

“USAR Pamphlet XXX-XXX”
DESIGN GUIDE
ARMY RESERVE FACILITIES



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DESIGN GUIDE: ARMY RESERVE FACILITIES

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

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TABLE OF CONTENTS

	<u>Page</u>
CHAPTER 1 INTRODUCTION AND GENERAL INFORMATION	
1-1 PURPOSE OF THE DESIGN GUIDE.....	10
1-2 SCOPE OF THE DESIGN GUIDE.....	11
1-3 ARMY RESERVE CADD PLATFORM	12
1-4 FORMAT OF THE DESIGN GUIDE	13
1-5 PROJECT PARTICIPANT RESPONSIBILITIES	13
1-6 PURPOSE OF THE ARMY RESERVE AND ITS FACILITIES ..	15
1-7 QUALITY OF DESIGN	16
1-8 PROJECT DELIVERY	17
1-9 PROGRAM SYNOPSIS.....	18
1-10 ARMY RESERVE PROJECT FUNDING	20
CHAPTER 2 PLANNING GUIDELINES	
2-1 INTRODUCTION	23
2-2 DESIGN AND REGULATORY CRITERIA AND THEIR APPLICATION.....	23
2-2.1 Applicable Criteria	23
2-2.2 Sustainable Development and Design (SDD).....	26
2-3 ENVIRONMENTAL.....	26
2-4 SITE SELECTION AND PLANNING	27
2-4.1 General Selection and Planning Criteria.....	27
2-4.2 Availability of Utilities	30
2-4.3 Existing Jurisdictional Agreements.....	31
2-4.4 Floodways	32
2-4.5 Traffic Impacts	32
2-4.6 Military Vehicle Information	33
2-5 ANTITERRORISM/FORCE PROTECTION (AT/FP)	34
2-6 LANDSCAPE.....	35
2-7 BUILDINGS.....	36
2-7.1 General Design Considerations.....	36
2-7.2 Training Center Functional Relationships.....	40
2-7.3 VMS Functional Relationships.....	45
2-7.4 Unheated Storage Functional Relationships	46
2-7.5 AMSA Functional Relationships	46
2-8 FIRE PROTECTION/LIFE SAFETY	47
2-9 INTERIOR DESIGN.....	48
2-10 TELECOMMUNICATIONS	49
2-11 SIGNAGE	49
2-12 ACCESSIBILITY.....	54
2-13 SECURITY	54

TABLE OF CONTENTS Continued

	<u>Page</u>
CHAPTER 3 GENERAL DESIGN CONSIDERATIONS	
3-1 INTRODUCTION	55
3-2 CIVIL AND UTILITIES	55
3-2.1 Grading and Drainage	55
3-2.2 Utilities.....	60
3-2.3 Roads and Pavements	64
3-2.4 Civil Layout.....	70
3-2.5 Fencing.....	72
3-2.6 Wash Platforms	74
3-2.7 Loading Ramps	76
3-2.8 MKT and CK Pads.....	76
3-3 LANDSCAPE ARCHITECTURE	77
3-4 FIRE PROTECTION/LIFE SAFETY	78
3-4.1 General.....	78
3-4.2 Fire Sprinkler System	79
3-4.3 Fire Alarm System	80
3-4.4 Mass Notification System	81
3-5 ARCHITECTURAL	82
3-5.1 Army Reserve Approved Systems and Materials	82
3-5.2 Image/Aesthetics	84
3-5.3 Room Numbering	85
3-5.4 Stairs and Elevators	85
3-5.5 Doors and Windows	86
3-5.6 Caging and Shelving	86
3-5.7 Trash/Recycling Enclosure.....	86
3-5.8 Flagpole.....	87
3-5.9 Sound Transmission Control	87
3-6 INTERIOR DESIGN.....	89
3-6.1 Army Reserve Approved Materials and Systems	89
3-6.2 Colors.....	89
3-6.3 Flooring	89
3-6.4 Wall Finishes	90
3-6.5 Furniture	91
3-6.6 Shelving and Workbenches.....	93
3-6.7 Electrical Coordination.....	93
3-6.8 Markerboards and Presentation Boards.....	93
3-6.9 Existing Tenant Furniture	93

TABLE OF CONTENTS Continued

	<u>Page</u>
3-7	STRUCTURAL 94
3-7.1	Army Reserve Approved Systems and Materials 94
3-7.2	Design Loads 95
3-7.3	Structural Ceiling Grid System 95
3-7.4	Wall Elevations 95
3-7.5	Antiterrorism/Force Protection (AT/FP) Considerations 95
3-7.6	Foundation 96
3-7.7	Renovations/Alterations 96
3-8	MECHANICAL 96
3-8.1	Choosing Mechanical Systems 96
3-8.2	Ventilation 98
3-8.3	Automatic Temperature Controls 98
3-8.4	Zoning and System Considerations 99
3-8.5	Mechanical Room 99
3-8.6	Total Building Commissioning 99
3-8.7	Emergency Air Distribution Shutoff 99
3-9	PLUMBING 99
3-9.1	Choosing Plumbing Systems 99
3-9.2	Hot Water Systems 100
3-9.3	Plumbing Equipment 100
3-10	ELECTRICAL 101
3-10.1	General 101
3-10.2	Exterior Electrical Systems 101
3-10.3	Interior Electrical 103
3-11	SPECIFICATIONS 110
3-11.1	Unified Facilities Guide Specifications (UFGS) 110
3-11.2	SpecsIntact 111
3-12	COST ESTIMATING 111
3-13	SUSTAINABILITY AND RESOURCE CONSERVATION 112
3-13.1	DoD Goals 112
3-13.2	Resource Reduction Measures 113
3-13.3	Renewable Energy 116
3-13.4	Strategic Use and Measures 117
3-13.5	LEED 117
3-14	ENVIRONMENTAL 118
3-14.1	Non-Contaminated Site Issues 118
3-14.2	Contaminated Site Issues 120
3-15	TELECOMMUNICATIONS 121
3-15.1	Telecommunications Outlets 121

TABLE OF CONTENTS Continued

	<u>Page</u>
CHAPTER 4	INDIVIDUAL SPACE CRITERIA
4-1	GENERAL 122
4-2	TRAINING CENTER BUILDING 123
4-2.1	Administrative Offices (Full-Time and Exclusive) 123
4-2.2	General Officer Suite 126
4-2.3	Unit Common 128
4-2.4	Retention Office 132
4-2.5	Career Counselor Office 134
4-2.6	Family Support Office 135
4-2.7	Administrative Support 136
4-2.7.1	Mail Distribution Room 136
4-2.8	Telecommunications Spaces 138
4-2.8.1	Telecommunications Spaces - General Information 138
4-2.8.2	Entrance Facility (EF) 139
4-2.8.3	Telecommunications Equipment Room (TER) 140
4-2.8.4	Telecommunications Room (TR) 141
4-2.8.5	IT Work Space 143
4-2.9	Lobby 144
4-2.10	Assembly Hall 146
4-2.11	Chair and Table Storage 148
4-2.12	Kitchen 149
4-2.13	Arms Vault 151
4-2.14	Armorer's Room 155
4-2.15	Classrooms 157
4-2.16	Team Rooms 160
4-2.17	Not Used
4-2.18	Learning Center 162
4-2.19	Not Used
4-2.20	COMSEC Storage 163
4-2.21	Unit/Individual Storage 164
4-2.22	Staging Area 168
4-2.23	Supply Office 169
4-2.24	Janitorial 170
4-2.25	Flammable Storage 171
4-2.26	Controlled Waste Storage 171
4-2.27	Facility Maintenance Storage 172
4-2.28	Simulator Room 173
4-2.29	Band Room 175
4-2.30	Medical Section 175
4-2.31	Physical Exam Wing 175
4-2.32	Sensitive Compartmented Information Facility (SCIF) 175
4-2.33	Not Used

TABLE OF CONTENTS Continued

	<u>Page</u>
4-2.34	Conference Room 176
4-2.35	Not Used
4-2.36	Physical Readiness Training 177
4-2.37	Not Used
4-2.38	Distance Learning Center 179
4-2.39	Male and Female Toilets and Showers 180
4-2.40	Male and Female Locker Rooms 183
4-2.41	Vending Alcove 184
4-2.42	Break Area 185
4-2.43	Mechanical 186
4-2.44	Electrical 187
4-2.45	Circulation 188
4-2.46	Stairs 190
4-2.47	Secret Controlled Access Area (SCAA) 191
4-2.48	Lactation Room 193
4-2.49	Elevator 194
4-2.50	Elevator Equipment Room 195
4-3	VEHICLE MAINTENANCE SHOP 195
4-3.1	General VMS Information 195
4-3.2	Shop Office 197
4-3.3	Male and Female Toilets 199
4-3.4	Tools and Parts Room 199
4-3.5	Storage Room 200
4-3.6	Special Equipment Alcove 201
4-3.7	Battery Room 202
4-3.8	Flammable Storage 203
4-3.9	Controlled Waste Storage 205
4-3.10	Workbays 207
4-3.11	Mechanical/Electrical 215
4-3.12	Information Technology 216
4-3.13	Custodial/Janitorial 217
4-3.14	Fluid Distribution Room 217
4-4	UNHEATED STORAGE (UHS) 218
4-5	AREA MAINTENANCE SUPPORT ACTIVITY (AMSA) 219
4-5.1	General 219
4-6	DEPLOYABLE MEDICAL SETS (DEPMEDS) 220
4-7	WAREHOUSE 220

TABLE OF CONTENTS Continued

	<u>Page</u>
APPENDICES	
APPENDIX A References	222
APPENDIX B Acronyms and Military Rank Designations	229
APPENDIX C Sample 1390, 1391, AND 5034R-Functional Space Detail	236
APPENDIX D Standard Kitchen Plan and Equipment List	273
APPENDIX E Band Room.....	278
APPENDIX F Sensitive Compartmented Information Facilities (SCIF)	281
APPENDIX G Physical Exam Wing	283
APPENDIX H Equipment Concentration Site (ECS)	286
APPENDIX I Roof Systems for Army Reserve Projects.....	288
APPENDIX J Physical Readiness Room Equipment Matrix.....	293
APPENDIX K Sample Projects and Photography Credits	294

DRAFT

FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1-1	ARC, St. Charles, Missouri.....	10
1-2	Project Guidance.....	12
1-3	Not Used	
1-4	Classroom, Ft. Allen, Puerto Rico	14
1-5	Total Systems Design.....	17
1-6	ARC, McAlester, Oklahoma.....	17
1-7	ARC, Saginaw, Michigan.....	20
2-1	Project Design Development.....	23
2-2	ARC, Joliet, Illinois	24
2-3	Site Access.....	27
2-4	Typical Reserve Center Site Plan.....	27
2-5	Typical AMSA Site Plan.....	28
2-6	Typical ECS Site Plan	29
2-7	Local Operating Console for Mass Communication	35
2-8	Landscape Planting.....	36
2-9	AFRC, Middletown, Connecticut.....	37
2-10	Flexibility for Future	38
2-11	ARC, Hayden Lake, Idaho.....	39
2-12	ARC, Garden Grove, California.....	40
2-13	Not Used	
2-14	GO Command Suite	41
2-15	Assembly Hall Adjacencies	41
2-16	ARC, Wilmington, North Carolina	42
2-17	Janitorial and Toilets.....	43
2-18	Training Center Adjacencies	44
2-19	Not Used	
2-20	AFRC, Middletown, Connecticut.....	46
2-21	Shop Office Views	47
2-22	AMSA Schematic Diagram	47
2-23	ARC, Butte, Montana.....	48
2-24	Army Reserve Monument Sign, ARC, Honolulu, Hawaii	50
2-25	Metal Freestanding Building Identification Sign.....	50
3-1	Outlet Control Structure ARC, Wilmington, North Carolina.....	56
3-2	Flared End Section, ARC, Fargo, North Dakota.....	57
3-3	Trench Drain in VMS Workbay, Fargo, North Dakota.....	60
3-4	ARC, Wausau, Wisconsin	69
3-5	AFRC, Kingsville, Texas.....	71
3-6	Bi-Level Loading Ramp	76
3-7	ARC, Ft. Allen, Puerto Rico	77
3-8	ARC, Honolulu, Hawaii.....	85
3-9	NCO Academy, Ft. McCoy, Wisconsin.....	90
3-10	ARC, Wilmington, North Carolina	95
3-11	Air Handling Unit	97
3-12	Not Used	

FIGURES Continued

Figure	Title	Page
3-13	ARC, Binghamton, New York	111
3-14	ARC, Camden, New Jersey	119
4-1	Single Office	126
4-2	Shared Office	126
4-3	Colonel (O6) Office	127
4-4	General Officer (O7/O8) Office	128
4-5	Unit Common	130
4-6	Retention Office	132
4-7	Mail Boxes	136
4-8	Mail Room	137
4-9	Not Used	
4-10	IT Work Space	143
4-11	Display Case	144
4-12	Lobby	144
4-13	Assembly Hall and Kitchen	146
4-14	Chair and Table Storage	148
4-15	Not Used	
4-16	Not Used	
4-17	Armorer's Room and Arms Vault	152
4-18A	Weapons Racks	153
4-18B	Wall Anchorage	154
4-19	Classroom	157
4-20	Classroom with Operable Partition	158
4-21	Team Room	160
4-22	Not Used	
4-23	Learning Center	162
4-24	Not Used	
4-25	Unit Storage with Supply Office	164
4-26	Dutch Door Configuration	166
4-27	Unit Storage with Staging and Supply Office	167
4-28	Janitorial	171
4-29	Facility Maintenance Storage	172
4-30	Not Used	
4-31	Simulator Room	173
4-32	Conference Room	176
4-33	Physical Readiness Training Room	179
4-34	Not Used	
4-35	Unisex Single Room Toilet	180
4-36	Shower Room	182
4-37	Locker Room	183
4-38	Vending Alcove	184
4-39	Break Area	185
4-40	SCAA	191
4-41	Lactation Room	193
4-42	Shop Office	197

FIGURES Continued

Figure	Title	Page
4-43	Unisex Toilet.....	199
4-44	Tools and Parts Room.....	200
4-45	Flammable Storage.....	204
4-46	Controlled Waste Storage.....	206
4-47	Typical Workbay.....	207
4-48	“Birdbath” Trench Drain.....	208
4-49	Exhaust Arm for Welding.....	209
4-50	VMS Minimum Workbay Conceptual Diagram.....	210
4-51	Fluids Distribution System.....	212
4-52	VMS Mid-Sized Workbay Conceptual Diagram.....	213
4-53	VMS Standard Workbay Conceptual Diagram.....	214
4-54	Unheated Storage.....	219
D-1	Large Kitchen Standard Plan.....	275
D-2	Medium Kitchen Standard Plan.....	276
D-3	Small Kitchen Standard Plan.....	277
E-1	Conceptual Band Room Plan.....	278
G-1	Physical Exam Wing Plan.....	283
H-1	Typical ECS Layout.....	286

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. ARIMD is the “Customer” for the project.

1-1.1.2 The Army Reserve Readiness Division (RD), which supports the facility, is the “User” for the project. The RD works with ARIMD to develop the requirements for the project. 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/E)s 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.

Figure 1-1
ARC, St. Charles, Missouri



1-1.1.5 U.S. Army Reserve Command (USARC) G6 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 (VMS), 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. USACE Louisville has a standard design for small and mid-sized Army Reserve training facilities. Verify whether a standard design should be used for the type of facility being constructed.

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.

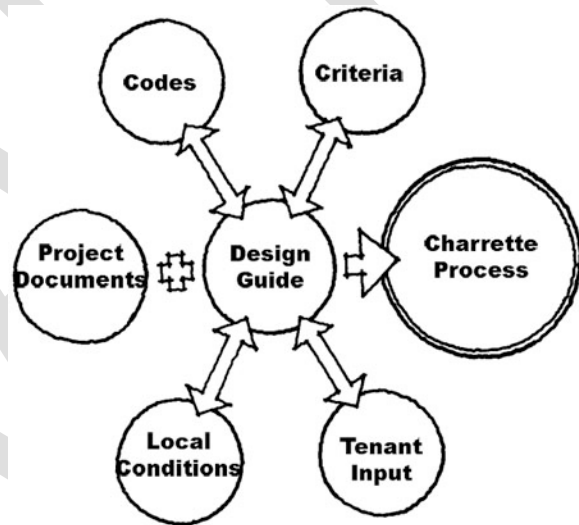
1-2.2 The intent of the Guide is to provide a portion of the general information and guidance required for the successful preparation of project designs. Additional information and other military installation design guidance must be obtained from the OCAR Engineer Office, the Support Installation, the 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](#).

- 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.

- Additional Design Criteria include the Army Reserve Design Process and Submittal Requirements, Unified Facilities Criteria (UFC), Unified Facility Guide Specifications (UFGS), Army Reserve Network Enterprise Center Infrastructure Technical Criteria (ARNEC), codes, and other design guidance.

- 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, as well as the Army Reserve template specifications. See the [Army Reserve website](#). Refer to Appendix A for the Army Reserve website link name.

**Figure 1-2
Project Guidance**



1-3 ARMY RESERVE CADD PLATFORM

1-3.1 Army Reserve drawing records are maintained in Autodesk Revit/AutoCAD. Army Reserve Tenants have CADD software. The shared data standard for Army Reserve CADD management is the United States Army Corps of Engineers TriServices Revit/CAD Standards. Refer to the CAD-BIM Center

website, <https://cadbimcenter.erdcdren.mil>, for the A/E/C CAD and Graphic Standards, A/E/C Work Structure, A/E/C Users Guide, Revit Templates, and all related requirements.

1-3.2 As-built drawings must be provided to the Government using Revit/AutoCAD; refer to the Design Process and Submittal Requirements, available on the [Army Reserve website](#).

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.

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 special 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. This includes both Contractor-furnished and Government-furnished items.

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, RD 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 (RD 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.

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

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



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) G6 is responsible for:

1-5.4.1 Determining the specific telecommunications requirements for the project.

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

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

1-5.4.4 Clarify all Army Reserve DD1391 Tab F requirements prior to being funded by ISEC.

1-5.4.5 Reviewing and commenting on Design Agency submittals, and providing input to the Design Agency as requested.

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 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 Vehicle Maintenance Shop (VMS) 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.

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.

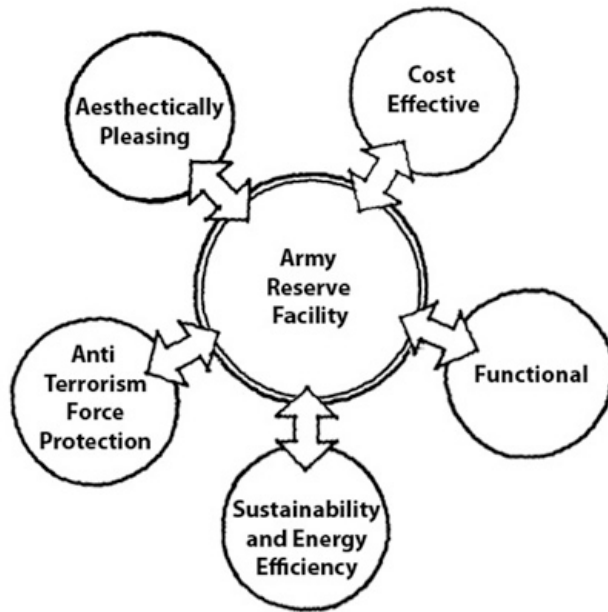
1-7.2 The concept of total systems design will be emphasized in promoting the development of a functional, durable, energy efficient and aesthetically pleasing building. Design concepts must evolve in a multidisciplinary manner with regard to architectural, interior design/furniture, civil, structural,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

**Figure 1-5
Total Systems Design**



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 (VMS, AMSA, etc.). Joint use facilities may include other military branch components (i.e. Navy Reserve, Marine Corps Reserve, National Guard, etc.).

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, training/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 various office spaces, retention, family support, career counseling, administrative support, and a lobby.

1-9.3.1.1 Full-time and unit exclusive space is dedicated space for full-time employees; and key unit command and staff positions. 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, information technology, and the lobby.

1-9.3.2 The assembly/kitchen group consists of the assembly hall, table and chair storage, and kitchen (including the kitchen office as applicable), and Mobile Kitchen Trailer (MKT) pad or Containerized (CK) pad.

1-9.3.2.1 The main element of the assembly group is a multipurpose space for assembly. The assembly 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. During battle assembly weekends, a Mobile Kitchen Trailer (MKT) or Containerized Kitchen (CK) is also used for training. Concrete pads for these trailers are located close to the training center kitchen.

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, team rooms, 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.

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.

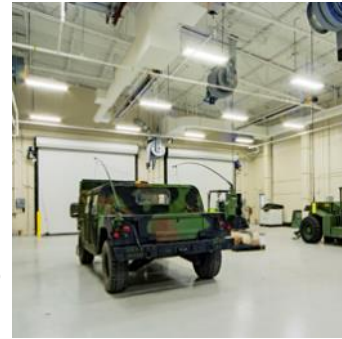
1-9.3.6 Special training areas, when authorized, include such spaces as physical training, simulator, medical wings, and band areas. Conference rooms, when authorized, are included as special training spaces.

1-9.3.7 Some 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, and space for mechanical, and electrical.

1-9.3.8 Some Support areas are allocated with predetermined room sizes. They include vending, break room, lactation room, and telecommunications rooms.

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

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



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

1-9.4.2 VMS 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 a 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 VMS/AMSA/ECS Configurations.

1-9.4.5.1 When collocated with an Army Reserve VMS, and supporting Army Reserve units in a geographical area, there will typically be a combined VMS/AMSA building with a shared POV area and a MEP.

1-9.4.5.2 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).

1-9.4.5.3 If in a separate location, and supporting only an ECS, there will typically be an AMSA (TEMF) 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 awarded within 180 days of construction completion.

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 GFGL) 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.

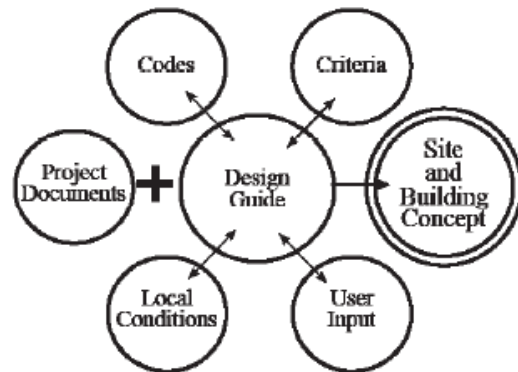
2-1.3 The two main documents submitted to the designer, prior to beginning design for a facility, are the project documents (see Paragraph 1-2.2.1) and this Guide. The project documents list the authorized spaces and their authorized areas for a specific project. This Guide provides design criteria and 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 Network Enterprise Center Infrastructure Technical Criteria (ARNEC), 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 RD's have published their own design guides or preferences; designers will consider these in the design of the project. The RD guides and preferences do not take precedence over this Design Guide or other government criteria. The designer will notify the PDT when any of these additional guides or preferences is used in the design of the project. 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. Refer to paragraph 3-4 Fire Protection/Life Safety.

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 particularly onerous or costly, or would reduce the level of safety within the facility. Local regulations which are complied with are (including but not limited to) NPDES Permits and SWPPP. The OCAR Engineer Office encourages the Design Agency to meet with local code and regulatory officials to review the

Figure 2-2
ARC, Joliet,
Illinois



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 (EISA 2007), ASHRAE 189.1, Executive Orders (EO) listed, among other guidance.

2-2.2.2 The memo, '2017 Implementing Guidance, Army Stormwater Management Using Low Impact Development can also be found on the [Army Reserve website](#).

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. Preparation of these environmental documents is typically the responsibility of the RD 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>, has general information and some counties or cities have more specific information. The Support Installation may also have information. Provide radon mitigation system, if required per UFC 3-101-01 Architecture.

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

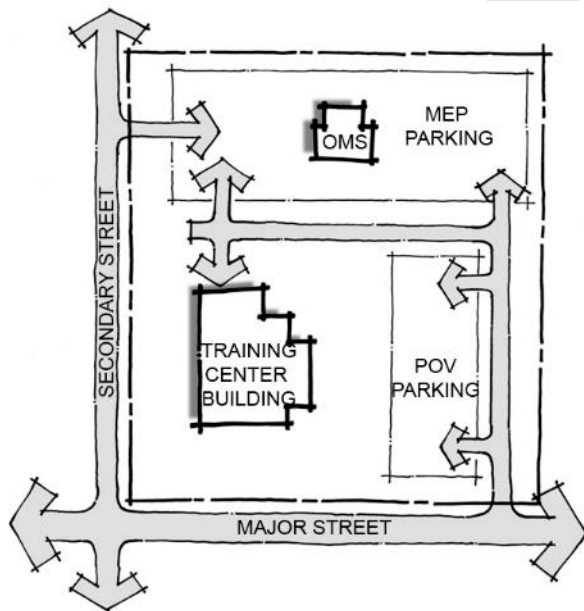
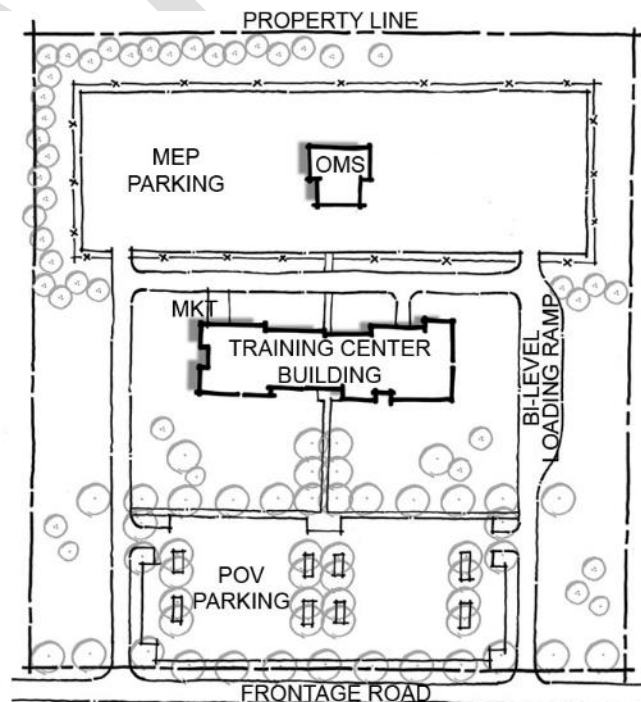


Figure 2-4
Typical Reserve Center Site Plan



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, floodplains, etc. In general, the Army Reserve will not acquire land that is located in the 100-year

floodplain. 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.

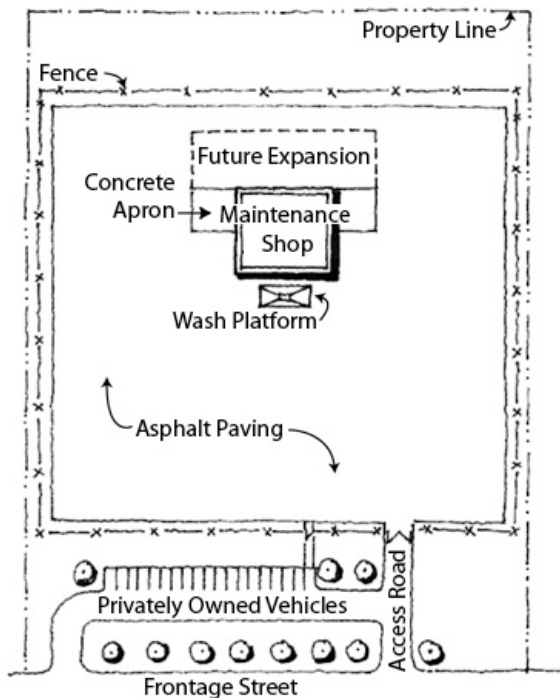
2-4.1.1.7 A site that will support energy reduction and sustainable design measures for the project, and may offer space for renewable energy strategies now or in the future. Consider mandated low-impact development (LID) measures, and how they will be accommodated.

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, vehicle maintenance shop (VMS) 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 VMS also should generally be located to afford a showcase for public relations purposes. Review location of the VMS and MEP, and whether community concerns necessitate visual screening of these functions, with the Tenants.

2-4.1.3 Generally, 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 VMS/AMSA is an individual structure generally located away

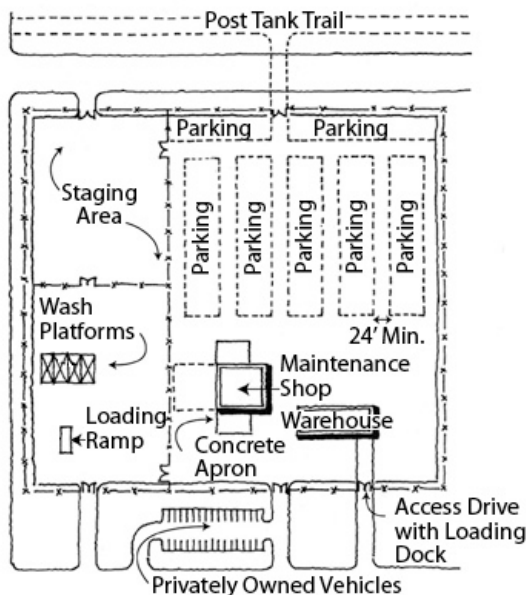
from the training center to minimize noise and disruption. Most Tenants prefer that the administrative portions of any VMS/AMSA building be nearest the training center. The UHS can be located as the Tenants think appropriate, but it is frequently located near the maintenance shop area.

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 VMS 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

Figure 2-6
Typical ECS Site Plan



program, site, Tenant functions, and long-term maintenance. It is intended, if possible, for the site to have minimal or no utility easements through the property to facilitate optimal site and building layouts. Project sites will vary; each requires its own solution.

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 VMS, 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 floodplain or flood protection program. Floodplain maps are also available on order from the FEMA website, <http://www.fema.gov>.

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 included within the boundaries of a USACE flood risk management project.

2-4.4.3 Not all sites that flood are documented as part of a formal floodplain 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. Refer to Site Design Planning requirements in UFC 3-201-01 Civil Engineering regarding flood hazard areas. This UFC provides additional guidance on Executive Order 11988 for any development with floodplains. 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.

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 Concealment, unobstructed space, equipment enclosures (electrical, mechanical, trash, etc.) shall comply with UFC 4-010-01.

Figure 2-7
Local Operating Console
(LOC) for Mass
Notification



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.

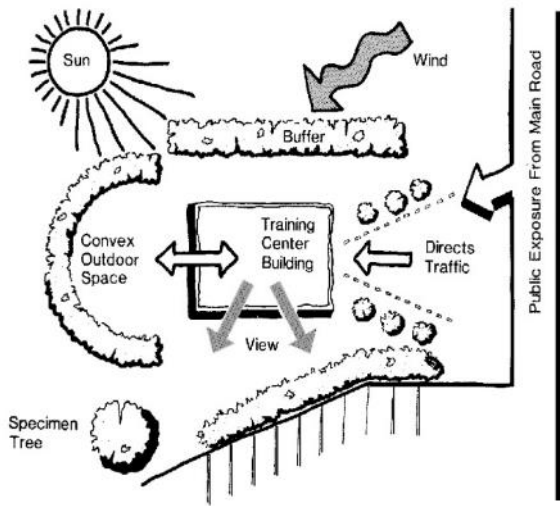
2-6.4 Landscape design must enhance and facilitate pedestrian and vehicular wayfinding. Good design encourages safety and assists in the resolution of conflicts between the automobile and the pedestrian.

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.

Figure 2-8
Landscape Planting



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.

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.

Figure 2-9
AFRC, Middletown,
Connecticut



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, Secret Controlled Access Area (SCAA), and others. The designer may want to locate these spaces away from major facades to allow use of fenestration on those elevations.

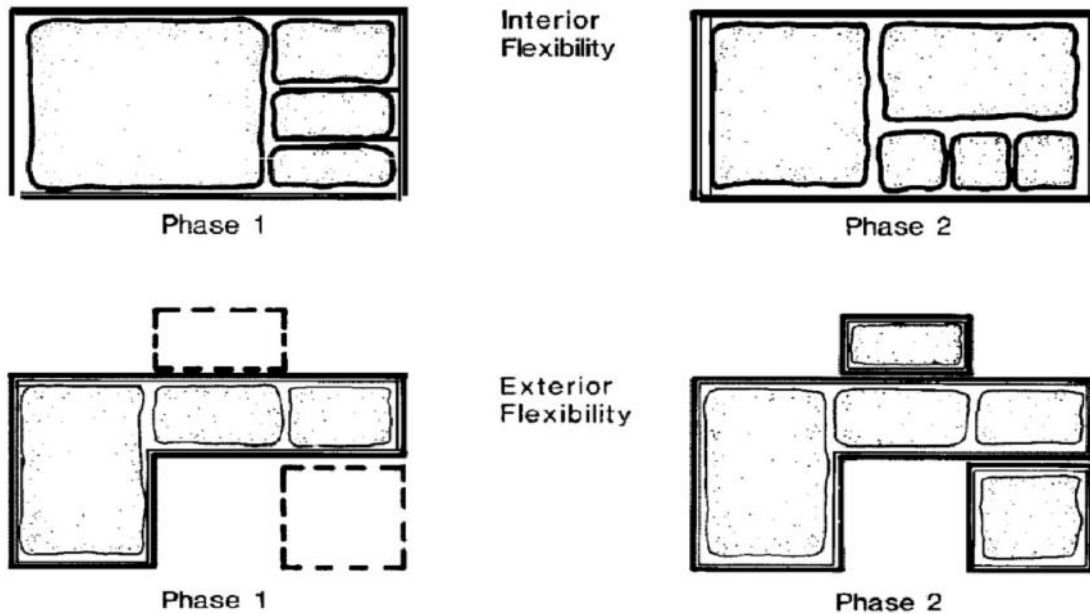
2-7.1.2 Flexibility and Economy

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 a Quartermaster Unit 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 telecommunications, 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 and benching systems are preferred to hard-walled offices for future flexibility.

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:

Figure 2-10
Flexibility for Future



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. Communication system floor boxes should be minimized.

2-7.1.2.3.5 Telecommunications: Telecommunications Equipment Room (TER), Entrance Facility (EF), and Telecommunications Room (TR) located in accordance with ARNEC to efficiently serve telecommunications outlets. Cable

tray provided for telecommunications 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 VMS 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

Figure 2-11
ARC, Hayden Lake, Idaho

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.

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.

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. Refer to [Figure 4-5](#)

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. Where practical, consider grouping full-time offices to facilitate zoning

Figure 2-12
ARC, Garden Grove,
California



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 retention office adjacent to the lobby for both monitoring and ease of location by 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

Figure 2-14
GO Command Suite

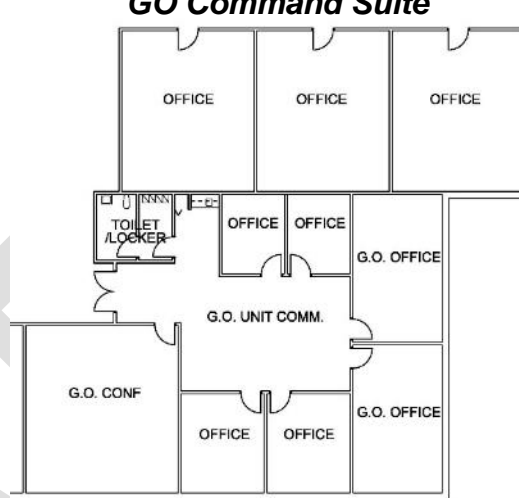
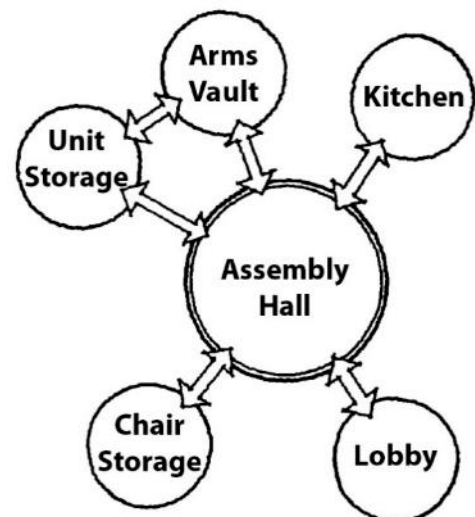


Figure 2-15
Assembly Hall Adjacencies



dispersal space required for large numbers of people in the assembly hall.

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.

Figure 2-16
ARC, Wilmington,
North Carolina



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.

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.

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 close to toilet facilities.

2-7.2.1.8.2 Team room(s) should be located off a hallway, and may be located near the administrative areas, to allow for impromptu smaller team meetings. Verify with Tenants the preferred locations.

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

2-7.2.1.9 Storage Adjacencies

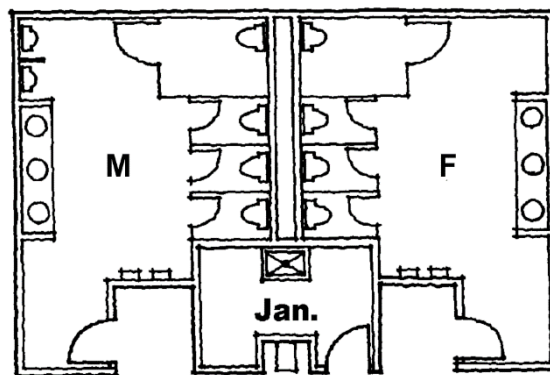
2-7.2.1.9.1 Locate unit/individual storage near the assembly hall, which may be used for training with or maintaining the equipment.

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 supply deliveries. 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 and budget 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.

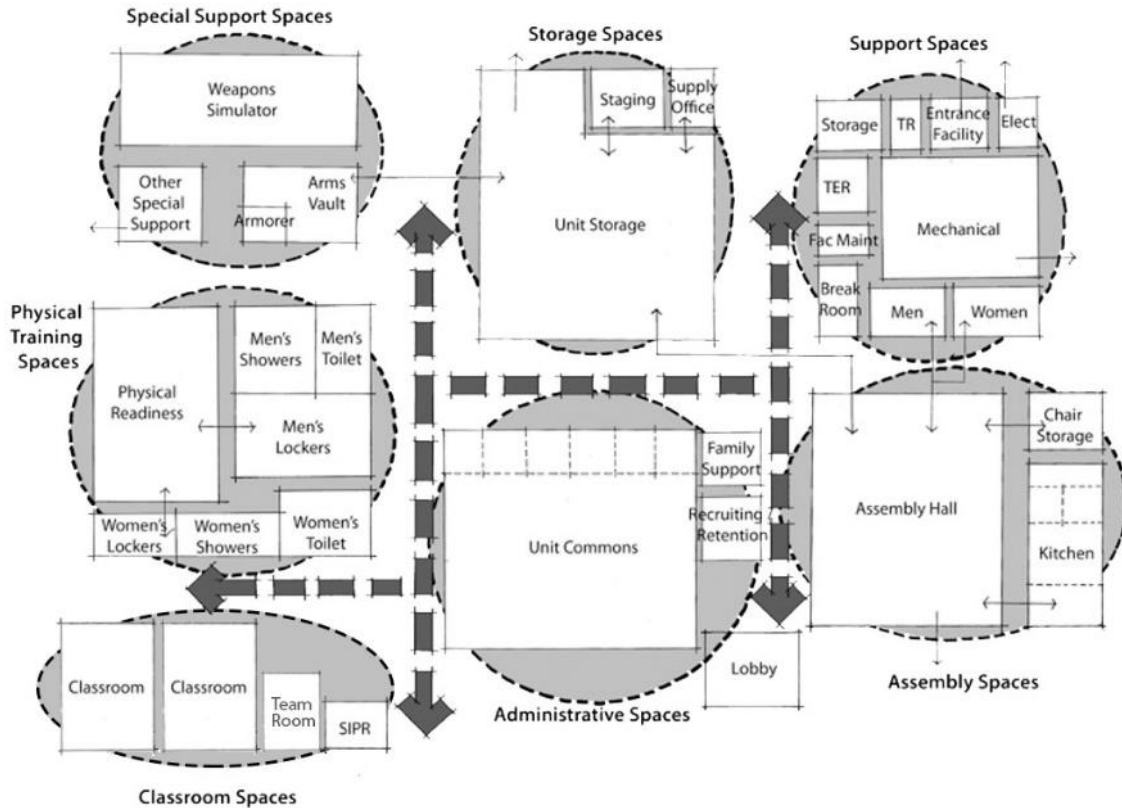
2-7.2.1.9.6 Flammable storage and controlled waste storage are not typically authorized for training center buildings collocated with an VMS. If authorized, locate these spaces on an exterior wall with exterior access only, as well as near a vehicle access for easy transfer for delivery to and removal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

2-7.2.1.10 Special Training Adjacencies

2-7.2.1.10.1 Medical section, physical exam, soils testing lab, 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.

Figure 2-18
Training Center Adjacencies



2-7.2.1.10.2 The Simulator Room utilizes electronic simulators. The simulator room should be located away from occupied areas of the building. One of the simulators used is the Engagement Skills Trainer (EST). The electronic weapons used are stored in the storage room; they need not be in the arms vault. This room will also be utilized for vehicle simulators, etc. Please coordinate type of simulator to be used with the RD.

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. It is preferred to have direct access from the locker rooms into physical readiness. Provide a short route of access to the exterior, since many of the soldiers will run as part of their training.

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. In large facilities, consider locating smaller (possibly single-use) toilets near the building entrance, for use by retention and family support visitors, if the primary toilets are not located nearby. 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, with direct access between the locker areas and physical readiness preferred.

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. 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.

2-7.3 VMS Functional Relationships

2-7.3.1 An optimal space arrangement for an VMS would have several of the VMS 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. The caging

area is usually subdivided into dedicated caging areas, based on number of Units (Tenants) involved in the project. 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(s) 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 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 VMS, but outside the MEP security fence.

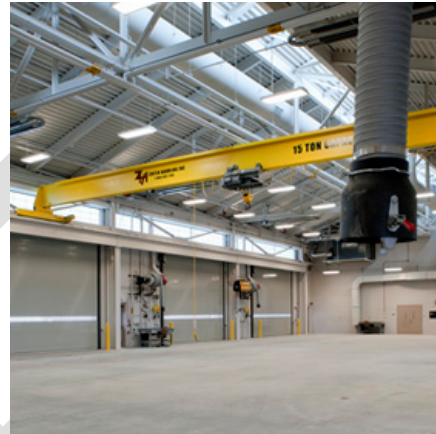
2-7.5 AMSA Functional Relationships

2-7.5.1 An AMSA is very similar to an VMS, with some additional spaces added. AMSA functional relationships are similar to those for an VMS – see Paragraph 2-7.3. A stand alone AMSA will follow the functional relationships of the Army TEMF standard.

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 VMS, 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

Figure 2-20
AFRC Middletown,
Connecticut



101 allow. They may also be located off a corridor leading to the workbays.

Figure 2-21
Shop Office Views

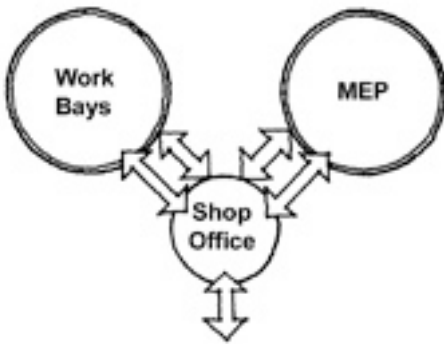
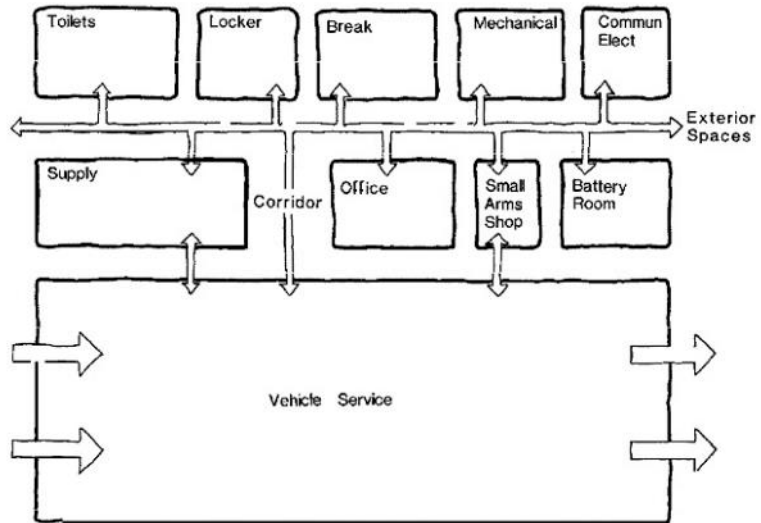


Figure 2-22
AMSA Schematic Diagram



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, VMS, 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 considered warehouse and storage facilities; follow the corresponding criteria requirements. The USACE Designated Fire Protection Engineer (DFPE) has the authority to waive fire protection for buildings less than 5,000 sf based on expected items to be stored, prior to the start of the project design. The criteria for providing and designing sprinkler systems are included in UFC 3-600-01. VMS and AMSA buildings are considered to be vehicle maintenance and repair facilities.

2-8.2 Refer to the requirements of UFC 3-600-01 for existing buildings with addition/alteration projects. If modification type work exceeds certain thresholds, certain upgrades may be required.

2-8.3 A "knox box" shall be provided at the main entrance of each building, and must be coordinated with local fire department requirements.

2-8.4 Verify jurisdiction for alarm systems with RD 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.

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.

Figure 2-23
ARC, Butte, Montana



2-9.5 Emotional responses to the environment 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 TELECOMMUNICATIONS

2-10.1 The primary criteria document for the design of telecommunication spaces and systems for Army Reserve facilities is the ARNEC. 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 telecommunication 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 Outside Plant (OSP) infrastructure for Army Reserve telecommunication systems.

2-10.3 USARC G6 is the proponent for Army Reserve telecommunications, and will participate in project meetings to define project telecommunication 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 Design: Sign Standards.

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.

2-11.3 Two “Minuteman” logo plaques will be provided for each project. Exterior minuteman plaque is not to be located on the monument sign. Further information about Minuteman plaques can be found in Paragraph 3-5.2.4.

2-11.4 Some Reserve Centers will be memorialized – named in honor of a serviceman or woman. A memorial plaque, and possibly other memorialization items, will be furnished by the Government; provide a location of visibility and prominence in the Training Center. Coordinate appropriate location with Tenants.

2-11.5 Exterior signage typically consists of a 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.

2-11.5.1 Exterior sign messages shall be clear, simple and easy for motorist to process quickly. Exterior signs must be located at significant decision points and oriented to provide clear sight lines for the intended user. Close coordination of locations with respect to landscaping, utilities, adjacent signage and various other site design elements is important to ensure long-term maximum visibility.

2-11.5.2 Exterior signs should be placed perpendicular to traffic, wherever feasible.

2-11.5.3 Exterior signage shall be designed with the ability to adapt to changing information and content. Design exterior signs for maximum durability and sustainability based upon regional weather impacts.

2-11.5.4 On military installations, it is common to provide approximately 16 inches high anodized aluminum building numbers on two faces of the building. Verify with the RD/installation.

Figure 2-24
Army Reserve
Monument Sign



2-11.5.5 At the Training Center, provide building mounted anodized aluminum signage letters which read “U.S. ARMY RESERVE CENTER”, approximately 14 to 20 inches high; coordinate location and size with building design features. Lettering color is to contrast with the building surface color, for legibility; clear anodized aluminum or dark bronze anodized aluminum are preferred. Coordinate with exterior Minuteman plaque noted in Paragraph 3-5.2.4.

2-11.6 The Army Reserve has a standard exterior Monument Sign in accordance with UFC 3-120-01 requirements for a 'Secondary Installation and Gate Identification Sign', and as further defined below. Verify facility sign requirements with the installation; the Monument Sign should be utilized, unless the Installation Design Guide requires otherwise. The Design Agency should verify whether such guidance governs. Signs for locations with multiple or separate ARC/AFRCs/AMSAs/ECSs will identify all facilities or units on the site. On an installation, it is common to utilize a metal 'Freestanding Building Identification Sign' (in lieu of the exterior Monument Sign noted above), similar to UFC 3-120-01 paragraph 3-3.1. The metal Freestanding Building Identification Sign may need to be used in lieu of the Monument Sign, in cases where site restrictions dictate the sign needs to be installed close to a roadway and a 'breakaway' design is required; this would be on rare occasion.

Figure 2-25
Metal Freestanding
Building
Identification Sign



2-11.6.1 Typeface and Logos. Standardization of graphic and text information used on military installation signs helps establish consistent visual communication and brand identity. Approved font and logos are indicated in UFC 3-120-01.

2-11.6.1.1 Display logos of each Service located at facility, and the Name of Army Reserve facility, if it has a formal dedicated name. If dedicated, the name should indicate the abbreviated rank (if applicable) and name of the individual. Examples: "1LT David R. Wilson Armed Forces Reserve Center", or "Taft Army Reserve Center", or "Orlando Armed Forces Reserve Complex".

2-11.6.1.2 Order of logo precedence is Army, Marines, Navy, Air Force, and then Coast Guard.

Display logos of each Service located at facility, and the Name of Army Reserve facility, if it has a dedicated name.

2-11.6.1.3 The following logos are not indicated in UFC 3-120-01, and are included for reference. Verify the use and accuracy of the emblems on each applicable project with the PDT, RD, Installation (if applicable), and Project Officer:

Army Star:



Official USAR Emblem
"The John Parker":



National Guard:



United States
Marine Corps Reserve:



United States
Navy Reserve:



United States
Air Force Reserve:



United States
Coast Guard Reserve:



2-11.6.1.4 The logo for the lead Service branch of a joint center must be mounted on the left side of the sign when looking at the sign. This would be the Army Star ("Army Logo Identification" in UFC 3-120-01) on a typical Army Reserve Center.

2-11.6.1.5 The Army Star is a registered trademark and must be displayed with the "R" to the right.

2-11.6.1.6 The Official USAR Emblem “The John Parker” must be 90% of the height of the Army Star logo. The John Parker must also be the four-color version as shown above.

2-11.6.2 Color Scheme. Exterior facility signs shall have a consistent color palette among all signs and on each Army Reserve property. However, this needs to be balanced with the fact many existing signs will not be replaced until their signage “life” is over.

2-11.6.2.1 A consistent dark bronze background will be used for standard exterior signage, with light text to provide sufficient contrast, to meet all visibility and required legibility objectives.

2-11.6.2.2 Accent stripe colors are used to help reinforce the brand identity of the Service branch; Gold for the Army Reserve, per UFC 3-120-01.

2-11.6.2.3 The sign and background material should be fabricated from aluminum with a Dark Bronze painted finish.

2-11.6.2.4 All logo symbols and seals must be 0.5 inch (13-mm) thick and fabricated from highly durable materials with full color graphics.

2-11.6.2.5 All letterforms must be constructed of 0.5-inch (13-mm) thick aluminum. Use a paint to match a “brushed aluminum” finish.

2-11.6.2.6 The monument sign supporting structure materials (brick, etc.) may vary to match the architectural character of the surrounding environment or installation-specific standards. However, the Figure 2-24 is the preferred masonry arrangement for Army Reserve facilities.

2-11.6.3 Materials and Construction. Sign panels are to be fabricated using aluminum. All signs, foundations, and connections must be engineered to resist wind loads and thermal movement per the local climate requirements without distortions and excessive deflections. All freestanding signs must include design calculations and the signed seal of a registered structural engineer licensed in the required area or follow approved state department of transportation standards to ensure compliance with all design and load requirements. Apply anti-graffiti coating to all signs.

2-11.6.4 Monument Signs shall incorporate masonry base and ‘book end’ masonry piers as shown in Figure 2-24. Provide precast concrete (cast stone) cap at masonry surrounding construction, to prevent moisture penetration.

2-11.6.5 Provide lighting on both sides of the monument sign.

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 VMS 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. See Paragraph 3-10.3.4.3.2 for details of Physical Access Control System (PACS).

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.

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.

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. Stormwater retention and detention ponds are not considered LID solutions, compliance with Federal environmental laws is required. In addition to UFC requirements (UFC 3-210-10), comply with the Clean Water Act and the

**Figure 3-1
Outlet Control
Structure,
ARC, Wilmington,**



applicable State and local requirements, including obtaining and complying with stormwater or applicable related permits. 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, RD 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. The Design Agency shall provide an operations and maintenance manual for the site stormwater management system to the RD, as part of the design submittals.

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



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

- Rain gardens, bioretention and infiltration basins, 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 VMS Workbay,
Fargo, North Dakota



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 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.

3-2.1.3.2 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 3-240-07.

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 VMS/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 RD's 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, RD 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. Separate water mains will be sized and utilized for both domestic and fire protection purposes.

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. 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 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 Fire hydrant flow tests shall comply with UFC 3-600-01. 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.

3-2.2.2.6 Coordinate with the water utility to determine meter type and installation. UFC 1-200-02 requires the utilities to be monitored through connection to a base wide or RD wide energy and utility monitoring and control system directly or via the building HVAC control system; this will require installing a smart meter per Army specifications 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, RD 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 1-200-02 requires the utilities to be monitored through connection to a base wide or RD wide energy and utility monitoring and control system directly or via the building HVAC control system; this will require installing a smart meter per Army specifications separate from the gas provider billing meter. Comply with U.S. Army Advanced Natural Gas Meter Specifications. Coordinate with the building mechanical and electrical design disciplines for individual building meter and corresponding controls requirements.

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.

3-2.2.4 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](#) and [Section 3-15](#) below for electric and telecommunications utilities.

3-2.2.5 Utility Metering

3-2.2.5.1 The Energy Policy Act (EPA) of 2005 requires all Federal facilities to install advanced meters. The Army has advanced meter specifications for electric, water, steam, and natural gas. These meters will be monitored through connection to a base wide or RD wide energy and utility monitoring and control system directly or via the building HVAC control system. Coordinate with the mechanical and electrical design disciplines.

3-2.3 Roads and Pavements

3-2.3.1 General Design Consideration

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 UFC 3-250-01 Pavement Design for Roads and Parking Areas.

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 a LID measure, or for site sustainability. Pervious Portland Cement Concrete (PCC) mix designs have been developed and may be used depending on the application as noted in Paragraph 3-2.3.6.4; however, pervious asphalt pavement is not allowed. Refer to UFC 3-201-01 Civil Engineering. 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 RD 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 coarse 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 be considered for projects when applicable conditions exist. Obtain Project Officer concurrence for use of alternative pavement and inform the RD 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
VMS/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 RD 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 VMS facilities are required at vehicle doors. Refer to the Workbay description in paragraph 4-3.10 for related apron dimensions. 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 or require other special details to mitigate potential heave from frost or soil conditions. 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 be a minimum of 7 ft wide to accommodate

Figure 3-4
ARC, Wausau,
Wisconsin



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 purposes of MEP and VMS/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. Also check with Utility providers to see if any service agreements or easements will be required to route the utilities the entire length of service.

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, with required accessible parking spaces in addition to the calculated space counts. 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-6 inches (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.

Figure 3-5
AFRC, Kingsville,
Texas



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. However, the cost is not specifically included in the project budget, and will have to come out of current programed 1391 budget.

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 When required by AT/FP requirements, at vehicle access driveways to kitchen, unit storage, mechanical, workbays, and similar spaces, provide a removable physical barrier. This can be accomplished with swinging steel framed 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, inside and outside both end posts of site fencing vehicular gates, 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 safety yellow. Provide 6" minimum diameter bollard size (unless noted otherwise), 5' exposed above grade, 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 using fencing at certain site elements 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 all fences are located in a three foot wide (minimum) strip of rock mulch or similar surfacing to avoid the need to maintain grass or plantings along the fence line. Security fences at MEP shall have such a maintenance strip. If project conditions allow, this MEP fence maintenance strip may be created by extending compacted aggregate surfacing utilized at the MEP fence 'interior clear zone' (noted below), to a point 1'-6" beyond the outside face of the MEP fencing. Provide steel edging between maintenance strip and adjacent non-paving surfaces.

3-2.5.2 The standard chainlink security fence is a minimum of 8 ft (2438 mm) in height, with 7 ft (2140 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 are to be located at least 10 feet from the inside and outside of the security fence and/or perimeter fence. For fences adjacent to property lines, the "clear zone" from the fence to the property line must be 20 ft (6100 mm). Refer to UFC 4-002-03 'Security Fencing and Gates' for additional requirements and details.

3-2.5.3 Vehicle gates at secure areas (i.e. MEP) shall result in an opening of 30 feet wide, and may be swinging or rolling, based on Tenant preference. The maximum height above ground when closed is 2 in (125 mm). Cantilevered rolling gates are preferred over ground rolling (with wheels) or swinging. 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, unless approved by the Project Officer.

At all MEP vehicular gates, provide:

- (1) 1 1/2" spare conduit from the vehicle pedestal, to an accessible above ceiling location in one of the offices in the VMS, for a future security camera.

At manual MEP vehicular gates, provide knox box mounted on the fixed fencing, adjacent to the latch edge of each vehicular gate.

At powered MEP vehicular gates, provide:

- Powered gate operation capability via fire department (Knox) key switch

on vehicle pedestal

CAC card readers on vehicle pedestal, and button activation from two offices in the VMS; verify appropriate offices with Users. Card readers are to be mounted at both 36" and 72" above grade, to allow for both regular size and large military/service vehicles.

4 foot wide lockable personnel day gates are required adjacent to each vehicle gate.

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.

Refer to paragraph 3-15 for access gate telecommunications requirements.

3-2.5.4 On projects where the entire site, or portions of the site, are fenced and access to the POV parking lot is affected by such fencing, the POV lot shall be provided with a vehicle and pedestrian gate at each entry point. Refer to the paragraph above for requirements, with the following adjustments: route intercom to two offices in the Training Center, and route the spare conduit for future security camera to an accessible above ceiling location in one of the offices in the Training Center.

3-2.5.5 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 platform 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 VMS. A minimum clear opening height of 16 ft (4900 mm) is required. It is preferred that the soffit of the roof assembly is finished with prefinished metal soffit panels, at a minimum. Columns shall have minimum 4 foot high concrete bases and have bollards located outside the curbing. 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 (rolled curb at curbs at vehicular drive-through direction), 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 and water 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 30 fc, and place fixtures such that sides, front and back of the vehicles are illuminated. Design all electrical systems for wet service. Conduits routed along the bottom of the roof structure are to be concealed above the soffit panels.

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. Where yard hydrants are utilized, provide bracing to adjacent structure.

Figure 3-6
Bi-Level Loading
Ramp



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 (along a service/access drive); 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 braced 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 the vegetation 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. The use of xeriscaping with the use of mineral (rock) mulch and drought resistant plant species in arid or semi-arid project locations is acceptable, if approved by the Project Officer.

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 provide 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.

3-3.9 At building wall locations at non-paved areas, provide a two foot wide (minimum) strip of rock mulch with weed fabric barrier, or similar surfacing, to avoid the need to maintain grass or plantings along the building walls. Provide steel edging between the strip and adjacent non-paved surfacing (i.e. turf, xeriscaping, etc.).

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 NFPA 101 and NFPA 10, even if not required by UFC 3-600-01. A fire extinguisher is required in the 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. Refer to UFC 3-600-01 for fire hazard classifications, unless noted otherwise in the Room Descriptions. 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.

3-4.3 Fire Alarm System

3-4.3.1 Provide combined Fire Alarm and Mass Notification Systems in accordance with UFC 3-600-01, UFC 4-010-01, and UFC 4-021-01.

3-4.3.2 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 Mass Notification System 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.

3-4.3.3 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.

3-4.3.4 Provide a remote annunciator panel at an entrance designated by the local fire department and per NFPA 72.

3-4.3.5 Kitchen equipment below hoods must be shut down upon activation of the kitchen fire suppression system per NFPA 96.

3-4.3.6 Provide photoelectric smoke detectors in electrical, EF, TR, and TER rooms, as well as where required by code.

3-4.3.7 Connect all water flow switches, tamper switches and post indicator valves to the fire alarm panel.

3-4.3.8 Audible requirements shall meet NFPA 72 requirements.

3-4.3.9 All conduits for the fire alarm system shall be 1/2 inch (13 mm) minimum.

3-4.3.10 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.

3-4.4 Mass Notification Systems

3-4.4.1 To reduce the risk of mass casualties, there must be a timely means to notify building occupants of threats and what should be done in response to those threats. Mass notification is defined as the capability to provide real-time information to all building occupants, or personnel in the immediate vicinity of a building, during emergency situations. Provide Mass Notification Systems in accordance with UFC 4-010-01 and UFC 4-021-01.

3-4.4.2 Mass notification shall be extended to buildings in accordance with UFC 4-010-01. In campus settings, buildings shall be networked.

3-4.4.3 Inhabited Buildings- Mass notification shall be in accordance with the requirements of UFC 4-021-01.

3-4.4.4 Uninhabited Buildings – Mass Notification shall be in accordance with the requirements of UFC 4-010-01, except a complete Mass Notification System shall be provided for an VMS even if it is categorized as low occupancy/uninhabited.

3-4.4.5 Mass notification shall be extended to the MEP and DEPMEDS areas. Mass notification for these areas shall consist of speakers only. No strobes or LOC's are required. Intelligibility for the areas shall be in accordance with UFC 4-021-01, Par. 3-6.4 Special Outdoor Areas.

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 may affect 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. Cast-in thin brick is acceptable; post-applied thin brick is not acceptable. Integrally colored concrete panel accents are acceptable.

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 and an insulated cavity.

3-5.1.2.5 Exterior Insulation Finish System (EIFS); may be allowed above the bottom 4 feet of the exterior wall. May not be applicable to all geographical regions. Not permitted in hurricane zones. If utilized, it is to be drainable system.

3-5.1.2.6 For pre-engineered metal buildings, unheated storage and similar unoccupied buildings without space conditioning, a standard pre-engineered metal wall panel system is acceptable.

3-5.1.2.7 Other exterior wall systems that provide equivalent performance may be used with Project Officer approval.

3-5.1.2.8 Prefinished metal panels may not be used as primary exterior finish materials without Project Officer approval. Metal panels may be used sparingly as accent materials, unless approved by the Project Officer. If metal panels are indicated for use in an Installation Design guide, review with the PDT and

incorporate on the project only with Project Officer approval. If utilized, concealed fastener panels shall be utilized (exposed fastener panels are acceptable at pre-engineered buildings).

3-5.1.2.9 Discuss wall type selection as part of the energy Charrette 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/concrete or 1/2 inch thick plywood wainscot to 8'-0" above floor in Unit Storage, Staging, Facility Maintenance Storage, and all non-office locations in an VMS. Insulated Concrete Forms (ICF) and metal stud framed exterior walls' interior surfaces shall be finished with gypsum board, with additional 1/2" thick plywood to 8'-0" above floor in the spaces listed above.

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 PVC.

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

3-5.1.5.4 RDs 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. Access is to be provided via roof hatch or stair door to the roof. Roof hatch shall be 30 inches by 30 inches minimum (or as indicated otherwise); larger at ships ladder locations (to meet head clearance requirements). Ships ladders are preferred over vertical ladders. Provide additional ladders at any parapets between roof areas of different heights. AT/FP requires internal access to roof for new construction. No exterior ladders/stairs from grade to roof plane.

3-5.1.5.6 Some RDs 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 VMS to be similar to a repair garage.

3-5.1.7 Most spaces with ceilings will be suspended acoustical tile; provide 24 in x 24 in (600 mm x 600 mm) lay in grid 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.

3-5.1.9 Provide blocking in stud walls for support of all wall mounted components; including but not limited to wall mounted television brackets, toilet accessories, casework, visual display boards, sit up bar, etc.

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.

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 VMS or AMSA building, finish and detail can be more utilitarian in the maintenance areas, but similar to a training center in the office areas.

Figure 3-8
ARC, Honolulu,
Hawaii



3-5.2.4 Each Army Reserve facility will have two “Minuteman” plaques, one for exterior display (aluminum) mounted to the building and one for interior display (bronze); the exterior plaque should be located with the “U.S. Army Reserve Center” signage; the interior plaque should be located in the front lobby. 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 plaque details and contact information.

3-5.2.5 Consider developing high-visibility locations in the lobby 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 RD 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 - Refer to the individual Space Criteria in Chapter 4.

3-5.4.1 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 where climate and security/operations allow. 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, in accordance with UFC 1-200-02 High Performance and Sustainable Building Requirements, for the unit or administrative common areas, offices, classrooms, corridors, assembly hall, lobby, VMS workbays, VMS offices, and unit storage area. Due to security concerns, unit storage daylighting may require clerestory glazing, translucent panels, 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, aluminum framed glass skylights, vertical glazed clerestory/light wells, “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 Interior doors in office and similar administrative, assembly, or educational areas are typically solid-core wood. Doors in more utilitarian areas, and all of the VMS, should be hollow metal. Interior hollow metal frames are typical. Doors to administrative, assembly, and educational areas are preferred to have door lights or sidelights for sustainable design purposes (daylighting/views), 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 8 inch diameter bollards per dumpster in the rear of the concrete pad to provide stops for dumpster return placement by the removal equipment. Provide positive slope of the concrete pad, to ensure stormwater drainage out of the trash enclosure. Provide 8 inch diameter 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 quantity and size of dumpsters and/or recycling containers with Tenants; a minimum of one 6CY waste dumpster and one 6CY recycling dumpster.

3-5.8 Flagpole

3-5.8.1 All Army Reserve Centers are required to 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, or raised 6” above grade at plaza areas with snow removal (to avoid shovel/plow damage to the flagpole). 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 standalone Army Reserve Centers, the flag shall be the field flag (6 ft 8 in hoist x 12 ft fly (2000 mm x 3650 mm)) which will require a 40 ft (12200 mm) flagpole. If the Army Reserve Center is built on an installation, please consult with the installation on the height requirement.

3-5.9 Sound Transmission Control

3-5.9.1 Certain spaces in Army Reserve facilities require effective sound transmission control (offices, SCAA, classrooms, simulator, team rooms, 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 roof/floor deck above, and seal to the floor/roof deck above.

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

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 wall STC rating is indicated, normal wall, floor and ceiling construction is adequate. These walls shall extend a minimum of 1 foot above ceiling, or as required by code or other criteria.

3-5.9.3 For spaces in Chapter 4 with a wall STC rating of 44 and less, provide walls to roof/floor deck above, or a minimum of 5 feet above ceiling, or as required by code or other criteria. Seal all wall penetrations and the bottom of the wall.

3-5.9.4 For spaces in Chapter 4 with a wall STC of 45 and above, provide walls to roof/floor deck above. Seal all wall penetrations and seal the top and bottom of the wall.

3-5.9.5 Provide STC rated door assemblies, where door STC rating is indicated in Chapter 4.

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, under the 'Furniture' link](#).

3-6.3 Flooring

3-6.3.1 The Army Reserve has moved 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. When utilized, it is to be provide in tile format to allow for future replacement of damaged tiles; sheet format is not allowed.

3-6.3.5 Luxury Vinyl Tile (LVT) may be used in areas where indicated in Chapter 4. LVT is a prefinished interlocking flooring material, usually in flank form, which does not require waxing.

3-6.3.6 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.

3-6.3.7 Certain areas of the building may require specialty floorings. Ceramic or porcelain tile are used in select areas. All tile must be grouted and sealed. In the kitchen, quarry tile is used on the floor 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.

3-6.3.8 Provide entrance walk-off mat systems at all major training center entrances to minimize tracking of dirt, mud and snow into the building.

3-6.3.9 All areas that have exposed concrete will use a concrete sealer.

3-6.4 Wall Finishes

3-6.4.1 Paint is the typical 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.

3-6.4.3 In corridors surrounding high-use areas, and the lobby, consider wainscoting between the wall base and the chair rail. Possible wainscoting materials (in order of preference) are: acrylic sheet covering, plastic laminate

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



sheet covering, 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 Provide window treatments at all exterior windows, except in Lobby and glazed entrances (unless noted otherwise in this document). Color shall be coordinated with the building color palette, and provide a uniform appearance from the exterior of the building.

3-6.4.6.1 At exterior windows, provide 5% visible light perforated manual roller shades. At rooms which have monitors/TVs and/or projection screens, also include roller blackout shade (as a combination unit with the perforated shade). At tall or high window locations, which preclude physical access or pose difficult operation of manual roller shades (i.e. long operation chain lengths, operation chain rubbing on jambs or sills), provide motorized roller shades with switch operation at the wall; provide separate switching for the perforated and blackout shades if both types are required.

3-6.5 Furniture

3-6.5.1 All Army Reserve projects are designated as a UNICOR or non-UNICOR (GSA) 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, panel-based systems, or benching systems. 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 Benching systems furniture and panel-based systems furniture is used in the unit common areas. Unit commons are meant to be flexible and allow both for individual and group activities. The furniture should be easily reconfigurable to allow for meeting space and different units. To allow for this, benching systems desks shall comprise the majority of the unit common furniture.

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 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 with arms 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 arms, upholstered seats and backs, and a sled base.

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

3-6.5.3.5 Assembly chairs are to be stackable, armless, sled base, plastic shell chairs. The plastic shell color to be specified for Assembly only – color not to be used in any additional areas.

3-6.5.3.6 Lounge seating will be fully upholstered.

3-6.5.3.7 Adjustable stools used in conjunction with workbenches in armorers' room and repair rooms will have woven commercial performance upholstery fabric with moisture barrier and stain resistance 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.

3-6.5.3.8 The designer is responsible for ensuring that the proper type of chair caster is specified on chairs for compatibility with specified flooring material.

3-6.5.4 Televisions

3-6.5.4.1 Typically, the TVs located in Classrooms, Team Rooms, and Physical Readiness Rooms are included in the furniture package. TVs are typically wall mounted LCD televisions, with wall brackets, and HDMI cables (from wall jack to television).

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 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 system workstations. The workstations will be furnished and installed by the Government, but the construction contractor will be responsible for wiring any panel systems 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 and Presentation Boards

3-6.8.1 Markerboards 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. Markerboards and presentation boards are attached to the building and are not included in the furniture package/specifications. However, the locations of the Markerboards and Presentation boards are to be coordinated with the TV placements when located on the same wall. Projection screens are not utilized; digital communications are normally accomplished through LCD monitors (TVs).

3-6.9 Existing Tenant Furniture

3-6.9.1 Ask the RD 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 a Risk Category II 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

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

Figure 3-10
ARC, Wilmington,
North Carolina



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 Refer to UFC 1-200-01, UFC 3-301-01, and all references therein, for seismic capability/upgrades of existing facilities.

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. Outside equipment should not be located under roof eaves. Rooftop equipment is discouraged except for kitchen applications. Serve EF, 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 RD 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 Provide a direct digital control (DDC) system to Army Reserve Buildings in accordance with the Army Reserve Enterprise Building Control System (EBCS) Design Guide, as posted on the Army Reserve website.

3-8.1.3 Comply with UFC 3-410-01 for HVAC system.

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, team 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.

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 RD, 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 Total Building Commissioning: Total Building Commissioning shall be provided in accordance with UFC 1-200-02 and ER 1110-345-723.

3-8.7 Emergency Air Distribution Shutoff: An HVAC emergency shutoff switch shall be provided in accordance with UFC 4-010-0. The shutoff switch should be the protected type (lift up enclosure or breakable glass).

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 need to be evaluated for Life Cycle Cost (LCC) per Army Policy and UFC 1-200-02 High Performance and Sustainable Building Requirements.

3-9.3 Plumbing Equipment

3-9.3.1 Reference UFC 1-200-02 for flow requirements and water conservation. 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. Weekend reservists are partial FTE occupants for LEED indoor water calculations.

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 and UFC 3-420-01 and provide design guidance for compressed air, plumbing, and gas piping systems respectively. UFC 3-230-01 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.

3-9.3.4 All water coolers shall have bottle fillers incorporated to encourage the use of personal refillable bottles.

3-9.3.5 Water softeners shall be utilized for if the water hardness is above 10 grains/gallon.

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 and controls, exit and egress lighting, fire alarm system, fire alarm signal transmitters, security systems, cathodic protection, lightning protection, open office furniture wiring, kitchen equipment wiring, elevator equipment wiring, and powering of project and government-furnished equipment, appliances, and devices.

3-10.1.3 Electrical and communication design must be closely coordinated with furniture design. See Paragraphs 3-6.5 and 3-6.7 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. Refer to UFC 3-520-01 for limitation of the number of workstations per circuit.

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 calculations in accordance with the Army Reserve Design Process and Submittal Requirements.

3-10.2 Exterior Electrical Systems

3-10.2.1 Obtain the main electric power service from the local power provider. For facilities on government installations, coordinate electrical service with government facility DPW. For facilities not on government installations, coordinate electric service with the local utility company.

3-10.2.2 A/E should confirm in writing the service requirements and any equipment provided from the utility or installation to provide primary underground electrical service, from a 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 contractor is responsible to coordinate with the utility provider to ensure a complete electrical service is provided as part of the project. The electric service may include, but not limited to, primary and secondary cables, transformer, pad, meter, and underground electrical conduits and conductors and shall be in accordance with NEC, NESC, and applicable UFC's and utility company standards. Also see Smart Meter paragraph below.

3-10.2.4 UFC 1-200-02 requires the utilities to be monitored through connection to a base wide or RD wide energy and utility monitoring and control system directly or via the building HVAC control system; this will require installing a smart meter per Army specifications separate from the billing meter. Coordinate with the building mechanical and electrical design disciplines for individual building meter and corresponding controls requirements.

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 All exterior light fixtures shall utilize light emitting diode (LED) sources and be automatically controlled by a programmable central timeclock with photocell and appropriate contactors located in an electrical room. Exterior lighting design shall be in accordance with UFC 3-530-01.

3-10.2.8 Light project exterior monument sign using fixtures furnished with glare control. Control is photocell on-timer off-timer on-photocell off.

3-10.2.9 Flagpole is lighted (unless it is determined that flag will be removed at night) with photocell on - photocell off control.

3-10.2.10 Provide exterior vandal-resistant lighting fixtures (wallpacks, canopy

lights) at building entrances/exit doors. Control is photocell on/photocell off.

3-10.2.11 Provide DEPMED and MEP area with full cut-off light fixtures mounted on 30-foot steel poles. Control is photocell on/photocell off. Provide light levels as required by UFC 3-530-01 with a minimum illumination of 0.2 foot candles. Consider the use of motion sensor control for high-low light levels, only if agreed upon by the RD or installation. See Paragraph 3-13.3.1 for use of solar to power lighting.

3-10.2.12 Provide POV parking area with full cut-off light fixtures mounted on 30-foot steel poles. Control is photocell on – timer off – timer on – photocell off. Provide light levels as required by UFC 3-530-01 with a minimum illumination of 0.1 foot candles. 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, only if agreed upon by the RD or installation.

3-10.2.13 Provide wash platform lighting per paragraph 3-2.6.7. Control shall be an on/off timer switch with 60-minute maximum on time. Timer switch is to be located at the wash platform.

3-10.2.14 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. Refer to paragraph 3-2.5.2 for location of light pole bases adjacent to MEP security fencing.

3-10.2.15 If required, provide empty conduit from the electrical room to a designated location in the MEP for a user provided GSA electric vehicle charging station to be installed in the future.

3-10.3 Interior Electrical

3-10.3.1 Interior Electric Power Distribution

3-10.3.1.1 Serve buildings from entrance equipment as described in UFC 3-520-01.

3-10.3.1.2 Dedicated Electrical Equipment Space. Size and organize main electric room to accommodate service entrance equipment, 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, working space, and access shall comply with the NEC.

3-10.3.1.3 Size conductors for feeders and branch circuits to prevent voltage drop exceeding the requirements of ASHRAE 90.1.

3-10.3.1.4 Specify service entrance equipment, 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. Provide provisions for future PV system connection at the service entrance equipment. Size the connection for a PV system that would generate enough energy to make up for all the facility energy consumption as calculated by the facility energy model. Size the service equipment busing to accommodate the back feed connection per the NEC and provide bused space dedicated for the appropriately sized circuit breaker. The service entrance equipment should have copper buses and circuit breakers serving large loads such as distribution boards, panelboards, motor control centers, elevators, and large 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.

3-10.3.1.4.2 Provide combination starters with disconnect switches and circuit breakers to serve motors in HVAC equipment that are not furnished with Variable Frequency Drives (VFD). Coordinate with mechanical to ensure that the code requirements for motor control are met and provide disconnecting means as necessary.

3-10.3.1.4.3 Distribution Transformers. Size for the load calculated per the NEC, UFC 3-520-01, and ASHRAE 90.1. Nonlinear Loads: In areas where nonlinear load type equipment is located, such as computers, printers, uninterruptible power supply (UPS), motors with variable speed drives, Dimmers and other similar loads, comply with UFC 3-520-01. Transformer efficiency is to meet EPACT/NEMA TP-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.

3-10.3.1.4.4 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, in all feeders and branch circuits.

3-10.3.1.6 Connect the main electrical service entrance equipment ground bus to a grounding electrode system in accordance with NFPA 70. Provide grounding and bonding in telecommunication spaces in accordance with the ARNEC.

3-10.3.1.7 Base final sizing for the service(s) for the facility for the load calculated per the NEC plus 25% and in accordance with UFC 3-501-01.

3-10.3.2 Power

3-10.3.2.1 Specify motors in accordance with UFC 3-520-01. Provide combination motor starter-disconnect controllers for polyphase motors. Coordinate starter type with motor design and starting torque requirements. Provide phase loss protection.

3-10.3.2.1.1 If four or more 3-phase motors are located within a room or area, consider providing a motor control center (MCC).

3-10.3.2.1.2 Motor Efficiencies. Provide premium motor efficiencies, in accordance with EPACT. Applications which require definite purpose, special purpose, special frame, or special mounted polyphase induction motors are excluded from these efficiency requirements.

3-10.3.2.1.3 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.

3-10.3.2.2 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.

3-10.3.2.2.1 Provide general purpose receptacles of 20 amps, NEMA WD 1. Provide ground fault circuit interrupter receptacles for bathrooms, kitchens, maintenance bays, outdoor receptacles, and elsewhere as required by the NEC. Locations of receptacles shall be per UFC 3-520-01, and as stated in subsequent paragraphs below.

3-10.3.2.2.2 General Purpose Receptacles. General purpose receptacles are in addition to the special purpose and dedicated outlets for special equipment.

3-10.3.2.2.3 Provide a minimum of one general purpose 120 volt, 20 ampere duplex receptacle in each room.

3-10.3.2.2.4 Private Offices, Unit Common and Administrative Spaces. Provide a minimum of one general purpose convenience receptacle each wall. In offices unit commons, and administrative spaces 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. See the individual space criteria for special purpose receptacles that are in addition to the general purpose receptacles. See the individual space criteria paragraph 3-6.7 for modular furniture and benching systems workstation requirements.

3-10.3.2.2.5 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, shredders, TVs, 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. Verify equipment required with Tenants.

3-10.3.2.2.6 Provide GFCI receptacles with weatherproof while in use covers adjacent to each exterior door and as required by code.

3-10.3.2.2.7 Copy areas. Provide two above-counter duplex receptacles for countertop equipment. Provide two wall duplex receptacles for floor copy machines.

3-10.3.2.3 Refer to Paragraph 3-6.8.1. At television locations, provide connections indicated in the Chapter 4 room descriptions.

3-10.3.2.4 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:

3-10.3.2.4.1 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 telecommunication services to the emergency space.

3-10.3.2.4.2 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.

3-10.3.2.4.3 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.

3-10.3.2.4.4 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 All interior light fixtures shall utilize light emitting diode (LED) sources and be automatically controlled unless noted otherwise. Interior lighting shall be in accordance with UFC 3-530-01.

3-10.3.3.2 Provide emergency lighting per NFPA 101 and UFC 3-530-01, utilizing battery backup drivers in the fixtures in finished spaces and emergency lighting unit equipment in mechanical, electrical, telecommunications, and storage spaces. 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, SCAA, mechanical, and electrical rooms.

3-10.3.3.3 Lighting foot-candle levels for individual areas should conform to levels indicated in UFC 3-530-01 unless noted otherwise. For spaces not addressed follow 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 0.8 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. LED/Driver combinations should provide expected lamp life of a minimum of 50,000 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, team rooms, and classrooms.

3-10.3.3.7 Provide wall mounted combination light switch and passive infrared motion sensor for light control in private offices. Provide ceiling-mounted motion sensors for large rooms. Provide local control switches to interface with ceiling mounted sensors. 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. Locate switches to avoid caging gate swings.

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. Where daylight harvesting is required, provide automatic full-range dimming.

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 4-2.13.

3-10.3.4 Special Requirements

3-10.3.4.1 Verify geotechnical report for soil resistivity. Provide cathodic protection of ferrous metals as required by UFC 3-570-01. Coordinate with Civil design.

3-10.3.4.2 Provide a lightning protection system if the calculations indicate that the facility lightning risk index $N_d > N_c$ based on NFPA 780. Provide a complete system that is in accordance with UFC 3-575-01 and is UL Master Labeled. 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 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 Physical Access Control System (PACS).

3-10.3.4.3.1 Intrusion Detection System (IDS): Provide conduit and power provisions for a Government-furnished, Government-installed IDS in arms vaults and SCAs in accordance with the USAR IDS Responsibility document available on the [Army Reserve website](#).

3-10.3.4.3.2 Physical Access Control System (PACS): Provide a complete Common Access Card (CAC) system in accordance with UFGS 28 13 00.00 40. Provide hardware, software, wiring, devices, control interfaces, and testing as required for a complete system acceptable to the Government. Provide 2-factor identification; CAC card reader and PIN Number.

3-10.3.4.4 Cable and satellite TV (collectively CATV). Provide a CATV distribution system to support the outlets required in the INDIVIDUAL SPACE CRITERIA.

3-10.3.4.4.1 CATV cabling, equipment, components, etc. shall not be placed in, or pass through, any TR or TER. Equipment may be placed in an EF. If the project is on a military installation and that installation does not require a standard EF, then a CATV EF shall be provided for CATV services and equipment.

3-10.3.4.4.2 The project does not provide CATV services. Those services are to be procured by the using agency separate from and after the project. Provide conduits for future underground and satellite services with a 2-inch conduit stubbed underground from the EF or CATV EF to the project property line and a 2-inch conduit stubbed from the EF or CATV EF to the roof with weatherhead for satellite services.

3-10.3.4.4.3 Provide a complete CATV premises distribution system that delivers RF, bi-directional, high definition, digital television signals with a full complement of channels over an installed network of coaxial cable. The contractor shall configure a Trunk and Tap system with appropriate amplifiers, couplers, and splitters and place the components throughout the facility as

required. After the installation is completed, the contractor shall test the system to ensure that it is fully operational and delivers high definition, low noise signals, in all areas of the facility.

3-11 SPECIFICATIONS

3-11.1 Unified Facilities Guide Specifications (UFGS)

3-11.1.1 UFGS is required for Army Reserve projects. UFGS is a standardized specification system (somewhat like MasterSpec and other master systems), and is updated quarterly 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 UFGS must be used to the greatest extent possible, but

occasionally a project may require a specification section not provided by UFGS. In such cases, the designer may use commercial or in-house specifications, while ensuring proper language and formatting in accordance with UFC 1-300-02.

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. Refer to UFC 1-200-02 High Performance and Sustainable Building Requirements.

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”, if the project budget supports such approaches. 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 RD 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 RD 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 RD 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 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 RD 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 UFGS Specification Section 07 05 23 Pressure Testing an Air Barrier System for Air Tightness and 07 27 10.00 10 Building Air Barrier System. 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 UFC 1-200-02, and ASHRAE 189.1 requirements indicated within.

Energy efficient windows: reduced glass area, optimized 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 charrette 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 – may not be effective in northern climates.

Green roof – only with Project Officer approval.

Building internal organization.

Building commissioning; LEED enhanced commissioning with Project Officer approval.

Natural ventilation.

Task lighting.

Solar walls – outside fresh air preheating in northern climates.

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 is rarely cost effective for Army Reserve
facilities.

3-13.2.4 Recycling. Make provisions for recycling programs in each facility.
Verify requirements for space with the RDs, Tenants, and local collection
agencies to ensure that facility use patterns, waste stream volume, and full-time
population are fully accommodated. The designer of record shall verify with the

tenants if a recycling program already exists at the project location to confirm the appropriate number of recycling bins are provided. 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 (most common), 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 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, with rock mulch ground cover, 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 and future roof replacement. 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, RD 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. Refer to UFC 1-200-02 'High Performance and Sustainable Building Requirements' for thresholds for third party certification. The processes for implementing the sustainable design portion of this policy may be found in the USACE Army LEED Implementation Guide, [which can be found on the Army Reserve website](#).

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 RD 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.

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.

Figure 3-14
ARC, Camden,
New Jersey



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 RD 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.

3-15 TELECOMMUNICATIONS

3-15.1 Telecommunications Outlets

3-15.1.1 Provide telecommunications outlets in accordance with ARNEC. Outlet types include standard outlets, MFD outlets, DDC outlets, wireless access point (WAP) outlets, wireless intrusion device (WID) outlets, wall phone outlets, and exterior call boxes.

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 ARNEC 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, which cannot be larger than authorized.

4-1.3.1 The size of some spaces, such as the kitchen, 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 SCAA 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 the current programmed 1391, meaning 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. Full time facility managers are also

authorized an office. 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 (GO) and staff suite, including all Colonels, Lieutenant Colonel Commanders, and Command Sergeant Major offices in the GO suite. Colonels outside of the GO suite also receive wood furniture. 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 at each desk location. On the "U" configured desk units, place these receptacles 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 ARNEC 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 Facility Manager Office. Similar to other offices. Locate the facility key box, access control computer and printer/card maker, and other related functions in the Facility Managers Office. Provide 4 ft x 4 ft markerboard with tackstrip. In addition to the typical office furniture configuration for a 120 sf office, provide an additional desk, power, and telecommunications for the access control computer and printer/access card maker.

4-2.1.8 Space Design Information

General/Code

- Size - Typical Office - 120 sf (11 sq m)
- Office for higher ranks - 150 or 200 sf depending on rank and position
- Facility Manager Office - 200 sf (18.5 sq m) for the Facility Manager. Desk furniture, access control equipment, and an 80SF closet with door and metal shelving inside are to be included within the 200 sf office.
- construct offices with no dimension below 9 ft - 6 in (2900 mm) to accommodate furniture.

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 35 (see Paragraph 3-5.9)

Ceiling height – 9 ft - 0 in (2743 mm)

Floor – carpet tile; rubber tile or luxury vinyl 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 – 85°F (29°C)

Electrical

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

Telecommunications Outlet(s) – provide in accordance with ARNEC

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 typical)

Task chair

Guest chair(s)

Guest chair(s)

5-high lateral file or cabinet; verify preference with Tenant

(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

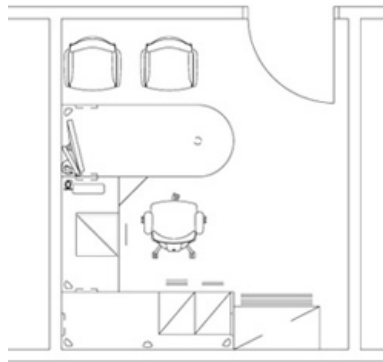
Equipment

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

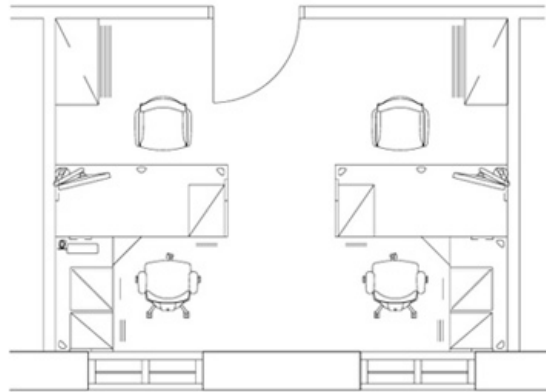
Special Features

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 ARNEC 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 – Typical Office - 120 sf (11 sq m)

- Office for higher ranks - 150 or 200 sf depending on rank and position
- Office for General Officer – 300 sf (27.8 sq m)
- construct offices with no dimension below 9 ft - 6 in (2900 mm) to accommodate furniture.

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45 at private/shared offices with minimum door assembly STC rating – 32. Wall STC 35 at reception area and work station/open office area – see Paragraph 3-5.9

Ceiling height – 9 ft - 0 in (2743 mm)
Floor – carpet tile; rubber tile or luxury vinyl 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 – 85°F (29°C)

Electrical

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

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Standard Wood Furniture

Wood desk unit with surface supporting box/box/file and file/file pedestals. Desk also includes overheads with task-lights, and a tack-board (refer to Louisville District's approved typical).

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

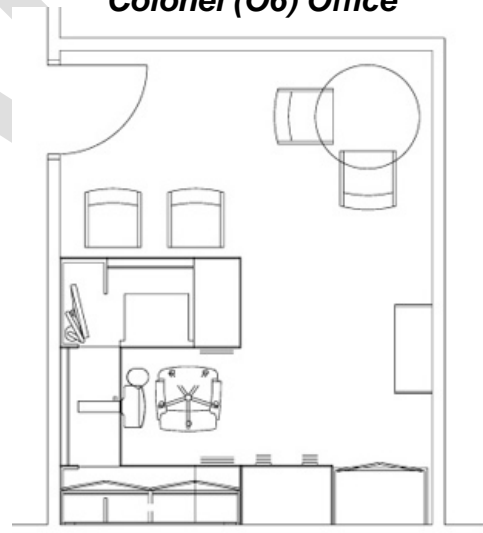
(1) Energy saving power strip per desk

(1) Desk pad per desk

Small meeting table with guest chairs

Wood wardrobe cabinet

Figure 4-3
Colonel (O6) Office



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, 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

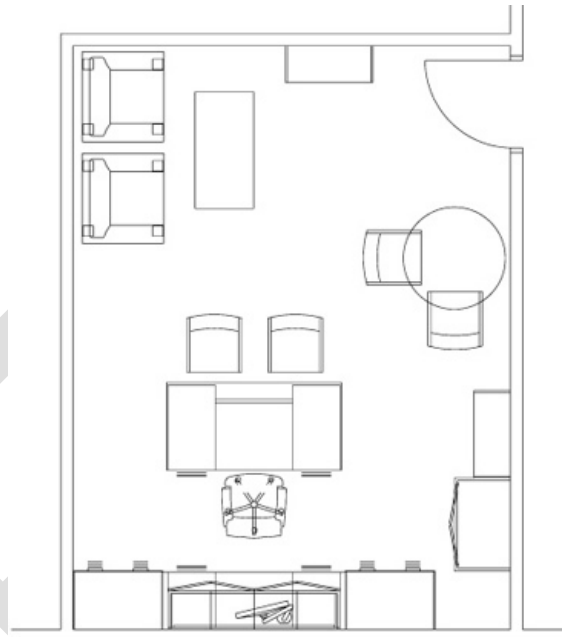
Extra wood lateral files and/or wood bookcases and/or wood Kiosks for storage

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 For full time personnel, panel-based systems furniture or benching systems workstations are typically used in unit common areas. Freestanding, metal desk-based furniture workstations may be used in smaller offices such as in the VMS admin common area. Part time personnel receive benching table type

workstations. 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 and benching requirements.

4-2.3.3 Where systems furniture is against walls or columns, provide power through junction boxes mounted in the wall or column. In other areas, provide power 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. Provide telecommunications outlets for modular and benching systems furniture and WAP outlets in accordance with ARNEC. 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 telecommunications outlets as required by ARNEC) in an adjacent wall or column. Also consider providing convenience duplexes.

4-2.3.4 For benching systems workstations, no electrical infrastructure should be directly connected to the furniture. Convenience receptacles outlets should be located on an adjacent wall or in a floor box under the benching configuration (one receptacle for every four benching 'seats'). Provide telecommunications outlets for modular and benching furniture and WAP outlets in accordance with ARNEC. The benching tables are meant to be flexible and easily moved and reconfigured. For large Unit Common areas, consider floor box receptacles on a 12' grid pattern.

4-2.3.5 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.

4-2.3.6 Make use of daylighting in this space; consider the use of glazed doors, extended sidelights, or other glazing. Consider glazed entrances at the hallway connection points.

4-2.3.7 An open collaborative workspace can be taken as “borrowed” space from unit common area, if desired. Refer to Paragraph 4-2.16 for the distinct Team Room description.

4-2.3.8 Provide a Copy Area at each Unit Commons, consisting of (at a minimum): 6 ft long plam upper and base cabinets with post-formed plam countertop (preferred to be placed with 3 ft on each side of the printer/copier). Floor space for minimum 5 ft wide floor set printer/copier (GFGI). 4 ft wide x 4 ft high tack board behind the printer/copier. The area for this function will need to be considered as part of the Unit Common allocation. Some Tenants may request multiple Copy Areas for facilities with larger, or physically separated, Unit Commons areas.

4-2.3.9 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 wall STC rating
– 35

Ceiling height – 9 ft - 0 in
(2743 mm)

Floor – carpet tile

Base – rubber

Walls – painted gypsum
board

Ceiling – suspended acoustical ceiling tile (ACT)

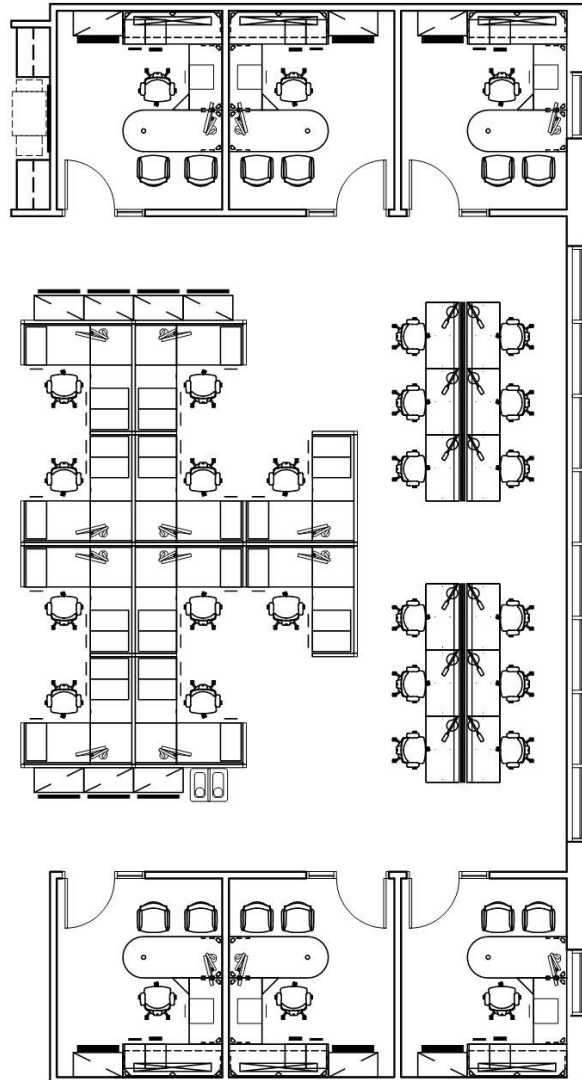
Trim – coat racks mounted on wall or freestanding coat racks -
appropriate number for room occupants and wall-mounted
door stop

Lockset – office

Mechanical

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

**Figure 4-5
Unit Common**



Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)

Electrical

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. A minimum of one double duplex 20A circuit for no more than four connected benching desks configurations.

Benching shall be flexible; no hardwiring, only plug and play power fed from the wall or floor utilizing standard duplex receptacle (minimum one duplex for every four occupant stations).

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Workstation furniture

Part time (common use) and full time (single use) benching systems workstations are table based. Refer to Louisville District's approved typicals for benching table sizes.

- Part time (common use) benching systems workstations are to receive a full length cable basket with power strip (one for every two occupants); desktop task lights and box/file mobile pedestals with optional cushion top are optional, depending on user needs. If mobile pedestals are user-requested, maximum of 4 mobile pedestals for every 6 seats.
- Full time (single use) benching systems workstations shall receive full-length cable basket with power strip, desktop task light, single monitor arm, box/file mobile pedestal with optional cushion top, credenza (1/2 box/file lateral storage with cushion top, and 1/2 open storage under the desk top).

Full-time panel-based systems 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 panel-based systems 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 workstation. (1) ~7 gal trash can per 4 shared workstations/part time benching seats

(1) ~7 gal recycling bin per full-time workstation. (1) ~7 gal recycling bin per 4 shared workstations/part time benching seats

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

Consider sinks with goose neck faucets for coffee stations in larger Unit Commons

Some Tenants prefer team groupings of workstations, or a few table/chair stations which can also function as meeting areas

4-2.4 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 and adjacent to the main entrance. This space is shared by all assigned units.

4-2.4.2 Glazed panels (door or sidelight) is preferred, 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 wall STC rating – 45

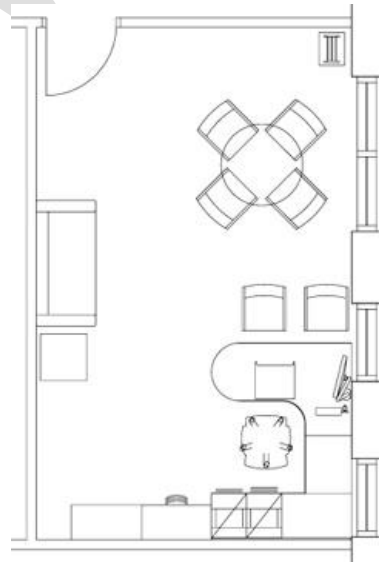
Ceiling height – 9 ft - 0 in (2743 mm)

Suspended acoustical ceiling tile (ACT)

Walls - painted gypsum board.

Floor – carpet tile

Figure 4-6
Retention Office



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– 85°F (29°C)

Electrical

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

Telecommunications Outlet(s) – provide in accordance with ARNEC

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 commercial performance upholstery fabric with moisture barrier and stain resistance.

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

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 (ARCC)

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 – 300 sf (23.25 sq m) each typical. Include a 50sf closet within the room, with door and metal shelving.

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45

Ceiling height – 9 ft - 0 in (2743 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– 85°F (29°C)

Electrical

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

Telecommunications Outlet(s) – provide in accordance with ARNEC

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 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)

One lockable 5-drawer file

Wood bookcase(s)

(2) Freestanding literature racks

Task chair

Guest chair(s) – Due to the high traffic in this space; consider commercial performance upholstery fabric with moisture barrier and stain resistance.

(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

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.

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 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 commercial performance upholstery fabric with moisture barrier and stain resistance.

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 Distribution 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 distribution room layout and construction.

4-2.7.1.2 The mail distribution 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 distribution room shall be located on an exterior wall. The room may be accessed from the interior, and also provide a door opening directly to the exterior if the Tenant desires, and with Project Officer approval. This room shall be one room.

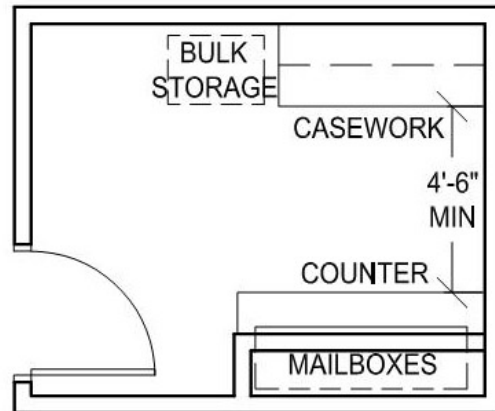
4-2.7.1.4 Equip the room with a lockable front-loading postal service approved mailbox unit, with lockable doors. Coordinate number and size of slots required with Tenants; unless directed otherwise, the mail slots are to accommodate 9 in (225 mm) x 12 in (300 mm) envelopes without folding, and a minimum of one oversized outgoing compartment with mail slot.

Figure 4-7
Mail Boxes



4-2.7.1.5 Provide a 12 in (300 mm) deep counter with metal brackets below the length of the mailboxes to be used for sorting mail, 4 ft long minimum. Provide minimum 6 ft long base and upper cabinets, with post-formed plam countertop in the sorting room for storage of postal meter, tape, boxes, or other supplies required to support mail distribution room operations. Doors not required on upper cabinets. Provide 4 ft long floor space for bulk storage containers (i.e. U.S. Mail totes).

Figure 4-8
Mail Room



4-2.7.1.6 Avoid routing utility, electrical, and mechanical provisions which do not serve the mailroom in the floor, walls or ceiling of the mailroom.

4-2.7.1.7 Space Design Information

General/Code

Size – 100 sf

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – 9 ft - 0 in (2743 mm)

Floor – rubber tile, linoleum, or luxury vinyl tile

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– 85°F (29°C)

HVAC system shall comply with UFC 4-010-01 and the system's HVAC emergency shutoff switch shall be located adjacent to the latch side of the door to the mailroom, in the hallway

Electrical

Receptacles – convenience receptacles as described in Chapter 3 and quad power receptacles as described in Paragraph 4-2.1.5, some at counter height

Telecommunications Outlet(s) – provide in accordance with ARNEC

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

Special Features

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

4-2.8 Telecommunications Spaces

4-2.8.1 Telecommunication Spaces - General Information

4-2.8.1.1 The Army Reserve telecommunication 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 telecommunications workspace. Almost all Army Reserve spaces have some telecommunication provisions to allow Tenant access to data or communications; the spaces described below have telecommunication as their primary purpose.

4-2.8.1.2 Descriptions and requirements for most ARNEC spaces are found below. The information for telecommunication spaces listed here is in addition to what is specified in ARNEC. Detailed wall, aerial, and rack elevation diagrams for the Entrance Facility (EF), Telecommunications Equipment Room (TER), and Telecommunications Room (TR) are in ARNEC. The Manual is available at the [Army Reserve website](#).

4-2.8.1.3 Closely coordinate light fixture locations in telecommunications spaces to avoid conflicts with telecommunication racks and cable tray. Do not block access to telecommunication racks, cable tray, or equipment. Do not block light fixtures from providing the required illumination levels.

4-2.8.1.4 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 Fire Protection.

4-2.8.1.5 Equipment (piping, ductwork, machinery, etc) that does not serve the EF, TER, or TR(s) shall not be installed above, in the slab below, or in these telecommunication spaces nor will equipment pass through or enter the EF, TER, or TR(s). HVAC equipment that does serve the EF, TER, or TR(s) shall not be placed above the telecommunication equipment.

4-2.8.1.6 Provide a minimum of 47 in (1200 mm) of separation between the EF, TR, TER walls and any transformer, motor, or device that is rated at 5 kVA or greater. It is highly desirable that telecommunications spaces are not located adjacent to electrical rooms, mechanical rooms, elevator machine rooms, or restrooms.

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 When a project is located on a military installation, an EF is typically not required. However, a room of approximately 48 sf may still be required for CATV service entrance and service provider equipment. The requirements should be verified with the installation.

4-2.8.2.3 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 permitted.

4-2.8.2.4 Space Design Information

General/Code

Size – 48 sf (4.5 sq m) typical

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – none; painted structure. If exposed structure is higher than 12 ft (3658 mm) above floor- a gypsum board ceiling may be provided at 12 ft (3658 mm) minimum above floor, with all devices, cable, and equipment below ceiling. Refer to ARNEC.

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

Receptacles – minimum of 1 convenience receptacle on each wall and quad power receptacles for service entrance equipment as required

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

No furniture required

Equipment

Refer to ARNEC for requirements

Special Features

Fire-resistant plywood backboards (3/4" thick) 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 telecommunications equipment and for the termination of the horizontal and backbone cabling. 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. When a project is on a military installation, a TER may not be required. In this instance, the space is still required but it will be called the Main TR.

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 VMS; 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. No windows are permitted.

4-2.8.3.4 Space Design Information

General/Code

Size – 80 sf (7.4 sq m) minimum; provide adequate space to accommodate facility telecommunications requirements

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – none; painted structure. If exposed structure is higher than 12 ft (3658 mm) above floor- a gypsum board ceiling may be provided at 12 ft (3658 mm) minimum above floor, with all devices, cable, and equipment below ceiling. Refer to ARNEC.

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

Receptacles – minimum of 1 convenience receptacle on each wall and power to racks as described in the ARNEC

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

30 in x 36 in table

Equipment

Refer to ARNEC for requirements

Special Features

Fire-resistant plywood backboards (3/4" thick) 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 house telecommunications equipment and provide for the termination of horizontal and backbone cabling.

4-2.8.4.2 Provide TRs in accordance with ARNEC. 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 typically require TRs. Size each TR in accordance with ARNEC.

4-2.8.4.3 Locate TR near the center of the area it serves. TRs in multi-story buildings will be stacked unless there is a strong reason not to do so. Buffer from electrical and mechanical rooms and equipment, in order to minimize the potential for signal interference and ductwork/cable tray conflicts. No windows

are permitted

4-2.8.4.4 Space Design Information

General/Code

Size – 48 sf (4.5 sq m) for 144 or fewer horizontal cabling terminations

- 80 sf (7.5 sq m) for 145 or greater horizontal cabling terminations.
- Refer to ARNEC for room requirements, including minimum dimensional requirements.

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – none; painted structure. If exposed structure is higher than 12 ft (3658 mm) above floor- a gypsum board ceiling may be provided at 12 ft (3658 mm) minimum above floor, with all devices, cable, and equipment below ceiling. Refer to ARNEC.

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

Receptacles – minimum of 1 convenience receptacle on each wall and power to racks as described in ARNEC.

Telecommunications Outlet(s) – provide in accordance with ARNEC

Equipment

Refer to ARNEC for requirements

Special Features

Fire-resistant plywood backboards (3/4" thick) 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 telecommunications equipment. It is not intended to provide telecommunications 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 wall STC rating – not applicable

Ceiling height – 9 ft - 0 in (2743 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 - 85°F (29°C)

Electrical

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

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Static dissipative workbench with shelf

ESD stool with woven upholstery

Lockable metal storage cabinet

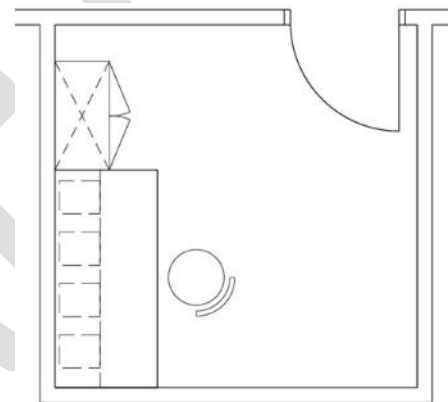
(1) ~7 gal trash can per bench

(1) Energy saving power strip per bench

Equipment

None

Figure 4-10
IT Work Space



Special Features
None

4-2.9 Lobby

Figure 4-11
Display Case



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. It is preferred for the entrance to have an exterior overhang. Provide an associated vestibule. The

design should provide an ordered, warm, friendly invitation to the public. Two story lobbies are not allowed, unless authorized by the Project Officer.

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.

4-2.9.4 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.

4-2.9.5 Space Design Information

General/Code

Size – 480 sf (44.6 sq m); may augment from circulation space

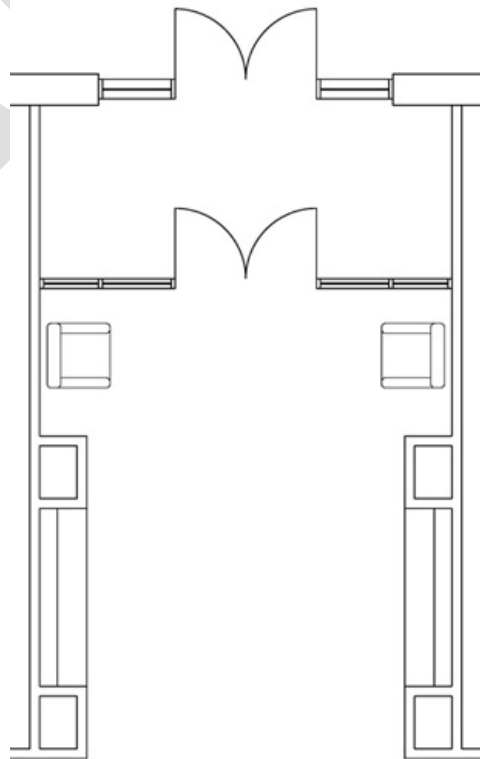
Occupancy – business; may be assembly if associated with assembly hall

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – 9 ft (2750 mm) minimum

Figure 4-12
Lobby



Floor – porcelain paver/tile

Base – porcelain tile

Walls – painted abuse resistant gypsum board

Ceiling – gypsum board; suspended ACT as an alternative

Trim – chair rail and wall or corner guards to protect walls.

Consider wainscoting, refer to paragraph 3-6.4.

Lockset – panic hardware; CAC card reader at exterior or interior of vestibule (verify location with Tenants)

Mechanical

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

Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)

Electrical

The trophy/display case lighting should be automatically controlled

Receptacles – convenience receptacles as described in Chapter 3

Telecommunications Outlet(s) – provide in accordance with

ARNEC

Furniture

Sofa, loveseat, and/or lounge chairs with commercial performance upholstery fabric with moisture barrier and stain resistance

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 display (trophy) case: Recessed/semi-recessed. Minimum 8'W x 4'H x 12"D. Lockable sliding glass front. Glass shelves. Tackable rear surface. Integral LED lighting connected to building lighting control system.

Bulletin board: Recessed/semi-recessed. Minimum 4'W x 4'H. Lockable swing or sliding glass doors. Tackable rear surface.

Special Features

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. Verify with Tenant if special displays are planned (i.e. if a dedicated facility, there may be plaques or other related memorabilia).

Building directory. Verify physical size of the directory, and need to include building plan on the directory, with Tenants.

Finishes in this space may be upgraded for image reasons

Exterior building finishes may be incorporated into the vestibule and lobby 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

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 ARIMD Project Officer 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

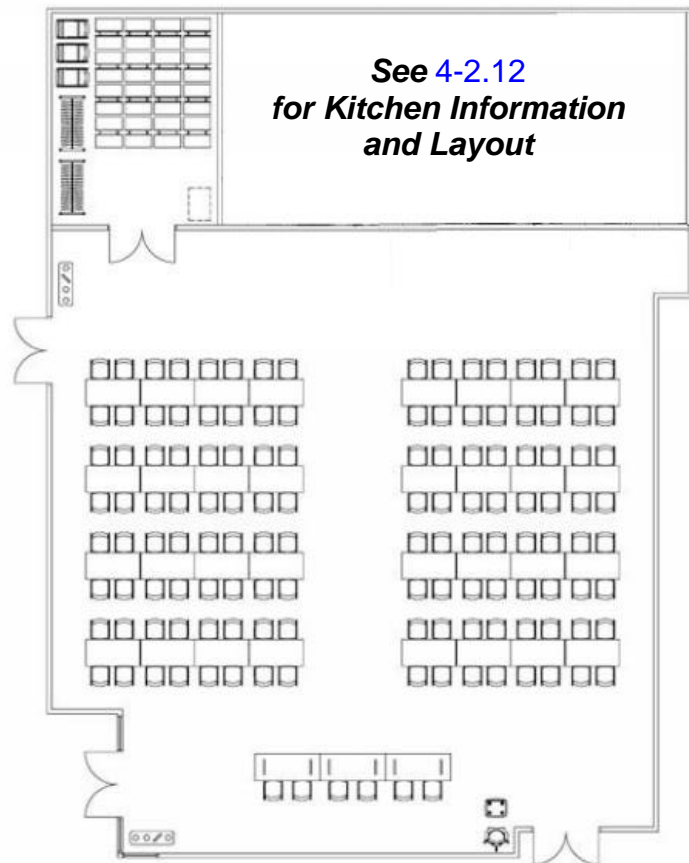
Minimum wall STC rating – 35

Ceiling height – 14 ft (4300 mm). 16ft maximum. Higher ceilings not preferred due to maintenance impact of the height (light fixture replacement, access to mechanical, etc.).

Floor – rubber tile or resinous flooring

Base – rubber

Figure 4-13
Assembly Hall and Kitchen



Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – fabric wrapped acoustical wall panels, above approximately 8 feet above floor (to minimize contact/damage by soldiers) and 15 percent (minimum) of the overall wall surface area are preferred, to help aid in sound absorption. Integrate with the overall room design.

Lockset – panic hardware

Mechanical

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

Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)

Electrical

Lighting – 30 fc on table tops; dual-level switching

Receptacles – convenience receptacles as described in Chapter 3

Telecommunications Outlet(s) – provide in accordance with ARNEC

Provide power for TV monitors, and a 1 ½” conduit to instructor location for GFGI HDMI routing.

Provide (2) dedicated power receptacles for the stand-alone portable public address system; one at the primary anticipated ‘presenter’ location, and another at the adjacent wall to allow for room reconfiguration.

CATV – two CATV outlets

Furniture

Fold up mobile cafeteria tables without attached seating, and sled-base stackable chairs. 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

Stand-alone Portable Public Address System with integral speakers and microphone. No building integrated public address system in the Assembly Hall.

Equipment

Provide 4 ft x 4 ft (minimum) tackboard near kitchen area

Markerboards and projection screens may be added if Tenants desire – size appropriate for the size of the space

Special Features

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 portable PA system for the assembly hall is also typically stored 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. Do not provide roof access through this room due to 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 wall 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.
Provide ½ in (12 mm) minimum painted plywood wainscot to 4 ft (1200 mm) above floor if walls are not concrete or CMU
Ceiling – suspended acoustical ceiling tile (ACT)
Trim – none
Lockset – classroom on active leaf; flush bolts inactive

Mechanical

Heating, occupied – 68°F (20°C); unoccupied– 55°F (13°C)
Cooling, occupied – none; unoccupied– none

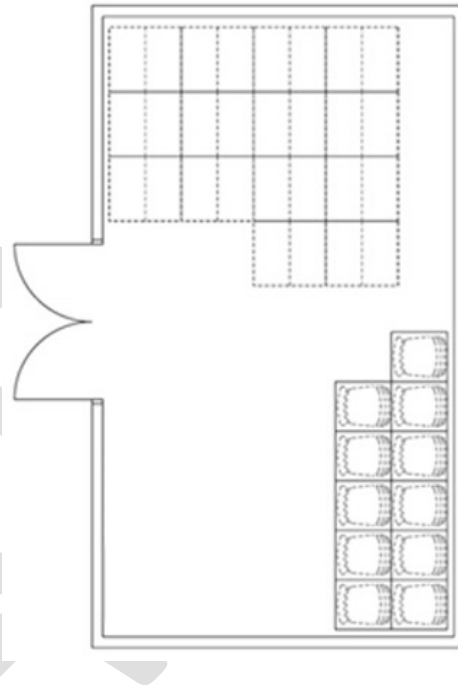
Electrical

Receptacles – one convenience receptacle
Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Table caddies for assembly hall folding tables (if regular folding

Figure 4-14
Chair and Table Storage



tables are specified)

Chair dollies for assembly hall stacking chairs

Equipment

None

Special Features

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 if closers are provided

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. Three sizes of Kitchen are approved depending on largest battle assembly weekend. Updates to the standard kitchen by the kitchen proponent do occur. The Training Center will contain a small kitchen as a minimum; the ARIMD Project Office is to provide direction if the Training Center is to contain a medium or large kitchen.

4-2.12.2 See [Appendix D](#) for the kitchen layouts and a list of kitchen equipment for each size kitchen.

4-2.12.3 The designer must obtain a copy of the current standard kitchen drawings from the [Army Reserve website](#), along with current equipment list and data sheets.

4-2.12.4 For the large kitchen, an administrative office is an integral part of the kitchen. This room is to adhere to the requirements for administrative offices in Paragraph 4-2.1, except as noted in the following Space Design Information.

4-2.12.5 For the large and medium kitchens, the janitor closet is an integral part of the kitchen. This room is to adhere to the requirements in Paragraph 4-2.24, with the following clarifications: Size approximately 14 sf (included in overall kitchen sf), FRP or tile wainscot on all four walls at this Janitor location, and no stand-alone shelving unit.

4-2.12.6 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).

4-2.12.7 Code analysis may require these coiling doors to be fire-rated doors

and on smoke-detector-activated hold-opens.

4-2.12.8 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.

4-2.12.9 Space Design Information

General/Code

Size – Small, Medium, or Large as indicated in Appendix D

Office Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 35

Ceiling height – 9 ft - 0 in (2743 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. Kitchen office, if provided, is to have a four-foot wide framed window to the kitchen area.

Locksets – office, classroom, and storeroom

Mechanical

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

Cooling, occupied – 80°F (27°C); unoccupied – 85°F (29°C)

Ventilation – comply with ASHRAE 62.1 and NFPA 96

Electrical

Receptacles – convenience receptacles as described in Chapter 3 in addition to equipment requirements

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture, Kitchen Office (Large Kitchen)

Metal desk unit (L-Shaped or double pedestal). Desk is to include overhangs 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 Appendix D

Special Features

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

Contactors to shut down power and gas to equipment under hood – coordinate with fire protection

An exterior grease interceptor must be provided unless design temperatures dictate interior interceptor per UFC 3-420-01

Locate fire suppression pull station along path of egress

Coiling doors to be aluminum or stainless steel. 3-sided bent stainless steel wall protection at head and jambs of coiling door openings.

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. The arms vault shall not be located on an exterior wall. The arms vault is usually located in the unit storage area, to utilize the unit storage staging area and related overhead door.

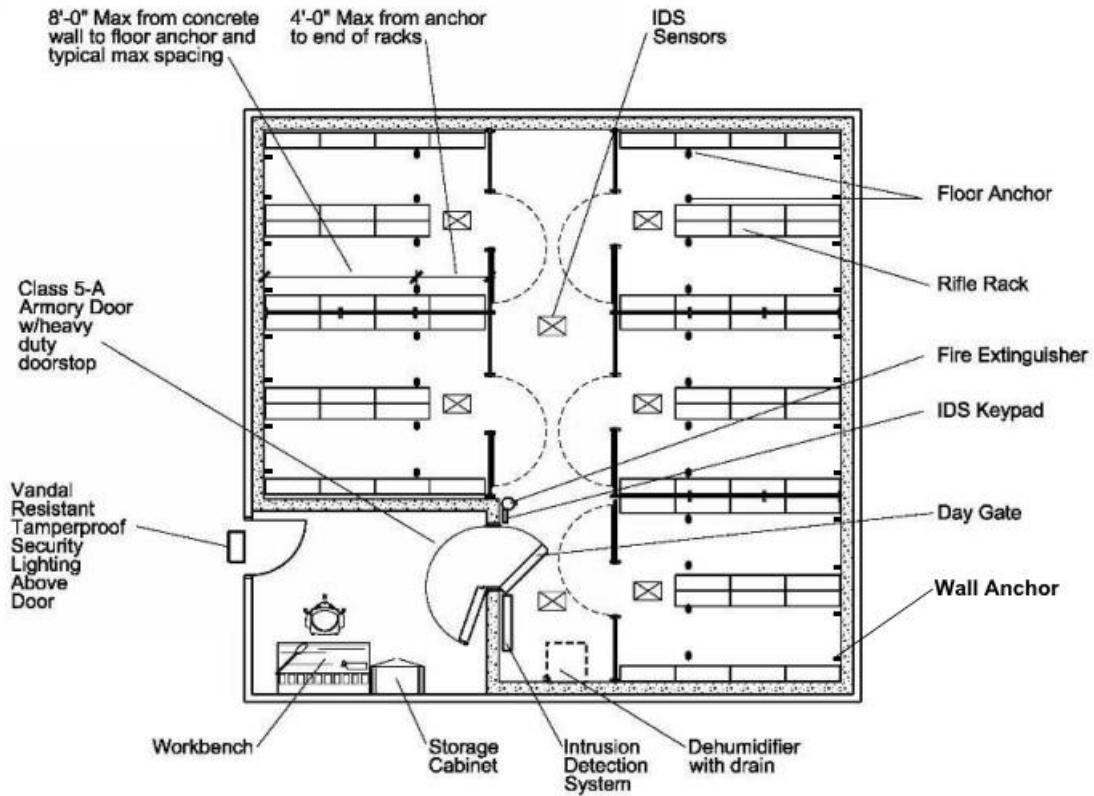
4-2.13.2 Construction of the vault is governed by AR 190-11, and will be cast-in-place, reinforced concrete. It is critical that designers refer to Chapter 4 and Appendix G in AR 190-11 for additional vault construction requirements. The structural documents must prominently display the following note: *“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 vault construction certification checklist.

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 shall be provided, with a pass-through capability for issuing weapons. Day gates may also be configured as a dutch door with issuing shelf, if desired by the Tenants. Provide a heavy duty floor mounted door stop for the vault door.

4-2.13.4 Provide for an intrusion detection system (IDS) as indicated in the ‘IDS Responsibilities’ document, available on the [Army Reserve website](#), which

clarifies contractor construction requirements, and IDS Installer (under separate contract) requirements.

Figure 4-17
Armorer's Room and Arms Vault



4-2.13.5 Provide battery backup, vandal-resistant tamperproof fixtures on the wall 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 6 ft (1525 mm) module for width to allow a 3 ft (915 mm) aisle between 16 in (260 mm) deep 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 expanded metal mesh screening. For further requirements on caging, see Paragraphs 4-2.21.4 and 4-2.21.9.

Figure 4-18A
Weapons Racks

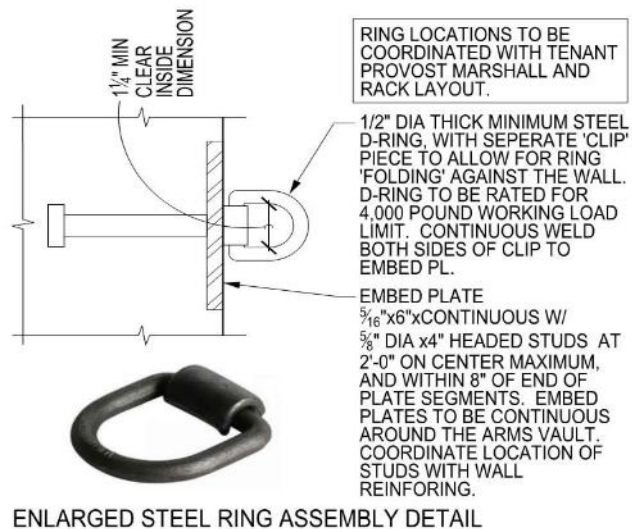
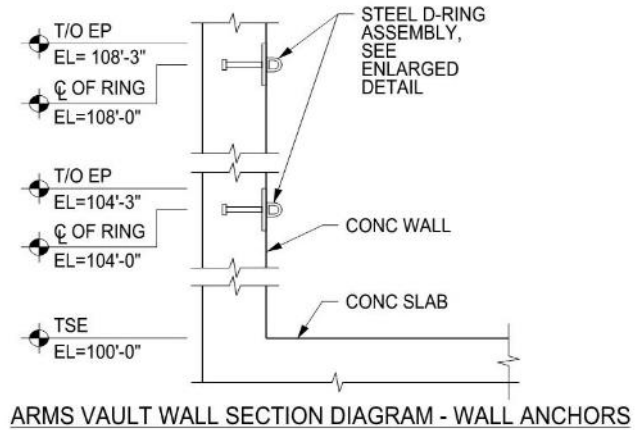


4-2.13.7 Weapons racks and containers are Government-supplied and installed. Verify with tenant the rack types, quantities, and sizes. Caged areas within the vault may vary in size and quantity per tenant direction. GSA approved Class 5 containers (safes) are approved for use instead of small arms storage 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 2 inch (50 mm) floor drain outside the caged area, with hard piping to the 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 anchors should not protrude from floor, and must be coordinated with slab thickness and reinforcing. Floor anchors are strongly preferred to be airport mooring eyes as manufactured by Neenah Foundry (Model R-3490-A) or equivalent as manufactured by others. Floor and wall anchors to be located between 4 and 8 inches from the ends/faces of the racks. Refer to Figure 4-17 for sample arms vault configuration and anchor placement for typical rifle racks. Coordinate anchor placement if Tenant utilizes a different weapons rack. Refer to Figure 4-18B for wall anchorage.

Figure 4-18B
Wall Anchorage



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.

4-2.13.11 Provide reinforced walls along the path from the arms vault to the unit storage area and loading dock 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 wall STC rating – not applicable

Ceiling height – 8 ft - 4 in (2500 mm) minimum, 9 ft-0 in preferred.

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

Receptacles – one convenience receptacle outside cages; one dedicated 20A circuit for dehumidifier and one for IDS panel
Telecommunications Outlet(s) – provide in accordance with ARNEC, provide telecommunications connection to IDS panel, in conduit

Provide emergency light inside vault

Vault door security lighting – see Paragraph 4-2.13.5

Furniture

None

Equipment

None

Special Features

Power, conduit and boxes for intrusion detection system (IDS).
See [Army Reserve website](#) for 'IDS Responsibilities' description and diagrams.

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. Refer to Figure 4-17.

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. Align the armorer door with the vault door 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 wall STC rating – not applicable

Ceiling height – 9 ft - 0 in (2743 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 – 85°F (29°C)

Electrical

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

Continuous metal raceway above and extending the length of the workbenches with power receptacles at 6 inches on center.

Telecommunications Outlet(s) – provide in accordance with ARNEC

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 commercial performance upholstery fabric with moisture barrier and stain resistance

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

Dutch door with shelf, if Tenants desire

4-2.15 Classrooms

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 floor/roof deck above.

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 45 minimum. Above the operable partition track, provide a sound attenuation assembly up to the floor/roof deck above 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.

Figure 4-19
Classroom

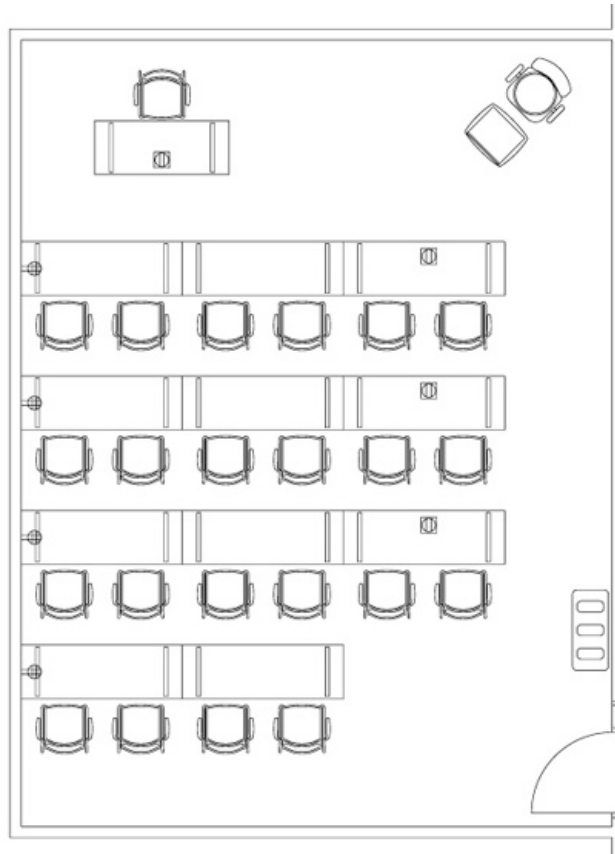
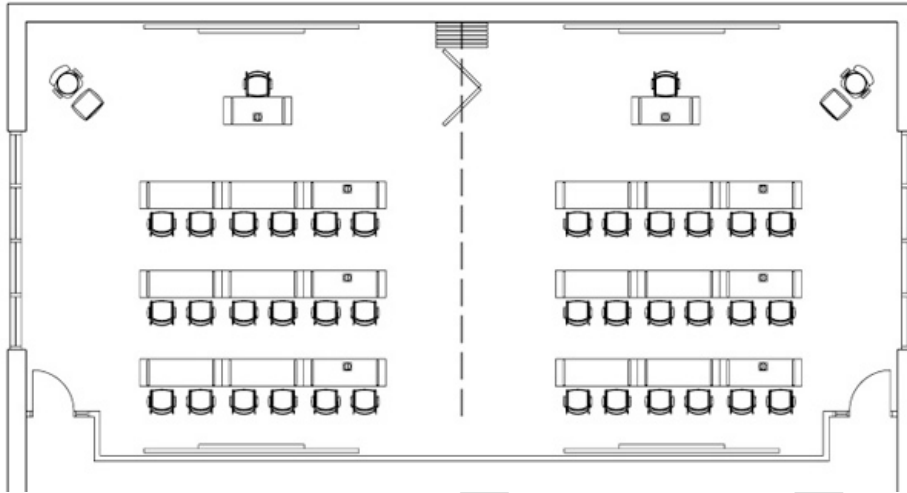


Figure 4-20
Classroom with Operable Partition



4-2.15.4 Space Design Information

General/Code

Size – varies; the default size is a 400 sf classroom

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45. Minimum door assembly STC rating – 32.

Ceiling height – 9 ft - 0 in (2743 mm) minimum

Floor – carpet tile, rubber tile, or luxury vinyl 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– 85°F (29°C)

Electrical

Lighting – dual-level switching (or dimming) throughout and broken down into two zones, front one-third and rear two-thirds of the room; provide additional controls at markerboard

Receptacles -

- Receptacles – convenience receptacles as described in Chapter 3 and duplex power receptacles at each telecommunications outlet
- Receptacle at the instructor table
- Provide receptacle for wall mounted television(s)

- Receptacle and telecommunications outlets (as required by ARNEC) are to be located within 12-feet of each student seat without the need to cross aisles. If wall outlets meet the proximity requirement, then provide one duplex wall receptacle for every two student seats, and telecommunications outlet(s) as required by ARNEC. For seats that cannot meet the proximity requirement with wall outlet locations, provide recessed floor boxes containing a single receptacle for each student, and telecommunications outlet(s) as required by ARNEC.

Telecommunications Outlet(s) – provide in accordance with ARNEC

Two 1 1/2" conduits, with pull strings, from each wall mounted television location; one to the instructor's location (with box), the other to center of the wall at the rear of the classroom (with box) (if rear of classroom is a moveable partition locate outlet box in wall at either end of the partition). Provide cover plate with circular opening at each box location. This is for Tenant provided HDMI cabling.

Furniture

Folding tables with "T" or "C" legs

- One classroom per Reserve Center shall be configured with power and telecommunications connections in the tables (to be connected by the Users to the floor/wall devices) if desired by the unit – typically two students per table

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)

Wall mounted Flat Screen Televisions and bracket – one television on main wall and one on side wall, to be interconnected.

Equipment

Minimum 4 ft high (1200 mm) x 8 ft wide (2400 mm) markerboard; multiple markerboards provided where appropriate

Minimum 4 ft high (1200 mm) x 4 ft wide (1200 mm) tackboard (sidewall or rear of room if front 'presentation' wall space does not allow)

2 in (50 mm) high map rail with integral tack strip with end stops and hanger clips continuous around the perimeter of room

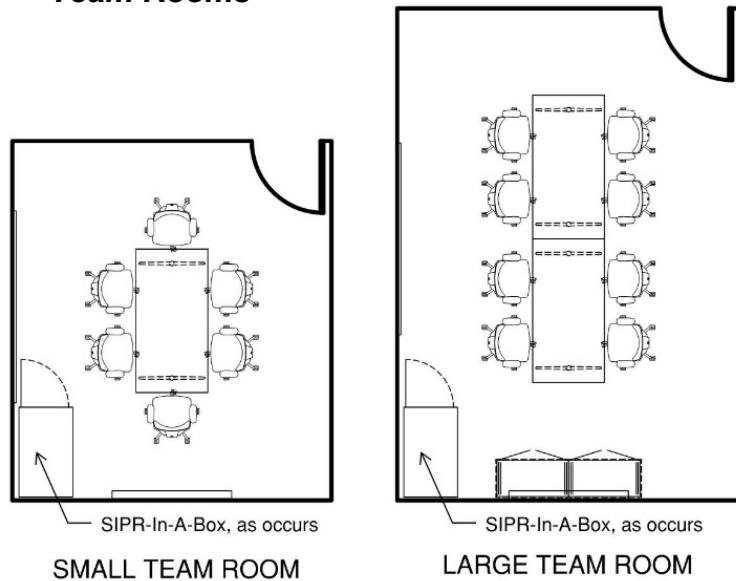
Special Features

See Paragraph 3-6.4.6 for window treatments.

4-2.16 Team Rooms

4-2.16.1 Team Rooms provide the Tenants a place to hold small team meetings as well as provide a location to review training publications and other reading material. One team room can be designated for 'SIPR-In-A-Box' use.

Figure 4-21
Team Rooms



4-2.16.2 One small team room is authorized for each Training Center with 0 to 150 soldiers on the largest Battle Assembly (BA) weekend. For each additional 150 soldiers on the largest BA weekend, one additional large team room will be allocated. For example, a BA of 180 will have one small team room and one large team room, and a BA of 305 will have one small team room and two large team rooms.

4-2.16.3 Space Design Information

General/Code

Size – Small 200 sf, Large 300 sf

- Although SIPR-In-A-Box is designated for one team room, all team rooms should be proportioned to accommodate clearances around furniture and SIPR-In-A-Box equipment.

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45. Minimum door assembly STC rating – 32.

Ceiling height – 9 ft - 0 in (2743 mm)

Floor – carpet tile, rubber tile, or luxury vinyl 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 – 85°F (29°C)

Electrical

Refer to ARNEC for SIPR-In-A-Box requirements

Lighting – dual-level or dimmable switching

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

- Provide receptacle for SIPR-In-A-Box and wall mounted television.
- Provide floor box under the table with duplex receptacle (for presenter laptop on the table)

Telecommunications Outlet(s) – provide in accordance with ARNEC

- One 1 1/2" conduit, with pull string, from the wall mounted television, to the floor box (for Tenant provided HDMI cable)
- CATV – one outlet at wall mounted television

Furniture

Meeting room table or folding tables with “T” legs

Sled-base upholstered stacking chairs w/arms or guest chairs with casters

Credenza storage unit. (Large team room only) Credenza is to consist of (2) 36 in wide metal storage cabinets with a 72 in laminate top piece, approximately 36 in high

Recycling receptacle (single unit divided into multiple compartments. One compartment is to be designated for trash)

Wall Mounted Flat Screen Television and bracket on ‘short end’ of room

Equipment

Minimum 4 ft high (1200 mm) x 8 ft wide (2400 mm) markerboard with tackstrip

Miniblinds on all glazing if SIPR-In-A-Box is located in the room

Special Features

Verify with Tenants if glazed wall(s) are preferred

4-2.17 Not Used

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 wall STC rating – 35

Ceiling height – 9 ft - 0 in
(2743 mm)

Floor – carpet tile, rubber tile, or luxury vinyl 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– 85°F (29°C)

Electrical

Lighting – dimmable overhead lighting

Receptacles – convenience receptacles as described in Chapter 3
and duplex power receptacles at each workstation

Telecommunications Outlet(s) – provide in accordance with
ARNEC

Furniture

Tables with 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)

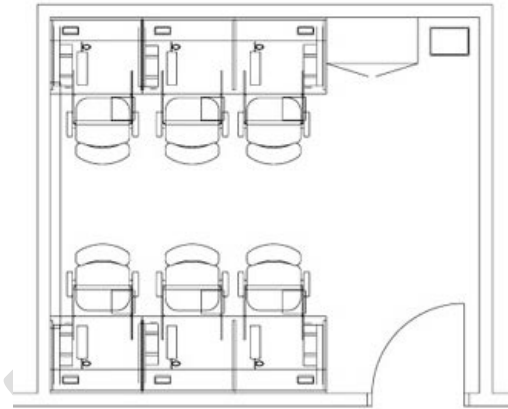
Equipment

Minimum 4 ft high (1200 mm) x 4 ft wide (1200 mm) tackboard

Special Features

Floor receptacles and outlets may be required if wall outlets are not
accessible per table layout

Figure 4-23
Learning Center



4-2.19 Not Used

4-2.20 COMSEC Storage

4-2.20.1 This space is provided only on an as-needed basis; defined during project programming.

4-2.20.2 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.

4-2.20.3 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.

4-2.20.4 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.

4-2.20.5 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.

4-2.20.6 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.

4-2.20.7 Space Design Information

General/Code

Size – varies

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall STC rating – 45; walls and openings must be audio tested along several points to assure STC rating is achieved.

Minimum door assembly STC rating – 45.

Ceiling height – 9 ft - 0 in (2743 mm)

Floor – rubber tile, linoleum, or luxury vinyl tile

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

Receptacles – convenience receptacles as described in Chapter 3

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Metal bookcases upon tenant’s request; designer shall verify

Equipment

Any safe(s) will be provided by the Tenants

Special Features

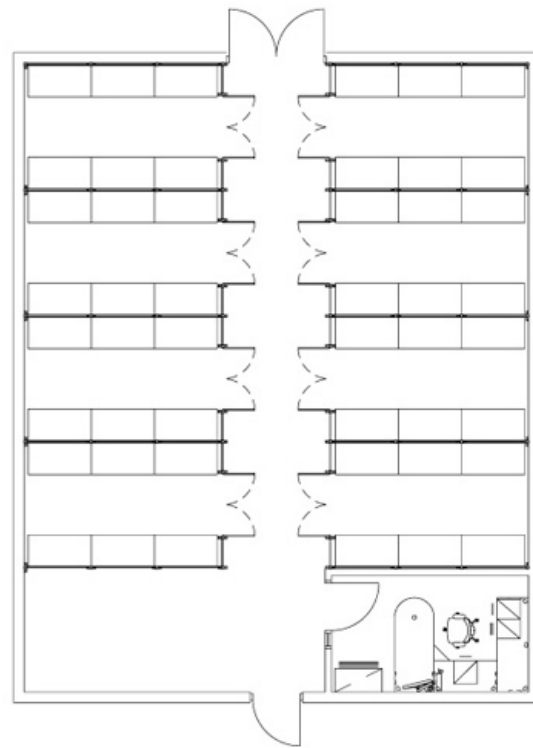
Verify whether IDS for the space is required

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. 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) or 2 in x 2 in (50 mm x 50mm) woven or welded wire fabric. Ensure that these dimensions are the inside clear dimensions to ensure the placement of (3) shelves (shelves described in paragraph below).

4-2.21.2 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.

**Figure 4-25
Unit Storage with Supply Office**



4-2.21.3 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 expanded metal mesh for caging. The partitions will be 10-gauge steel wire, 1 in by 2 in (25 mm x 50 mm) or 2 in x 2 in (50mm x 50mm) 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.

4-2.21.4 The clear interior 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.

4-2.21.5 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, per Fire Marshal”. Place lighting inside of the cage, with one light per 8 ft x 12 ft (2400mm x 3650 mm) cage. No other serviceable HVAC or other equipment is to be placed above cages.

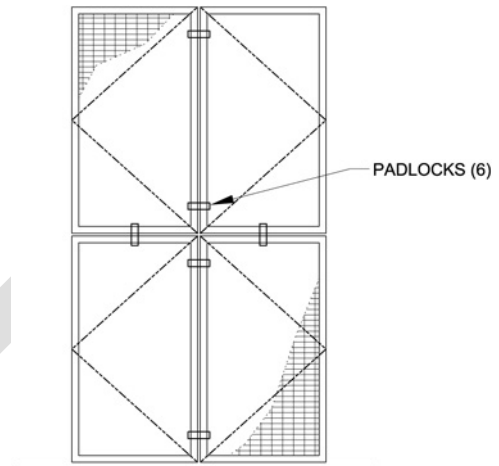
4-2.21.6 Provide each cage unit with a small sign identifying each cage sequentially (ex. 82 cages would be numbered 1 thru 82).

4-2.21.7 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.

4-2.21.8 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 (non removable) hardware and screws 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

4-2.21.9 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. 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

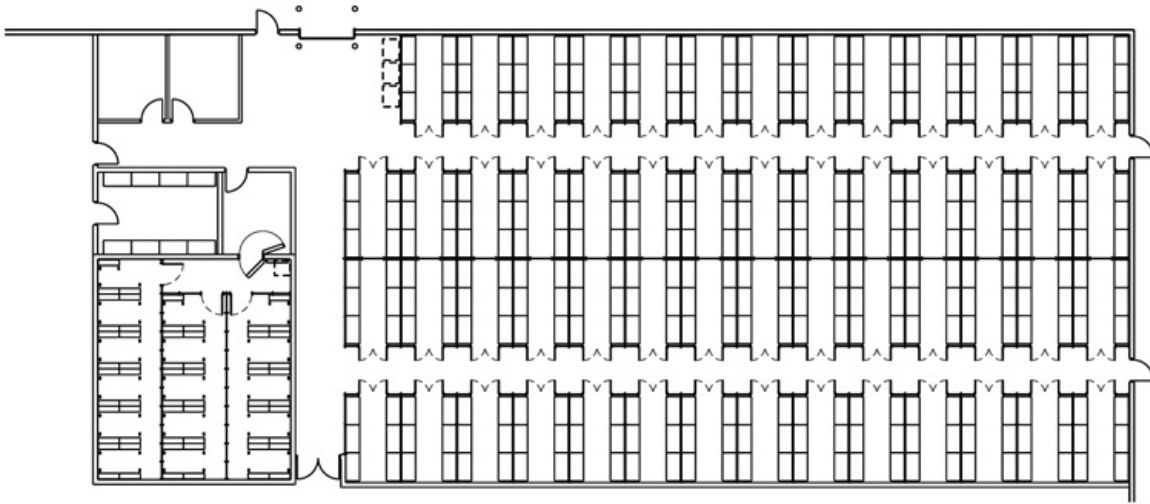


4-2.21.10 Shelving for the unit storage caged areas shall be heavy-duty open steel shelving units with five adjustable shelves. Shelves shall contain solid backs. The units are typically 4 ft wide by 2 ft deep by 7 ft tall (1200 mm wide, 600 mm deep and 2100 mm tall). Shelving for maintenance shop tool 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. Shelves placed back to back shall have metal backs.

4-2.21.11 See “Typical Caging Layout Plans” on the [Army Reserve website](#) for more details.

4-2.21.12 The fire protection engineer on the design team must review the expected storage materials with the user and project delivery team (PDT) and document in the design analysis. Include NFPA 13 Storage Sprinkler System Design checklist in the design analysis. Provide a fire protection analysis for storage type applications per UFC 3-600-01. Include the use of plastic storage cases in the development of fire sprinkler protection requirements at all unit storage spaces. This allows for future flexibility by designing to a higher hazard level without the need for rework in the future. Sprinkler protection must be based on the maximum potential height of storage. The maximum potential height of storage shall be based on the roof or ceiling height, not the height of the shelving or cages. Roof slope may not exceed a rise of 2 units per 12 unless the protected space is provided with a flat ceiling. The sprinkler design demand, minimum K-factor, and hose stream shall meet the more stringent of UFC 3-600-01 and NFPA requirements.

Figure 4-27
Unit Storage with Staging and Supply Office,
with Arms Vault shown



4-2.21.13 Space Design Information

General/Code

Size – varies

Occupancy – storage, unoccupied

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – 10 ft (3050 mm) minimum to ceiling, or bottom of structure/obstructions if no ceiling. Additional distance to structure may affect sprinkler system design.

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 – stainless steel corner guards to protect non-cmu/concrete wall corners

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 – motion sensors for aisles. Locate lights inside 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.

Zone lighting controls for cage lighting separate from aisle

lighting. Locate light control switches at 48" above floor. Verify height of switches with tenants; some tenants prefer 60", to prevent cart damage in aisles. Coordinate switch location to avoid caging door swings, to prevent damage.

Receptacles – convenience quadplex receptacle in aisle for every four cages, or duplex receptacle for every two cages.

Receptacles to be distributed uniformly. Locate receptacles on the outside of the cages at 48" above floor. Verify height of receptacles with tenants; some tenants prefer 60", to prevent cart damage in aisles. Coordinate receptacle location to avoid caging door swings, to prevent damage.

Provide convenience duplex receptacles inside each cage, at the rear 'wall' without shelving.

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

None

Equipment

Steel shelving as noted above.

Caging as noted above.

Special Features

Very limited occupancy; ventilation required only when occupied

Sprinkler – see paragraph above

Provide padlocks for all cage door hasps; ASTM F883 Type Po-1 Option 'B', Grade 6, with removeable core.

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 wall STC rating – not applicable

Ceiling height – 10 ft (3050 mm) minimum to bottom of structure/obstructions

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 – stainless steel corner guards to protect non-cmu/concrete wall corners

Mechanical

Heating, occupied - 68°F (20°C); unoccupied– 55°F (13°C)
Cooling – none; outdoor air ventilation
Ventilation – one air change per hour; ventilation required only when occupied

Electrical

Receptacles – convenience receptacle
Telecommunications Outlet(s) – provide in accordance with ARNEC

Special Features

Overhead door to the exterior, typically 10 ft x 10 ft (3 m x 3 m); motorized automatic door with sensors to prevent door from closing on items in the path of closure
Provide bollards inside and outside of overhead door jams
Sprinklers - Very limited occupancy

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 (door should be closed). 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). Tenant may also request these safe(s) to be located in certain Unit Storage cages; verify with Tenant.

4-2.23.3 Electrical 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 wall STC rating – 35
Ceiling height – 9'9 ft - 0 in (2743 mm)
Floor – rubber tile, linoleum, or luxury vinyl tile

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– 85°F (29°C)

Electrical

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

Telecommunications Outlet(s) – provide in accordance with ARNEC

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 typical)

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

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

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 wall STC rating – not applicable

Ceiling height – 9 ft - 0 in (2743 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 or ceramic tile, to 4 ft AFF on the walls adjacent to the mop sink (full width of each wall)

Ceiling – epoxy-painted water resistant gypsum board

Trim – 3 ft long minimum stainless steel utility shelf with a minimum of 3 mop holders, located over the floor sink. Lockset – classroom

Mechanical

Heating – passive, through transfer air

Cooling – passive, through transfer air

Ventilation – ventilate exhaust to larger of ASHRAE 62.1 requirement or 4 air changes per hour; maintain negative pressure

Electrical

Receptacles – GFCI duplex receptacle

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

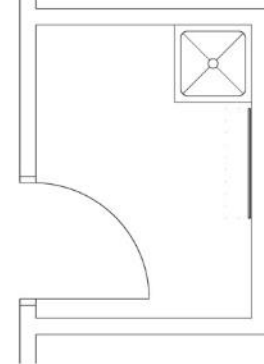
None

Equipment

Heavy-duty open steel shelving units, as noted under Unit Storage above.

Special Features

Floor sink with spout with pail hook



4-2.25 Flammable Storage

4-2.25.1 These rooms are rarely provided in training centers; see VMS 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 VMS

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 wall STC rating – not
applicable

Ceiling height – 9 ft - 0 in (2743 mm) minimum

Floor – sealed concrete

Base – rubber

Walls – painted gypsum board; painted CMU as an alternative

Ceiling – exposed structure, painted; suspended acoustical ceiling
tile (ACT) as an alternative

Trim – none

Lockset – storeroom

Mechanical

Heating – 55°F (13°C)

Cooling - none

Ventilation – ventilation shall comply with larger of ASHRAE 62.1
and UFC 3-410-01.

Electrical

Receptacles – convenience duplex receptacles as described in
Chapter 3

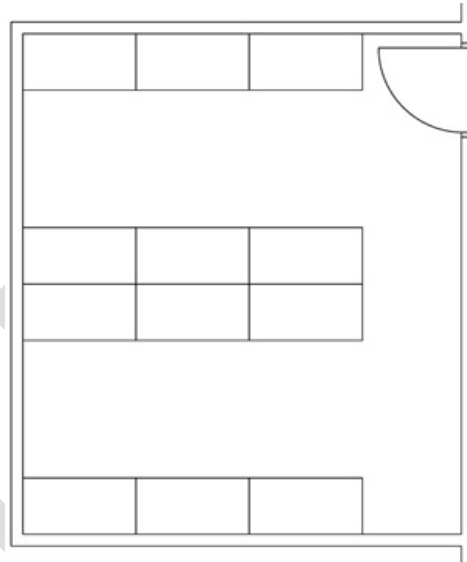
Telecommunications Outlet(s) – provide in accordance with
ARNEC

Equipment

Steel shelving and or storage cabinets

Special Features

Figure 4-29
Facility Maintenance Storage



4-2.28 Simulator Room

4-2.28.1 The simulator space can accommodate the Engagement Skills Trainer (EST) and other types of simulation trainers. The simulator space is sub-divided into the simulator room and a lockable storage room. The space is sized to accommodate the EST systems; obtain Project Officer approval if changes to the room sizes are contemplated. Due to noise concerns, do not locate the simulator near offices, unit commons, team rooms, or classrooms.

4-2.28.2 Simulator rooms should eliminate excessive light;

4-2.28.3 Room should have a sign posted outside the entry door stating, "maximum occupancy is 49."

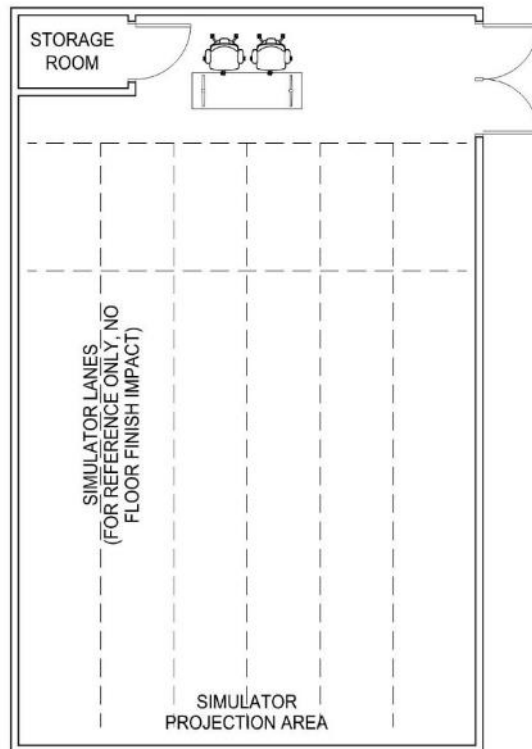
4-2.28.4 The designer should verify the type of simulator system(s) to be provided with the OCAR Engineer Office and Support Installation, and obtain the current specifications for the system(s). Some Tenants may have vehicle simulators which require floor space and power receptacles. The simulator system, including projection and screen 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 simulators are capable of producing noise levels up to 107 dB. When located near typically occupied spaces (including Circulation spaces), provide 60 STC walls for Weapons Simulators Room walls, as well as the floor/ceiling assembly above, when there is occupied space above. Reduce wall STC rating to 48 when adjacent to unoccupied spaces (Mech, Elec, Telecom, Storage rooms, Toilet/Locker/Showers, Janitor).

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

Figure 4-31
Simulator Room



General/Code

Size – 25 ft x 40 ft; 1,000SF. Include a storage closet 6 ft by 4 ft clear inside (door on short end).

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 48/60 (see discussion above).

Minimum hallway door assembly STC rating – 45; overlapping astragal is preferred over removeable mullion.

Ceiling height – 9 ft - 0 in (2743 mm) minimum

Floor – rubber tile, carpet tile, or luxury vinyl tile

Base – rubber

Walls – painted high-impact gypsum board Ceiling – suspended acoustical ceiling tile (ACT).

Trim – none

Double door with inactive leaf at hallway; 6 ft width minimum.

Locksets – classroom function at hallway door. Storage room is storage function

Mechanical

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

Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)

Air movement shall not cause targets or simulator projection screen to ripple, special emphasis for simulator screen location at the short end of the room opposite the hallway door.

Quiet air distribution

Ventilation – comply with ASHRAE 62.1

Electrical

Lighting – provide 3-zone dimming for room darkening

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

- Provide two dedicated 20 amp receptacles on separate circuits with duplex outlet for simulator air compressor(s), at the side walls near the 'simulator projection area' in Figure 4-31.
- In addition to the dedicated receptacles above, provide power duplex receptacles at approximately 12 ft on center around the room.
- Provide one quad receptacle on the wall behind the table.
- Provide one power duplex receptacle in the storage room, near the door.
- Verify electrical requirements if specific simulators are identified.

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Exercise (floor mats) for comfort at firing area and to cover
cables/air lines on floor connecting targets and equipment

(1) Table, Flip Top, 72 inches long

(2) task chairs

(1) ~7 gal trash can

Equipment

None

Special Features

Verify equipment power or telecommunication needs with Tenants

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 Not Used

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 TV, and tack-boards in relation to the furniture.

4-2.34.4 Space Design Information

General/Code

Size – 600 sf (55.7 sq m)

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45.

Minimum door assembly STC rating – 32.

Ceiling height – 9 ft - 0 in (2743 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)

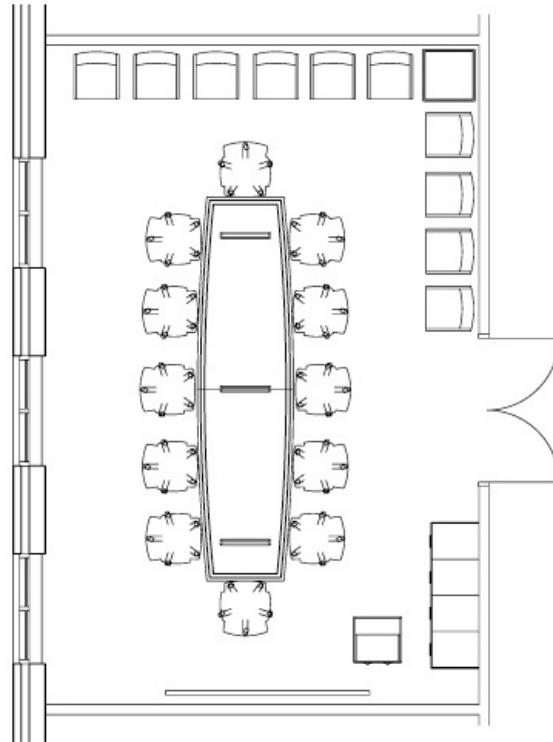
Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)

Electrical

Lighting – provide two dimmer zones.

Receptacles – convenience receptacles as described in Chapter 3

- Provide receptacle for wall mounted television.



- Provide floor box under the table with duplex receptacle (for presenter laptop on the table).

Telecommunications Outlet(s) – provide in accordance with ARNEC

- One 1 1/2" conduit, with pull string, from the wall mounted television, to the floor box (for Tenant provided HDMI cable)
- CATV – one outlet at wall mounted television

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)

Wall mounted Flat Screen Television and bracket

Equipment

4 ft x 6 ft (1200 mm x 1800 mm) (minimum) 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– (teleconferencing related specialty TV/projector would be by Tenants) OCAR Engineer Office approval is required

Special Features

Optional built-in casework may be appropriate for storage and counter space

Provide structural support and mount for ceiling mounted projector

4-2.35 Not Used

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. The room door shall be 6 ft wide double door.

4-2.36.3 Locate an electric water cooler in or near this space.

4-2.36.4 Space Design Information

General/Code

Size –1,200 sf
Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45.
Minimum door assembly STC rating – 32.
Ceiling height – 9 ft - 0 in (2743 mm) minimum
Floor – vulcanized rubber flooring, 1/2 in (12 mm) minimum thickness
Base – rubber
Walls – painted impact resistant 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– 85°F (29°C)
Ventilation – 20 cu ft per minute (10 L/S) per person minimum;
sufficient ventilation for rigorous activity – do not recirculate to other spaces

Electrical

Receptacles – convenience receptacles as described in Chapter 3; outlets for powered equipment. A dedicated 20A/120V electrical receptacle is required for each treadmill.
Telecommunications Outlet(s) – provide in accordance with ARNEC
Electrical outlet and telecommunications or CATV outlet, at TV mounting bracket

Furniture

A matrix of equipment has been developed.
See matrix in [Appendix J](#)

~10 gal trash can
(2) Flat Screen Televisions and Brackets

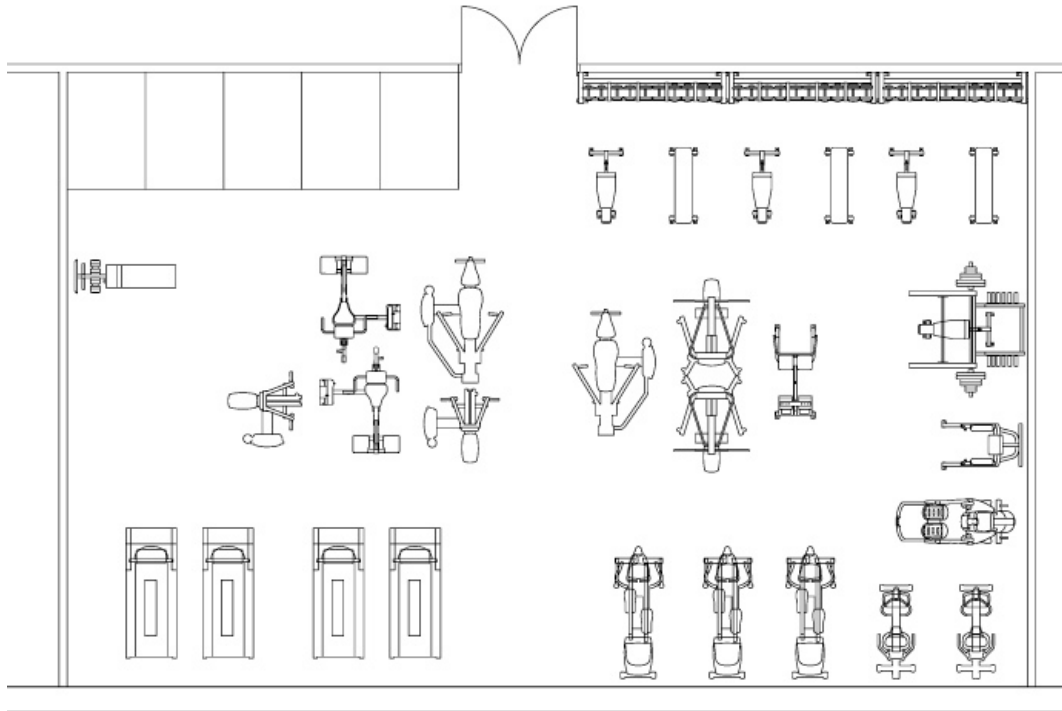
Equipment

Sit up bar at the exercise mat locations. Bar to be mounted to the floor or securely to blocking in the wall.
Frameless mirrors from 2 ft above floor to approximately 7 ft above floor on wall with sit up bar.
Frameless mirrors from 4 ft above floor, to approximately 7 ft above floor on wall behind the weight racks.

Special Features

CATV and telecommunication jacks at TV location(s). Provide blocking in wall for televisions.

Figure 4-33
Physical Readiness Training Room



4-2.37 Not Used

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.

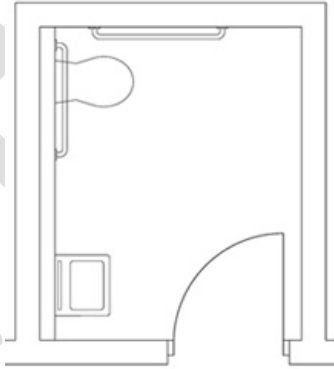
4-2.38.2 The space will be similar to a computer learning lab. The OCAR Engineer Office will provide and install all equipment, hardware and software; the designer must obtain the current design criteria from the OCAR Engineer Office, and coordinate the design of the mechanical, electrical, and telecommunications building systems required to support the space and equipment.

4-2.38.3 Space Design Information: Similar to classroom above. Designer must verify whether 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.

Figure 4-35
Unisex Single Room
Toilet



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 the current programmed 1391 area. Obtain ratio of male to female personnel from Tenants, and apportion fixtures accordingly; a reasonable default is 2/3 male.

4-2.39.3 Provide modesty screening to ensure no lines of sight from adjacent spaces or corridors, except in unisex/single use rooms.

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. Group showers should also be considered for male showers. Reducing the number of showers may help reduce water use and water service infrastructure. All female showers will be individual units; no group 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. Shower rooms should be considered as a wet

area and toilet areas should be considered as a limited water exposure area.

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 wall STC rating – 45 at overall room perimeter to adjacent spaces. No wall STC requirements at walls within the Toilet/Shower/Locker room areas, or adjacent to other Toilets/Showers/Locker rooms.

Ceiling height – 9 ft - 0 in (2743 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 room – full height solid surface, full height ceramic tile, or one-piece drop-in assembly. Backing material to be cement board. Provide fluid-applied waterproof membrane applied to the entire shower walls and floor.

- In toilet areas – ceramic tile to a minimum of 4 ft above floor, with mold resistant gypsum board for remainder.

Ceiling – in shower room - cement board with a skim coat and epoxy-paint

- In toilet areas – mold-resistant suspended acoustical ceiling tile (ACT) with prefinished white 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 1 cfm/sf (5.1 l/s/sq m), 6 air changes/hour, or ASHRAE 62.1; negative air pressure.

Electrical

Lighting –at showers, recessed, wet location, lensed downlights

Receptacles – convenience receptacles as described in Chapter 3

– GFCI in wet areas; GFCI duplex at sinks

Telecommunications Outlet(s) – provide in accordance with

ARNEC

Furniture

None

Equipment

Towel hooks (2ea minimum) or towel rack (1 ea minimum, 18" long minimum) adjacent to each shower

All water closet stalls to receive coat hook

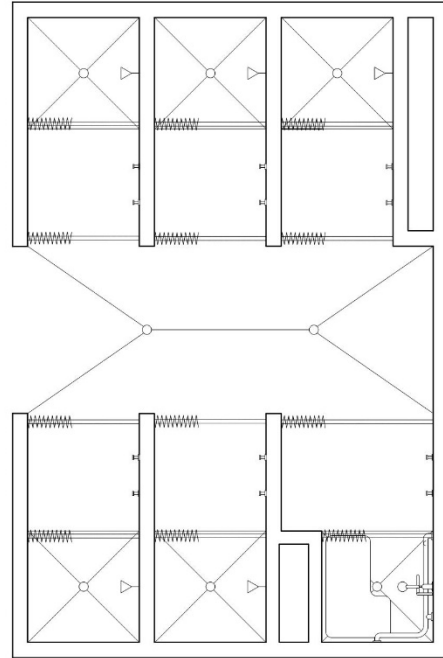
Provide a minimum 18 inch wide x 72 inch high mirror near the exit

Consider a hat shelf in the toilet area near the sinks and mirrors

Soap dish in showers

Commercial grade shower curtain, stainless steel rod at each shower.

Accessible shower(s) with grab bars and benches per accessibility requirements



Special Features

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. Provide wall to wall frameless mirrors above sink countertop at toilet areas.

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

Provide high capacity trash cans, toilet paper dispensers, liquid soap dispensers and paper towel dispensers and disposal units to accommodate heavy weekend use without service; verify with RD if they prefer to provide their own soap and/or paper towel dispenser, and provide mounting accommodations. Verify with RD/Installation preferred paper towel dispenser (roll versus tri-fold) and trash bin types.

Provide plastic or stainless steel baby diaper changing station(s) at the restrooms closet to the Lobby. If restrooms closest to the Lobby are both Male and Female, both rooms shall have a changing station. If a unisex type restroom is provided near

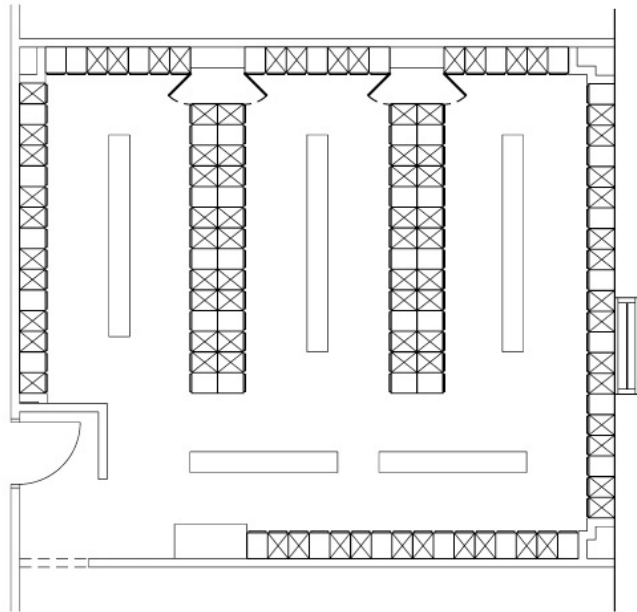
the Lobby, only that room would need to have the changing station.

Wall mounted soap dispensers are preferred, mounted above counters, to catch drips.

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 (12inches wide x 18 inches deep by 72 inches high each) for each full-time personnel and each Commander. Provide stacked half-height lockers (12inches wide x 18 inches deep by 72 inches high each) to equal twice the number of showers. Provide accessible locker(s) in addition to the quantities listed above.



4-2.40.3 Provide modesty screening provided to ensure no lines of sight from adjacent spaces or corridors.

4-2.40.4 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45 at overall room perimeter to adjacent spaces. No wall STC requirements at walls within the rooms, or adjacent to other Toilets/Showers/Locker rooms

Ceiling height – 9 ft - 0 in (2743 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– 85°F (29°C)
 Ventilation – Use 1 cfm/sf (5 l/s/sq m) in locker area; air pressure to be negative

Electrical

Receptacles – convenience receptacle - GFCI
 Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

None

Equipment

Benches, including accessible benches

Special Features

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. If located within another room, the overall square foot space allocation for both rooms are to be utilized (vending should not 'come out of' the primary room area). Large facilities may justify multiple locations, but the space will have to come out of the current programmed 1391 area.

4-2.41.2 Space Design Information

General/Code

Size – 28 sf (4.5 sq m)
 Occupancy – business

Architectural/Interiors

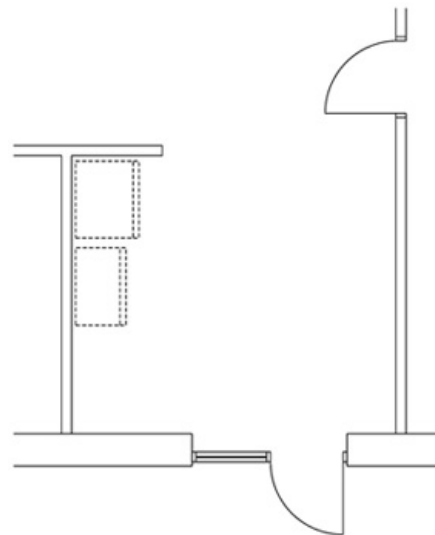
Minimum wall STC rating – not applicable
 Ceiling height – 9 ft - 0 in (2743 mm) minimum
 Floor – rubber tile, linoleum, or luxury vinyl tile
 Base – rubber
 Walls – painted gypsum board
 Ceiling – suspended acoustical ceiling tile (ACT)

Trim – none

Lockset – none

Mechanical

**Figure 4-38
 Vending Alcove**



Heating, occupied – 68°F (20°C); unoccupied – 55°F (13°C)
 Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)
 Ventilation –return air in proximity to remove heat from vending machines

Electrical

Receptacles – dedicated 20A receptacle for each vending machine, GFI receptacles with readily accessible controls are required

Telecommunications Outlet(s) – provide in accordance with ARNEC

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

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 wall STC rating – 45

Ceiling height – 9 ft - 0 in (2743 mm) minimum

Floor – rubber tile, linoleum, or luxury vinyl tile

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

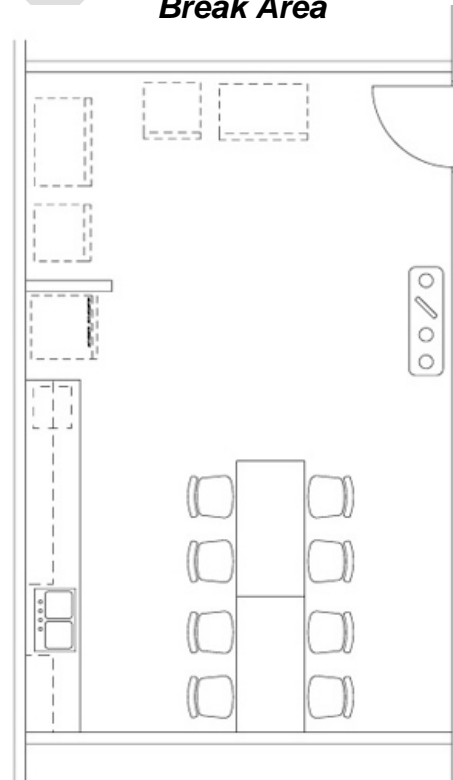
Trim – none

Lockset – passage

Mechanical

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

Figure 4-39
Break Area



Cooling, occupied – 78°F (25°C); unoccupied– 85°F (29°C)
Ventilation exhaust with local control for intermittent ventilation

Electrical

Receptacles – convenience receptacles as described in Chapter 3;
dedicated 20A for appliances and coffee maker; GFCI duplex
at sink

Telecommunications Outlet(s) – provide in accordance with
ARNEC

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

4 ft (1200 mm) x 4 ft (1200 mm) tackboard

4 ft (1200 mm) x 4 ft (1200 mm) markerboard

Special Features

Refrigerator and microwave, are CFCI

Solid surface counter with plastic laminate upper and lower
cabinets and two-compartment stainless steel sink and
gooseneck faucet. No garbage disposal, unless authorized by
the Project Officer.

8 ft (2438 mm) minimum length for cabinetry

Large coffee maker, set on countertop, by Tenant

Provide 1/4 inch supply water line to the coffee maker. Shutoff
valves under the sink.

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 RDs 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 the current programmed 1391 area. 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 – 7 % of authorized building functional area or as required

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall 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

Receptacles – convenience receptacles as described in Chapter 3

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Folding table with “T” legs

Task chair with commercial performance upholstery fabric with moisture barrier and stain resistance

Metal Storage cabinet or lateral file for O&M manuals

~7gal trash can

Equipment

Special Features

Connections to flow switches, tamper switches, and fire alarm

Floor drains for relief valves and condensate, hose bibb, eyewash if water treatment chemicals in room

Power and telecommunication connections for DDC computer including JACE

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 the current programmed 1391 area.

4-2.44.2 The main electrical room shall be dedicated to electrical equipment, in accordance with UFC 3-520-01.

4-2.44.3 Space Design Information

General/Code

Size – 360 sf (33.5 sq m)

Occupancy – business, unoccupied

Architectural/Interiors

Minimum wall 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

Receptacles – convenience receptacles as described in Chapter 3; and receptacle for building temperature control system

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

None

Equipment

Electrical service equipment

Special Features

Main ground bar

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 a glazed interior weather vestibule, for energy conservation, at all entrances at hallway locations.

4-2.45.4 Provide magnetic hold-open devices for doors in high-traffic corridors.

4-2.45.5 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – 9 ft - 0 in (2743 mm) minimum

Floor – resinous flooring or rubber tile; carpet tile or luxury vinyl tile as an alternative in more formal and administrative areas with low foot traffic

Base – rubber

Walls – painted impact resistant gypsum board, consider wainscot of burnished CMU, ceramic tile, or other durable surface; 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– 85°F (29°C)

Electrical

Receptacles – convenience receptacles as described in Chapter 3

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Display cases, bulletin boards; if space allows, seating areas with lounge chairs

Equipment

None

Special Features

Electric water coolers for each floor, minimum

Consider concealed sprinkler heads for aesthetics and durability

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 All stairs shall receive rubber flooring on steps and landings. 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 Stair runs shall be 4 ft wide minimum (6 ft wide preferred). Some Tenants may wish to have stairs wider than this requirement, or codes require; if approved by Project Officer, the space required may have to come out of the current programmed 1391 area.

4-2.46.5 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height – 9 ft - 0 in (2743 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

Receptacles – convenience receptacle at each landing

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

None

Equipment

None

Special Features

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
SCAA



4-2.47 Secret Controlled Access Area (SCAA)

4-2.47.1 The Secret Controlled Access Area (SCAA) is intended for the processing of classified information while authorized personnel are present. This space is not authorized for “Open Storage” without approval from USARC. This room provides space for secure/SIPRNET communications, in lieu of bringing SIPRNET to individual desktops. This room is intended to operate during normal business hours; under normal circumstances this room will not need to be environmentally conditioned 24/7. All classification

processing levels must be approved by USARC G2. In Reserve Centers without a SIPRNET requirement, this space may be used for other purposes during those times when SIPRNET equipment is not installed. No permanent changes are allowed to the configuration of this space. Use as a SCAA takes precedence when a conflict occurs.

4-2.47.2 The preferred location for the SCAA is at a ground floor point central to the Army Reserve units and personnel in the facility. It is also desirable that the SCAA is 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 The SCAA will contain a user provided GSA Information Process Container (IPS) with a typical weight of 1,100 to 1,500 lbs. The floor design should accommodate a minimum 1,500 lbs load unless a larger safe size is identified by the user. The actual safe size should be verified with the User.

4-2.47.4 Provide for an intrusion detection system (IDS) as indicated in the ‘IDS Responsibilities’ document, available on the [Army Reserve website](#), which clarifies contractor construction requirements, and IDS Installer (under separate

contract) requirements.

4-2.47.5 Space Design Information

General/Code

Size – 250 sf (14 sq m),

Occupancy – business

Architectural/Interiors

Minimum wall 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 deck above

Ceiling – painted gypsum board

Trim – none

Lockset – Classroom with deadbolt.

Mechanical

Heating – Occupied - 68°F (20°C); unoccupied 55°F (13°C)

Cooling –78°F (13°C); unoccupied - 85°F (29°C)

Electrical

Receptacles – Provide a duplex receptacle for each workstation and a quadplex receptacle for the IPS Container. See ARNEC

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Six computer stations

Fixed leg tables with “C” legs 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 SCAA to be provided by USARC, not the project

Special Features

Power, conduit and boxes for intrusion detection system (IDS).

See [Army Reserve website](#) for ‘IDS Responsibilities’ description and diagrams.

Do not route utilities or other infrastructure not associated with this space through or above this space

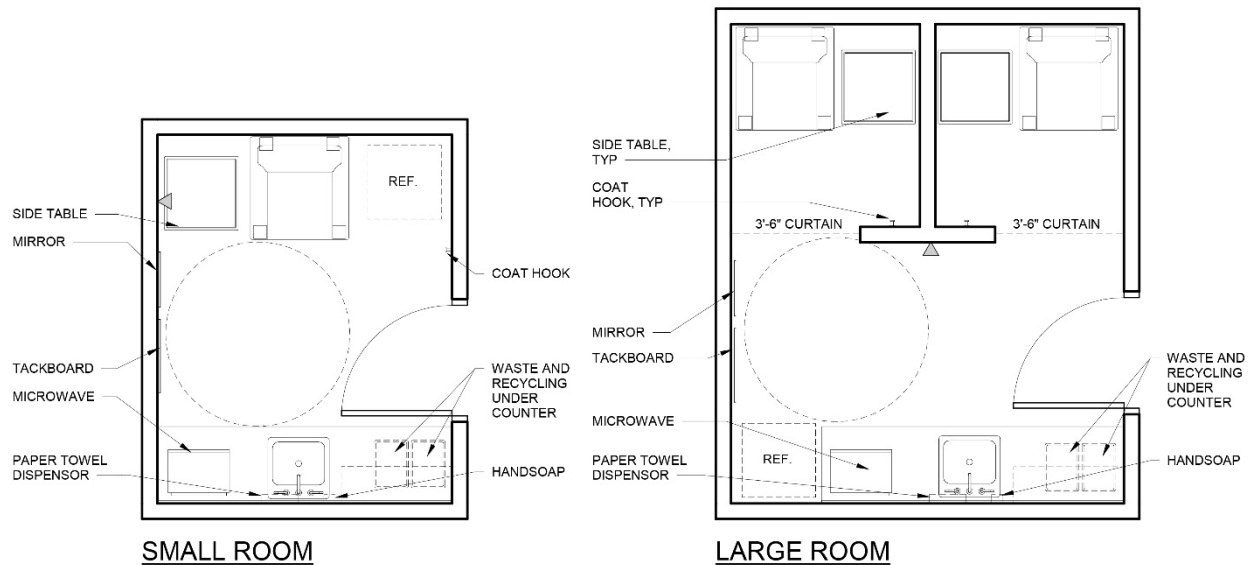
Verify weight of IPS and other equipment to determine appropriate design floor loads

No windows allowed.

4-2.48 Lactation Room

4-2.48.1 This room provides space for mothers to express and store milk for their infants. It should be located near, but not in or through, a women's restroom.

Figure 4-41
Lactation Room



4-2.48.2 Space Design Information

General/Code

Size – “Small” 100 sf (at Training Centers 35,000 sf or less), “Large” 140 sf (at Training Centers 35,001 sf or more).

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 45.

Minimum door assembly STC rating – 32.

Ceiling height – 9 ft - 0 in (2743 mm) minimum

Floor – carpet tile; rubber tile or luxury vinyl tile as an alternative

Base – rubber

Walls – painted gypsum board

Ceiling – suspended acoustical ceiling tile (ACT)

Trim – coat hook(s), overhead stop on door.

Lockset – privacy with ‘in use’ indicator for single occupant rooms.

5-button mechanical cipher lock for double occupant room.

Mechanical

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

Cooling, occupied – 78°F (25°C); unoccupied – 85°F (29°C)

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 side table (at 36 inches above floor), at the refrigerator, at the microwave, and above the counter, minimum.

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Lounge chair(s) with vinyl covering (one in Small, two in Large) – rocking.

Side table(s) - 24 inch x 24 inch minimum

(1) ~7 gal trash can

(1) ~7 gal recycling

Equipment

Special Features

4.5 cu. ft minimum compact refrigerator with freezer compartment

Microwave oven for sterilizing breast pump equipment, on counter

Wall mount hand-soap dispenser and paper towel dispenser

Solid surface counter with plastic laminate upper and lower cabinets, and one-compartment stainless steel sink with a gooseneck faucet. 6 ft (600 mm) minimum length for base cabinet. Upper cabinet may be omitted above the sink, to allow for wall mounted soap and paper towel dispenser.

18 inch wide by 72 inch high stainless steel framed mirror, to adjust clothing

24 inch wide by 48 inch high tackboard

4-2.49 Elevator

4-2.49.1 Refer to UFC 3-490-06 Elevators

4-2.49.2 Space Design Information - The items below are intended to provide Army Reserve preferences, to supplement the requirements of UFC 3-490-06 Elevators.

General/Code

Size – As required by UFC 3-490-06 Elevators and elevator manufacturer

Occupancy – business

Architectural/Interiors

Floor – porcelain paver/tile, preferable to match the Lobby; rubber tile as an alternative

Base – none

Walls – plastic laminate or stainless steel rear and side walls.

Stainless steel front (control) wall.

Ceiling – translucent white panels or stainless steel suspended ceiling pan system.

Trim – stainless steel handrails. Protection pads and wall buttons.

Stainless steel hallway frames.

Mechanical - Per UFC 3-490-06 Elevators

Electrical

Lighting – LED

Telecommunications Outlet(s) – provide in accordance with ARNEC, UFC 3-490-06 Elevators

4-2.50 Elevator Equipment Room

4-2.50.1 Refer to UFC 3-490-06 Elevators

4-2.50.2 Space Design Information - The items below are intended to supplement the requirements of UFC 3-490-06 Elevators

Architectural/Interiors

Minimum wall STC rating – 52. Minimum door assembly STC rating – 48

Floor – sealed concrete

Base – none at cmu, rubber at gypsum board

Walls – painted cmu, or painted gypsum board

Door width to be 42 inches wide minimum, verify with code and elevator requirements

Lockset – storage

4-3 VEHICLE MAINTENANCE SHOP (VMS)

(Formerly known as Organizational Maintenance Shop)

4-3.1 General VMS Information

4-3.1.1 The Army Reserve has developed three conceptual layouts for their VMS 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 VMS 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.

4-3.1.1.1 The size of the workbays adhere closely to the maintenance bays described in the Army TEMF standard, however, the VMS does not adhere to the complete TEMF Standard Design including floor plan and other miscellaneous

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 VMS workbay size should be 32 ft x 40 ft. It is based on a single TEMF bay of 32 ft x 32 ft except the bay length is increased to 40 ft to better accommodate the typical Army Reserve equipment. If site conditions or paving authorizations dictate, the minimum VMS 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 VMS is based on two TEMF workbays sized at 32 ft x 32 ft for an overall size of 32 ft x 64 ft.

4-3.1.1.4 The standard VMS includes three TEMF workbays sized at 32 ft x 32 ft, organized in a drive-through configuration for an overall size of 32 ft x 96 ft. 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 SATS Containers. All of the conceptual layouts accommodate roofed wash platforms alongside the maintenance bays, and can accommodate Standard Automotive Sets (SATS) containerized trailers adjacent to the one side of the building, when dictated by the Tenant's inventory. Each SATS is approximately 8 ft wide x 20 ft deep x 8 ft high (plus axle/frame height). 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. Side edges of canopy to extend a minimum of 3 ft past each side of the SATS container(s). Provide 4 ft between containers (if applicable). Tenants to indicate number of SATS to accommodate, based on their inventory. Each VMS is to accommodate (1) SATS trailer minimum. The area under the SATS Canopy is to be counted as half square footage, as it relates to the overall building allowable square footage.

4-3.1.2.2 At each SATS parking location, provide a branch circuit sized to the full capacity power of a 10kw generator to a weatherproof wall mounted 208/120V, 3-phase 100A/240V disconnect switch within reach of the SATS pre-manufactured cable, and external/weatherproof telecommunication connections. Provide a means to hang a 50 foot long power cable on the building wall. The cable (GFGI) has a plug on one end, and terminal connections on the other end. Cable and cable connections will be by the Government

4-3.1.2.3 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.

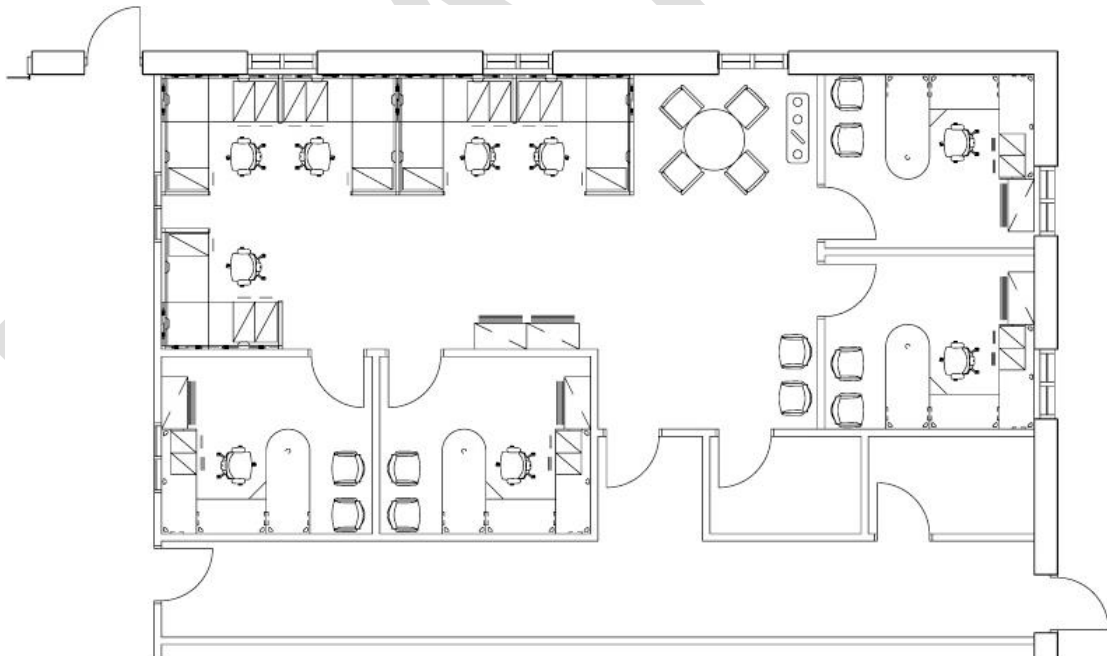
4-3.2 Shop Office

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. Unless otherwise directed, provide offices located to 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.

Figure 4-42
Shop Office



4-3.2.4 Space Design Information

General/Code

Size – varies

Occupancy – business

Architectural/Interiors

Minimum wall STC rating – 35

Ceiling height – 9 ft - 0 in (2743 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– 85°F (29°C)

Electrical

Receptacles – convenience receptacles as described in Chapter 3 and two quad power receptacles as described in Paragraph 4-2.1.5. Receptacles for copier and shredder.

Telecommunications Outlet(s) – provide in accordance with ARNEC

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, metal overheads with task-lights, and a tackboard (refer to Louisville District’s approved typicals)

Task chair with commercial performance upholstery fabric with moisture barrier and stain resistance

Guest chair(s) with commercial performance upholstery fabric with moisture barrier and stain resistance

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

Special Features

At open office area:

(1) 4 ft x 4 ft markerboard with tackstrip

(1) 4 ft x 4 ft tackboard

(1) floor set copier/printer (GFGI)

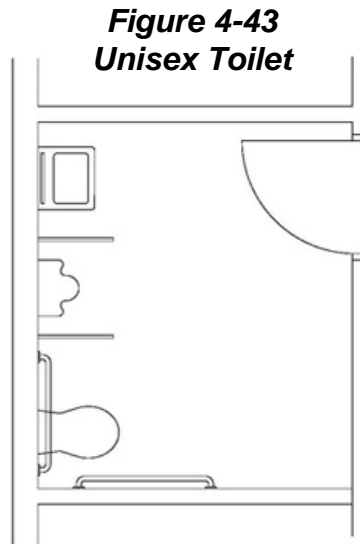
(1) floor set shredder (GFGI)

4-3.3 Male and Female Toilets

4-3.3.1 The toilet authorization for the VMS is typically sufficient for separate male and female toilet rooms. Where only a unisex/single use toilet is authorized provide a toilet, urinal and sink.

4-3.3.2 An AMSA has full-time staff so accessible male and female toilets, showers and locker rooms are to be provided.

4-3.3.3 Space Design Information: See Paragraph 4-2.38. VMS toilet rooms may utilize wall mounted porcelain lav(s), with stainless steel framed mirrors.



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. Room is to open to the workbay.

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.

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 wall 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

Receptacles – convenience receptacles as described in Chapter 3; duplex power receptacles if automated inventory equipment is required; verify with Tenants

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Workbench with wood top and stool provided upon Tenant's request

Equipment

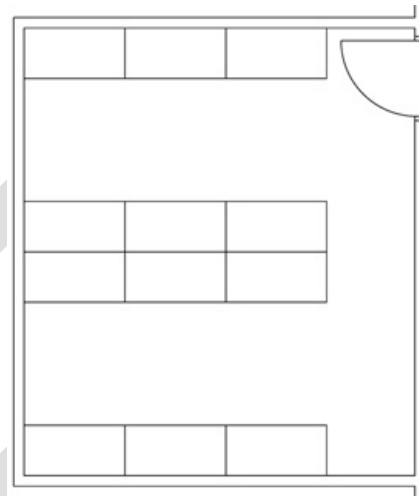
Steel shelving. Back to back shelving shall have metal backs

Special Features

Provide single 4 ft (1200 mm) wide door for ease of access; or pair of doors if desired by the Tenants.

The designer should verify whether a Dutch door with shelf, or sliding window, is required for issue of parts and tools to the workbay, and whether one or more workstations are desired in the room.

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 and criteria 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 wall 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

Ventilation – Use the larger of the required ventilation amount by ASHRAE 62.1 or UFC 3-410-01

Electrical

Receptacles – convenience receptacles as described in Chapter 3; duplex power receptacles if automated inventory

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

None

Equipment

Open steel shelving

Special Features

Provide single 4 ft (1200 mm) door for ease of access; or pair of doors if desired by the Tenants.

4-3.6 Special Equipment Alcove

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 (full length of the workbay), 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. Provide

appropriate electrical and other utility connections for this equipment.

4-3.6.1 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.

4-3.6.2 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 applicable only in Area Maintenance Support Activity (AMSA) and VMS/AMSA facilities.

4-3.7.2 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.

4-3.7.3 Provide battery shelving under the construction contract, typically of redwood, cedar or fiberglass (preferred), 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.

4-3.7.4 Provide a hose bibb; no floor drain is required.

4-3.7.5 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:

4-3.7.6 Within the duct for the exhaust fan, provide a sail switch connected to the receptacle power wiring.

4-3.7.7 Interlock exhaust fan sail switch with battery charger receptacles to deactivate and prevent charging upon loss of airflow.

4-3.7.8 Provide eyewash/deluge showers in the room.

4-3.7.9 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage, unoccupied

Architectural/Interiors

Minimum wall 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 – continuous 24/7 explosion proof exhaust to keep hydrogen gas below code required 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

Telecommunications Outlet(s) – provide in accordance with ARNEC

Furniture

Workbench with laminate top and stool provided upon Tenant's request

Equipment

Battery shelving

Special features or Considerations

Provide single 4 ft (1200 mm) door for ease of access

4-3.8 Flammable Storage

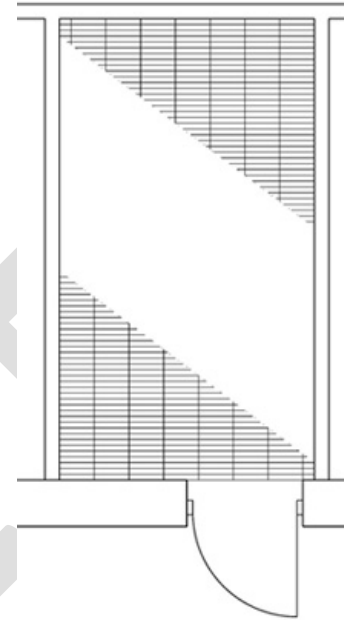
4-3.8.1 This space is provided for storage of petroleum-based lubricants, paints, solvents, etc for use in the VMS. Due to the volatile nature of the contents, it will have exterior access only, and CMU or pre-cast walls to structure or a concrete ceiling.

4-3.8.2 The room should have a depressed well under an aluminum grate floor for collection of any spills: no drain. Slope well to allow convenient suction of spills at a low point (no drain) near the door, with removeable grate (3 ft x 3ft minimum) above. 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. Unless directed otherwise, provide a minimum of two heavy metal shelving units (refer to paragraph 4-2-21 for description of shelving units).

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.

Figure 4-45
Flammable Storage



4-3.8.5 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage, unoccupied

Architectural/Interiors

Minimum wall STC rating – not applicable

Ceiling height –

Floor – concrete with liner below metal grate

Base – none

Walls – painted CMU or pre-cast

Ceiling – painted exposed. Fire rated ceiling where a ceiling/intermediate floor condition is above, where required by code (including but not limited to NFPA 30 paragraph 9.9).

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 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 – minimum of two explosion-proof fixtures on exterior weatherproof pilot-lighted switch. Pilot light to be illuminated when switch is in the ON position.

Receptacles – none

Telecommunications Outlet(s) – provide in accordance with ARNEC

Equipment

Open steel shelving

Special Features

Provide single 4 ft (1200 mm) door for ease of access; or pair of doors if desired by the Tenants.

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 an aluminum grate floor for collection of any spills. Slope well to allow convenient suction of spills at a low point (no drain) near the door, with removeable grate (3 ft x 3ft minimum) above. 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. Unless directed otherwise, provide a minimum of two heavy metal shelving units (refer to paragraph 4-2-21 for description of shelving units).

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 wall STC rating – not
applicable
Ceiling height –
Floor – concrete with liner below
metal grate
Base – none
Walls – painted CMU or pre-cast
Ceiling – painted exposed. Fire rated
ceiling where a
ceiling/intermediate floor
condition is above, where
required by code (including but
not limited to NFPA 30
paragraph 9.9).

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

Electrical

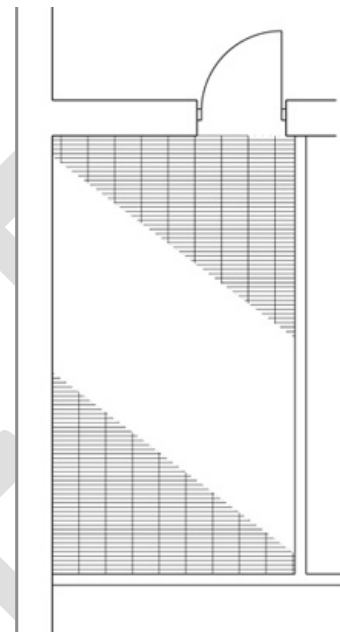
Lighting – minimum of two explosion-proof fixtures on exterior weatherproof pilot-lighted switch. Pilot light to be illuminated when switch is in the ON position.

Receptacles – none

Telecommunications Outlet(s) – provide in accordance with ARNEC

Equipment

Figure 4-46
Controlled Waste
Storage



Open steel shelving

Special Features

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

Provide single 4 ft (1200 mm) door for ease of access; or pair of doors if desired by the Tenants.

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

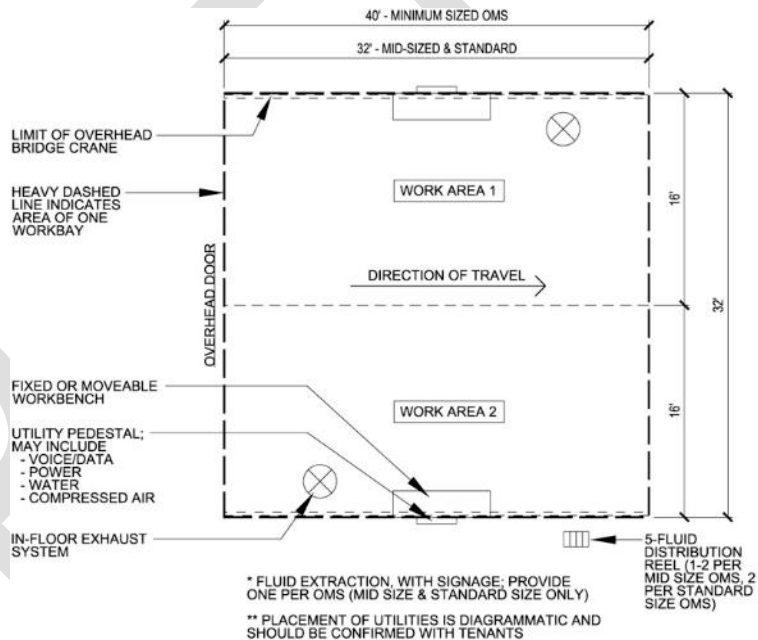
4-3.10.1 The workbay provides space for training and for the performance of services and repairs of assigned equipment (mobile and stationary). Include drive-through workbays whenever possible.

4-3.10.2 The workbays are the heart of the VMS. 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.

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 VMS, 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, compressed air line connection, hose bibb, power, power reel/trouble light, and telecommunications outlet. 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

**Figure 4-47
Typical Workbay**



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.

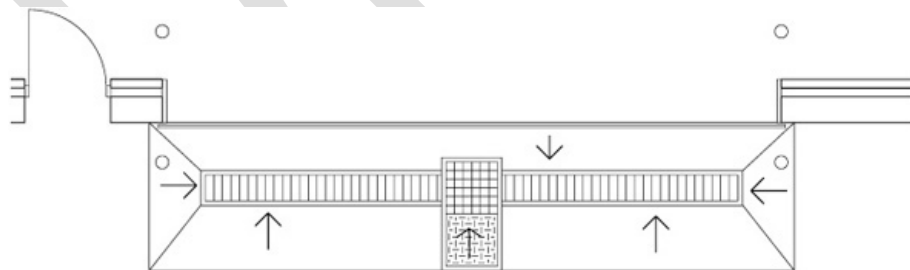
4-3.10.3.3 Utility service lines and drops must remain clear of the vehicle paths of travel. Provide stable, durable mounting provisions at or near workbench – consider a CMU knee wall or well-anchored steel frame. For utilities and light fixtures along safety aisle and equipment alcove, maintain 10 feet (3000mm) clear height, and maintain 16 feet (4500mm) clear height above the work areas.

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. Doors should have safety sensors and open door position height settings based on tallest design vehicle. At each overhead door, provide 18 in high anodized aluminum door number on the exterior wall (color to contrast the wall finish) and 18 in high painted number at the interior on, or above, the overhead door; coordinate numbering with Tenants.

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 outside corners of VMS which are in the MEP.

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. Trench drains are to incorporate sand interceptor function, with provision for sand removal.

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.

4-3.10.3.9 At AMSA and VMS/AMSA facilities only - A 10-ton bridge crane is required in AMSA 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. This area should be separated from

Figure 4-49
Exhaust Arm for Welding



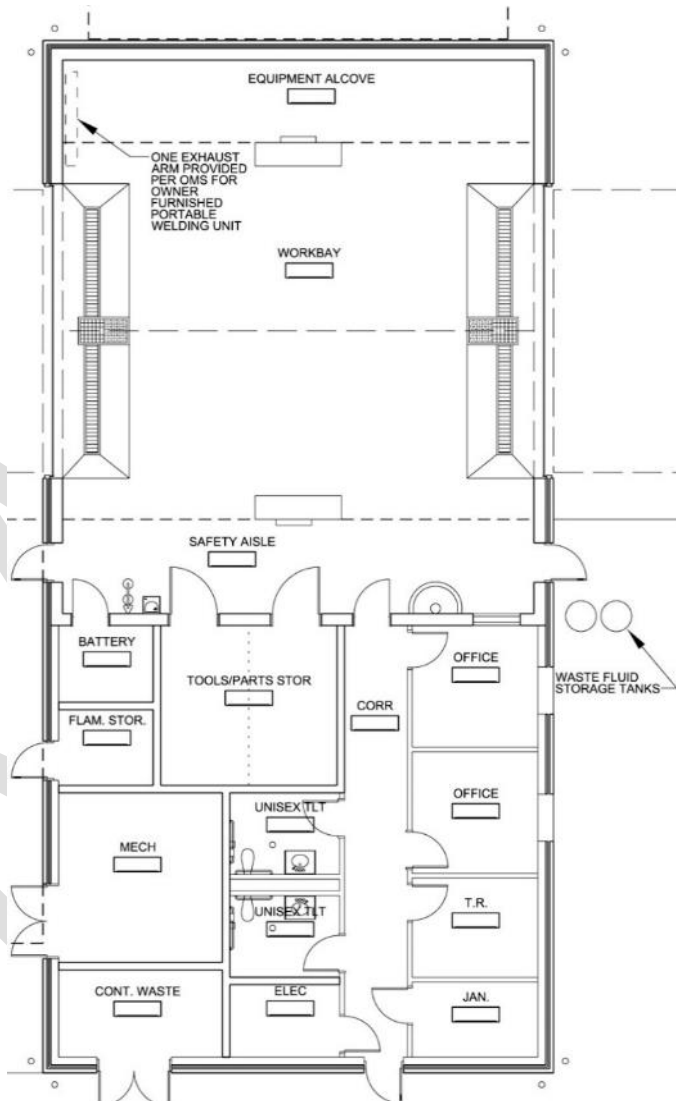
the workbay with a yellow painted stripe. The safety aisle is to be in addition to the workbay dimensions noted.

4-3.10.5 The workbays typically are appreciably taller than is required for the other VMS 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 VMS 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. Each bay door should have a 24' wide x 36' deep concrete apron - see drawings from [Army Reserve website](#) for layout.

4-3.10.7 Vehicle exhaust provisions must be located in each 16' x 32' work area. Design exhaust outlets for 1,400 cfm and 900 degrees F. In the design phase, discuss exhaust requirements with users to determine quantity of high rate vehicle exhaust hoses based on vehicles supported by the facility. At a minimum, provide one of the required exhaust outlet locations for 3,000 cfm and 900 degrees F. 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

Figure 4-50
VMS Minimum Workbay
Concept Diagram



accumulating in piping. Provide pump for fluid removal. A convenient and adequate storage location for the hoses should be provided if an underfloor system is utilized. If an above door vehicle exhaust system is utilized, it should be installed where it does not interfere with the doors.

4-3.10.8 Pay particular attention to coordination of systems in the space above the workbays. Lights, space conditioning, 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 1.5 cfm/sf when flammable liquids are being used in the occupied workbays; placarding shall be used to ensure compliance. The system shall operate at a reduced ventilation rate in accordance with code requirements during normal operation. The electronic control system shall operate the general exhaust system at the high exhaust rate when either the level of carbon monoxide is detected above set point, or the level of nitrogen dioxide is detected above set point as determined by gas monitors.

4-3.10.10 An air compressor and distribution system must be provided. The compressor will normally be located in the mechanical room for noise control. Provide air hose reel, filter, pressure regulator, and quick disconnect outlets to serve each work area (one reel may serve two work areas if hose length accommodates).

4-3.10.11 At two locations, on opposite ends of the workbays, provide:

- Exterior hose bib with interior hot and cold water controls
- Compressed air line with interior filter and pressure regulator and exterior quick disconnect outlets. Hose reel is GFGI.
- A 20A dedicated convenience receptacle.
- Coordinate locations of these locations with Tenants.

4-3.10.12 Provide fluid evacuator(s) capable of two-fluid extraction (waste POL and antifreeze) in the workbay area of the mid-size and standard VMS and AMSA. Provide separate collection tanks, normally of 100 gallons for each fluid for VMS 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

4-3.10.13 Provide a minimum of one eyewash/deluge shower (with floor drain) in the workbay area. Provide 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. Provide additional eyewash and

shower units to meet this requirement.

4-3.10.14 Provide a 3-person semi-circular wash fountain in the workbay area. Provide two soap dispensers and two paper towel dispensers at the wash fountain. Provide one 24 in x 24 in (minimum) floor (mop) sink with minimum 4 ft wide x 4 ft high frp wall panel or wall tile at floor sink wall(s). 3 ft long minimum stainless steel utility shelf with a minimum of 3 mop holders, located over the floor sink. These may be located in the safety aisle if a 4 ft clear travel path is maintained.

4-3.10.15 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.

4-3.10.16 At AMSA and VMS/AMSA facilities only - Provide a five-line pneumatic pump shop fluids distribution system. Typical fluids to be pumped are two lines for motor oil, one for gear oil, one for antifreeze, and one for transmission fluid. Coordinate with users. 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
VMS Mid-Sized Workbay Concept Diagram

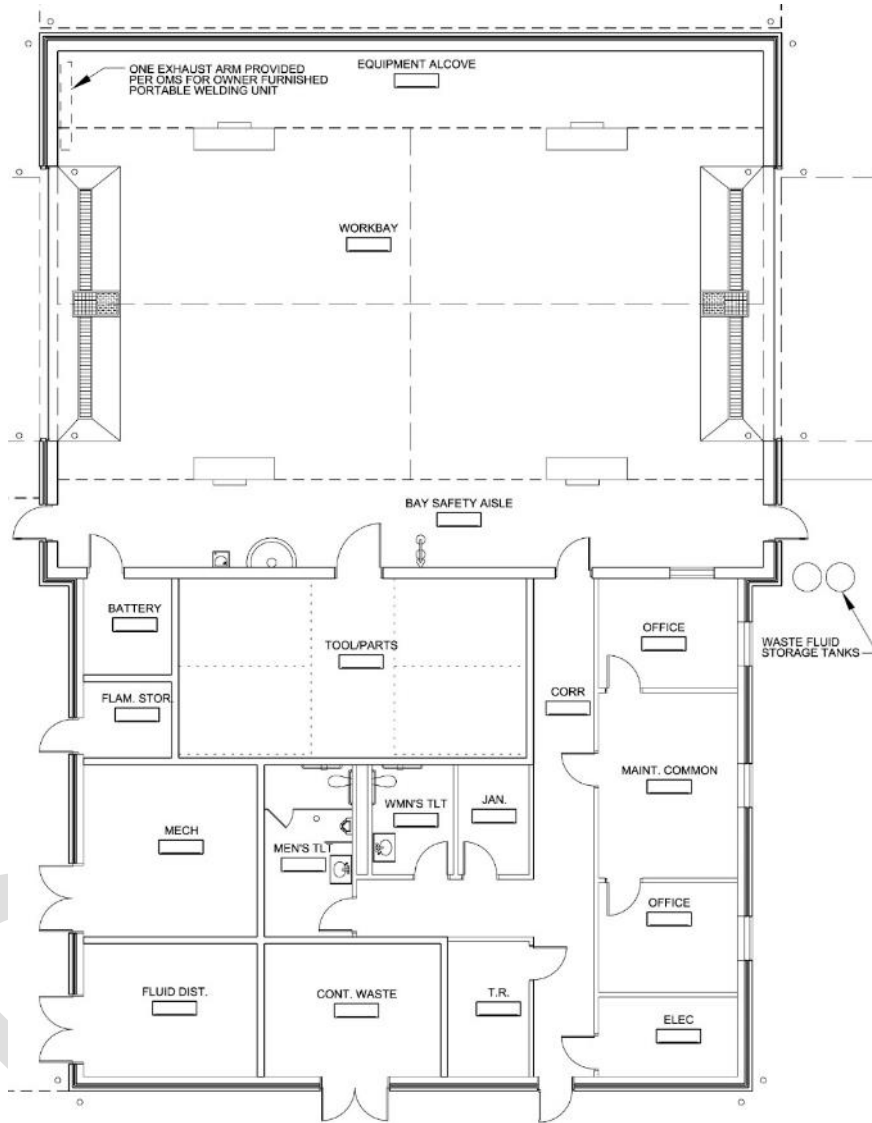
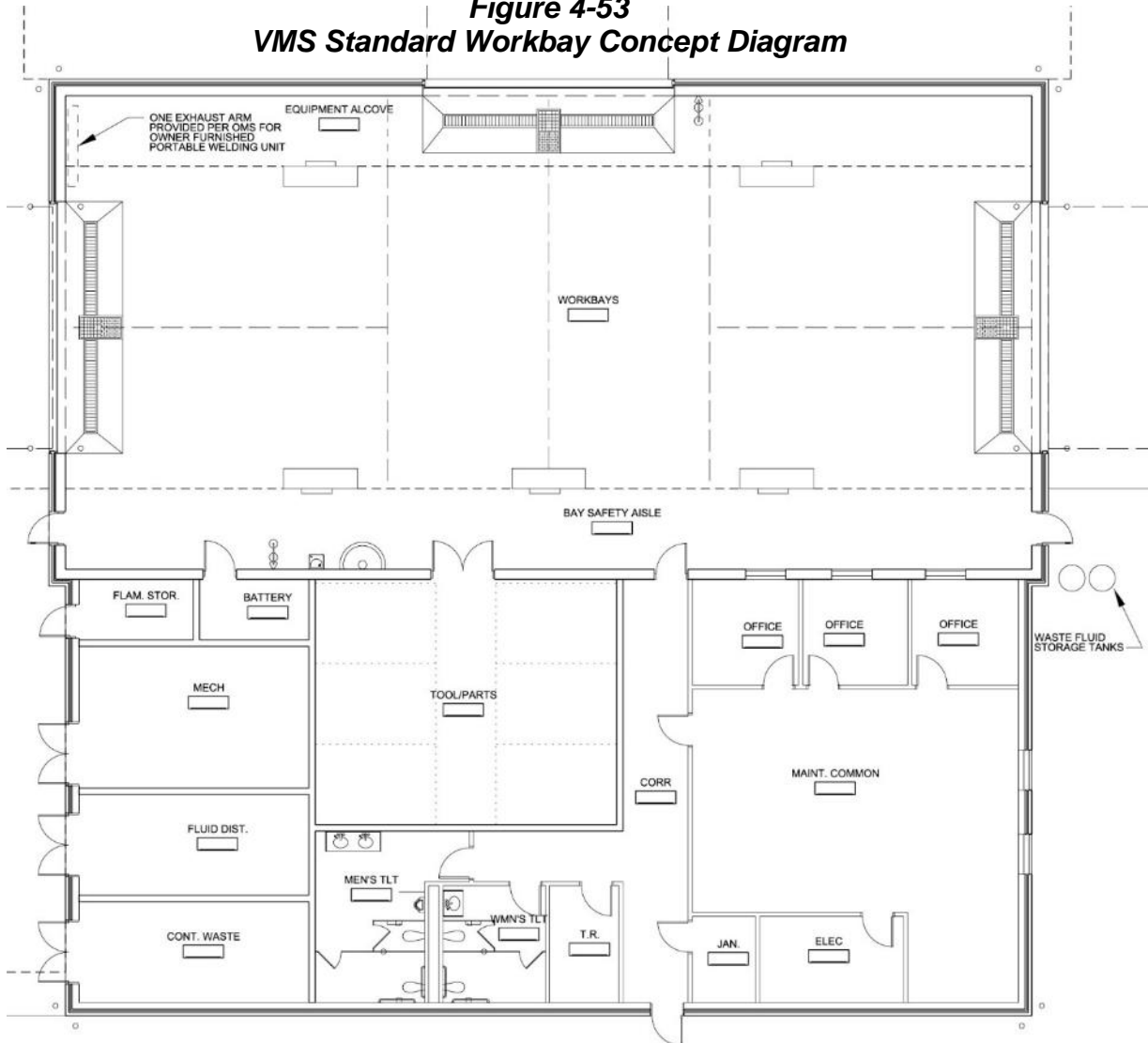


Figure 4-53
VMS Standard Workbay Concept Diagram



4-3.10.17 Space Design Information

General/Code

Size – varies; base workbay is 1,024 sf (95 sq m), bay for minimum VMS 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 wall 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

Trouble light/power reel, two per work area

Receptacles – Provide a minimum of four GFCI duplex receptacles work area (32'x32'), mounted at 48 in (1220 mm) AFF

- Provide power for portable GFGI Hetra Vehicle Lifts between every pair of overhead doors, and the side overhead door (if applicable based on workbay configuration), via L15-30 receptacle 208V, 3ph. Coordinate final information with Tenant.

Telecommunications Outlet(s) – provide in accordance with ARNEC

Ground - provide a static ground receptacle readily available for each bay

Furniture

Workbenches 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

Utility rolling trash can adjacent to hand washfountain.

Special Features

Carbon monoxide and nitrogen dioxide detectors

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 wall STC rating – typically not applicable. Minimum wall STC 45 rating if adjacent to offices, hallway, or toilet rooms (due to compressor noise)

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

Receptacles - convenience duplex

Telecommunications Outlet(s) – provide in accordance with ARNEC

Equipment

Air compressor for workbay

Special Features

Connections to flow switches, tamper switches, and fire alarm

Power and telecommunication connections for computer if energy management control system

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 VMS, with connection typically back to the training center TER.

4-3.12.2 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 space is applicable only in Area Maintenance Support Activity (AMSA) and VMS/AMSA facilities.

4-3.14.2 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.

4-3.14.3 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) near the door, with removeable grate (3 ft x 3ft minimum) above. 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

4-3.14.4 Space Design Information

General/Code

Size – varies

Occupancy – high hazard storage, unoccupied

Architectural/Interiors

Minimum wall 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

Telecommunications Outlet(s) – provide in accordance with ARNEC

Equipment

None

Special features or considerations

A dry pipe sprinkler system or dry heads shall be provided for locations with more than 4,500 heating degree days.

Provide single 4 ft (1200 mm) door for ease of access; or pair of doors if desired by the Tenants.

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). Overhead door(s) shall be motorized with interior controls and safety provisions. Provide minimum 5 ft deep 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.

4-4.2 The interior space is also typically quite simple: concrete floor, unfinished walls, service-level (5 fc on floor) lighting and convenience duplex receptacles. 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 plumbing, or HVAC are provided.

4-4.3 UHS may require sprinkler protection, refer to UFC 3-600-01 for specific requirements.

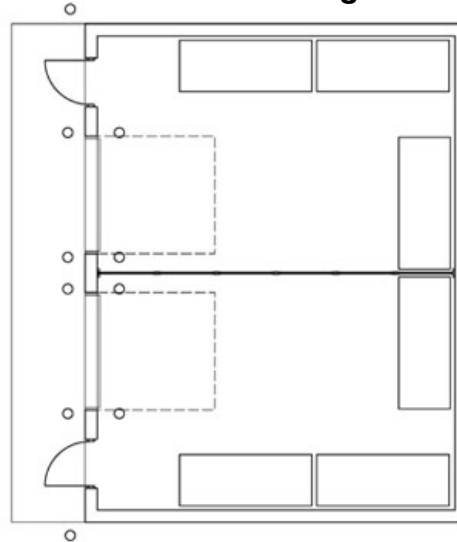
4-4.4 Design should provide a minimum of two louvers to support natural convection and heat removal from the building. Consideration can be made in warm climates to include a manual timer-controlled exhaust fan and wall mounted intake for occasional ventilation.

4-4.5 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 and/or pallet racking may be required, along with open space for bulk or palletized storage. For details on caging, reference paragraph 4-2.21.

4-4.6 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.

4-4.7 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.

Figure 4-54
Unheated Storage



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 stand alone AMSA

projects will follow recent Army Reserve TEMF designs. The inspection, maintenance and repair bays must follow the TEMF standard. The project design team may only modify the administrative portion (offices, break room, etc) to fit the needs of the Units. 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.

4-5.2 When project has a combined VMS/AMSA, reference Section 4-3 Vehicle Maintenance Shop for requirements for combined VMS/AMSA facilities.

4-5.3 AMSA shops have full time personnel, requiring accessibility measures in the building.

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.

4-6.3 Refer to paragraph 3-4.4 for Mass Notification.

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. All HVAC, sprinkler, and other systems should be above 15 ft to allow for required 15 ft high clear space for storage.

DRAFT

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-
<https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/background/ada-aba-accessibility-guidelines-2004>

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.fedcenter.gov/>

EPA-840-B-92-002

January 1993 - Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters - <https://www.epa.gov/nps/guidance-specifying-management-measures-sources-nonpoint-pollution-coastal-waters>

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):

<https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc>

UFC 1-200-01

DoD Building Code

UFC 1-200-02

High Performance and Sustainable Building Requirements

UFC 3-101-01	Architecture
UFC 3-110-03	Roofing
UFC 3-120-01	Sign Standards
UFC 3-120-10	Interior Design
UFC 3-201-01	Civil Engineering
UFC 3-201-02	Landscape Architecture
UFC 3-210-10	Low Impact Development
UFC 3-220-01	Geotechnical Engineering
UFC 3-230-01	Water Storage and Distribution
UFC 3-230-03	Water Treatment
UFC 3-240-01	Wastewater Collection
UFC 3-250-01	Pavement Design for Roads and Parking Areas
UFC 3-260-02	Pavement Design for Airfields
UFC 3-301-01	Structural Engineering
UFC 3-320-06A	Concrete Floor Slabs on Grade Subjected to Heavy Loads
UFC 3-401-01	Mechanical Engineering
UFC 3-400-02	Design: Engineering Weather Data
UFC 3-410-01	Heating, Ventilating and Air Conditioning Systems
UFC 3-410-02	Direct Digital Control for HVAC and Other Building Control Systems
UFC 3-420-01	Plumbing Systems
UFC 3-420-02	Compressed Air
UFC 3-440-01	Facility Scale Renewable Energy Systems
UFC 3-450-01	Noise and Vibration Control
UFC 3-490-06	Elevators
UFC 3-501-01	Electrical Engineering
UFC 3-520-01	Interior Electrical Systems
UFC 3-530-01	Interior and Exterior Lighting Systems and Controls
UFC 3-540-01	Engine-Driven Generator Systems for Backup Power Application
UFC 3-550-01	Exterior Electrical Power Distribution
UFC 3-575-01	Lightning and Static Electricity Protection Systems
UFC 3-580-01	Telecommunications Building Cabling Systems Planning and Design
UFC 3-600-01	Fire Protection Engineering For Facilities
UFC 4-010-01	DoD Minimum Antiterrorism Standards for Buildings
UFC 4-010-05	Sensitive Compartmented Information Facilities Planning, Design, and Construction
UFC 4-010-06	Cybersecurity of Facility-Related Control Systems
UFC 4-021-01	Design and O&M: Mass Notification Systems
UFC 4-023-03	Design of Buildings to Resist Progressive Collapse
UFC 4-214-02	Tactical Equipment Maintenance Facilities (TEMF)

2.1 Department of the Army

ARMY REGULATIONS (AR):

<https://armypubs.army.mil/ProductMaps/PubForm/AR.aspx>

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):

https://www.wbdg.org/FFC/NAVFAC/DMMHNAV/1013_1a.pdf

MIL HDBK 1013/1A	Design Guides for Physical Security of Facilities
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TECHNICAL MANUALS (TM):

https://armypubs.army.mil/ProductMaps/PubForm/TM_Admin.aspx

TM 5-810-6	Nonindustrial Gas Piping Systems
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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, available on the [Army Reserve website](#)

2.1.2 Army Reserve Support Team Documents

[Army Reserve website](#)

<https://www.lrl.usace.army.mil/Missions/Engineering/Design-Guide/Military-Programs/Army-Reserve-Customers/>

Army Reserve Design Process and Submittal Requirements

Army Reserve Network Enterprise Center Infrastructure Technical Criteria (ARNEC)

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 Military Design Guide

Louisville District Tailored Specifications for SpecsIntact

Fire Protection/Life Safety Code Submittal

CAD-BIM Center website

<https://cadbimcenter.erdcdren.mil/default.aspx?p=a&t=1&i=3>

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 189.1 Standard for the Design of High-Performance Green 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

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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
ARNEC	Army Reserve Network Enterprise Center Infrastructure Technical Criteria
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
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
RD	Readiness Division
REPR	Real estate planning report
RFP	Request for proposal
RPX	Real property exchange
RST	Reserve support team
SATS	Standard automotive tool set
SCAA	Secret Controlled Access Area
SCIF	Sensitive compartmented intelligence facility
SDD	Sustainable design and development
SF	Square foot
SGML	Standard generalized markup language
SIPRNet	Secret Internet Protocol Router Network
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
VMS	Vehicle Maintenance Shop
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**

DRAFT

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>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 border="0"> <tr> <td>(1) Status:</td> <td></td> </tr> <tr> <td>(a) Date Design Started.....</td> <td><u>Aug 2012</u></td> </tr> <tr> <td>(b) Percent Complete As Of</td> <td></td> </tr> <tr> <td>(c) Date Design 35% Complete.....</td> <td><u>Mar 2013</u></td> </tr> <tr> <td>(d) Date Design Complete.....</td> <td><u>Dec 2013</u></td> </tr> <tr> <td>(e) Parametric Cost Estimating Used to Develop Cost.....</td> <td><u>Yes</u></td> </tr> <tr> <td>(f) Type of Design Contract.....</td> <td><u>Design -</u> <u>Bid - Build</u></td> </tr> <tr> <td>(g) An energy study and life cycle cost analysis will be documented during the final design.</td> <td></td> </tr> <tr> <td>(2) Basis:</td> <td></td> </tr> <tr> <td>(a) Standard or Definitive Design.....</td> <td><u>No</u></td> </tr> <tr> <td>(b) Where Design Was Most Recently Used.....</td> <td><u>N/A</u></td> </tr> <tr> <td>(3) Total Cost (c) = (a) + (b) or (d) + (e) (\$000):</td> <td></td> </tr> <tr> <td>(a) Production of Plans and Specifications.....</td> <td></td> </tr> <tr> <td>(b) All Other Design Costs.....</td> <td></td> </tr> <tr> <td>(c) Total.....</td> <td><u>1307</u></td> </tr> <tr> <td>(d) Contract.....</td> <td><u>1045</u></td> </tr> <tr> <td>(e) In-house.....</td> <td><u>262</u></td> </tr> <tr> <td>(4) Construction Award.....</td> <td><u>Mar 2014</u></td> </tr> <tr> <td>(5) Construction Start.....</td> <td><u>Apr 2014</u></td> </tr> <tr> <td>(6) Construction Completion.....</td> <td><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 -</u> <u>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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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;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Equipment Nomenclature</th> <th style="text-align: left; border-bottom: 1px solid black;">Procuring Appropriation</th> <th style="text-align: center; border-bottom: 1px solid black;">Fiscal Year Appropriated or Requested</th> <th style="text-align: right; border-bottom: 1px solid black;">Cost (\$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>Point of Contact: LTC Dickerson, 703-806-6796</p>			Equipment Nomenclature	Procuring Appropriation	Fiscal Year Appropriated or Requested	Cost (\$000)	Collateral Equip	OMAR	2015	394	Caging & Shelving	OMAR	2015	343	Furniture	OMAR	2015	293	IT Equipment	OMAR	2015	138	Total:			1168
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IT Equipment	OMAR	2015	138																							
Total:			1168																							

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	
5. FREQUENCY AND TYPE UTILIZATION					
Reservist		2 weekends/month	2 nights/week		
Full-Time Personnel -		5 days/week			
6. OTHER ACTIVE/GUARD/RESERVE INSTALLATIONS WITHIN 15 MILE RADIUS					
ARNG, Armory, Stewart, NY - 34 Miles, 0 SF,					
USAR, Center, Newburgh, NY - 36 Miles, 0 SF,					
USAR, Center, Poughkeepsie, NY - 51 Miles, 0 SF,					
7. PROJECTS REQUESTED IN THIS PROGRAM					
<u>CATEGORY</u> CODE	<u>PROJECT TITLE</u>	<u>SCOPE</u>	<u>COST</u> (\$000)	<u>(DESIGN STATUS)</u>	
171	Army Reserve Center	46,478 SF	14,500	08/12	12/13
8. STATE RESERVE FORCES FACILITIES BOARD RECOMMENDATION					
Facilities identified in item 6 have been examined by the 06 Dec 2011 Joint Service Reserve Component Facility Board for possible (Date) joint use/expansion. The board recommends unilateral construction.					
9. LAND ACQUISITION REQUIRED					
None				0 AC (Number of Acres)	
10. PROJECTS PLANNED IN NEXT FOUR YEARS					
		<u>FISCAL</u> <u>YEAR</u>	<u>COST</u> (\$000)		
None					

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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																													
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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

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

Description	Information Systems		Criteria
	Authorized	Approved	
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

Description	Information Systems		Criteria
	Authorized	Approved	
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			

DRAFT

Basic Project Data - Actual/ English

Project Number: 67690
Project Title: Army Reserve Center
Date: Jul 16, 2012

All Dates are in (DD/MM/YYYY) Format

Basic Information

RSC/Arcom : 99TH RSC FACID NY011
Facility Name : Ssg Frederick J. Ill 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

* Special Training Areas

* Exclusive Space

General Officers	0	Band Room	N
Principal Staff Officers	0	Weapons Simulator Room	N
Colonel	0	Physical Exam Wing	N
Lieutenant Colonel	0	Soil Testing Lab	N
Major Or Below	0	Photo Lab	N

* Common-Use Space

Members Requiring Open Office Space	4	S.C.I.F	N
Cooks	0	Medical Section	N
Automotive/Engineer Mechanics	0		
Maintenance Administrative Personnel	0		
Draftpersons	0		

* 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

* Special Training Areas

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

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

* 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

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

* Special Training Areas

* Exclusive Space

General Officers	0	Band Room	N
Principal Staff Officers	0	Weapons Simulator Room	Y
Colonel	0	Physical Exam Wing	N
Lieutenant Colonel	0	Soil Testing Lab	N
Major Or Below	0	Photo Lab	N
		S.C.I.F	N

* Common-Use Space

Members Requiring Open Office Space	1	Medical Section	N
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

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

* Special Training Areas

* Exclusive Space

General Officers 0
 Principal Staff Officers 0
 Colonel 0
 Lieutenant Colonel 0
 Major Or Below 0

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

* 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

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

* Special Training Areas

* Exclusive Space

General Officers	0
Principal Staff Officers	0
Colonel	0
Lieutenant Colonel	0
Major Or Below	0

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

* 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

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
Cooks	0
Automotive/Engineer Mechanics	17
Maintenance Administrative Personnel	3
Draftpersons	0

* Special Training Areas

* Exclusive Space		
General Officers	0	Band Room N
Principal Staff Officers	0	Weapons Simulator Room Y
Colonel	0	Physical Exam Wing N
Lieutenant Colonel	0	Soil Testing Lab N
Major Or Below	0	Photo Lab N
* Common-Use Space		S.C.I.F N
Members Requiring Open Office Space	0	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

* 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

* 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

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

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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

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	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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	

Project Number : 67690
Project Title : Army Reserve Center
Date: Jul 16, 2012

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

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
			<hr/>	<hr/>	<hr/>
Totals (SF)	<hr/> 56,589	<hr/> 43,592	0	0	46,478

Project Number : 67690
Project Title : Army Reserve Center
Date : Jul 16, 2012

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

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

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 Kitchens

D-1.1 The three sizes of the standard Army Reserve kitchen plan are shown below. These plans and their 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 to obtain a copy of the current standard kitchen drawings from the Army Reserve Website, along with current equipment list and data sheets. The equipment list notes quantities and funding for the items.

FOODSERVICE EQUIPMENT KEYNOTES - FOR LARGE, MEDIUM, AND SMALL KITCHEN STANDARD PLANS

KEYNOTE NO.	DESCRIPTION
1	Hand Sink
1A	Sidesplash
2	Vegetable Sink
2A	Sidesplash
2B	Swing Spout
2C	Twist Handle Drain With Overflow
3	Three-Compartment Sink
3A	Disposer
3B	Pre-Rinse Spray
3C	Sanitizing Sink Heater
3D	Hot Water Booster Heater
3E	Twist Handle Drain With Overflow
3F	Swing Spout
4	Air Curtain
5	Water Filter
6	Ice Maker
6A	Ice Storage Bin
7	Freezer
8	Refrigerator
9	Tilting Braising Pan – 40 Gallon
9.1	Tilting Braising Pan – 30 Gallon
9A	Floor Drain with Grate (30" x 24")
9A.1	Floor Drain with Grate (24" x 24")

10	Twin Kettles
10A	Kettle Stand
10B	Floor Drain with Grate (42" x 12")
11	Combination Steamer/Oven
11.1	Combination Steamer/Oven
11A	Oven Stand
11A.1	Double Oven Stand
12	Worktable
12.1	Worktable
13	Food Preparation Table
13A	Slicer
13B	Can Opener
14	Mobile Cold Food Counter
14A	Food Shield
15	Mobile Hot Food Counter
15A	Two Tier Food Shield
16	Mixer
16A	Mixer Stand
17	Mobile Security Rack
18	Mobile Shelving Unit
19	Worktable With Backsplash
19A	Ice Dispenser
19B	Coffee Maker
21	Hood, Type 1 - Grease
21A	Fire Suppression System
22	Hood, Type 2 - Condensate
23	Rubber Floor Mat
24.1	36" Wide Range
24.2	60" Wide Range

Figure D-1
Large Kitchen Standard Plan

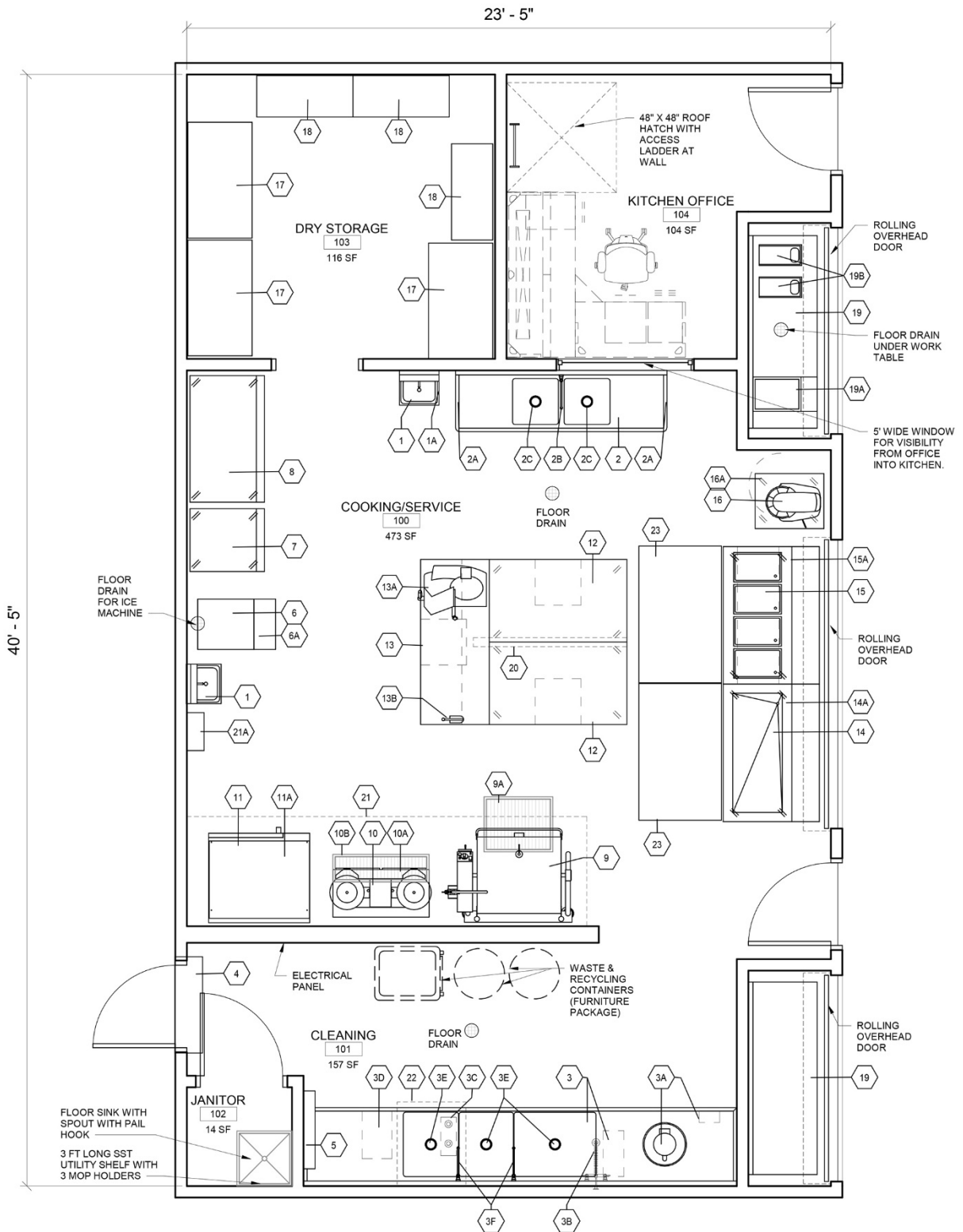


Figure D-2
Medium Kitchen Standard Plan

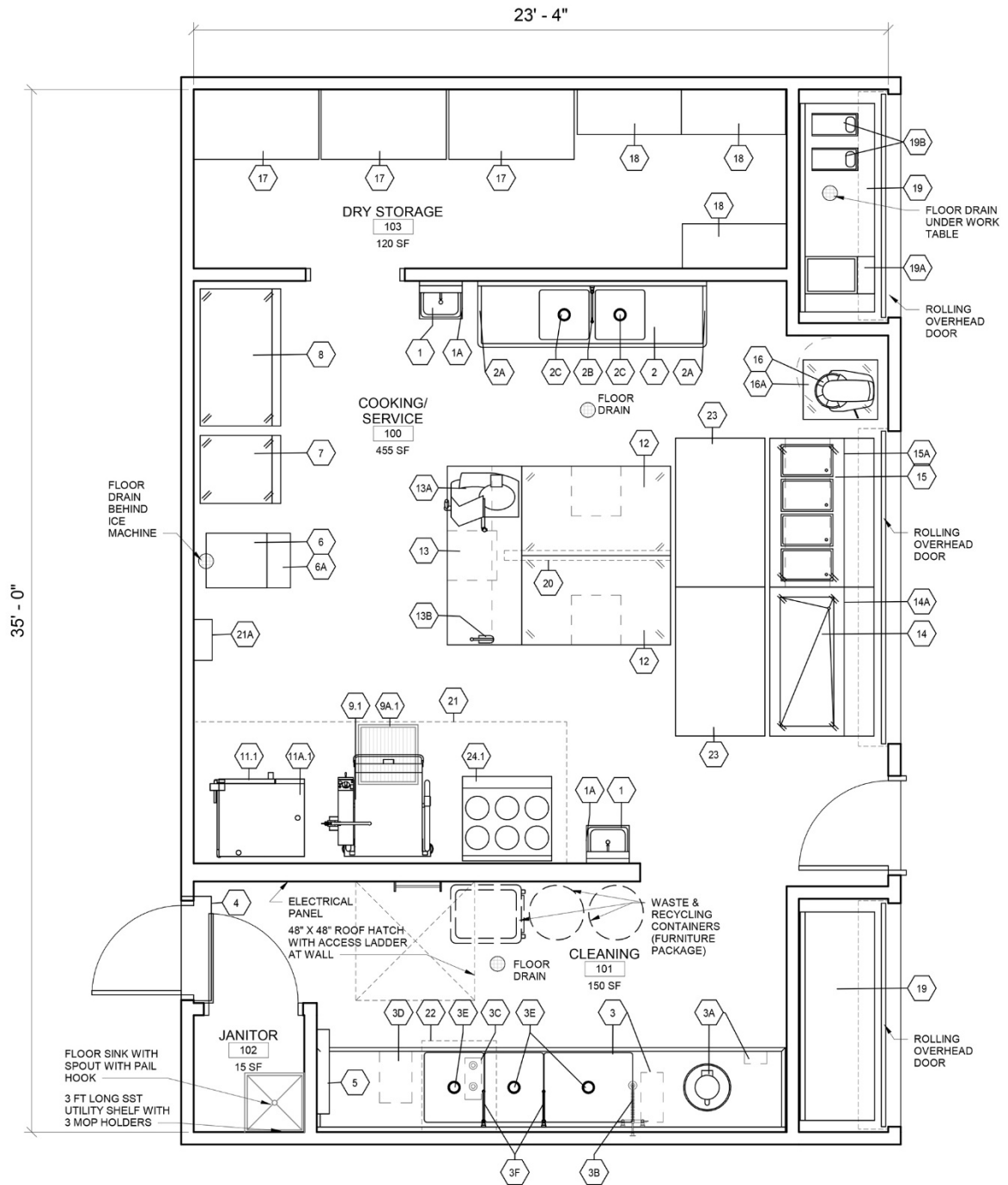
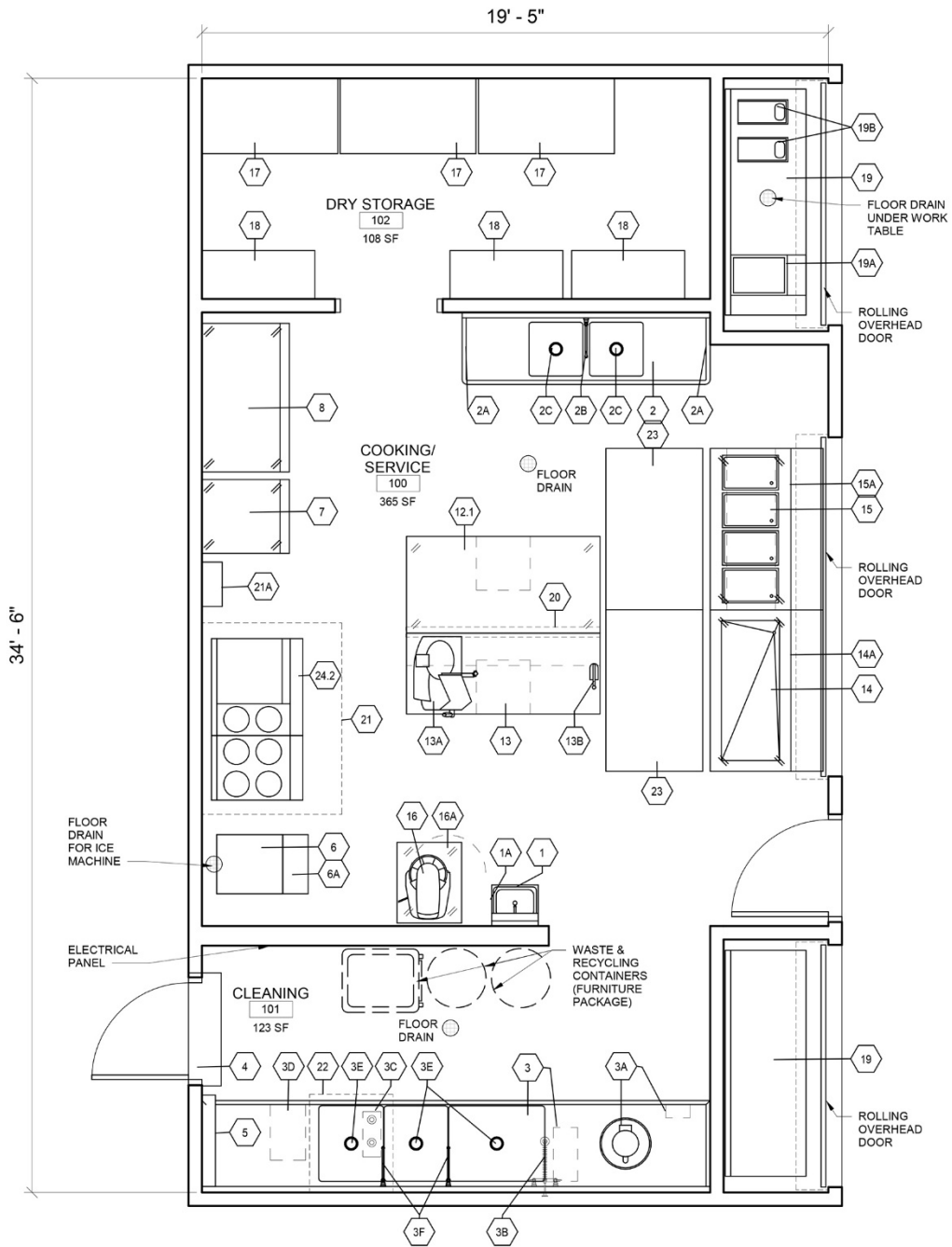


Figure D-3
Small Kitchen Standard Plan



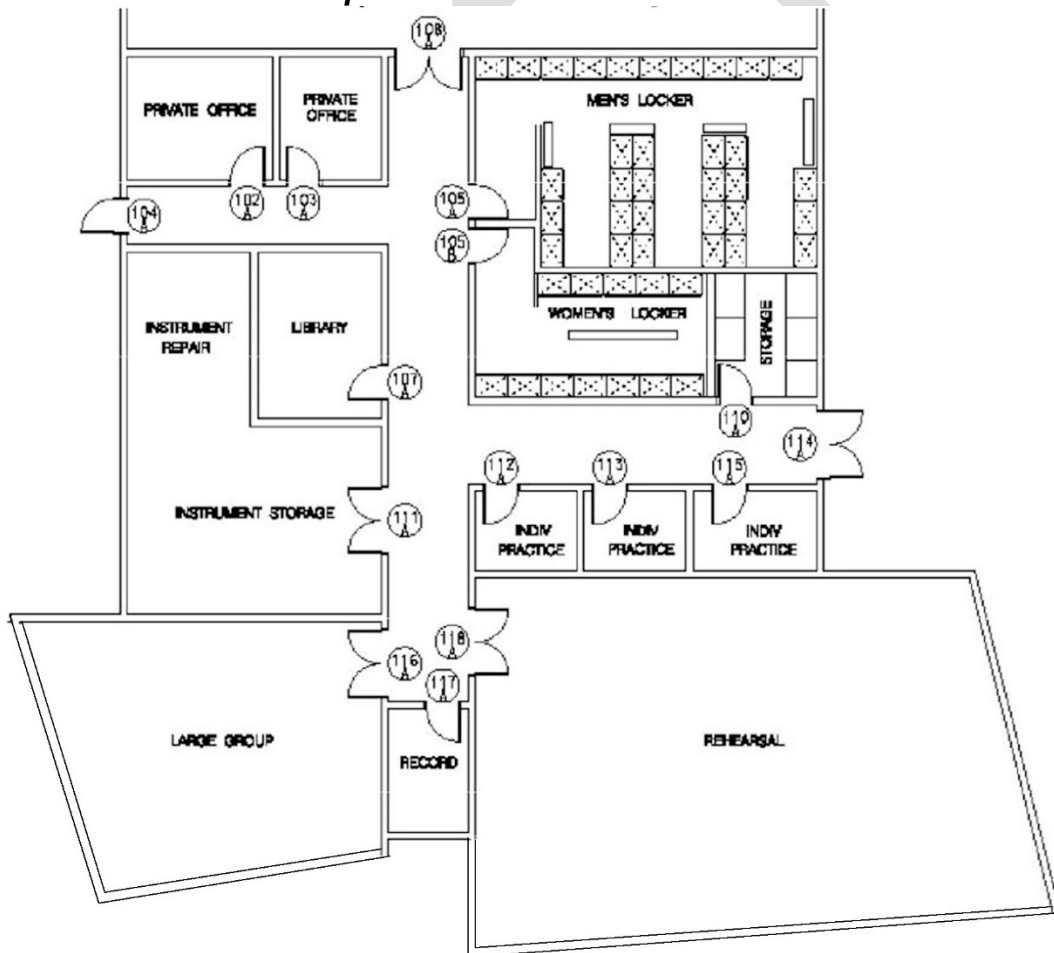
APPENDIX E

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



Acoustic design considerations are complex and cannot be concisely duplicated here.

E-1.2 Walls separating band room areas from other spaces shall be constructed with sufficient STC ratings to prevent disruption of activities in those spaces. Minimum STC 65 walls and STC 50 doors at practice rooms, large groups rooms, and rehearsal rooms. Minimum STC 45 walls and STC 40 doors at offices and library. Separate any other Band Room area walls from the remainder of the building with minimum STC 45 walls and STC 40 door(s).

E-1.3 Walls in large group and rehearsal rooms should be non-parallel to aid in reverberation mitigation.

E-1.4 Ceilings and walls to have combination of absorptive and diffusive panels based on the requirements of the acoustic properties of the space and band type.

E-1.5 Careful attention is to be made to control sound propagation through the practice rooms, large groups rooms, and rehearsal rooms' mechanical systems.

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.

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APPENDIX F

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, RD, 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 UFC 4-010-05 Sensitive Compartmented Information Facilities Planning, Design, and Construction; and all references therein, including ICS 705-1 and IC Tech Spec for ICS/ICD 705. However, the designer must ask the SCIF Security Officer (SSO) for any additional current applicable guidance, particularly for communication security.

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 telecommunication 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.

APPENDIX G

PHYSICAL EXAM WING

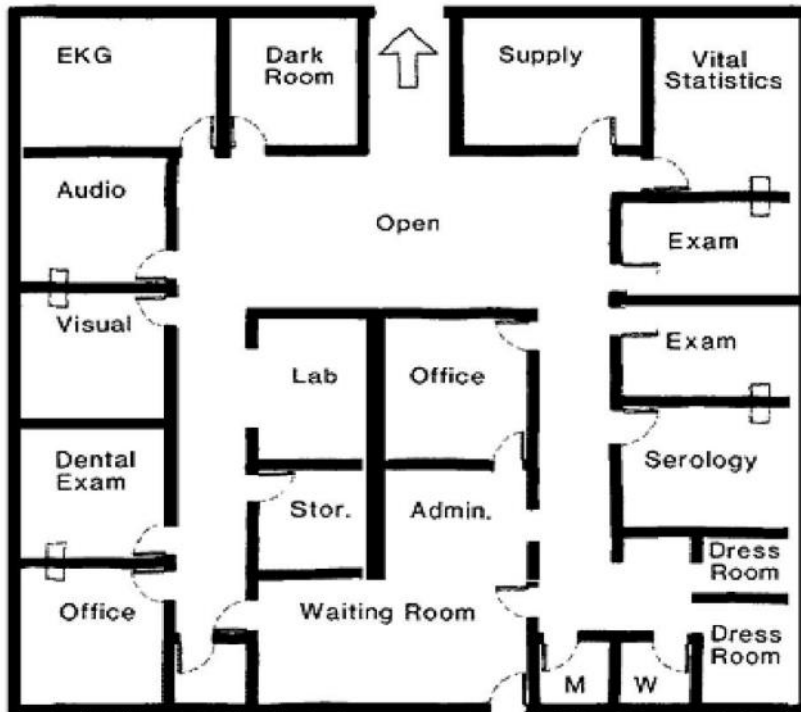
G-1 General

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 are 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.

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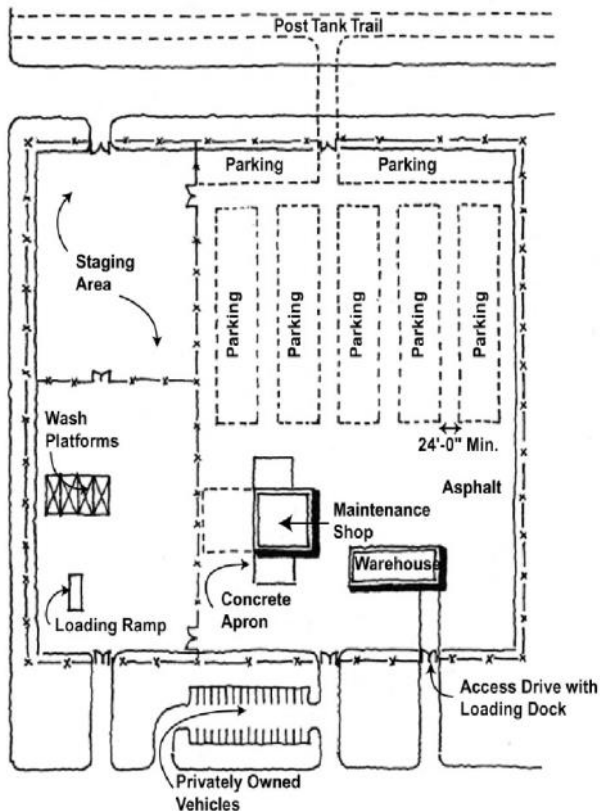
APPENDIX H

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



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 VMS 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 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-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.

APPENDIX I

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 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 Army Reserve website.

I-2.1.9 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 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-2.1.10 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 inches (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 inches (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 low-slope projects to be re-roofed

I-2.6.1 Minimum slope is to be ½ inch (12 mm) per 12 inches (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

APPENDIX J

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
1200	1	3	3	2	2	2	1	1	2	1	1	1	2	1	1	1	1	6

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.

St. Charles Army Reserve Center – USACE Louisville District In-House Design Team

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