIGN INTENT AND MANUFACTURER'S REQUIREMENTS FOR A PREMIUM WEATHERTIGHTNESS WARRANTY.

INSTALLER'S NAME

PROJECT

DATE

MANUFACTURER'S TECHNICAL REPRESENTATIVE

I _____, A TECHNICAL REPRESENTATIVE EMPLOYED FOR A MINIMUM OF FIVE YEARS BY _____, THE ROOFING MANUFACTURER FOR THIS PROJECT, HEREBY ATTEST THAT THE ROOF INSTALLED FOR THIS PROJECT BY _____ WAS CONSTRUCTED AND ASSEMBLED IN ACCORDANCE WITH THE MANUFACTURER'S APPROVED METHODS AND DETAILS AND MEETS THE MANUFACTURER'S PREMIUM 20 YEAR (50 YEAR FOR FIBERGLASS-BASED ASPHALT SHINGLE) WEATHERTIGHTNESS WARRANTY REQUIREMENTS.

INSTALLER

PROJECT

DATE

**PHYSICAL READINESS ROOM
 EQUIPMENT MATRIX**

Nominal Area (sq. ft.)	Adaptive Motion Trainer	Elliptical Cross Trainer	Treadmill	Recumbent Bike	Flat Bench	Incline Bench	5-50 Lbs Dumbbell Set	55-100 Lbs Dumbbell Set	Dumbbell rack	45 Deg. Back Extension	Leg Press	Multi-Press	Lat Pull	Row	Leg Raise/Dip	Bent Leg Ab Board	Power Cage w/Weight Set	Fitness Mats
1600	1	3	4	2	3	3	2	1	3	1	2	2	2	2	1	1	1	10
1500	1	3	4	2	3	3	2	1	3	1	2	2	2	2	1	1	1	8
1400	1	3	4	2	2	2	1	1	2	1	2	1	2	2	1	1	1	8
1300	1	3	3	2	2	2	1	1	2	1	2	1	2	1	1	1	1	8
1200	1	3	3	2	2	2	1	1	2	1	1	1	2	1	1	1	1	6
1100	1	2	3	2	2	2	1	1	2	1	1	1	1	1	1	1	1	6
1000	1	2	2	1	2	2	1	1	2	1	1	1	1	1	1	1	1	6
900	1	2	2	1	1	1	1	0	1	1	1	1	1	1	1	1	1	6
800	1	2	2	1	1	1	1	0	1	1	1	1	1	0	0	1	1	6
700	1	2	2	1	1	1	1	0	1	1	1	1	1	0	0	1	1	4
600	1	2	2	1	1	1	1	0	1	1	1	1	1	0	0	1	1	4
500	0	2	2	1	1	1	1	0	1	1	1	1	1	0	0	0	0	4
400	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	4
300	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	4
200	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	2

APPENDIX K

SAMPLE PROJECTS AND PHOTOGRAPHY CREDITS

K-1 Sample Projects

K-1.1 The following pages provide illustrations of Army Reserve projects as examples for project designers.

K-2 Photography Credits

K-2.1 The project photographs in this Appendix and throughout the Design Guide are reprinted with the permission of the photographers or other owners of the photographs. For any use of the photographs other than in this Guide, obtain the owners' permission.

Butte Army Reserve Center – Staff of RSP Architects (Darrell Brinkman and Kristine Shovein), USACE Louisville District (Greg Cardwell)

Garden Grove Army Reserve Center – Larry Faulke

Tuscaloosa Armed Forces Reserve Center – Terry Wieckert, Abstract Photography, Inc.

Camp Bullis Armed Forces Reserve Center – Alan Harmon Photography

Fort Worth Army Reserve Center– John Thomas Photography

Middletown, Connecticut – Paul Burk photography

Joliet Army Reserve Center in Elwood – Staff of RSP Architects (Lucie Marusin)

Marysville Armed Forces Reserve Center in Everett/Seattle – Terry Shapiro

Saginaw Army Reserve Center – Terry Wieckert, Abstract Photography, Inc.

Fort Allen Armed Forces Reserve Center – Alexander Denmark, Denmark Photography

Sinton Army Reserve Center – Staff of GLMV Architecture

USARC/OMS/UHS; BUTTE, MONTANA



- Armed Forces Reserve Center – 20,460 sf
- 10 acres
- Design completion – September 2008
- Construction completion – September 2010

RSP ARCHITECTS

USARC/OMS; GARDEN GROVE, CALIFORNIA



- Garden Grove Army Reserve Center – 76,511 sf
- 15.5 acres
- Design completion – June 2008
- Construction completion – June 2011

JACOBS ENGINEERING

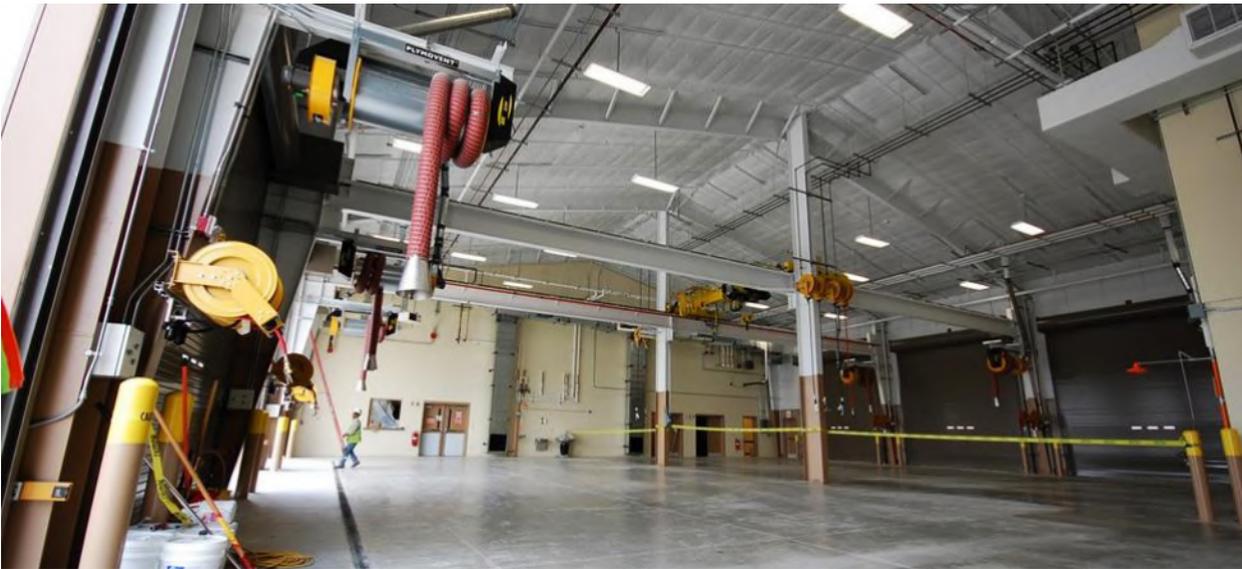
USAFRC/OMS-AMSA; TUSCALOOSA, ALABAMA



- Tuscaloosa Armed Forces Reserve Center – 80,664 sf
- 16 acres
- Design completion – July 2009
- Construction completion – December 2010

THE MASON & HANGER GROUP, INC.

**USAFRC/OMS-AMSA, Heated Organization Unit Storage, UHS;
CAMP BULLIS, SAN ANTONIO, TEXAS**



- Camp Bullis Armed Forces Reserve Center – 189,071 sf
- 18 acres
- Design completion – September 2008
- Construction completion – August 2009

MICHAEL BAKER CORPORATION

USARC/OMS/UHS; FORT WORTH, TEXAS



- Fort Worth Army Reserve Center – 76,888 sf
- 70 acres
- Design completion – February 2008
- Construction completion – May 2010

USAFRC/OMS/UHS; MIDDLETOWN, CONNECTICUT



- Armed Forces Reserve Center – 202,890 sf
- 42 acres
- Design completion – July 2010
- Construction completion – June 2011

KBE VENTURES

USARC/OMS/UHS; ELWOOD, ILLINOIS



- Joliet Army Reserve Center in Elwood – 62,666 sf
- 23 acres
- Design completion – October 2009
- Construction completion – February 2012

RSP ARCHITECTS

USAFRC, OMS; MARYSVILLE, WASHINGTON



- Marysville Armed Forces Reserve Center in Everett /Seattle – 172,335 sf
- 25.5 acres
- Design completion – July 2009
- Construction completion – March 2012

JACOBS ENGINEERING

USARC, OMS/UHS; SAGINAW, MICHIGAN



- Saginaw Army Reserve Center – 37,625 sf
- 12 acres
- Design completion – September 2009
- Construction completion – June 2011

THE MASON & HANGER GROUP, INC.

USAFRC, UHS; FORT ALLEN, PUERTO RICO



- Major General Salvador Padilla Escabi Armed Forces Reserve Center – 49,470 sf
- 8.5 acres
- Design completion – March 2010
- Construction completion – December 2010

MICHAEL BAKER CORPORATION

USARC, OMS, UHS; SINTON, TEXAS



- Sinton Army Reserve Center – 37,405 sf
- 14.15 acres
- Design completion – September 2009
- Construction completion – May 2011