Technical Criteria

Non-Commissioned Officer Academy

Catcode: 171XX

April 22, 2022

CENTER OF STANDARDIZATION:

Primary CoS (Campus, Operations, DFAC, and Instruction)

Norfolk District

Supporting CoS (Barracks):

Fort Worth District

SECTION 01 10 00

STATEMENT OF WORK

1 PART 1 GENERAL

1.0.1 The Non-Commissioned Officer Academy (NCOA) is part of the Non-Commissioned Officer Education System (NCOES) which provides an Academy environment for educating Non-Commissioned Officers (NCO's) in the United States Army. At the Academy, NCOs receive individual and collective training in a consolidated campus setting that promotes operational efficiency while maximizing Command and Control (C2). The courses provided at each NCOA are leader-centric, leveraging technological and conventional face-to-face teaching and delivery methods to train future Army leaders. The NCOA supports the training and education of NCOs as developed by the NCO Education System (NCOES). The following describes the courses that are typically offered at an NCOA:

BASIC LEADER COURSE (BLC). The BLC is a branch-immaterial course that provides basic leadership training. The BLC provides Soldiers an opportunity to acquire the leader skills, knowledge, and experience needed to lead team-level size units. It is the foundation for further training and development. Scope of tasks/competencies addressed in the BLC will provide both the team and squad-level perspective, where appropriate, and build upon experience gained in previous training and operational assignments.

ADVANCED LEADER COURSE (ALC). The Advanced Leader Course is a branch-specific course that provides Soldiers selected for promotion to Staff Sergeant (SSG) with an opportunity to enhance leadership, technical skill, tactical expertise and experience needed to lead squad-size units. Training builds on experience gained in previous training and operational assignments. Branch schools and selected training battalions conduct this course in a live-in learning environment, where possible.

SENIOR LEADER COURSE (SLC). The SLC is a branch-specific course that provides an opportunity for Soldiers selected for promotion to E-7 to acquire the leader, technical, and tactical skills, knowledge, and experience needed to lead platoon-size units. Training builds on experience gained in previous training and operational assignments. Branch schools and selected training battalions conduct this course in a live-in learning environment, where possible.

MASTER LEADER COURSE (MLC). The MLC is a branch-immaterial course that provides an opportunity for Soldiers selected for promotion to Master Sergeants (MSG) to acquire the leader skills required for success at both troop and staff assignments throughout the defense establishment

The NCOA complex is comprised of a dedicated campus of buildings for conducting individual and collective training, and is required by the Army to accommodate administration, instruction, living, dining, outdoor training, an equipment storage, related site amenities and parking. Facilities include the Academy Building which houses the administration and Instruction functions, Barracks Building (when applicable), Dining Facility (when applicable), Covered training, and a Lawn Equipment Storage Building (LEB). These

facilities, along with a running track and additional support facilities, are arranged on the site as a unit to allow the students to live, eat, learn, and work together. (DA PAM 415-28). An NCOA will generally fall within three primary sizes: Small, Medium, or Large. The size of the NCOA and the facility requirements are based on the annual through-put (enrollment) of Soldiers for a given NCOA course(s); through-put is captured from the Army Training Requirement and Resources System (ATRRS) which is derived from the Army Program of Individual Training (ARPRINT) during the Structure Manning Decision Review (SMDR) process. The three NCOA sizes are identified below by converting the annual throughput to an average daily student load by PN.

NCOA Sizes						
	Annual Enrollment (Throughput) Load			Average Daily Load (PN)		
Small	0	to	1,536	0	to	128
Medium	1,537	to	3,072	129	to	256
Large	3,073	to	4,608	257	to	384

NCOA facilties include:

ACADEMY BUILDING. Instruction areas are comprised of classrooms, instructor offices, Instructor break/huddle rooms, and Student break rooms. The Operations/Administration areas are adjacent to the Instruction area. This space is comprised of offices, special functions, locker/shower rooms, storage, and multi-purpose room components. The Program of Instruction (POI) is an approved, defined course document that outlines the Academy's curriculum. The POI describes the academic timeline, administrative support requirements, and the materials and equipment necessary to conduct the NCOA course(s), the selected approved POI will determine the facility requirements. The facility requirements are generated by the approved POI and the space is defined utilizing Web Based Real Property Planning and Analysis System (WebRPLANS). Based upon student throughput, the Gross Square foot requirements for the Academy building are below:

ACADEMY BUILDING GROSS SQUARE FOOT		
Small	37,100 GSF	(each, 128 PN)
Medium	62,990 GSF	(each, 256 PN)
Large	84,200 GSF	(each, 384 PN)

The following table represents the typical TDA;

Tables of Distribution and Allowances				
	Student Daily Load (PN)	TDA Instructors	TDA Non-Instructors	Total TDA
Small	128 PN	20	8	28
Medium	256 PN	40	10	50
Large	384 PN	60	12	72

BARRACKS. Barracks are comprised of living quarters, toilets, laundry, lounge, storage, and other support spaces. The barracks building can be

separated or attached to the Academic building. However, it must be within 1,680 feet of the academic building. It is preferable that it be located contiguously within the academic building's site footprint.

DINING FACILITY (DFAC). Dining is comprised of delivery, storage, preparation, cleaning, serving and seated dining. See the section on DFAC within this document for special considerations as part of an NCO Academy. NCOA will generally not warrant an entire DFAC, but rather may share a DFAC facility. Siting of a NCOA needs to be in close proximity to a DFAC.

COVERED TRAINING. A covered training area is included to provide a sheltered exterior space for training and instruction. The covered training structure can be separated or attached to the Academic Building. It is much preferred however to be attached.

OUTDOOR TRAINING AREA. Outdoor Training Area include a running track, physical training (PT) pits.

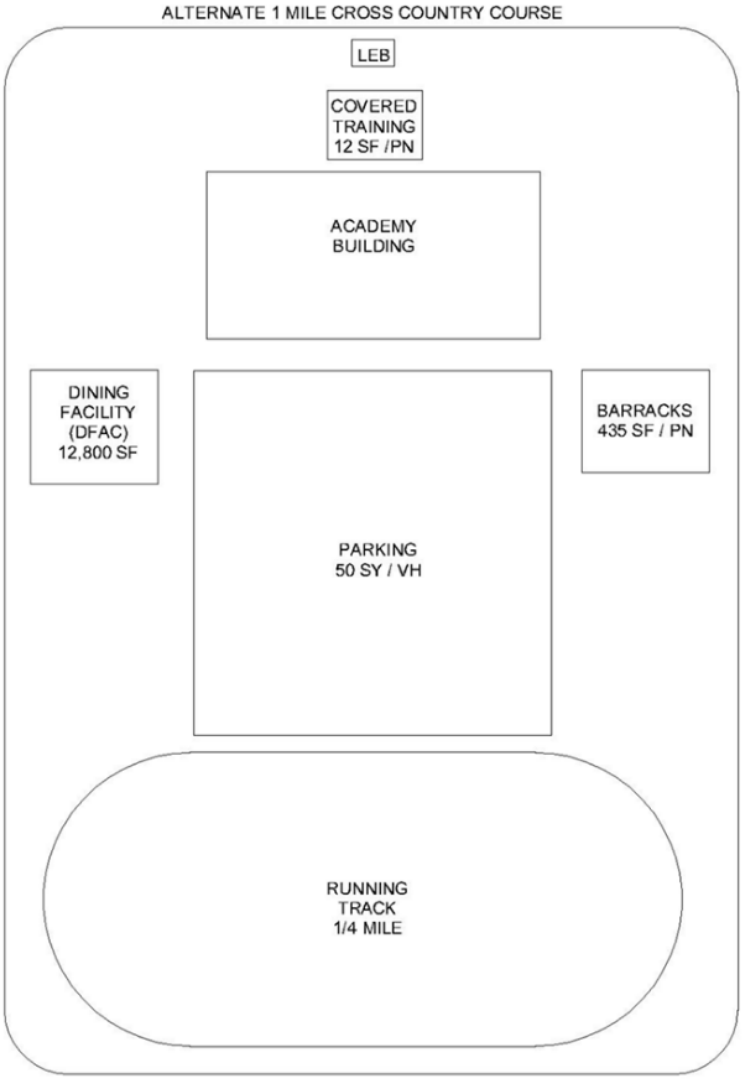
LAWN EQUIPMENT BUILDING. The LEB provides storage for maintenance equipment and materials for use by the Facility. This building is detached from all NCOA buildings.

1.0.2 SITE: The site concept is to provide an economical modular and scalable academic campus and building solution responsive to small, medium, or large NCO student populations on a variety of sites of varying supporting features. These suggested solutions are included as appendixes drawings to the standard design criteria. The standard flexibly accommodates a wide variety of conditions, including:

- NCO Academic Building alone, supported by existing nearby barracks and DFAC
- NCO Academic Building with attached or detached (contiguously located) barracks, with or without a contiguously located DFAC, or
- In the case of no TDY requirement (or when TDY students can otherwise be accommodated), an NCO Academic Building appropriately located to provide efficient access and use of a separate DFAC.

Site the facilities in close proximity to one another to enable the Solider to walk between activities in a reasonable time. While the specific facility requirements for the NCOA are based upon the approved POI, every facility on campus shall be Architectural Barriers Act (ABA) compliant to accommodate Warrior in Transition (WT) Soldiers and must follow approved Anti-Terrorism/Force Protection (AT/FP) standards. Site features include a vehicular and service access drives, dumpster area, and parking areas.

The following diagram illustrates the Core Activities for the NCO Academy and provides a layout that maximizes internal campus functions.



Provide site design and construction within the limits of construction necessary to support the new building facilities. Supporting facilities include, but are not limited to, utilities, electric service, exterior and security lighting, fire protection and alarm systems, security fencing and gates, water, gas, sewer, and site improvements. Provide accessibility for individuals with disabilities. Include Antiterrorism/Force Protection measures in the facility design in accordance with UFC criteria.

Maintain the construction site and haul route. Repair damage to existing sidewalks, pavements, curb and gutter, utilities, and landscaping within the construction limits, adjacent to the construction site, and along the Contractor’s haul route resulting from the Contractor’s construction activities at no additional cost to the Government. Prior to construction activities, the Contractor and Contracting Officer Representative must perform an existing condition survey. At the completion of the work, the Contractor and Contracting Officer representative must perform a final condition survey to determine repair requirements.

Approximate area available for this (these) facility(ies) is shown on the drawings.

1.0.3 GOVERNMENT-FURNISHED GOVERNMENT-INSTALLED EQUIPMENT (GFGI)
Provide equipment unless indicated below to be GFGI.

The following items are GFGI:

a. Computers and associated peripheral hardware
b. Printers
c. Student and instructor desks and chairs
d. Interactive whiteboard, projectors, and manual projector screens
e. Switches and servers for communications room
f. Conference Room tables and chairs, credenzas, free standing shelving, and cabinets
g. Break room furniture and vending machines

1.0.4 KEY CARD ACCESS: Provide Complete and Comprehensive building Key card access system. Coordinate with Base master planner and the User. See Part 3 for specific requirements.

1.0.5 HANDICAP ACCESSIBILITY: This facility is required to be handicapped accessible.

1.0.6 OCCUPANCY CLASSIFICATION: Business.

1.0.7 ACOUSTIC REQUIREMENTS: This facility has special acoustic design requirements.

1.0.8 The project objective is to design and construct facilities for the military that are consistent with the design and construction practices used for civilian sector projects that perform similar functions to the military projects. For example, a Company Operations Facility has the similar function as an office/warehouse in the civilian sector; therefore the design and construction practices for a company operations facility should be consistent with the design and construction of an office/warehouse building.

Comparison of Military Facilities to Civilian Facilities

Military Facility	**Civilian Facility**
Academy Building	College Level Education/Training Facility

1.0.9 It is the Army's objective that these buildings have a 50-year useful life. Provide an appropriate level of quality in the design and construction to ensure the continued use of the facility over that time period with the application of reasonable preventive maintenance and repairs that would be industry-acceptable to a major civilian sector project OWNER. Consider in the facility design that the Army may repurpose the use of the facility over the 50-year life. The Army's intent is to install products and materials of good quality that meet industry standard average life that corresponds with the period of performance expected before a major renovation or repurpose. Provide a design that is flexible and adaptable to possible future uses different than the current to the extent practical while still meeting the operational and functional requirements defined within. Flexibility is

achieved through design of more flexible structural load-bearing wall and column system arrangements. The site infrastructure must have at least a 50-year life expectancy with industry-accepted maintenance and repair cycles. Develop the project site for efficiency and to convey a sense of unity or connectivity with the adjacent buildings and with the Installation as a whole.

1.0.10 Requirements stated in this contract are minimums. Innovative, creative, and life cycle cost effective solutions, which meet or exceed these requirements are encouraged. Further, the OFFEROR is encouraged to seek solutions that expedite construction (such as panelization, pre-engineered) and shorten the schedule. **The intent of the Government is to emphasize the placement of funds into functional and operational requirements. Reflect this in the materials and methods by choosing the most economical Type of Construction allowed by code for this occupancy or project type allowing the funding to be reflected in the quality of interior and exterior finishes and systems selected.**

1.1 REFERENCES

<<INSERT CHAPTER 4 CRITERIA HERE>>

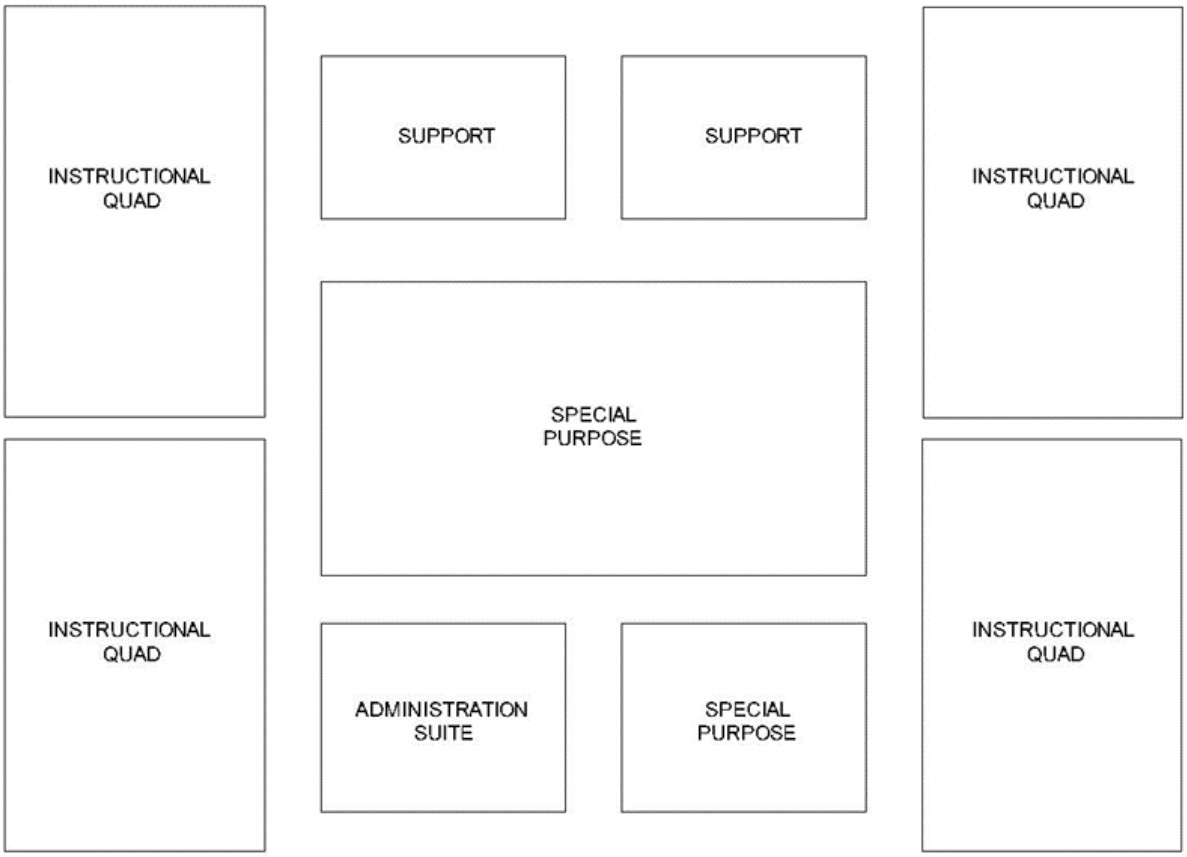
1.2 TECHNICAL REQUIREMENTS

<<INSERT CHAPTER 5 CRITERIA HERE>>

2 PART 2 PRODUCTS – FACILITY REQUIREMENTS – NCO ACADEMY (NCOA), Category Code 17***. This document applies as either a stand-alone criteria document or as an insert to a statement of Work (SOW) or Request for Proposal (RFP) solicitation. When used within a RFP, a completed program of spaces, conceptual plans, and adjacency matrix may also be provided but do not preclude the requirements of this criteria document. The criteria contained in this document establish the baseline levels of features, spaces, and finishes to be provided in these facilities. The designer must allow for and be sensitive to the differences in space requirements for students, instructors, and administrators.

2.1 GENERAL REQUIREMENTS: For Barracks criteria, contact the Ft Worth District COS. For Dining Facility Criteria, contact the Norfolk District COS. All other facility criteria is in this document.

2.1.1 FACILITY DESCRIPTION: A NCO Academy Building is a facility that includes primarily classroom space for multipurpose leadership-based training and instruction typically conducted in accordance with NCOES curriculum. These facilities may include other functional spaces such as auditorium, library, learning resource centers, and administrative support space. This is a facility intended for use by active and reserve components, combined arms training center in major training areas, and other sites that serve a large population for conference and seminar instruction. The diagram below represents the major functional adjacencies in schematic form;



2.1.2 FACILITY RELATIONSHIPS: For the Academic Building, economies of scale and operational efficiencies suggests a single-story solution for all but the larger NCOA's. The important functional relationships between the spaces of the Academic Building – and between the building spaces and other facilities - is an important organizing element of the standard design solution. Classoom 'Quads' have more or less direct access to outdoor training. Lockers/showers are convenient to the perimeter adjoining the outdoor covered training, as well as to the multipurpose room where they will support in/out processing, and PT activities and related instruction. The multipurpose room itself remains centralized; convenient for students' access, and as it fronts the main entrance, accommodates large and/or visiting instructor lectures and, in a pinch, smaller POI-required graduation activities. Flanking the main entrance, Administration is bifurcated between staff and support and positioned for ease of command and control, in processing/out-processing, and the day-to-day operational mission of the academy…The organization of the spaces of the facility have been optimized for efficient conveyance, and in almost every case designed to accommodate a multiplicity of functions.

The NCOs day to day academic time (0900-1700) is largely spent in the academic "quads"; 4 classroom clusters with their related supporting instructor (Small Group Leader) space. The configuration of the quad clusters reflects optimal class size, the pedagogical objectives of leadership instruction, and distraction-free ingress/egress – a microcosm of the "academic campus" concept. The required internal

circulation element of these quads double as pre-function hubs supporting the important instructor-instructor and instructor-student collaboration within …. quads are connected by academic hallways, "learning streets ", in a barbell arrangement - which efficiently circulate students to/from classrooms and supporting areas like the multi-purpose space, centralized break areas, outdoor training and the toilet/shower/locker facilities in accordance with the POI. These hallways are in turn anchored by a larger central lobby space accommodating circulation of staff, students, visitor ingress/egress.

Scalability is a critical driving organizational element; the number of classrooms and their supporting instructor spaces are driven by throughput (instructor TDA's are based on established Instructor/ Student ratios) and are most easily increased or reduced in whole number increments of 4-classroom quads which correlates with the vast majority of anticipated NCOA's. But incremental classroom additions/subtractions of other than 4 can also be accommodated within the same conceptual organization. 'Front of the house' operations – executive staff, administration, logistics, course management, duty desk, etc. – flank the main entrance and again scale easily by TDA algorithm. The Core spaces of the building – Multipurpose and flanking support spaces like lockers/showers, scale by extending the footprint in accordance with student population towards the rear of the building. The net effect of the modularized organization of the building is scalability throughout the size spectrum, while maintaining intact not only the functional relationships, but also the consistent overall look, feel, and professional learning environment commensurate with the aim of leadership training of the Army's future leaders.

2.1.3 There are many first time users in education and training facilities. Students must be able to easily identify their entrance when approaching the site. Once in the building, the Registration/Information desk must be obvious. Students should be able to find inprocessing functions, counselors, classrooms, and building facilities easily. Establish zones for the various users of the facility. Instructor's spaces must be closely related to the classrooms while administrators are more remote. Applied Instruction areas often require the use of temporary equipment and therefore must be easily accessible from vehicular circulation on the exterior of the building.

2.1.4 ACCESSIBILITY REQUIREMENTS

2.1.4.1 GENERAL: As of 31 October 2008, areas and facilities required to be accessible to physically disabled persons must be in accordance with the ABA Accessibility Standard for Department of Defense Facilities. This standard is composed of ABA scoping chapters 1 and 2 and the technical chapters 3 through 10. This is a publication of the U.S. Access Board and is available at: https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/aba-standards.

2.1.4.2 SITE PLAN AND CONSTRUCTION

a. Provide accessible parking spaces for those visitors and non-military employees with disabilities. The required number of spaces is prescribed by the accessibility guidelines. Such spaces are required to be located so as to provide convenient access to the building entrance. Typically, a minimum of one accessible spaces is required for every

increment of 25 spaces up to 100 parking spaces, thereafter increasing one additional space for every 50 spaces up to 200. Additionally, one of every six accessible spaces, or fraction thereof, must be "van-accessible". Refer to the accessibility guidelines.

2.1.4.3 FACILITY DESIGN AND CONSTRUCTION

a. Accessible desks and chairs must be handled by the installation based on specific needs. Accessible desks are not required in each classroom. In Auditoriums provide access to permanent stages and wheelchair space in the audience in accordance with standards.

b. The following areas are not required to be handicapped accessible: mechanical, electrical, and communications equipment rooms; storage space; hazardous waste/materials storage space; loading docks. Other spaces are required to be accessible unless specifically exempted by the Accessibility Standard.

2.1.5 BUILDING AREAS: Building area is established and must include a combination of appropriate educational spaces (identified in parts below) and may include (as required) administrative, special functional use, and support space. The Completed programming worksheet will provide the allocation of square footage required for both program areas and building support spaces. Note that mechanical and electrical building support spaces in the worksheet may be based on a planning algorithm and requires verification during design. Program spaces must not be reduced by more than five percent.

The NCO Academy Academic Building is generally Business Group B occupancy classification under the International Building Code. The IBC generally allows assembly accessory occupancies such as Assembly A-3 (auditoriums or large lecture halls) to remain non-separated in the predominant 'B' occupancy. One of the following strategies is commonly followed: (a) if the aggregated accessory use areas do not exceed ten percent of their respective building floor area, then the uses may remain unseparated, or (b) Regardless of its proportion of the total building area, uses may remain unseparated provided that the building's area and height limitations are based on the most restrictive use group. In both of these non-separated use strategies, IBC chapter 403 for the most restrictive use applies to the building as a whole. Refer to the IBC for other requirements. Storage requirements may also include Storage Group S occupancy classification. GIBs are occupancy type "Primary Gathering" for purposes of UFC 4-010-01. The allowable occupant load for life safety is based on the requirements of UFC 1-200-01 Design: General Building Requirements, which references both NFPA 101 and IBC depending upon the intended application of the occupancy calculation (i.e. NFPA for egress, IBC for others).

2.1.5.1 GROSS AREA: Calculate gross area in accordance with ANSI/BOMA Z65.3 *Gross Areas of a Building: Standard Methods of Measurement*.

2.1.5.2 NET AREA: Net area must follow the definition in TI 800-01, Chapter 5 Buildings and Facilities Criteria. Net area for programmed spaces is included in this document. If net area requirements are not specified, size the space to: accommodate the required function and comply with code, overall gross area limitations, and other requirements. Examples of spaces without net areas defined are corridors, stairs, restrooms, and mechanical and electrical rooms.

Provided net areas and room sizes are guidance that may be adjusted for specific situations such as special functional requirements, construction efficiency, or adaptation for existing facilities.

2.1.6 ADAPT BUILD MODEL

Contact the Center of Standardization for Adapt-Build Model

2.2 FUNCTIONAL AND OPERATIONAL REQUIREMENTS

Functional areas generally include the following:

NCOA REQUIRED FUNCTIONAL SPACES	
Instruction	Classrooms
	Instructor Offices
	Senior Instructor Offices
	Instructor Huddle/Break rooms
	Student Break Rooms
Administration	Offices and cubicle workstations
	Conference Room
	Staff Work Room
	Reception
	Staff Break Room
	Staff Toilets
	Staff Duty Office
Special purpose Space	Records Storage
	Computer Maintenance Room
	General storage Space
	Locker Rooms
	Multi-Purpose Room
	In-processing space
Support Spaces	Vestibules
	Lobby
	Corridors
	Stairs
	Elevators
	Restrooms
	Lactation Room
	Janitor Closets
	Recycling Rooms
	Telecommunications Rooms
	Fire Pump Rooms
	Electrical Rooms
	Mechanical Rooms

2.2.2 FUNCTIONAL SPACES: The space requirements of each facility are based on the needs of the school mission and the program of Instruction (POI) facility requirements. The criteria here state the area requirements in terms of Net Square Feet (NSF) or Gross Square Feet (GSF). Space requirements for the various uses are expressed in terms of NSF. GSF is determined by adding NA spaces plus an estimated area for building construction (including wall thickness, chase space, structural enclosure, and circulation) and half scope areas such as entry canopies. Gross area in the programming worksheet (appendix) is based on a sliding scale net to gross factor of the net area required by building functions. This gross area factor is intended to cover the area of walls, partitions, structure, mechanical/electrical rooms, chases, restrooms, and corridor/hallway circulation. The factor does not include network/server rooms, storage, break area or service spaces, which are identified in net areas. In some cases, the net to gross factor will not be appropriate such as for very small facilities where it would be inadequate or very large facilities where it would be excessive. Typical net to gross is 1.45. A concise description of each space follows:

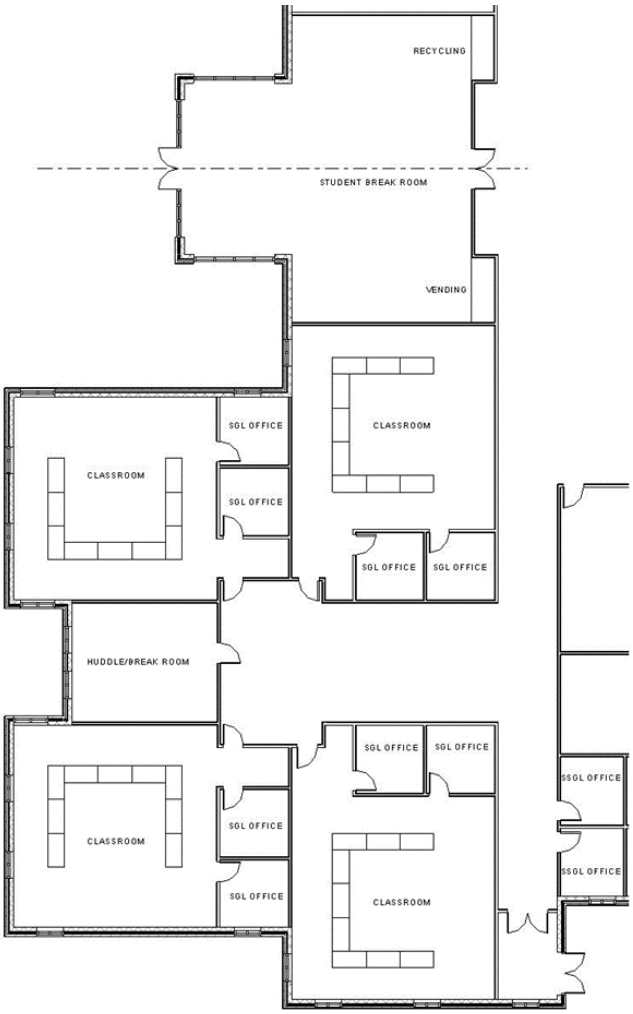
a. Hours of Operation: Generally, operation for a NCOA is normal duty hours Monday through Friday, but may extend to approximately 2230 plus weekends.

b. Deviation from square footages: Classrooms may be enlarged to accommodate special equipment related to the instruction for instance in a combined seminar/applied instruction situation. Do not reduce a classroom by more than five percent from stated target square footages.

c. Classroom shape and layout considerations: For optimal arrangement of furniture and sightlines, ensure a classroom length to width ratio of no more than 3:2. In most cases, a classroom shape approximating a square in plan is optimal. The space description includes recommended furniture, fixtures, and equipment (FFE) for each classroom. The designer must verify requirements with the user and coordinate specific sizes, arrangements, and finishes. FFE that are Government Furnished Government Installed (GFGI) are provided by the government but the contractor must plan for it (provide space, power, cooling) and fit the furniture to the space. Detailed furniture data and specifications are available from the COS upon request.

2.2.3 CLASSROOM TECHNOLOGY: An assessment of the course Program of Instruction (POI) is critical for establishing the appropriate technology level. Typical equipment listed below for each technology must be verified with the training proponent.

2.2.4 INSTRUCTIONAL SPACES. Instructional spaces include Classrooms, Instructor (SGL) Offices, Senior Instructor (SSGL) Offices, Instructor Huddle/Break Rooms, and Student Break Rooms. Instructional spaces are preferred to be arranged in a “quad” type configuration that allows for flexible teaching methods and instructor collaboration. The quad will also include the senior instructor (SSGL) offices in close proximity and an adjacent student break room. See Diagram below for typical quad arrangement.



2.2.4.1 NCOA CLASSROOM: The space is used to present lectures, projected images, and written information on the board. This type of classroom is planned for sixteen students arranged in a "U-shaped" desk configuration and shall be approxiamtely 920 NSF. These spaces have the flexibility to teach in the traditional lecture mode, use projection media, present handheld material, and work on group projects that may require moving furniture to create an open area. Provide power and network connections to each instructor and student desk. Classes must have a single or double projector, an interactive whiteboard and white board at the front of the class. In the past, small open offices have been remotely provided for instructors, but it has been found that they are not often used. A classroom typically includes eight (8) 2-person desks (sixteen (16) Soldiers total), One (1) 2-person desk (two (2) Instructor's total) and one (1) visitor desk, along with open classroom storage for standard supplies and instruction aides. The Instructor to Soldier ratio is 1/8. A U-shaped desk layout is preferred, specific room accommodations will be provided at the design stage. Consult with INCOPD for current design standards and examples. Instructor and Soldier desks shall be served by electrical and data systems. Power and network connections are provided to each student computer. The

use of laptops requires less desk surface than desktops and permits better sightlines for students. This classroom type should accommodate technology features (Legacy Classroom XXI Level 3) such as enhanced facilitation tools, automated instruction aides, and interactive capabilities in coordination with TRADOC's Enterprise Classrooms Program. The supporting infrastructure requirements described below are general and robust enough to accommodate a wide spectrum of technology and tools; however, designer must consult TRADOC ECP through the COS no later than the 35 percent design level to validate and obtain written approval that the design adequately supports the requirements of the POI. his space can be scheduled by Academy personnel for additional training when the classroom is not in use.

Classrooms must be clustered and have student break, vending, and restrooms nearby. Classrooms must be easily accessed from the public entrance. Instructor space must be adjacent to the classrooms.

Each classroom must have individual temperature control.

Day lighting is preferred and must be controlled. Classroom lighting to provide between 40 to 50 foot-candles at desk level in accordance with IESS recommendations and provide a color rendition of 5000K. Each Classroom must have individual lighting control that switches off automatically when the room is not in use; however, it is important to correctly specify occupancy sensors: in the past, they have inadvertently turned out the lights in occupied classrooms (as during test-taking for example, or other low-activity classes). Lights can be parabolic or volumetric and mix of indirect/direct to eliminate glare, facial shadows, and must not washout projection surfaces. 2x4 lighting fixtures is typical and must be oriented lengthwise along the student rows, however, 2x2 lights are preferable. Lighting can be zoned but is generally not mandatory in smaller classrooms of TRADOC schools. Dimmable capabilities may be considered, though not necessary if using high lumen output projection media such as those provided by TRADOC schools. Each two-person student station must have a minimum of six receptacles outlets, and instructor must have a minimum of eight outlets on a dedicated 20A circuit to accommodate transformer and wall adaptor power supplies. No more than three student stations on a single 20A circuit. The AV media cabinet location as well as the printer/peripherals location must each have a dedicated circuit. Smartboards must also have a dedicated circuit. Power to student positions can be distributed by one or a combination of: floor boxes at tables, raised floor systems, flush-mounted raceways integrated into the floor systems, or desking raceway (below desk level) systems with plug-and-play floor infeed modules with or without wall whips. Consider the flexibility required for desk reconfiguration. Provide a duplex receptacle for accreditor and visitor desk. "Power poles" in classrooms are not allowed in MILCON projects.

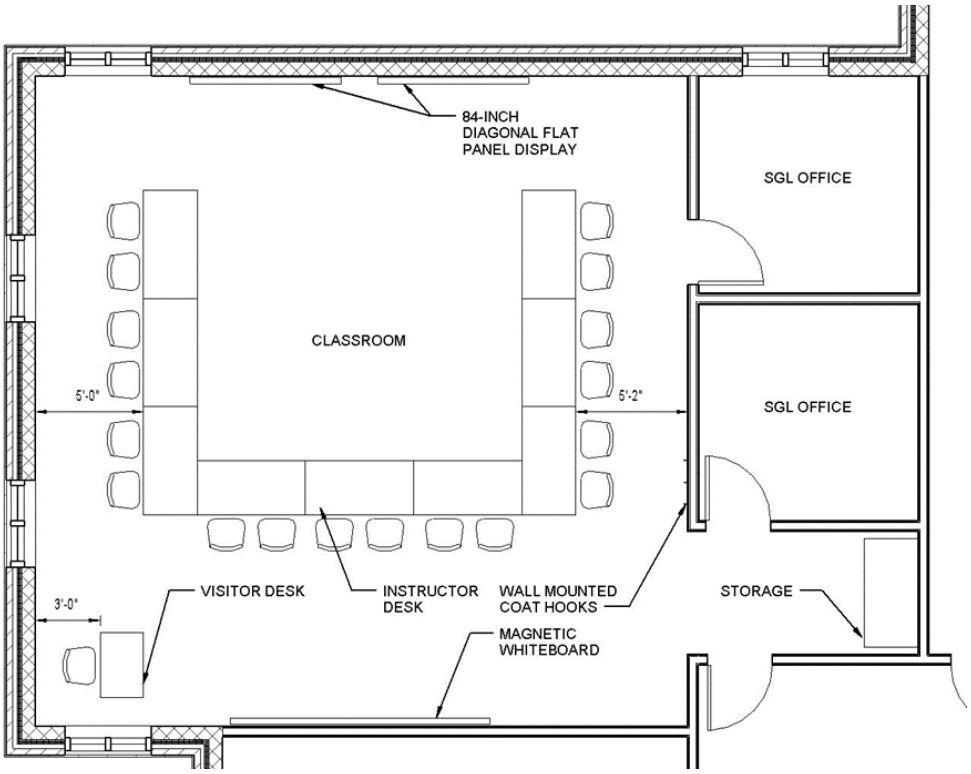
Communications: Instructor must have data and power receptacles. Room must have NIPR data and power receptacle for use by every student which can be accommodated in accordance with power distribution described above. Typically, four-pair CAT6 cable is used and is homerun back to the TR from each student position, and network cabling also runs from table to table. A data outlet is generally not required for the accreditation/visitor desk. Due to

the noise, generated heat load, and security concerns associated with network equipment, it is preferable that communication racks serving classrooms be consolidated in the TR rather than placed within the classroom. A separate AV/media cabinet associated with and adjacent to the interactive whiteboard (if needed) that must be fed with control wiring and conduit from both the instructor position as well as whiteboard to facilitate instructor control of classroom media devices, lighting. Wire classrooms for future wireless access (WIFI) if budget allows. In that case, a wireless access point (box and associated CAT6 cables) must be termination back to the TR in anticipation of future connection of wireless routers.

Provide map rail, white board, tack board, and coat hooks. Government-furnished government-installed (GFGI) equipment includes computers, printer, student desks, chairs, two 65- or 84-inch interactive white boards (with or without short-throw projection capabilities), an AV/media cabinet, and instructor's integrated podium or workstation. Some schools may still require one or two ceiling mounted projectors and projection screens although there have been sustainment concerns with these. Interactive whiteboards can be used as projection surfaces as well as be equipped with projection capabilities. Regular whiteboards provide additional instruction flexibility and must be provided liberally. Two-person student desks and instructor desks are typically either 24"x60" or 30"x72". (Refer to AR415-15.)

Ensure that the classroom has an unobstructed 'presentation' wall space – free of structural projections, fire alarm pulls/strobes and other appurtenances - of approximately 30 feet to accommodate dual screens which can be up to ten-foot wide each, separated by approximately two feet in between.

If the classroom is to be used broadcasting in a traditional distance learning environment, then STC 50 walls are required. Otherwise, STC 45 is required. Ceiling NRC must be minimum 0.70, but 0.90 is preferred. Provide a minimum NRC 0.25 floor finishes.



2.2.4.2 INSTRUCTOR (SGL) OFFICES

Provide one (1) 100 NSF office per instructor. Each classroom shall have two (2) instructor offices. Instructor offices shall be accessed from within the classroom. The instructor office space follows the utilization of Real Property, AR 405-70, and the U.S. Army Corps of Engineers TI 800-01. This space is required in accordance with the approved TDA for authorized personnel. The instructor to soldier ratio is 1/8. e.g. (16 students/8 students per instructor) = 2 instructors per classroom

2.2.4.3 SENIOR INSTRUCTOR (SSGL) OFFICES

Provide one (1) 100 NSF office per Senior Instructor.
Senior instructors are provided at a ratio of 1 SSGL per 4 SGLs, e.g. (16 classrooms X 2 SGL = 32 SGL), (32 SGL / 4 SGL per SSGL = 8 SSGL's) SSGL Offices shall be located near the classroom clusters along a main corridor.

2.2.4.4 INSTRUCTOR HUDDLE/BREAK ROOMS

Provide a combined Huddle/Break Room for instructor and senior instructor use. Huddle Break rooms shall be provided for each group of 4 classrooms at 30 NSF per Instructor/senior instructor. Locate adjacent to the classrooms.

2.2.4.5 Student Break Rooms
Provide Student Break Rooms at 8 to 10 NSF per Stuedent PN (average daily student load). The space shall be accessible from a main corridor and located in close proximity to classrooms and toilet rooms. The student break room will include tables, chairs, bar-type seating along walls, and space for ecyclables and vending machines. This space shall be connected to a fenced, exterior student break area.

2.2.5 ADMINISTRATIVE SPACES. The Administration Suite is the headquarters element for the Academy. Within the building, administrative activity is segregated from the Instruction activities and contains open and private offices for the Academy Headquarters Staff, i.e., the Commandant, Deputy Commandants, Chief of Training, Course Manager, and other support Staff Authorized by the approved TDA. This portion of administrative space does not include instructor space; Both Senior and Small Group Leader (SGL) instructor offices are provided for within the Instruction portion of the building, i.e.: the academic "Quads".)

The administrative suite is for the use of non-instructor staff within the approved TDA. The space is required for the efficient logistical administration of student activities and course instruction. The Staff oversees the instructors, senior instructors and other authorized personnel required to maintain the facility.

Space allocations are based partly on the Utilization of Real Property, AR 405-70, (appendix D Administrative Space) to the extent applicable. Non-instructor staff are allotted admin space based on 130 NSF per non-instructor TDA plus special purpose space. This allotment includes 'in-suite" circulation, or aisle space between cubicles.

2.2.5.1 PRIVATE OFFICE SPACE AND SUPPORT
Provide Offices for Commandant, Dpty Commandant, CRS Manager and associated staff.

Facility Size	Room Type	Quantity	Net SF Each
All	Commandant	One (1)	150 NSF each
All	Deputy Commandant	One (1)	110 NSF each
All	CRS Manager	One (1)	100 NSF each
Small facility	Office	One (1)	100 NSF each
Medium facility	Office	Two (2)	100 NSF each
Large facility	Office	Three (3)	100 NSF each

Additionally, provide open cubicles:

Facility Size	Function	Quantity	Net SF Each
All	Admin Receptionist	One (1)	6'x8' cubicle
Small facility	Admin	Three (3)	6'x8' cubicle
Medium facility	Admin	Four (4)	6'x8' cubicle

Large facility	Admin	Six (6)	6'x8' cubicle

2.2.5.2 WAITING AREA

Provide a waiting area within the administration suite, adjacent to the reception desk to accommodate NCOA visitors. Waiting area shall be sized based on 10 NSF per person to be served but shall not be less than 100 NSF. Provide as follows:

Facility Size	Room Type	SF/Person	Guests	Net SF Each
Small facility	Waiting Room	10 SF/Person	ten (10) guests	100 NSF each
Medium facility	Waiting Room	10 SF/Person	twelve (12) guests	120 NSF each
Large facility	Waiting Room	10 SF/Person	fourteen (14) guests	140 NSF each
Provide a minimum 20 NSF coat closet adjacent to and accessible from the waiting area.				

2.2.5.3 STAFF WORK ROOM

Provide a minimum 150 NSF minimum staff work room within the administration suite, capable of accommodating copiers, worktables, mail room equipment, and mail slots.

2.2.5.4 CONFERENCE ROOM

Provide a Conference room within the administration suite. The conference room is used for Staff/Instructor meetings which occur at least twice during a course term and Staff meetings with visitors. The conference room shall be equipped with a large conference table to accommodate half of the intended people and equipped to provide video teleconferencing capability. Additional seating shall be made available by the use of chairs along the conference room walls.

Conference room shall be sized based on 150 NSF + 12 NSF per TDA.

Facility Size	Room Type	SF/Person	TDA	Net SF
Small facility	Conference Room	150 SF + 10 SF per person	28 persons	480 NSF
Medium facility	Conference Room	150 SF + 10 SF per person	50 persons	750 NSF
Large facility	Conference Room	150 SF + 10 SF per person	72 persons	1,000 NSF
Provide 20 NSF A/V control closet accessed from within the conference room.				

Government furnished equipment includes conference tables (reconfigurable table is preferred), seating, and credenza. Provide in a speaker system. Government shall provide an interactive lectern and "smart" board system that shall be placed at one end of the room. Government shall provide a ceiling mounted projector in all size rooms. Consider coat/cap closet or rack for ½ of the occupants.

2.2.5.5 STAFF BREAK ROOM

Provide a Staff Break Room. Locate within close proximity of the administration suite. Provide space based on 30 NSF per person based on the approved TDA of non-instructional staff. Break Room shall include a sink, countertop, upper and lower storage cabinets, space

for a refrigerator, space for a microwave, and tables and chairs to accommodate the Staff.

2.2.5.6 STAFF RESTROOMS
Provide separate Male and Female Restrooms in or near Admin suite.

2.2.6 SPECIAL PURPOSE SPACE. The NCOA special purpose spaces support the Administration suite and Instruction activities and enables the staff to conduct daily Academy operations. These spaces utilize approved DA standards. The activities identified below are required. Existing NCOA's will require a sub-set of these spaces to support the Academy personnel. The special purpose space is ideally located adjacent to the Administration suite. The special purpose space criterion must be justified and validated by TRADOC.

2.2.6.1 RECORD STORAGE
Provide a secured lockable room, near the administration suite, with controlled access to store test material and other files.

Facility Size	Room Type	SF/Person	PN	Net SF Each
Small facility	Record Storage	1.5 NSF/PN	128	192 NSF
Medium facility			256	384 NSF
Large facility			384	575 NSF

2.2.6.2 COMPUTER MAINTENANCE ROOM
Provide a Computer Maintenance Room in close proximity to the administration suite. Calculate the space requirement based upon AR 405-70 Space allowances or established industry space planning standards.

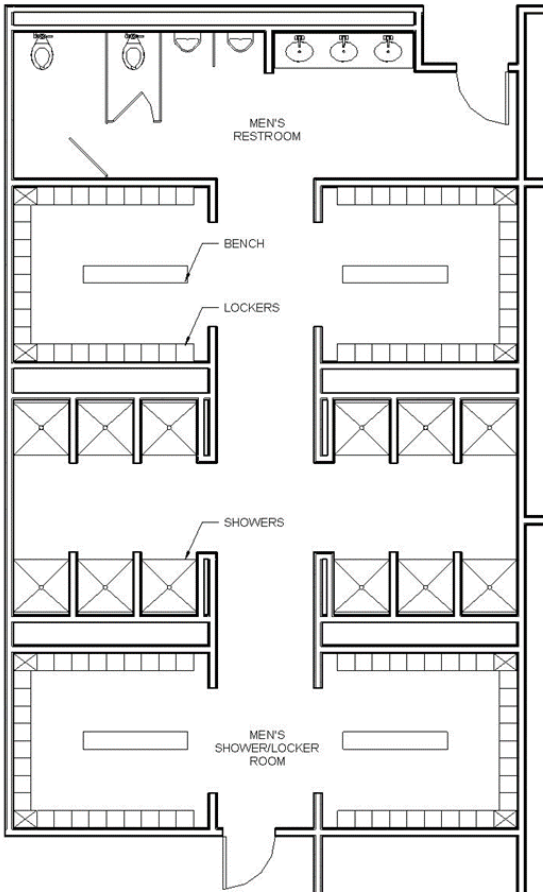
Facility Size	Room Type	SF/Person	PN	Net SF
Small facility	Computer Maintenance Room	3 NSF/PN	128	384
Medium facility			256	768
Large facility			384	1,152 NSF

2.2.6.3 GENERAL STORAGE
General Storage adjacent to and accessible from the large group classroom for storage of tables, chairs, military paraphernalia to support the Large group training classroom and adjacent outdoor PT. include a 50 NSF storage closet located adjacent to and accessible from the Large group classroom for Audio/Video equipment and controls. Storage core will be configured to support classroom furniture storage. These should be accessible from the main corridor and be located centrally in the building.

Facility Size	Room Type	SF/Person	Building GSF	Net SF
Small facility	Multi-Purpose Storage	3.5% Building GSF	37,100 GSF	1,300 NSF
Medium facility			62,990 GSF	2,205 NSF
Large facility			84,200 GSF	2,950 NSF
Provide 50 NSF multi-purpose Audio/Video Storage				

2.2.6.4 LOCKER ROOMS

A separate men's and women's locker room shall be provided with all functions listed above provided. Locker Rooms must be arranged so that the restroom functions are close to the entrance of the locker room, and do not require that people needing to use the restroom must pass through the locker and/or shower area. Room accomodates locker/dressing area, restrooms facilities, and shower area with individual stalls. See Diagram below for typical Men's Locker Room Layout. Gang showers are not allowed.



The number of lockers shall be based on the number of soldiers to be served. The Male/Female ratio for lockers shall be 80/20. Toilets provided within the Locker Room shall count toward the total required number of fixtures for the Academy building as calculated per IBC based on the occupant load. Male/Female ratio for toilet fixtures shall be 60/40

	Women's Showers	Men's Showers
Small	4	8
Medium	6	12
Large	9	18

2.2.6.5 LARGE TRAINING CLASSROOM (AKA MULTI-PURPOSE ROOM)

Provide one (1) multi-purpose large training classroom capable of accommodating the approved average daily load of soldiers plus the TDA for staff and instructors. The Multi-Purpose room shall be centrally located as well as visible from the main entrance. The multi-purpose room shall be sized based on 17 NSF per person.

Facility Size	Room Type	NSF/ (PN +TDA)	Guests	Net SF Each
Small facility	Multi-Purpose Room	17 NSF	128 + 28 = 156	2,652 NSF
Medium facility			256 + 50 = 306	5,202 NSF
Large facility			384 + 72 = 456	7,752 NSF

A raised, removable/disassemblable platform shall be provided along the wall opposite the main entrance doors. The platform and gathering area must accommodate persons with disabilities. The minimum depth of the platform shall be 10 feet. The top of platform shall be 12 to 18 inches above finished floor. A recessed ceiling mounted, electrically operated, projection screen shall be located at the back of the platform. Minimum ceiling heights above the top of the platform based on room size and projection screen size are presented below;

Distance to Last Row of Seats (feet)	Minimum Screen Size (16:10 Aspect Ratio)	Minimum Ceiling Height (feet)
Up to 35	Up to 112" W x 70" H	11
35-40	128" W x 80" H	12
40-45	12' W x 7.5' H	12.5
45-50	13.5' W x 8.5' H	13.5
50-55	14.5' W x 9' H	14
55-60	16' W x 10' H	15
60-70	19' W x 12' H	17
70-80	22' W x 14' H	19

Coordinate structural loading information and mounting details. Provide Sound-absorbing materials on ceilings and on the upper levels of walls in the rear of the room to ensure a calculated reverberation time target of 0.75 (generally acceptable range, 0.6 to 1.2).

2.2.6.6 IN-PROCESSING

Provide two (2) rooms, minimum 100 NSF each accessed from within the Multi-purpose room. Rooms will be used for separation of Men and Women during in-processing activities

2.2.6.7 STAFF DUTY OFFICE

Provide a 64 NSF minimum Staff Duty Office with a counter station adjacent to the Lobby and main Corridor. Additional shelving and storage shall be built-in to accommodate holding of pre-screened packages and letters. Serves as security office and has monitors for the security cameras that are located throughout the facility. The Barracks facility will be remotely monitored from this office. All authorized TDY students will use the Staff Duty Office within the Academy Building as a "check-in" point for the Barracks. Linens and room key cards for the Barracks will be issued from this office.

2.2.7 COMMON BUILDING SUPPORT SPACES

2.2.7.1 VESTIBULE: Provide a vestibule or air lock at the main entrance. A vestibule or air lock shall be provided at primary and secondary building entrances. Vestibules shall have walk-off mats at least 10 feet long in the direction of travel. Vestibules shall be provided as required by code

2.2.7.2 LOADING DOCK (CATEGORY CODE 17120): A loading dock is important for new standalone facilities. It must be remote from the student entrance and have storage and vertical circulation. In large facilities (over 40,000 SF), where delivery of supplies or instruction material is received daily, loading docks are usually required. The dock must be raised with a platform height at 3’-6” above lowered truck area. Dock must include a roof, dock leveler, and stairs.

2.2.7.3 RESTROOMS: Plan on proper male/female ratio and for surges when classes break. Currently, many installations have a greater male instruction program than female and this must be considered when determining fixture counts. In facilities with more than 30 staff, separate administrative restrooms from student restrooms. Minimum number of fixtures must be as required by International Plumbing Code (Business occupancy). Consider additional fixtures to handle surge of students. Arrange entrance to provide visual privacy.

2.2.7.4 JANITOR CLOSET: Provide one at each group of toilets on each floor of the building. Minimum area is 48 SF. Room must be accessed from the corridor. Provide one floor mounted mop sink and mop rack for three mops. One Janitor Closet is required on each floor minimum.

a. **Function:** Sink and storage of cleaning supplies, soap, paper products, floor buffer, and wet vacuum.

b. **Adjacency Requirements:** Near Restrooms.

c. **Space Requirement:** Total net area of 48 SF. The net area is a part of the of the gross area factor calculation.

d. **Plumbing:** Design faucet to support a bucket and have a threaded end to receive a hose. Provide vacuum breaker for faucet.

e. **Mechanical:** Ventilate the space.

f. **Electrical and Lighting:** Provide a GFCI protected receptacle near the shelving wall.

g. **FFE:** Provide shelving.

h. **Finishes:** See the Finish Schedule for standard finishes.

2.2.7.5 MECHANICAL ROOM: Provide dedicated interior spaces and exterior areas for plumbing, fire protection, and HVAC equipment. Size and locate rooms (including doorways) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces.

2.2.7.6 ELECTRICAL ROOM: Provide dedicated interior spaces and exterior areas for electrical equipment. Size and locate rooms (including doorways) to allow equipment removal and maintenance. Provide floor openings and vertical shaft spaces. Provide minimum of one electrical room per floor.

2.2.7.7 COMMUNICATIONS (COMM) ROOM: A Communications Room is required to manage building connection to telephone, fiber optic, cable television, and other infrastructure. For GIBs larger than 10,000 SF, multiple Communications Rooms are required and are to be arranged in accordance with the I3A Technical Criteria. The room must not be located remote from the Network Operations Center (NOC) or classrooms for the purpose of being located near Department of Public Works managed spaces such as Mechanical or Electrical Rooms. The Communications Room must serve the NOC, which is the primary means of distributing information/communications systems through the facility to desktops. Provide additional communications closets as required to meet the I3A Technical Criteria.

2.2.7.8 CORRIDORS: Provide as required for circulation; minimum corridor width must be as required by code, but not less than seven feet for student classroom corridors, while eight to twelve feet is appropriate in large facilities and five feet for administrative areas. Provide glazed aluminum (or other material as required by the Installation Design Guide) storefront doors at public entrances. Provide abuse-resistant wall material/finish in the corridors to required height. Provide insulated hollow metal doors and frames for exterior service areas.

2.2.7.9 STAIRS: Provide as required for circulation and egress in multi-story buildings. Interior stairs are preferable in most climates. A stair must be conveniently located near the Lobby/Elevator/Public Entrance to the building. Minimum stair width must be as required by code, but not less than 44 inches. The main student use stair must be at least four feet wide. Provide exit signage. Stair doors must have glazed panels (comply with code requirements for fire ratings and safety glazing). Exterior stairs must be cast-in-place concrete construction. Interior stairs must be cast-in-place concrete or steel construction with concrete-filled treads. Open risers and metal grating treads are prohibited.

2.2.7.10 ELEVATOR: Provide at least one hydraulic passenger elevator in each multi-story building. Some facilities require an additional passenger and freight elevator, but the designer must focus on convenient stair design and locations to minimize the need for elevators. Passenger elevator: 2,500-pound capacity, minimum 75 feet

per minute speed, and center opening doors. Elevator is required for handicapped accessibility to floors not on ground level.

2.2.7.11 GENERAL STORAGE: Storage is required for furniture, computers, and accessories. when rearranging classroom layout.

2.2.7.12 LACTATION ROOM: Lactation room is a mandatory space in accordance with Army Policy. Design Criteria must be in accordance with the American Institute of Architects (AIA) *Lactation Room Design*, and the following:

2.2 SITE FUNCTIONAL REQUIREMENTS

2.3.1 GENERAL: The Site must accommodate parking and vehicular access, maintenance, equipment yards, trash removal, outdoor storage, and break areas. See also Part 2.4 Site and Landscape Requirements for expanded technical requirements and criteria.

2.3.2 PARKING: Comply with the requirements of Technical Instructions 804-11 Design for Non-Organizational or Privately Owned Vehicle (POV) Site Circulation and Parking and Technical Instructions 800-01 Design Criteria, Chapter 3 Site Planning and Design Criteria..

2.3.3 OUTDOOR BREAK AREA: This space is desirable in appropriate climates but do not locate where it will disturb classes. Assure this space is not located near mechanical fresh air intakes or noisy equipment.

2.3.4 EQUIPMENT YARD: Provide equipment yards in compliance with ATFP and the Installation Design Guide to house and screen mechanical and electrical equipment, satellite antennas, and emergency generators. Provide access to the yards for maintenance. Consider the use of turf pavers for vehicle access.

2.3.5 DUMPSTER ENCLOSURE: If a dumpster is provided, provide an enclosure. Consider accommodating recycling in the same enclosure.

2.3.6 OUTDOOR STORAGE: Storage facility for outdoor equipment, such as lawn maintenance equipment, may be considered. The structure must be consistent with Installation Design Guide.

2.4 SITE AND LANDSCAPE REQUIREMENTS

2.4.1 GENERAL: Site Planning Objective. Provide a functional layout of buildings and site elements. The site plan must place emphasis on creating a safe work environment. Arrange vehicular circulation to minimize conflict with pedestrian circulation. Pavement marking and signage must clearly delineate traffic patterns, especially important to first time visitors at the site. Integrate sustainable design principles by retaining and using existing topography to advantage. Preserve environmentally sensitive areas and reduce overall project impact on the site.

2.4.2 SITE DESIGN: Site planning is an essential aspect of the facility design. The art of site planning requires the interdisciplinary

involvement of the community planner, architect, landscape architect, civil, mechanical, electrical, and communication engineers. The design of vehicular paths, pedestrian paths and landscape design can define the functional campus yet enhance the flow into and out of the area. Provide appropriate buffer areas to separate and visually isolate the facility from adjacent areas. Consider providing landscaping or other screening between incompatible land uses.

2.4.3 VEHICLE TRAFFIC: Site the facility so it is clearly visible to pedestrians, cars, and delivery vehicles. Separate service/delivery access from the student/staff access and circulation. Plan for daily deliveries to the loading area in larger facilities. Control vehicular access within UFC 4-010-01 standoff distances for the building.

2.4.4 PARKING AND VEHICLE CIRCULATION: Comply with UFC 3-210-02 Privately Owned Vehicles (POV) Site Circulation and Parking. Coordinate parking and vehicular circulation with AT/FP standards. A site traffic impact study must be done to determine the traffic patterns and impact on the local roads and circulation patterns. Access requirements for fire equipment, trash/recycling removal, and service vehicles on site must be considered. Consider shared use parking with adjacent sites. Design entrance and exit drives for safe and controlled traffic flow. Consider pavement maintenance and snow removal (if required) in the design. Consider the use of alternate materials such as turf pavers for service vehicle access to mechanical rooms. Provide concrete paved parking for motorcycles. Design pavement for organizational vehicle parking for the heaviest vehicle at the installation. Provide handicap-parking areas when required.

2.4.5 WALKWAYS: Connect the building to public walkway system and to parking with pedestrian walkways. Primary building entrances must be at least eight feet wide. The minimum width of a sidewalk must be five feet. Place handicapped curb cuts in convenient locations while not creating obstacles for walkers. Depress curbs for handicapped access where possible instead of creating ramps. Consider brick or concrete pavers or patterned concrete to identify significant entrances. Provide well-lighted walkways since the facility may used in the evening

2.4.6 OUTDOOR FURNISHINGS: Provide outdoor furnishings including trash and recycling receptacles, seating, bicycle racks, lighting standards, bollards in coordination with the Installation Design Guide. Where the climate is acceptable, provide outdoor break areas with tables, seating, and shading devices.

2.4.7 SIGNAGE: Plan site identification signage in coordination with site approach, landscape, and lighting. Comply with the Installation Design Guide and the Army Installation Design Standards. Provide traffic control signage as well as “No Parking” signs at service drives. Provide informational signs to direct students to appropriate entries.

2.4.8 SITE LIGHTING: Site lighting is an integral part of the design. Comply with the requirements of the Installation Design Guide. Provide lighting to ensure safe movement through outdoor areas. Consider the color rendition of outdoor lighting. Use bollards or variations in lighting to articulate entrances and public areas. Design lighting levels in accordance with the *Illuminating Engineering Society (IES) Lighting Handbook* illumination levels. Use photocells, motion detectors and timers to control lighting and conserve energy.

2.4.9 LANDSCAPING AND HARDSCAPING: Coordinate the landscape design with AT/FP and Installation requirements. Preserve natural landscape features including existing topography, trees, and vegetation. Provide windbreaks and shading where appropriate. Consider earth berms to screen parking and roadways. Where berms or swales are used use gradual slopes no greater than 1:5 to allow use of mowing equipment. Screen service area and outdoor equipment. Shade parking areas to reduce heat developed by exposed pavement. Landscaping must be in accordance with requirements of the Installation. Where appropriate, provide a variety of plants with seasonal change, color, texture, fragrance, and interpretive value. Always use local, durable, native species to help ensure survivability. The use of native plants minimizes the requirement for chemical pesticides, herbicides, and watering. Choose plant materials based on plant hardiness, climate, soil conditions, low maintenance, and quality. Selected plant materials must be easily maintained and tolerant of the specific site conditions. Incorporate sustainable design principles into the selection of plants. Planting or seeding must occur only during periods when beneficial results can be obtained. Plant varieties must be nursery grown or plantation grown stock. They must be grown under climatic conditions similar to those in the locality of the project. Furnish plants that have heavy, well-developed, and balanced tops with vigorous well-developed root systems, and must be furnished in containers.

2.4.10 CAPILLARY WATER BARRIER: A capillary water barrier is required for interior slabs on grade, including storage, loading dock, mechanical, and electrical spaces.

2.4.11 TERMITE TREATMENT: Apply preventive methods for subterranean termites in accordance with local regulations.

2.4.12 RADON TESTING: Perform test for potential radon exposure to occupants in accordance with UFC 3-490-04A. Provide Radon protection in accordance with code requirements.

2.5 ARCHITECTURAL REQUIREMENTS

2.5.1 GOALS AND OBJECTIVES: Overall architectural goals for the facility are to provide a functional, visually appealing facility that is a source of pride for facility users, and the installation, instilling attitudes of a high level of achievement and environmental awareness. Provide coherent, architecturally compatible design consistent with the Installation’s architectural theme. Design buildings to enhance the visual environment of the installation.

2.5.1.1 Exterior materials, roof forms, and detailing must comply with the Installation Design Guide to the extent permissible by MILCON Business Process (formerly MILCON Transformation) and must be compatible with the immediate local context. Configure building massing and use exterior elements such as entry focal points and material detailing to provide human scale, especially at public areas. Use durable, low-maintenance materials and furnishings that can be easily maintained and replaced. Materials, such as flooring, storefront, and hardware, must be exceptionally durable for high use.

2.5.1.2 Arrange spaces in an efficient, functional manner with simple circulation schemes that allow easy way finding within buildings. Vestibules, corridors, stairs, elevators, and common spaces must be linked in obvious ways to make circulation convenient and clear.

2.5.1.3 Provide flexibility to interior functional layouts where functional changes are normal operation and to allow maximum flexibility for potential future modifications. Changes may routinely take place in courses being taught, the materials required by the course, teaching techniques, and student load.

2.5.1.4 Use interior surfaces that are light in color; avoid trendy or bright color schemes. Use materials in circulation areas that control and reduce noise. Interior design must consider creation of spaces, circulation, and functional use as well as materials and colors that complement the instructional and learning experience. Multipurpose use must be considered in design of floor loads, ceiling heights and floor systems. Maximize use of day lighting and operable windows.

2.5.1.5 Provisions for and location of adequate storage space is important, as is the capability of adapting environmental services for changing requirements.

2.5.1.6 Low and mid-rise facilities must not rely on elevators as the primary source of circulation. Locate stairs for convenience as well as life safety. Building entrances for the public must be identifiable and sheltered from harsh weather. Entrances must be accessible to handicapped. Entrances must offer a transparency for recognizing activity in the building. Screen service entrances. Consider alarming egress doors that are not desirable for building access, which improve security and deter theft.

2.5.2 BUILDING ELEMENTS: Systems and materials must meet the requirements of the criteria. The criterion includes a range of specificity: some material requirements are specific (no option); other material requirements allow a range of options. The criteria requirements establish a minimum quality level. Consider efficient yet durable building systems that compliment flexibility; for example, Interior load bearing partitions often deter future re-design for changing needs.

2.5.3 WALLS

2.5.3.1 <u>NON-COMBUSTIBLE CONSTRUCTION:</u> is preferable, even where combustible materials are allowed by code. A better level of materials is required for GIBs to reinforce the desired level of professionalism and achievement the Army is pursuing in the education of the military force. Painted gypsum board or plaster must be the standard, although designs must consider using reconfigurable partitions for future room change requirements. Moveable partitions must also be considered to allow similar room types to be expanded on occasion. When reconfigurable or moveable partitions are used, other requirements such as acoustic ratings and equipment locations must be considered. Metal studs for interior partitions must not be lighter than 20 GA. Use chair rails in small rooms with moveable furniture.

2.5.3.2 ROOM DIVIDERS: Where multiple classrooms are located adjacent to one another, moveable partitions (panel type) must be used in at least one location to allow classrooms to be opened into a larger instruction space. Consider the stacking requirement for the partition. See Acoustic Requirements.

2.5.4 FLOORS:

2.5.4.1 A capillary water barrier is required for interior slabs on grade, including storage, loading dock, mechanical and electrical spaces.

2.5.4.2 Consider the requirements for durability in areas that will receive more traffic and areas that have high abuse. Porcelain tile is identified for traffic areas but other durable products such as terrazzo may be considered. Consider using a water proofing membrane and mortar bed for thick setting materials. Coordinate Installation requirements that may require recessed structure. Carpet is not to be used in high traffic areas such as stairs, corridors, and typical classrooms. Where carpet is used consider carpet tile in a multi-color pattern. In Communication and NOC Rooms provide non-static flooring. Provide carpet static control to permanently control static buildup to less than 3.5 kv when tested at 20 percent relative humidity and 70 degrees F in accordance with AATCC 134.

2.5.4.3 RAISED ACCESS FLOORS: Raised access floor has sometimes been found to meet life cycle requirements allowing for quick reconfiguration of electrical and communication systems to serve the changing needs for technology through less disruption to the permanently fixed floors and walls. Projects in the planning phase must consider programming raised access floor (or some flexible system of providing power and data) throughout the education, communication, and electrical areas of the building or in individual areas. Raised floor is not necessary for mechanical, administrative, service and support areas. When considering access flooring in optional areas, designers must perform an economic analysis relative to anticipated use. Other alternatives must also be considered such as wall or floor raceways, recessed duct banks, and redundant floor or wall receptacles. “Tombstone” type floor receptacles are not acceptable.

2.5.4.4 Laminate or tile floor finish is desirable in high traffic areas. Where a plenum is used below the floor for mechanical requirements, additional space and fire stopping is required. Low profile four to five inches access flooring can be used in areas with minor cable requirements. Level 3 Digital Classrooms typically requires access floor and the low profile floor system (six inches) has been successful.

2.5.5 OPENINGS:

2.5.5.1 WINDOWS: Windows in classrooms must be placed high on the wall for small classes to preserve more useable wall space for projection screens and white boards. Exterior windows in occupied spaces must have blinds to control sunlight. Windows in this facility type must satisfy the requirements of UFC 4-010-01 Design: Minimum Antiterrorism Standards for Buildings.

2.5.5.2 INTERIOR DOORS AND FRAMES: Provide hollow metal frames and solid core wood doors generally. Hollow metal doors are acceptable at

service areas. Where equipment will be moved in and out often such as transient classrooms, consider double doors. Doors at classrooms, counselors, and conference rooms must have a small, glazed vision.

2.5.5.3 DOOR FINISH HARDWARE: Locks must be series 1000 mortised locks. Classrooms must be locked and opened by the Building Manager's office when needed for classes. Integrate with the Installation locking system where possible. Use programmable electronic card access locks. For NCO academies there is often an interest in using cipher locks for specific classrooms.

2.5.6 CEILINGS:

2.5.6.1 CEILINGS AND CEILING HEIGHTS: Ceilings are identified in the finish schedule generically. Where acoustic tile is used, gypsum board or plaster can be incorporated to add interest such as walls, soffits, or other patterns. In acoustically-rated spaces, the wall/partition must penetrate the ceiling. The acoustic rating must include the entire envelope; therefore, requiring partitions to extend to the structure above or treatment of the ceiling to prevent sound from transmitting over the partition.

2.5.6.2 Refer to the Finish Schedule for minimum ceiling heights. Rooms with a ceiling mounted projector must have a ceiling at least nine feet high. Larger Classrooms and classrooms with tiered seating requires twelve-foot high ceilings. This is sometimes impossible in renovation projects. In difficult situations, if a ten-foot ceiling cannot be provided for these classrooms, investigate alternative spaces. Classrooms and conference rooms with forty or more people must have at least ten-foot ceilings. Classrooms and conference rooms with sixty or more people must have at least eleven-foot ceilings.

2.5.7 ACOUSTICAL REQUIREMENTS:

2.5.7.1 DESIGN: Designers and planners must consider environmental as well as functional noise when locating and designing instruction facilities. Where possible avoid background noise from traffic, airfields, outdoor activities, and mechanical equipment. Work within the building to acoustically separate classrooms from student gathering areas, mechanical equipment, and restrooms. Extend acoustically rated partitions to the horizontal acoustic element such as the roof deck or floor slab above (acoustic ceilings do not effectively stop sound transmission over partitions). Use acoustic doors in sound rated partitions. Consider acoustic windows in exterior walls. Separate and seal penetrations in rated partitions. Locate mechanical equipment in less sensitive areas such as over corridors. Use low noise ballasts in light fixtures. Realize the use of operable partitions increases noise levels.

2.5.7.2 REVERBERATION: Effective learning requires students be able to hear. The Signal Noise Ratio (SNR) and Reverberation Time are key factors for intelligible hearing. A successful SNR is fifteen decibels (dB) or more. For instance, an instructor's voice must be approximately 50 decibels average weighted (dBA) at the rear of the classroom. To achieve a SNR 15 the ambient noise in the room cannot be greater than 35 dBA. Likewise the reverberation time or length of time it

takes a sound to decay must not exceed 0.6-0.7 seconds to avoid build-up of noise and degradation of speech.

2.5.7.3 SPACE REQUIREMENTS:

a. Classrooms and large meeting spaces (which are defined herein as fifteen students or more) with a volume less than 10,000 cubic feet must have background noise levels of 35dBA or less and a reverberation time of no more than 0.6 seconds.

b. Classroom and large meeting spaces with a volume between 10,000 and 20,000 cubic feet must have background noise levels of 35dBA or less and a reverberation time of no more than 0.7 seconds.

c. Classrooms and large meeting spaces with a volume of 20,000 cubic feet or more must have background noise levels of 40dBA. An acoustic designer must determine the reverberation time in compliance with ANSI S12.60.

2.5.7.4 STC/IIC/NRC: To achieve these sound levels and reverberation limits walls/partitions, floors, and ceilings must have certain Sound Transmission Class (STC), Impact Insulation Class (IIC) and Noise Reduction Coefficient (NRC) ratings. The STC rating is a measure of the isolation provided between adjacent surfaces for noises in the range of common speech. The IIC rating is similar but measures the isolation of impact noise between a space and the space below it. The higher the STC or IIC number the greater the isolation. The NRC is a measure of a materials ability to absorb the sound within a space when the sound waves hit it. The NRC is described in hundredths using a decimal point such as 0.65 NRC.

a. This standard uses the following minimum wall STC ratings for classrooms and meeting spaces for fifteen or more students:

(1) STC-45 adjacent to circulation spaces, offices, and conference rooms.
(2) STC-50 adjacent to other classrooms/meeting spaces or outdoors.
(3) STC-53 adjacent to restrooms.
(4) STC-60 adjacent to mechanical room and student gathering areas.
(5) STC-47 for moveable partitions.

b. This standard requires STC-30 or higher ratings for classrooms/meeting space doors.

c. This standard uses an IIC of 50 (recommended) and 45 (minimum) for spaces above classrooms/meeting spaces in new construction.

d. Classrooms/meeting spaces must have a ceiling with a NRC of 0.70 or higher.

2.5.8 MISCELLANEOUS BUILDING ELEMENTS:

2.5.8.1 ELEVATORS: Consider service use of the elevators when making material selections. The elevator must have the same level of design as other portions of the building in terms of quality of materials. Stainless steel doors and entrances are preferred. Carpeted floors are acceptable in low service use elevators since it is easily replaced.

2.5.8.2 SIGNAGE: Comply with Accessibility Standards. Provide interior signage that conforms to UFC 3-120-01 Air Force Sign Standards (applies to Army projects). Coordinate signage requirements, including message content, room numbering, and placement with User and COR. Provide interior room identification signage. Provide gloss or matte finish plaques with slots in base laminate for insertion of changeable message strips. Auditoriums and conference room signage must have an "In Use" feature. Provide a building directory at the public entrance. In large complex facilities provide a graphic directory indicating orientation of the building from the location the directory is placed.

2.5.9 FINISHES AND INTERIOR SPECIALTIES

2.5.9.1 GENERAL: Provide durable and appropriately professional finishes typical of a corporate educational training center. Provide finish color and pattern selections that help hide soiling. Examples of soiling include but are not limited to: boot marks and tracked in dirt on floors, marks and fingerprints on doors and door frames, systems furniture panels, and overheads and tack boards.

2.5.9.2 FINISHES: A finish schedule is provided to establish minimum levels of acceptance. The designer in conjunction with the Installation must determine the requirements for the specific project in compliance with Army Standards. Ceiling heights are minimum recommended. See room descriptions for higher ceilings in large spaces. It is understood some renovation projects may not be able to achieve the higher ceiling heights.

SPACE NAME	FLOOR	BASE	WALLS	CEILING	CLG HGT MIN
EDUCATION SPACES					
Multi-Purpose Classroom	Vinyl Tile	Resilient	Paint	Susp Acou	9-10 ft(typ)
NCO Training classroom	Vinyl Tile	Resilient	Paint	Susp Acou	10 ft
ADMINISTRATION SPACES					
Information/Reception	Tile	Resilient	Paint	Susp Acou	10 ft
Director's Office	Carpet	Resilient	Paint	Susp Acou	9 ft
Administration Office	Carpet	Resilient	Paint	Susp Acou	9 ft
Conference Room	Carpet	Resilient	Paint/Pan	Susp Acou	9 ft
Computer Maintenance	Vinyl Tile	Resilient	Paint	Susp Acou	9 ft
Loading Dock (if required)	Concrete	NA	E Wall	Plaster	10 ft
Building General Storage	Concrete	Resilient	Paint	Open Struct	10 ft
Record Storage	Vinyl Tile	Resilient	Paint	Susp Acou	9 ft
Copy Room	Vinyl Tile	Resilient	Paint	Susp Acou	9 ft
Supply Storage	Vinyl Tile	Resilient	Paint	Paint Gyp	9 ft
SUPPORT SPACE					
Vestibule	Tile	Tile	Paint	Susp Acou	9 ft
Student Break/Vending	Tile	Tile	Paint	Susp Acou	9 ft
Staff Break Area	Tile	Tile	Paint	Susp Acou	9 ft
Restrooms	Ceramic	Ceramic	Paint	Susp Acou	8 ft
Janitor Closet	Ceramic	Ceramic	Paint	Paint Gyp	8 ft

Mechanical Room	Concrete	NA	Paint	Open Struc	NA
Electrical Room	Concrete	NA	Paint	Open Struc	NA
Comm Room	Vinyl Tile	Resilient	Paint	Susp Acou	9 ft
Corridors	Tile	Tile	Paint	Susp Acou	9 ft
Lobby Stair	Tile	Tile	Paint	Susp Acou	9 ft
Stairs	Vinyl Tile	Resilient	Paint	Susp Acou	8 ft
Elevator	Carpet	Laminate	Laminate	Metal	7’-4”
General Storage	Vinyl Tile	Resilient	Paint	Susp Acou	9 ft
Lactation Room	Carpet	Resilient	Paint	Susp Acou	8 ft

Abbreviations:

Ceramic	Ceramic Tile
Concrete	Sealed Concrete
E Wall	Exterior Wall Construction
Laminate	Laminate Panels
NA	Not Applicable
Susp Acou	Suspended Acoustic Tile
Paint Gyp	Painted Gypsum Board
Pan	Acoustical Wall Panels
Conc	Concrete
Tile	Large Porcelain or Ceramic Tile

2.5.9.3 INTERIOR SPECIALTIES: Refer to other portions of the RFP.

2.6 STRUCTURAL REQUIREMENTS

2.6.1 STRUCTURAL LOADS: Including dead, live, hydrodynamic, earth, vehicular, snow, wind, seismic loads and AT/FP, structural loads and design must be in accordance with UFC 1-200-01 Design: General Building Requirements and codes referenced therein. Verify code required loadings for raised access flooring.

2.7 THERMAL PERFORMANCE - NOT USED

2.8 PLUMBING REQUIREMENTS: Refer to Part 2.11.

2.9 TELECOMMUNICATIONS AND SECURITY SYSTEMS

2.9.1 GENERAL: Refer to other portions of the RFP for additional requirements.

2.9.2 TELECOMMUNICATION SYSTEMS: Information systems must consist of a complete end-to-end voice, data, and telemetry cable based functional design accomplished IAW the US Army Installation Information Infrastructure Architecture (I3A) Technical Criteria. Information system equipment provided to satisfy the service requirements of this design must meet the technical specifications and planning guidance found in ANSI/TIA/EIA-568-B and 569A, as appropriate. Functional requirements must be developed and implemented based upon the I3A criteria to satisfy both the near-term as well as the growth potential of this US Army facility. The I3A standard dual jack voice/data outlet must be used throughout this facility with the following exceptions: wall telephone outlets must be single jack configuration, classroom computer jacks must be data only (dual jacks) to serve the computers planned for each classroom; however, the classroom instructor's administrative telephone outlet must be a standard dual-jack voice/data

outlet. System provisions must be compliant with the requirements of the Americans with Disabilities Act (ADA), as required for the facility.

2.9.3 VOICE SYSTEMS: The telephone/voice system provided in this project must meet US Army I3A objectives using standard state-of-the-art equipment and installation practices. The telephone/voice system provided with this facility will receive dial tone from a US government-controlled telephone switching system. Special requirements for telephone circuits receiving dial tone from other sources, such as pay-telephone, must be coordinated with installation's local commercial provider. See NEC for contact information. The telecommunications cross-connect scheme for this project must utilize a combination of 110 punch down blocks and category rated patch panels as shown in the I3A Criteria. This is not a "small facility" for cross-connect purposes. Coordinate minimum essential service requirements with the NEC; use these requirements in conjunction with the I3A Criteria to develop the design based upon planned functional usage of the various spaces. Plan for wall telephone outlets to satisfy an intelligent design based upon safety, courtesy, and convenience. As a minimum, wall telephone outlets must be provided in equipment rooms (electrical room, HVAC room, telecommunications room, and CATV/CCTV/surveillance room), in "break" areas and at entry areas, and along corridors and hallways using a density of four wall telephones per 10,000 square feet of gross building space.

2.9.4 DATA SYSTEMS: Terminate data jacks on patch panels located on racks in the telecommunications rooms(s). Terminate classroom data jacks on patch panels located in classroom equipment rack. Each classroom area, including those established by folding partitions, must have its own equipment. The classroom data network must be contained in a communication closet within the classroom, with its own data switch (provided by TRADOC). Provision each classroom with twelve strands of fiber optic cable (six single mode and six multimode) to the nearest serving Network Operations Center in the building. Coordinate with the NEC for special data requirements. Provide a dedicated 20-amp circuit for each classroom communication closet.

a. **Wireless Technology:** The use of wireless technology for data transfer must be in accordance with Army Regulation 25-1 Army Information Management found at www.army.mil/usapa/epubs/25_Series_Collection_1.html as well as the latest memorandum and letters regarding this quickly evolving issue.

2.9.5 INFORMATION SYSTEM EQUIPMENT: The building's interior copper cabling must be TIA/EIA 568B Category 6. Installation must be in accordance with UFGSs.

2.9.6 MASS NOTIFICATION: Provide a mass notification system in accordance with UFC 4-010-01 and UFC 4-021-01 for the purpose of providing real-time announcements in the immediate vicinity of the building during emergency situations. Coordinate specific system requirements with the User and Installation.

2.9.7 OUTSIDE CABLE PLAN INFRASTRUCTURE: Extend the information system infrastructure from the nearest existing information system node having sufficient capacity to satisfy the facilities requirements. Coordinate with the NEC on this location. New underground conduits must be multiple concrete encased four-inch PVC ducts (or equivalent) and

sized, designed, and installed in the underground manhole and duct system IAW the installation's current approved I3A Plan to ensure maximum flexibility for future growth. Place outside plant information systems cabling, both copper cable and fiber optic cable, from the servicing nodes into the new facility; extend and terminate the OSP information system cabling on the building's entrance facility in accordance with fire and safety code.

2.9.8 PREMISES DISTRIBUTION SYSTEM (PDS) INFRASTRUCTURE: Design the PDS in accordance with the I3A Technical Criteria to develop the functional information system features required along with the preferred technical implementation. Ensure that PDS cable distribution and telecommunications requirements comply with the I3A (for design and allocations) and with the latest versions of TIA/EIA 568B (for technical implementation).

Follow requirements of ANSI/TIA/EIA-569-A for telecommunications paths and equipment room spaces. Provide dedicated PDS raceway space and equipment room space for the purpose of future fiber optic cable installation to each outlet location initially served only by copper cable. Provide space for future data and communication cabling. Provide I3A standard dual-jack voice/data outlets throughout core areas, the supply/administration areas, and the classroom's instructor's podiums/desk; use I3A functional area outlet-densities to determine the outlet quantities. Provide data outlets for planned computer equipped classroom desktops; voice outlets are not appropriate for classroom desktops. Use of multiple-jack outlets to serve classroom desktop locations, (i.e. up to four RJ-45 jacks) is typical. Terminate classroom data outlets on patch panel(s) mounted in a classroom-based cabinet. This cabinet must also contain LAN networking equipment needed within the classroom. Provide fiber optic cable from this rack (six single mode and six multimode) to the nearest building telecommunications closet.

2.9.9 CABLES AND JACKS: Provide in accordance with the I3A Criteria using the latest technical standards in TIA/EIA-568-B. Connect information system (voice/data) outlets from the equipment room's equipment rack with two four-pair, Category 6, unshielded twisted pair (UTP) solid copper station cable terminated on eight-position IDC type connectors and extended to the servicing equipment room's equipment rack. Connect single eight-position type walls, special purpose, and pay telephone outlets with one four-pair, Category 6, unshielded twisted pair (UTP) solid copper station cable terminated on eight-position IDC type connectors and extended to the servicing equipment room's equipment rack. For specialized circuits, such as pay phones, coordinate with the local telephone company for electrical requirements and Americans with Disabilities Act (ADA) design features. When systems furniture is installed as part of the construction contract, ensure that systems furniture specifications include ANSI/TIA/EIA-568-B and ANSI/TIA/EIA-569-A cabling and raceway standards. Use a combination of multimode and single mode fiber optic cable (12 strands of each) for backbone data service, unless expanding an existing site where other backbone cable types are required or requested by user. Refer to the “Installation Information Infrastructure Architecture (I3A) Technical Criteria".

2.9.10 PAGING SYSTEMS: Provide for a paging system for the entire building with the microphone located in the Building Manager’s Office. Provide a system that allows paging individually or grouped in classrooms,

administration, and public areas. Outdoor spaces such as break areas must be on the public area system.

2.9.11 CATHODIC PROTECTION: Cathodic Protection (CP) is mandatory on buried ferrous metallic structures. Design of cathodic protection systems in accordance with UFC 3-570-02N.

2.9.12 ELECTRONIC SECURITY SYSTEM (ESS): Coordinate the requirement for security systems including provisions for the CCTV system with the User and the Installation local security authority. Design of security systems must also be coordinated with the Mandatory Center of Expertise (MCX) Electronic Security Center, US Army Installation Support Center, Huntsville, Alabama.

2.9.13 CCTV: For large facilities, provide an alarm and CCTV system. Alarm monitoring will be performed in the Building Manager's Office at a console where the public cannot view the alarm and CCTV monitors. Every exterior door must have a door position switch. Install CCTV camera in corridors, public spaces, and the loading dock. Facilities must have their alarms reported to the Installation security office.

2.9.14 CLOCK SYTEMS: Provide clocks in classrooms and public spaces. When requested by the Activity, this requirement can be met by providing an integrated clock system that provides adjustment of clocks from one central point.

2.10 ELECTRICAL REQUIREMENTS

2.10.1 GENERAL: The electrical design for facilities must be in accordance with the current editions of the National Electrical Code and the National Electrical Safety Code, and other required criteria. Lighting design must be in accordance with the Illuminating Engineers Society of North America (IESNA) Lighting Handbook and recommended practices.

a. **Facility Energy Conservation Requirements:** The entire facility design, including interior and exterior lighting and power systems must be in accordance with UFC 1-200-02 *High Performance and Sustainable Building Requirements*.

b. **Design Calculations:** Provide analysis throughout the design to document selection of equipment and wiring in accordance with code criteria. Calculations as a minimum must include load analysis, voltage drop, fault, device coordination, interior and exterior lighting.

c. **Space Requirements:** Provide electrical space for electrical equipment. Provide clearances and working areas as required for the space by the National Electrical Code. Coordinate location to consider factors such as aesthetics, ease of maintenance, proximity to loads being served, and accessibility.

d. **Materials and Equipment:** Materials and equipment must be the standard catalogued products of manufacturers regularly engaged in the production of such equipment and material and must be the manufacturer's latest design. Equipment and material must be in accordance with 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

required. Where standards exist, materials and equipment must bear the label and be listed by Underwriters Laboratories, Inc. (UL) or other recognized testing organization.

2.10.2 POWER: Feed power service to the buildings underground from the base electrical distribution system via a pad-mounted transformer located near the primary building. Power service to buildings must be fed underground from the transformer to building service entrance equipment located in the electrical equipment room.

a. **Special Power Requirements:** Coordinate electrical power outlets for special power with the requirements in Chapter 2, Space Design Criteria.

b. **Grounding:** Each building must have in addition to the grounding requirements of the National Electrical Code a ground grid or counterpoise around the building perimeter for connection to incoming service, building steel, telephone service, piping, and internal grounding requirements.

c. **Lightning Protection:** Protect facilities from lightning in accordance with the National Electrical Code. Where recommended by the Standard for installation of Lightning Protection Systems, NFPA 780, Annex L, protect the facility by a building lightning protection system.

2.10.3 LIGHTING LEVELS, FIXTURES, AND CONTROL: Interior and exterior lighting design must be in accordance with the recommendations of the IESNA Handbook, RP-1-93, Office Lighting and RP-3-00, Guide for Educational Facilities Lighting, UFC 3-530-01 *Interior and Exterior Lighting Systems and Controls* (except for color rendition which must be 5,000K for classrooms spaces) and UFC 1-200-2 *Sustainable and High Performance Building Requirements*. Provide computer friendly lighting systems such as indirect and parabolic systems in spaces where Video Display Terminals are used extensively. Provide variable/multilevel switching and dimming systems in interior spaces as indicated in Chapter 2, Space Design Criteria. Provide occupancy sensors in spaces where use is intermittent, such as conference rooms, corridors, restrooms, and storage spaces. Note that UFC 3-530-01 prohibits use of incandescent fixtures except where alternatives are unavailable.

2.11 HEATING VENTILATING AND AIR CONDITIONING (HVAC) REQUIREMENTS

2.11.1 GENERAL: Design Standards and Codes. The mechanical design for facilities must be in accordance with the current versions of Army Design Guides, UFC, International Mechanical codes, and required codes and standards. The building including the building envelope, HVAC systems, service water heating, power, and lighting systems must meet the requirements of UFC 1-200-02 *High Performance and Sustainable Building Requirements*.

2.11.1.1 Design building systems and elements to meet the minimum requirements of ANSI/ASHRAE/IESNA 90.1. Design the building, including the building envelope, HVAC systems, service water heating, power, and lighting systems to achieve an energy consumption that is at least 40 percent below the consumption of a baseline building meeting the minimum requirements of ANSI/ASHRAE/IESNA Standards 90.1. Energy calculation methodologies used for this documentation and analysis must follow the guidelines

set forth in Appendix G of ASHRAE 90.1, with the exception that receptacle and process loads may be omitted from the calculation.

The equipment must be Energy Star or FEMP-designated products. The term "Energy Star" means a product that is rated for energy efficiency under an Energy Star program. The term "FEMP designated product" means a product that is designated under the Federal Energy Management Program of the Department of Energy as being among the highest 25 percent equivalent products for energy efficiency. When selecting integral sized electric motors, choose NEMA PREMIUM type motors that meet NEMA MG 1, minimum Class F insulation system. Motors with efficiencies lower than the NEMA PREMIUM standard can only be used in unique application that require a high constant torque speed ratio (e.g., inverter duty or vector duty type motors that meet NEMA MG 1, Part 30 or Part 31).

2.11.1.2 ACOUSTICS: Comply with LEED v4 NC acoustical requirements, ANSI A12.60 (latest edition) recommendations, and the following: Mechanical equipment, systems, and components must be selected to ensure a maximum noise level of 40dBA in learning, study, and 'quiet' spaces, except that noise levels in corridors and support spaces cannot exceed 45 dBA. When full compliance with the prescriptive requirements and recommendations of these requirements cannot be met, then an Acoustic Consultant must be retained and must design a system of noise control that meets the acoustical performance requirements. Of special concern in educational facilities is Speech intelligibility/Privacy (open plan spaces), noise transmission (through walls and ceilings), vibration (from mechanical equipment), and ambient noise (such as from ductwork).

2.11.1.3 Do not locate Roof-top mechanical units directly over classrooms.

2.11.1.4 To the extent possible, do not locate VAV boxes in classroom ceilings. These are best located in corridor ceilings.

2.11.1.5 DESIGN CALCULATIONS: Heat loss and heat gain calculations. Heating and cooling loads must be in accordance with the current edition of the ASHRAE Handbook of Fundamentals, International Mechanical Code and UFC 3-410-01FA *Design: Heating, Ventilating, and Air Conditioning*. Provide computer-generated load calculations and include complete input and output summaries. Equipment can be oversized to no more than 115 percent of the computer-generated load. Base design on weather data from UFC 3-400-02 *Engineering Weather Data*, from ASHRAE Handbook of Fundamentals, or from other recognized and authoritative sources of weather data. Include values for internal cooling loads in the computerized load calculations in accordance with ASHRAE recommendations. Provide minimum space heating and ventilation in spaces normally unoccupied, such as storage and equipment rooms. Industrial ventilation requirement, other than that required per human occupant, may be considered process load when selecting supplemental heating equipment for the bay area.

a. **Load Design Criteria:** Include internal loads for each space. Include lights for the actual quantity provided. Additional equipment furnished or planned under the design must also be included in the appropriate space.

b. **Ventilation Air Calculations:** Provide calculations determining minimum outside ventilation air for each building space. Ventilation rates must be in accordance with the current edition of the International Mechanical Code, and the current ASHRAE Standard 62.1. Outside air quantities must be sufficient to meet ventilation requirements and maintain a positive pressure relative to the outdoors.

c. **Exhaust Air Calculations:** Provide calculations determining minimum exhaust for each exhaust system. Exhaust rates must be in accordance with the current edition of the International Mechanical Code and the current ASHRAE 62.1.

d. **Piping Calculations:** Provide calculations for pressure drop calculations for piping systems, including head loss calculations for pumps.

e. **Duct Calculations:** Provide calculations for sizing duct systems, including static pressure drop calculations for fans. Ductwork layout drawings must also be provided to indicate fittings and devices to substantiate calculations.

f. **Acoustic Calculations:** Model system and simulate across full sound spectrum to ascertain compliance with the acoustic requirements.

2.11.2 HVAC DESIGN CRITERIA

2.11.2.1 MECHANICAL SYSTEMS: Provide each building core area with a central heating and air conditioning system. Systems must be designed, installed, balanced, and adjusted to distribute heat and cooling in proportion to the calculated load requirements of these spaces. Provide a detailed investigation of the treatment of outdoor ventilation air. Classroom spaces, auditoriums, training spaces, conference rooms, and multipurpose spaces are typically occupied by a high number of people. The correspondingly high amount of outdoor air required is often beyond the capability of office or classroom type systems, leading to potential problems with mold, mildew, and high humidity situations. Special problems requiring special solutions occur when the outdoor air is at a high relative humidity condition or the spaces are only partially occupied or unoccupied. Systems such as a dedicated VAV outdoor air handling unit and carbon dioxide sensing controls (Demand Ventilation) must be investigated and considered. Provide means for determining when rooms are partially occupied or unoccupied to modulate outdoor air supply. Provide each space with a separate system with occupancy sensors or other override to change status from unoccupied to occupied. The Designer in close coordination with the installation shamustll determine the allowable system types and fuel options to be used. Also coordinate unit locations with Installation facilities engineering personnel (DPW). Consider systems utilizing energy efficient equipment, providing additional space in the mechanical room, and other features, which contribute to ease of system operation and maintenance. Consider the high people and computer load that may require cooling in some areas while heat is needed in others at the same time.

a. **Air Distribution Systems:** Provide duct systems in accordance with the recommendations of the SMACNA Duct Construction Standards including seal class requirements. Provide fire dampers where required by NFPA

90A. Provide balancing dampers at branch takeoffs and for supply outlets. Provide permanent access to dampers. Place air intakes at least ten feet above ground to meet the requirements of UFC 4-010-01 *DoD Minimum Antiterrorism Standards for Buildings*. Cover intakes with screens to prevent insects and foreign objects from entering.

b. **Humid Air Design:** Where required, use the special criteria for humid areas in UFC 3-410-01FA *Design: Heating, Ventilating, and Air Conditioning*.

c. **Building Automation System:** Provide a building Automation System consisting of a building control network, and integrate the building network into the existing base wide EMCS/UMSC (if present).

2.11.3 TEMPERATURE CONTROLS

2.11.3.1 The building control network must be a single complete non-proprietary Direct Digital Control (DDC) system for control of the heating, ventilating, and air conditioning (HVAC) systems. The building control network must be an Open implementation of LonWorks® technologies using ANSI/EIA 709.1B as the only communications protocol and use only LonMark Standard Network Variable Types (SNVTs), as defined in the LonMark® Resource files, for communication between DDC hardware devices to allow multi-vendor interoperability. The building automation system must be open in that it is designed and installed such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original contractor.

2.11.3.2 Perform necessary actions needed to integrate the building DDC system into the base wide EMCS/UMCS. Include these actions in configuring M&C Software functionality including graphical pages for System Graphic Displays including overrides, alarm handling, scheduling, trends for critical values needing long-term or permanent monitoring via trends, and demand limiting. Install IP routers or ANSI/CEA-852 routers as needed to connect the building network to the EMCS/UMCS IP network. Routers must be capable of configuration via DHCP and use of an ANSI/CEA-852 configuration server but must not reply on these services for configuration. Communication between the EMCS/UMCS and building networks must be via the ANSI/CEA-709.1B protocol over the IP network in accordance with ANSI/CEA-852.

2.11.3.3 Provide air distribution emergency shutoff switch as required UFC 4-010-01.

2.12 ENERGY CONSERVATION REQUIREMENTS - SEE PART 3

2.13 FIRE PROTECTION REQUIREMENTS

2.13.1 GENERAL: The fire protection design for facilities must be in accordance with the current versions of the Unified Facilities Criteria 3-600-01 *Design: Fire Protection Engineering for Facilities*, International Building Code, and the National Fire Protection Association (NFPA) standards and codes.

2.13.2 FIRE SUPPRESSION SYSTEMS:

a. **Sprinkler System:** Provide a wet or dry type sprinkler as required by the project. Provide design by a qualified Fire Protection Engineer as defined in UFC 3-600-01 and in compliance with UFC 3-600-01 and NFPA 13 *Standard for the Installation of Sprinkler Systems*.

b. **Loading Docks:** Fully sprinkle the loading docks by a sprinkler system.

c. **Hydrant Flow Data:** Perform a hydrant flow test in the early stages of design indicating Date and Location of Test, Static Pressure, Flow, and Residual Pressure. Provide preliminary hydraulic calculations to determine whether there is sufficient water supply and pressure to meet the flow demands of the sprinkler systems within the facility and the fire department hose stream requirements from the fire hydrants.

d. **Fire Pump:** When a pump is required, type of pump must be in accordance with Unified Facilities Criteria 3-600-01 *Design: Fire Protection Engineering for Facilities*. Provide electric driven fire pump and controllers in accordance with NFPA 20.

e. **Fire Extinguishers and Cabinets:** Provide portable fire extinguishers in accordance with NFPA 10. Provide bracket-mounted extinguishers in service areas. Provide semi-recessed aluminum fire extinguisher cabinets with clear view panel in public areas. Provide fire-rated cabinets in fire-rated wall assemblies.

f. **Interior Wall and Ceiling Finishes:** Wall and ceiling finishes and movable partitions must meet the requirements of the IBC and NFPA 101, except for interior finish for exits and exit passageways must be Class A only. Test flame spread (FS) and smoke development (SD) in accordance with IBC requirements. Class C materials must only be permitted in fully sprinklered buildings.

2.13.3 FIRE DETECTION AND ALARM SYSTEMS:

a. **Fire Alarm:** Provide an addressable fire alarm system in accordance with requirements of NFPA 72 and NFPA 101. Fire alarm system must consist of pull stations, audiovisual devices, control/annunciation panel and tamper and flow connection/supervision to the sprinkler system. Provide supervision of fire pump where fire pump is provided. Tie fire alarm system into the base-wide system in accordance with base requirements. Consult with Fire Department regarding the number of zones they require. Note that at many installations, eight zones are required.

2.14 SEE PART 3 SUSTAINABLE DESIGN

2.15 SEE PART 3 ENVIRONMENTAL

2.16 SEE PART 3 PERMITS

2.17 SEE PART 3 DEMOLITION

2.18 SEE PART 3 ADDITIONAL FACILITIES

2.19 EQUIPMENT AND FURNITURE REQUIREMENTS

2.19.1 FURNISHINGS

2.19.1.1 GENERAL: Classroom desk and chairs for students and staff must be heavy duty, ergonomic designs for high use. The use of keyboard trays will be up to the local school based on their teaching situation (classes that seldom use computers but require maps and books on the desk will prefer keyboard trays). In digital classrooms, keyboard trays must not be used. Desk that has keyboards on the top must be 27 inches high for proper typing ergonomics. Student desk must be modular and have appropriate wire management to allow easy reconfiguration of spaces. Where desktop computers are used, consider flat screen monitors to use less desk space and provide better sight lines to the front of the class.

a. Desks must be steel frame based using at least 18-gauge steel with high-density particleboard or plywood to minimize lifecycle costs. Student desk must be approximately 3 feet wide by 30 inches deep. This may vary based on the subject being taught and the inclusion of applied instruction. Where students work in pairs, a singlewide desk may be required. Where use of equipment or printed maps/drawings is taught, a deeper and occasionally wider desk may be required. In the case of applied instruction such as the operation and repair of radios, special desks are required to support and power equipment. These things must be considered in the planning process.

2.19.1.2 ADMINISTRATIVE SPACES: Use systems furniture where possible and must include integral cabling and task lighting. Desktops must have medium to low reflectivity durable surfaces. Conference room tables must be modular to allow for reconfiguration and removal from the room. Common area furniture such as in Lounges must be durable, comfortable, and reconfigurable. Systems furniture must incorporate removable panels, hinges, or other means of convenient access to wall electrical outlets and communication jacks.

a. Provide caster chairs with appropriate floor casters.
b. Provide keyboard trays.
c. Provide lockable desks and workstations, filing cabinets and storage. Key locks within a one-person office the same. Key one-person offices within a building differently. If an office or open office area has more than one workstation, key the workstations differently, but key locks within an individual workstation the same.

2.19.1.3 AUDITORIUM SEATING: Fixed auditorium seating must consider riser mounting to keep the floor open. Consider the need for writing tablets, data, and power connections in special situations.

2.19.1.4 CLASSROOM COAT STORAGE: Consider project specific requirements for coat storage. This usually takes place inside of classrooms. Storage in corridors is not acceptable. Typically a wall space of the classroom is devoted to coat hooks within an entrance ‘alcove’ or recess of the classroom.

2.19.2 EQUIPMENT

2.19.2.1 GENERAL: Coordinate User’s required equipment needs and provide matrix of responsibilities for equipment and furniture.

2.19.2.2 AUDIO/VISUAL EQUIPMENT:

a. **Interactive Whiteboard:** Interactive Whiteboards are wall mounted in coordination with other equipment in the room. Installation is by the Proponent Command (TRADOC, USARC). Therefore, designer needs to provide power/data and supporting infrastructure in coordination with Proponent Command. Early coordination is essential. Small classrooms and meeting rooms often use the whiteboard as a projection surface. The board is used to write and edit notes to work in projected and non-projected modes. The board can capture notes and save them to a digital file. The system must be fully integrated into the classroom with concealed power and data. Proponent Command determines the size of the boards based on current models and room requirements. Units ordered are self-contained with operating software included with each board. Do not provide wall recesses, since the final board size may change during the design in response to the availability of more desirable larger models.

   LCD panels located at lecterns or instructor’s workstation and provide the same functions as interactive whiteboards may be used to replace the white boards. This is often done in smaller classrooms where space is more limited. This allows instructors to work without turning their backs to students or blocking the information.

b. **Whiteboard/Marker Board:** Marker board must have a porcelain enamel writing surface (on a steel backing) and chalk tray. It must be a factory assembled unit complete in one piece, without joints whenever possible. Marker board must include a map rail with a tackable insert and must have map hooks with clips for holding sheets of paper. Dry erase markings must be removable with a felt eraser or dry cloth without ghosting. Unit must come complete with accessories. Installations will determine the size of the boards based on current models and room requirements.

c. **Tack Board:** Tack board must have fabric wall covering laminated to cork, insulation board or fiberboard and framed to match other specialties in the space. In offices, tack board and whiteboard may be a combination unit. Installations will determine the size of the boards based on current models and room requirements.

d. **Projection Screen:** Ceiling-mounted motorized projection screen must be motor operated in large rooms, such as auditoriums. Installation is by the Proponent Command (TRADOC, USARC). Therefore, designer needs to provide power/data and supporting infrastructure in coordination with Proponent Command. Early coordination is essential. Screens are motorized with three-position control switching to stop or reverse screen at any point. Accommodate recessed ceiling mounted case. Coordinate with Proponent Command on exact size. Screens must be at least 72 inches high by 84 inches wide or larger as appropriate for room size. Bottom of screen must be no lower than 36 inches. Proponent Command will provide controls and wiring that integrate with the interactive lectern/instructor’s workstation in rooms where they are required.

e. **Projectors and Brackets:** Provide sufficient blocking and structure to accommodate ceiling-mounted projectors and bracket supports with concealed power and control wiring. Fixed brackets are typically used. Models are selected based on individual classroom requirements, and early coordination with the Proponent Command is essential in order to define the loading requirements and locations.

f. **Lectern:** Due to its connection to the AV equipment controls, the Interactive Lecterns are provided by the Proponent Command. These are normally enclosed metal or wood cabinets manufactured specifically as a lectern. They integrate control of room lights, projector, and sound system in large classrooms (50 or more students), large conference rooms (50 or more people), and auditoriums. It also includes a sloped reading surface, reading light, sound system, wireless microphone, clock with countdown feature, and space/connectivity for a computer. Coordinate the lectern with building electrical power and lighting and LAN. Conceal cabling. As indicated in the space narratives, instructor's desk with the same functions must be used for VTT and digital classrooms in lieu of a lectern. Coordinate lectern requirements for each project to address special needs such as rack-mounted computer. Some large auditoriums require two lecterns. Control wiring for classroom A/V equipment is usually provided by the Proponent Command.

2.19.2.3 WINDOW TREATMENTS:

g. **Classrooms:** Provide commercial grade treatments for windows. Preferred system is fabric roller shade. Typically, a classroom requires shades with no greater than three percent openness factor. Design shades to adequately mitigate glare for both student computers as well as wash-out of the presentation wall/screen.

h. **Non-Classrooms:** Provide window treatment at exterior interior windows where privacy is required, such as an office.

2.20 FACILITY SPECIFIC REFERENCES - NOT USED

Part 3 Execution

3.1 installation Requirements (paragraph 6)

-- End of Section --