

Architectural**Building Layout**

In conformance with Part 3, Chapter 2 paragraph 2.4.1, building layout is based on the Blocking Diagram found in Chapter 4 of the RFP. Spaces have been laid out to follow the described adjacencies to ensure the functionality is not compromised. This layout requires two distinct areas: classified and non-classified with multiple functions within each. Duplicate support facilities such as breakrooms and heads/shower areas are provided to minimize traffic through this separation, therefore limiting opportunities for breach attempts. P1338F building will provide a total of 53,443 gross square feet as limited by DD1391. This is a single level facility and it will be made fully accessible per the ABA guidelines. This facility will provide instructional flexibility as it will be equipped with folding partitions between the Simulator Classrooms allowing numerous configurations of space to accommodate any size gathering(s).

Construction Type

P1338F facility will be of a Type IIB construction, designed to current codes and applicable criteria as defined by the RFP. Due to its elongated shape, this building will contain a building expansion joint occurring on the non-classified side.

Building Design

In conformance with Part 3, Chapter 2 paragraph 2.4.1, building design for P1338F II MEF Simulation/Training Center Replacement follows the design features prescribed in the Camp Lejeune Base Exterior Architectural Plan (BEAP) for Hadnot Point area. The BEAP requires this building to be of Georgian or Colonial Revival architectural style, with 4:12 sloped hip roof forms. The proposed building massing and the aesthetics are compatible with vernacular architecture.

Building Envelope

The exterior envelope of this building will be consistent with the Georgian style and will include both brick veneer and precast stone elements. All vertical elements are erected over slab on grade, insulated with R-20 rigid insulation for 24" from the edge and cast over vapor/radon barrier. At the building's base, a precast stone water table will be provided to 40 inches above the floor, this will also be the height of the window sills, also made of cast stone. At entries, a precast stone entryway will define the main, glazed aluminum entry doors. Balance of the wall will be achieved with brick, including quoins at building corners. Precast stone Jack arches above windows will provide support of brick above. The exterior walls will be constructed as cavity walls with masonry block (precast panel) load-bearing back-up, with air/vapor barrier applied directly over the exterior face and insulated w R-10 rigid insulation. Where required by the finish schedule these walls will be furred out on the inside to provide gypsum board finished look. This building will be air-tight to eliminate issues with infiltration and to eliminate security vulnerability. To this end, the soffit and fascia panels will be insulated. This will ensure the continuity of the air/vapor barrier at eaves where water and air penetrations are most common. Standing Seam Metal Roof (SSMR) will be provided over the entire building with Expansion Joint cover in matching color. 16 inch wide SSMR panels will be installed over the air/vapor barrier and gypsum sheathing installed over the R-33 rigid insulation on metal deck. Main entries will provide overhangs with metal columns and articulation matching the Georgian style. These projecting entries with include gable roof forms and will be painted white to contrast the building main color of red brick. Aluminum windows will meet the AT/FP requirements and will be fixed, thermally broken with tinted, insulated glazing. Extra-Heavy-duty, 4'-0" wide exterior doors will be insulated hollow metal, factory primed, and field painted to achieve the desired aesthetics. Any mechanical louvers will be drainable, prefinished aluminum. Gutters and downspouts will be prefinished metal and will terminate in the cast iron boots, for underground storm water management system. Colors of all building elements will be provided in accordance with BEAP color scheme for Hadnot Point.

Building Interior

The interior layout will be achieved with mostly metal stud partitions. Steel columns will provide structural support for roof above. Where specifically required by the finish schedule CMU partitions will occur. At the corridors where polished face CMU is required as the finish, our design provides the veneer approach where the 4" CMU veneer terminates above the ceiling and the back-up stud wall is providing the required fire, smoke and/or sound rating. Where required, STC 45 or STC 50 partitions are provided full height to deck above. All penetrations are sealed to ensure continuity of the sound separation. At the Simulator Classrooms, a 12 inch raised access flooring is provided over recessed slab. In the Auditorium, a sloped floor is provided in support of the assembly function with staggered, fixed auditorium seating. At two entry vestibules, a recessed walk-off mat is provided. Doors into the Simulator

Classrooms, Auditorium, Fire, Exercise Control, Simulation Admin and Server Admin are 4'-0" wide, flush wood doors. Extra-Heavy Duty at Classrooms, Head and Breakrooms and Heavy-Duty at other occupied spaces. In unoccupied areas doors are Hollow metal, painted, with Level 4 and physical performance level A.

Majority of spaces have 24x24 inch suspended acoustical ceiling panels. At Simulator Classrooms, gypsum board header at folding partitions is provided to add visual interest. For the same reason the Auditorium includes a 2 foot wide perimeter soffit, and at the main Lobby a gypsum board ceiling with a vaulted form is provided. In mud, head and shower areas, all gypsum partitions are moisture resistant, so are the gypsum board ceilings. Ceiling mounted folding partitions inside the Simulator Classrooms and Fire Rooms will provide sound rating to match wall requirements and will include communicating/egress doors integral to the panel. Sound rating will continue above these panels via a gypsum board partition suspended and braced from deck above.

**DB Hurricane Florence Recovery MILCON Package 3,
Training and Storage Facilities, MCB Camp Lejeune, NC**

Factor 4 Data Call:

P1338F: II MEF SIMULATION/TRAINING CENTER REPLACEMENT

Abbreviated name: P1338 MEF Simulation Training Center

Introduction (Joe to complete)

Understanding of RFP Part 3, 2.0 (project specific priorities, special design challenges, etc)

Architectural

Building Structure

Gravity Framing Systems:

The structural framing system for the referenced project will be comprised of steel joists supported on load bearing walls for the majority of the plan. At the intersection of the hips to the ridge, engineered steel trusses will provide support for the typical joist framing. All roof framing will support galvanized 1½" Type B metal roof deck which will then support architectural roofing components. Exterior wall construction shall be either comprised of reinforced masonry or reinforced concrete walls. Concrete walls may be either cast on site, or prefabricated and erected into place. Given the length of the building, a building expansion joint is to be positioned along corridor 108 in the proposed layout.

Foundation System:

Currently, a geotechnical study is on going to develop foundation recommendations. Based upon the preliminary information provided to date, the foundation shall be comprised of column and continuous walls footings associated with a shallow foundation system. The shallow foundation system will be designed for an allowable soil bearing pressure of 2,000 psf. Concrete for the foundation work will have a 28-day minimum compressive strength of (f'c) of 3,000 psi minimum.

Based upon preliminary information provided to date, the first-floor slab shall be a 4" slab-on-grade, over 4" depth of porous fill, over a vapor retarder. Concrete for the slab shall be 28-day minimum compressive strength (f'c) of 3,500 psi and will be reinforced with synthetic fibers. The slab shall be jointed in accordance with ACI recommendations and mild reinforcing bars may be added at various locations to minimize the occurrence of slab cracks.

Lateral Resisting System:

The lateral load resisting system for the structure will consist of "ordinary plain reinforced masonry shearwalls" or "ordinary plain reinforced concrete shearwalls."

Building Envelope

Mechanical Systems and DDC Controls

Accessibility to Mechanical room

Circulation within the mechanical system

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Abbreviated name: P1338 MEF Simulation Training Center

Electrical Systems

Communication Systems Infrastructure

Resiliency

Cyber secure EMCS integration
utility metering and controls

Anti-Terrorism/Force Protection (ATFP) Features

Sustainability and Low Impact Development (LID)

Site Layout

improvements and/or efficient use of sites.

Special Systems

Security measures
Cybersecurity measures
Weapons storage

General

The following is considered the significant pricing items related to the fire alarm/mass notification (FA/MNS) and fire suppression systems for the project.

Fire Alarm and Mass Notification System

The P1338F Simulation/Training Center shall be provided with fully operational, fully addressable, intelligent, combination, fire alarm and mass notification system in accordance with UFC 3-600-01, UFC 4-021-01, and NFPA 72. The systems shall be capable of providing notification of alarm, supervisory, and trouble conditions, alerting the occupants, summoning aid, and controlling emergency control function.

- The system shall include a combined Fire Alarm/Mass Notification System Control Panel (FMCP) that is solid state microprocessor-based and capable of handling a minimum of 500 individually identified addressable devices.
 - The FMCP shall be a Simplex, Notifier, or Fire-lite and include a fire reporting system, compatible with the existing receiving and reporting systems.
 - The FMCP shall be provided with a 24-volt D.C. battery backup & recharging system sized to meet system requirements in accordance with NFPA 72.
 - The FMCP back-up battery shall be capable of operating the system under standby load for a minimum of 48 hours followed by an alarm condition for a period of 15 minutes at maximum connected load or 60 minutes of mass notification at the maximum connected load immediately upon loss of power, whichever is greater.
 - Each NAC and SLC shall include a 25% spare capacity for future modifications.
- The system shall also include a digital alarm communicator transmitter (DACT), mass notification radio transceiver, subpanels, notification appliance circuit (NAC) panels, local operating console, power supplies, initiating devices, notification appliances, conduit, wire, fittings, and all accessories required to provide a complete operating system.
 - All fire alarms, supervisory alarms and trouble conditions must be transmitted to the Sur-Gard System III Multi-platform Digital Telephone Receiver.
 - Provide a point reporting digital alarm communicator transmitter utilizing two CAT 6 UTP cables inside one-inch conduit from the FMCP to the telephone equipment room.
 - Space, antenna, conduit, cable, pull strings, shall be provided for a government provided TRX-401 mass notification transceiver.
 - The FA/MNS system shall be initiated from devices consisting of pull stations, photoelectric area smoke detectors located as required by code (building is fully sprinklered), duct mounted smoke detectors, vane type sprinkler flow switches, and valve (including post indicator valve) supervisory tamper switches. Remote test stations shall be provided for inaccessible detecting devices.
 - HVAC interlocks shall be provided in the FMCP to shutdown selected ventilation equipment upon fire alarm activation via duct detectors.
 - Carbon monoxide (CO) detection shall be provided in areas where fossil fuels are burned.
 - The annunciation system will consist speakers, strobes, and combination speaker/strobes.
 - Provide ceiling mounted notification appliances where a suspended ceiling is provided
 - Exterior speakers shall be weatherproof "bull horn" style.

- A single visual ABA rated strobe, clear color, marked "Alert", shall be utilized for both the fire alarm and mass notification systems.
 - LED Text notifications displays shall be provided over (or adjacent to) each substantial means of egress from the building.
- Server room shall be provided with very early warning air aspirating smoke detection in accordance with UFC 3-600-01 Section 4-11.3.
 - Air sampling network shall be designed to monitor total room/zone concentration of smoke.
 - The detector must provide no less than three distinct alarm threshold levels (Alert, Action, Fire) and must alert equipment operators at every level of detection.
 - Alarm Level 1 (Alert) shall initiate a local alarm condition at a constantly attended location in the building.
 - Alarm Level 2 (Action) shall initiate a supervisory condition at the building FMCP, which transmits a supervisory condition to the Installation Fire Department.
 - Level 3 (Alarm) shall initiate a general building fire alarm condition at the FMCP, which transmits the fire alarm condition to the Installation Fire Department.
 - The detection system must shall be installed in the following locations; ceiling level within the server room, beneath raised access flooring where the subfloor area contains cables, in the exhaust/return air stream where aisle containment systems are used, and in the return air stream where the above ceiling area is used as a return air plenum.
- Initiating and notification circuits shall use class B wiring.
 - Wiring for signaling line circuits shall be minimum #16 AWG twisted pair with shielded jacket and wiring for notification appliances shall be #14 AWG minimum per NFPA 72.
 - Conduit for all fire alarm system shall be minimum ¾ inch.
 - Provide all fire alarm circuits in Electrical Metallic Tubing (EMT) or Intermediate Metal Conduit (IMC).
 - All raceways shall be factory painted red.
 - Provide raceways listed for installation in wet locations. Wet locations are considered any location within a 5 ft radius of fire suppression equipment and as defined by NFPA 70.
 - Flexible Metallic Conduit (FMC) shall not exceed 6 feet and shall only be permitted for connections from junction boxes to field devices.
 - Provide duct seal inside all conduits that penetrate exterior walls per NFPA 70.
- A single mass notification local operating console shall be provided at the primary entrance vestibule.
- A steel, locking, cabinet shall be provided for each the document cabinet and parts box cabinet. Both shall be located adjacent to the FMCP.
- An LCD remote annunciator panel shall be provided for the system and located near the main entrance FA/MNS panel. Remote annunciator shall be capable of control functions the same as the FMCP. Control functions must be accessible only by user code or secured behind a locked panel.

- A laminated building floor plan (22" by 34") indicating location of the FMCP, LOC, remote power supply panels, and all initiating devices shall be mounted at the main entrance of the building, adjacent to the annunciator.
- A Knox box shall be provided at the building entrance. Location shall be approved by the fire department.
- A factory-trained instructor shall be provided to teach a five-day technical training classroom instruction for at least five Government personnel at Camp Lejeune. The technical training shall include classroom instruction as well as hands-on programming, troubleshooting and diagnostics exercises.
- Three laptops shall be provided for the government's retention. Laptops shall be Windows 10 based and include system software, special connecting cable(s), proprietary equipment necessary for the maintenance, testing and reprogramming of the fire alarm equipment and system.

Fire Suppression

The P1338F Simulation/Training Center shall be protected throughout with a new automatic, wet pipe fire sprinkler system. The system shall be designed in accordance with UFC 3-600-01 and NFPA 13.

- Prior to any design, a water flow test shall be performed to determine the available water supply. Tests shall be conducted in accordance with NFPA 291.
- A new underground fire service line shall be provided for each facility.
 - The sprinkler service line entering the building shall be ductile iron. Transition shall occur at a point 5 feet beyond the perimeter of the building.
 - The incoming sprinkler service shall be provided with a reduced pressure zone backflow preventer.
 - A test header shall be provided to test the backflow prevention assembly for full design flow with one 2 ½" hose connection for every 250 gpm of anticipated flow of the fire sprinkler system.
- All equipment, piping, and other fire suppression components shall be UL Listed and/or FM Approved for fire protection service.
- All wall penetrations shall be sleeved. All floor penetrations shall be provided with thrust rods.
- A control valve assembly shall be provided for the fire sprinkler riser, with a check valve, vane-type flow switch, and inspector's test connection to drain.
 - Due to the size of the facility, a minimum of two sprinkler risers shall be provided.
- A freestanding pedestal type fire department connection (FDC) shall be provided at the main vehicle entrance just outside the compound fence line.
 - The FDC shall be a 5 inch diameter Storz connection on a 30 degree galvanized elbow pointed downwards.
 - The check valve on the FDC shall be installed at fire protection system manifold inside the building.
 - The FDC shall be provided with a ball drip valve and protected with bollards when location is subject to vehicular damage.

- A UL listed post indicating valve (PIV) shall be provided at the connection to the underground water supply located a distance from the building equal to the height of the building plus 15 feet.
 - PIV shall be protected with bollards when location is subject to vehicular damage.
- Sprinkler pipe shall be black steel pipe as permitted by NFPA 13. Schedule 40 pipe must be used for all piping two inches or less in diameter.
- The wet pipe sprinkler systems shall include pressure relief and air venting on each system in accordance with NFPA 13
- Quick-response, recessed or concealed, sprinklers shall be provided in areas with finished ceilings. Quick response upright sprinklers shall be provided in areas exposed to structure. Sprinkler guards shall be provided for sprinklers susceptible to damage and sprinklers installed less than 8 feet above finished floor.
- Sprinkler protection for server rooms shall be in accordance with UFC 3-600-01 Section 4-11.4.
 - Quick-response, concealed sprinklers with white cover plates shall be provided in server rooms with finished ceilings.
 - Quick-response, upright sprinklers with sprinkler guards shall be provided in server rooms with unfinished ceilings.

Preliminary Hydraulic Calculations:

Per Part 3 – Chapter 6 – ESR D4020 of the RFP, the basis for the following hydraulic calculations shall be:

Static Pressure: 70 psi

Residual Pressure: 66 psi

Flow: 885 gpm

Mechanical

Flow Demand

Ordinary Hazard (0.2 x 3,250) 30% increase for sloped ceiling	650 gpm
20% hydraulic imbalance	130 gpm
Required Hose Demand	250 gpm
Total water demand	1,030 gpm

Preliminary pressure calculations

End Head pressure (130 sq ft x 0.2 gpm/sq ft / 8)^2	10.6 psi (minimum)
Elevation loss (20 ft x 0.433)	8.7 psi
Backflow Preventer	12.0 psi
Total	31.3 psi plus pipe friction losses

Available water at 1,030 gpm is 64.7 psi. This allows for 33.4 psi available for pipe friction losses.

Storage/Shipping

Flow Demand	
18' Storage of Class IV Commodities (0.49 x 2,000 x 0.8)	784 gpm
- NFPA 13 Table 21.4.1.2	
20% hydraulic imbalance	118 gpm
Required Hose Demand	500 gpm
- NFPA 13 Table 20.12.2.6	
Total water demand	1,402 gpm
Preliminary pressure calculations	
End Head pressure ($100 \text{ sq ft} \times 0.49 \text{ gpm/sq ft} \times 0.8 / 11.2$) ²	12.3 psi (minimum)
Elevation loss (17ft x 0.433)	8.7 psi
Backflow Preventer	12.0 psi
Total	33 psi plus pipe friction losses

Available water at 1,402 gpm is 60.6 psi. This allows for 27.6 psi available for pipe friction losses.

A fire pump and water storage tank are **not required** to meet the fire suppression demand of the facility.

Portable Fire Extinguishers

Portable fire extinguishers shall be provided throughout the building in accordance with FY20 National Defense Authorization Act. Semi-recessed fire extinguisher cabinets will be provided in in finished, occupied areas. Fire extinguisher wall brackets will be provided in unfinished areas. Provide clean agent fire extinguishers utilizing FE13 fire extinguishing agent within the server rooms. Fire extinguishers shall be installed in accordance with NFPA 10.

General:

This project involves the demolition of existing and construction of a Simulator / Training Center at Marine Corps Base Camp Lejeune. A description of the required plumbing system is described within this narrative to assist with the plumbing project understanding to streamline the cost estimating process. This narrative is to be used in conjunction with the associated pricing narratives developed for other design disciplines as well as any architectural/civil drawings and sketches developed to assist in the estimating process. These pricing documents have been produced to show the Designer's interpretation of the RFP requirements and the specifics of the selected plumbing system. Contractors shall also read and be familiar with the RFP, particularly the key areas pertinent to the plumbing systems design.

Additional UFC's which dictate and constrain the plumbing design include (but are not limited to):

- UFC 1-200-02 HIGH PERFORMANCE AND SUSTAINABLE BUILDING REQUIREMENTS
- UFC 3-420-01 PLUMBING SYSTEMS

Sustainability Requirements

The plumbing fixtures shall be of an ultra-low flow design to meet requirements in accordance with Unified Facilities Criteria, High Performance and Sustainable Building Requirements UFC 1-200-02. Provide meters with BAS monitoring for overall domestic water and domestic hot water.

Commissioning of Plumbing Systems:

All plumbing systems shall be commissioned including service water heating and utility metering systems.

Plumbing Systems Description:

Domestic Water: See civil narrative for water piping from service main to 5'-0" of the building. Provide new domestic water service main from 5'-0" outside the building and up through slab into the mechanical room. Domestic water service main to include main shut off valve, strainer, water meter and reduced pressure zone (RPZ) backflow preventer in mechanical room. A RPZ backflow preventer shall be installed on the make-up water lines for the HVAC systems.

The Contractor shall ensure the compatibility of each water meter with the protocols of the building DDC system, and shall provide communication cabling from the meter to the nearest DDC panel.

The supply lines to each item of equipment or fixtures, except faucet, flush valves, or other control valves, which are provided with integral stops, shall be equipped with an accessible shut off valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. All piping with the exception of individual fixture run-outs will be completely concealed. Overhead piping in finished areas will be concealed above ceilings. Vertical stacks and risers will be concealed in pipe chases or properly protected from damage.

Pipe sizes will be per the International Plumbing Code. The domestic cold and hot water systems will be designed for a maximum system piping loss of 4.0 PSIG at full system flow. Velocities in the domestic water piping shall be maximum of 5 ft./sec. Water hammer arrestors shall be installed and sized to minimize water system noise in accordance with the International Plumbing Code and PDI WH 201 Water Hammer Arrestor. Arrestors shall be installed with proper access panels

The domestic hot water system for the building shall include a domestic hot water recirculation loop system with an in-line mounted recirculation pump that is monitored through building DDC system.

Aboveground water piping shall be Type L copper pipe with soldered or brazed joints. Joints under the slabs will be prohibited. Under slab supply piping shall be limited to the trap primer piping only. All exposed piping of fixtures to be chrome plated. Trap primer piping will be Type K copper pipe. Below grade water service piping shall be PVC C-900. Underground piping larger than 4" shall be ductile iron, mechanical joint conforming to AWWA C151 factory wrapped.

Provide insulation for domestic cold water, domestic hot water and domestic hot water return piping. Domestic hot and cold water supply pipes and stops for handicapped lavatories shall be insulated in accordance with ADAAG requirements.

Water Service Size: 2 ½"

Building is single story with most demanding fixture (WC flush valve) requiring 25 psi to operate. With a 12 psi allowance for a backflow preventer and 5 psi system drop, 42 psi is required. Pressures from RFP section D40 Fire Protection indicate booster pumps are not anticipated: 70 psi static & 66 psi residual at 885 gpm

Fire Protection: See civil narrative for fire protection piping from service main to 5'-0" of the building. Provide new fire protection water service main from 5'-0" outside the building and up through slab into the mechanical room. Provide spool piece approximately 12" above finished floor. See fire protection narrative for fire protection piping within building.

Stormwater: See architectural and civil narratives for information on building roof drainage system and discharge. Provide new storm drainage system to serve the small flat roof areas (if any). Above grade stormwater piping shall be cast iron hubless pipe and fittings with stainless steel clamps in compliance with ASTM A888, CISPI 301 and ASTM B306. Below grade piping shall be cast iron with hub and spigot joints.

Sanitary Sewer Waste & Vent: Provide new sanitary, waste vent piping inside the building and exit the building at one location to 5'-0" outside the building. The sanitary sewer lateral from beyond 5'-0" outside the building shall be described in the Civil narrative.

The minimum size of sanitary sewer below floor within the building shall be 4". All sanitary piping shall be concealed. Each fixture and piece of equipment, except water closets, requiring connection to the drainage system, shall be provided with a trap. Above grade sanitary and vent piping and fittings shall be cast iron

hubless pipe and fittings with stainless steel clamps in compliance with ASTM A888, CISPI 301 and ASTM B306. Below grade piping shall be cast iron hub and spigot pipe and fittings, rubber compression gasket joints.

Vent piping shall be combined wherever possible to reduce the number of roof penetrations. Metallic vent piping shall be used through the roof from at least 12" below the roof to the required point of termination.

Natural Gas: Obtain natural gas pressures from the local gas utility provider. Contractor must invite the utility provider to the design reviews. Contractor is responsible for any applications and permits, and must provide the complete natural gas system from the load side of the utility meter to the heating equipment. Provide steel natural gas piping system. Include gas distribution piping from the gas meter to points of usage. Follow Camp Lejeune design standards for piping pressures inside the building. Natural gas piping shall be schedule 40 black iron with welded and flanged fittings for piping 2 1/2" and larger and threaded fittings for piping 2" and smaller.

Solar Water Heating: Solar domestic hot water generation is not expected to be Building Life Cycle Cost Effective in accordance with UFC 1-200-02, High Performance and Sustainable Building Requirements. Based on preliminary calculations, system payback is over 40 years and, therefore, will be not provided.

Rainwater Harvesting: Rainwater harvestings is not expected to be Building Life Cycle Cost Effective in accordance with UFC 1-200-02, High Performance and Sustainable Building Requirements. Based on preliminary calculations, system payback is over 40 years and, therefore, will be not provided.

Radon Mitigation: install a radon mitigation system including sub-slab pits, solid core PVC vent piping, exhaust fan and termination above the roof. Provide radon testing and reporting.

Plumbing Equipment:

Hot Water Heaters: Provide electric or natural-gas fired, low-NOx, condensing storage type water heaters for heating of domestic water. Provide with required safeties, ASME rated tank, CSD-1 controls and condensate neutralizer for drains from boiler condensing sections prior to entering the sanitary waste system. The water will be stored at 140° F storage temperature and piped through a thermostatic mixing valve complying with ASSE 1017, mounted on the wall next to the water heaters to distribute 120° F. water to required fixtures and equipment. The water heater and storage tanks shall be installed on a housekeeping pad located in first floor mechanical room. Water heaters shall be complete with a control system and shall have ASME rated pressure and temperature relief valves and include an expansion tank. An inline recirculation pump, monitored through building DDC system, shall be provided on the domestic hot water recirculation system.

Sizing information: 80 gallon heater at 150 MBH

Plumbing Fixtures:

Water Closets: Floor mounted, vitreous china, hard-wired sensor operated dual flush valve, 1.28 GPF, siphon jet, elongated bowl type with white open seat and no cover. Provide fixture complying with ADAAG/ABA where indicated.

Urinals: Wall mounted, back outlet, vitreous china, hard-wired sensor operated flush valve, 0.125 GPF, washout type. Provide fixture complying with ADAAG/ABA where indicated.

Lavatories: Solid surface integral with countertop, minimum 18". Provide hard-wired sensor operated mixing faucet with deck plate, aerator rated at 0.50 gpm and pop-up drain. Temperature limiting valve, complying with ASSE 1070, shall be provided for each lavatory. Provide fixture complying with ADAAG/ABA where indicated.

Sinks: Provide countertop under-mounted, double compartment stainless steel sink (minimum 33" wide, 21" front-to-back, 9" deep) without waste disposal. Faucets must be brushed nickel finish, designed for minimum splashing and single lever. Faucets must have a maximum flow rate of 1.5 gpm when tested in accordance with ASME A112.18.1/CSA B125.1. Faucets must be EPA "WaterSense" labeled. Provide all lavatories with aerator, adjustable P-traps, and perforated grid strainers.

Provide free-standing single compartment stainless steel service/laundry sinks (minimum dimensions 27" square sink, 16" deep and 33" tall, including faucets, in the mudroom.

Showers: Refer to architectural and interiors narratives for shower surround and base. Provide a surface mounted stainless steel enclosure with integrated shower supply fittings. Shower control shall be fitted with a pressure balance mixing valve, high-temperature limit stop. Shower shall be 2.0 GPM flow rate.

Mop Receptors: Floor mounted, pre-cast terrazzo, 36" x 24" x 10" high, with 12" high stainless steel wall surround, Faucet shall be wall mounted on adjustable center, with ¾" hose thread integral vacuum breaker, pail hook and wall brace.

Emergency Showers and Eyewashes: Provide in accordance with ANSI Z358.1, OSHA 1910.151(c) and UFC 3-420-01. Provide privacy curtain and rail. Provide tepid water (60F to 100F) with water tempering valve assembly at each emergency shower and eyewash location. Serve tempering valve assembly with domestic hot and cold water from the building services. Domestic hot and cold-water piping shall be routed such that there are no dead legs in the water distribution serving the emergency shower and eyewashes. Provide alarms and appurtenances for service within NEMA type 3 or 4 enclosures. Per ANSI/ISEA Z358.1 eyewash safety stations must be installed within 10 seconds or 55 feet from the hazard

Electric Water Coolers: Wall hung, dual height unit, self-contained, energy efficient, conforming to ARI 1010. Capacity shall be 8 gallons per hour at 50° F. with an inlet water temperature of 80° F., while residing in a room environment of 90° F. Unit shall have self-closing valves with automatic stream regulators, flow control capability, push button front and side activation and apron on higher unit. Exposed surfaces of stainless steel

shall have a polished finish. Electric water coolers shall be provided to meet the requirements of the ADAAG. Provide with bottle filler and in-line filter.

Outlet Boxes: Ice machine, refrigerator icemaker, coffee maker, etc. supply boxes shall be recessed polystyrene box with one (1) 1/4 turn ball valve.

Floor Drains: Floor drains (FD-1) with 7" diameter nickel bronze strainer shall be provided in Janitor Closets, Public/Staff Toilet rooms, Mechanical Rooms and at emergency eyewash locations. Provide 9" diameter floor drains (FD-2) with acrylic coated cast iron strainer in the Mechanical Rooms. Provide floor drain (FD-3) with 5" diameter nickel bronze strainer and funnel assembly at ice machines and location that will receive condensate discharge. Provide 12" diameter floor drains (FD-4) with a 6" diameter funnel and acrylic coated cast iron strainer at the water service entrance. Floor drains shall be cast iron with integral seepage pan, and adjustable perforated. Provide 12" floor sink (FS-1) at air handling units.

All floor drains/floor sink shall have 1/2" trap primer connection with an automatic trap primer valve and an appropriate distribution unit for 1-4 drains. Provide floor drains and floor sinks with deep seal traps.

Roof Drains: (refer to architectural plans) Roof drains shall be 8-inch diameter, cast-iron body with combination membrane flash clamp/gravel guard, underdeck clamp and roof sump receiver. Provide with low silhouette cast iron dome.

Wall Hydrants/Hose Bibbs: Wall hydrants (WH-1) with integral vacuum breaker and locking cover shall be provided on the exterior of the building, spaced along the building exterior such that all points along the perimeter can be reached with a 100-foot hose, and shall be placed so that areas can be watered without crossing the main entrances. A hose bibb (HB-1), with non-removable vacuum breaker backflow preventers shall be provided in the mechanical room, keyed type shall be provided under each lavatory or lavatory group. Wall hydrants and hose bibbs to be located a minimum of 2 feet above finished floor.

Description (Base Bid)	Approx. Size/Capacity	Location / serves
General - mechanical equipment design and installation shall be such that mechanical equipment requiring routine/periodic maintenance will be installed at elevations not to exceed 12'. Installations above 12' require means of permanently installed catwalk/access in accordance with UFC 3-410-01 para 4-2.3.2.	n/a	All
Airside distribution system - shall consist of ductwork, fans, louvers, dampers, turning vanes, grilles, registers, diffusers, and airside specialties. Dampers conveying air in/out of the building shall be motorized low leakage type. Return air shall be fully ducted. Provide fire dampers at fire rated walls and floors. Provide smoke dampers around smoke rated walls including but not limited to storage rooms. Refer to Architectural/Fire/Life Safety information. Provide bars in ductwork when crossing security boundaries.	n/a	All
Hydronic chilled water distribution system with variable volume pumping system with two-way valves on coils. Provide accessories including but not limited to chemical shot feeder, air separator, chilled water buffer tank, and expansion tank.	n/a	All
Hydronic hot water distribution system with variable volume pumping system with two-way valves on coils. Provide accessories including but not limited to chemical shot feeder, air separator, buffer tank, and expansion tank.	n/a	All
DDC control system – BACnet, provision for monitoring and control of all HVAC equipment including all utility meters.	n/a	All
Motor Controls – Mechanical Contractor shall furnish all motor control devices including but not limited to starters, VFD's, pilot lights, HOA switches, fused disconnects, disconnects, motor starting switches, push button stations, fractional horsepower manual motor starters with thermal overloads, 3 phase motor contactors, combination motor starters, variable frequency drives, single phase motor speed adjustment devices. All devices shall be in NEMA rated enclosures. Mounting and wiring by Electrical Contractor. Provide VFD on all motors 1 Hp and larger regardless of operation to allow for reduced voltage start.	n/a	All
Provide housekeeping pads and vibration isolators for mechanical equipment on floor.	6" high indoor 12" high outdoor	All
Provide sound attenuation for duct and transfer grille penetrations to meet STC requirements of rooms.	n/a	All

High efficiency air cooled chiller with constant primary pumping system. Install to meet ATPF requirements (setbacks, enclosures, etc.) Chiller shall meet minimum part load IPLV in accordance with FEMP or Energy Star efficiency requirements (upper 15% efficiency range of similar chillers). 3,000 hour salt spray coating on condenser coils.	150 tons (650 kW)	Grade Mounted
(2) Constant volume primary chiller pumps. (2) Variable volume secondary chilled water distribution pumps. Base-mounted type. Lead / Standby arrangement.	360 gpm ea. (15 Hp)	Mech. Room
Chilled water buffer tank.	500 gal	Mech. Room
(2) High efficiency, hot water condensing boilers with primary/secondary pumping system. Sealed combustion, natural gas fired, low NOx type boilers. Ducted combustion and flue ducts. Condensate neutralization kit. Factory supplied inline circulator pump.	1200 MBH ea. (1 Hp)	Mech. Room
(2) Variable volume secondary hot water pumps. Base mounted type. Lead / Standby arrangement.	180 gpm ea. (7 1/2 Hp)	Mech. Room
Shut-off type VAV terminal boxes. Each zone greater than 175 sq. ft. shall have its own terminal unit. Maximum zone size on one terminal is 1,000 sq. ft. Several of the terminal Fan powered boxes discouraged per CJMDG, 4 AC/hr requirement excluded per D304001.	Average is 8" dia. inlet size.	Ceiling space through-out
Variable air volume air handling units with VFD's for supply and return/exhaust airstreams. Fixed plate enthalpy type energy recovery section; single point electrical connection, MERV 8 first stage air filters + MERV 13 second stage air filters on both supply and exhaust upstream of the energy recovery section; supply, outside air & exhaust air measuring stations, chilled-water cooling coil; hot-water reheat coil; both heating and cooling coils sized for energy recovery wheel failure. Unit to deliver conditioned air directly ducted to each space/zone in the building facility through VAV box distribution. Provide smoke detectors on supply and return ductwork prior to any takeoffs. Provide separate AHU's for secure and unsecure areas (refer to architectural plans) final unit sizing to occur once defined.	36,000 cfm total Divided between two AHUS (50 Hp total)	Mech. Room
Split system air conditioning units. Wall mounted with condensate pumps. 3,000 hour salt spray coating on condenser coils. Sizing dependent on electronic equipment heat load (refer to telecom narratives)	7 kW (9 kW)	Comm Rooms
	7 kW (9 kW)	SIM Control Room
	7 kW (9 kW)	Comm Vault

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Electric unit heaters	5 kW	Elec Room
Hydronic unit heaters	40 MBH	Mech Room
Cabinet fans with louvered and ducted intake and exhaust	1000 cfm	Elec. Room
	7500 cfm	Mech Room
Packaged dehumidification unit.	175 ppd	Mech Room

Preliminary DDC Controls, Points and Sequences

Air Cooled Chiller

Chiller - Run Conditions:

The chiller shall be enabled to run whenever:

- A definable number of chilled water coils need cooling

To prevent short cycling, the chiller shall run for and be off for minimum adjustable times (both user definable), unless shutdown on safeties or outside air conditions.

The chiller shall run subject to its own internal safeties and controls.

Chilled Water Pump:

The chilled water pump shall run anytime the chiller is called to run. The chilled water pump shall also run for freeze protection whenever the outside air temperature is less than a user definable setpoint (adj.).

The chilled water pump shall start prior to the chiller being enabled and shall stop only after the chiller is disabled. The chilled water pump shall therefore have:

- A user adjustable delay on start.
- AND a user adjustable delay on stop.

The delay times shall be set appropriately to allow for orderly chilled water system start-up, shutdown and sequencing.

Alarms shall be provided as follows:

- Chilled Water Pump Failure: Commanded on, but the status is off.
- Chilled Water Pump Running in Hand: Commanded off, but the status is on.
- Chilled Water Pump Runtime Exceeded: Status runtime exceeds a user definable limit.

Chiller:

The chiller shall be enabled a user adjustable time after pump statuses are proven on. The chiller shall therefore have a user adjustable delay on start.

The delay time shall be set appropriately to allow for orderly chilled water system start-up, shutdown and sequencing.

The chiller shall run subject to its own internal safeties and controls.

Alarms shall be provided as follows:

- Chiller Failure: Commanded on, but the status is off.

- Chiller Running in Hand: Commanded off, but the status is on.
- Chiller Runtime Exceeded: Status runtime exceeds a user definable limit.

Chiller Chilled Water Supply Setpoint:

The chiller shall maintain a chilled water supply temperature setpoint as determined by its own internal controls (provided by others).

Chilled Water Temperature Monitoring:

The following temperatures shall be monitored:

- Chilled water supply.
- Chilled water return.

Alarms shall be provided as follows:

- High Chilled Water Supply Temp: If the chilled water supply temperature is greater than 55°F (adj.).
- Low Chilled Water Supply Temp: If the chilled water supply temperature is less than 38°F (adj.).

Point Name	Hardware Points				Software Points						Show On Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Chilled Water Return Temp	x								x		x
Chilled Water Supply Temp	x								x		x
Chilled Water Pump Status			x						x		x
Chiller Status			x						x		x
Chilled Water Pump Start/Stop				x							x
Chiller Enable				x							x
Outside Air Temp					x						x
Chilled Water Pump Failure										x	
Chilled Water Pump Running in Hand										x	
Chilled Water Pump Runtime Exceeded										x	
Chiller Failure										x	
Chiller Running in Hand										x	
Chiller Runtime Exceeded										x	
High Chilled Water Supply Temp										x	
Low Chilled Water Supply Temp										x	

Two Boiler System

Boiler System Run Conditions:

The boiler system shall be enabled to run whenever:

- A definable number of hot water coils need heating.

To prevent short cycling, the boiler system shall run for and be off for minimum adjustable times (both user definable), unless shutdown on safeties or outside air conditions.

The boiler shall run subject to its own internal safeties and controls.

The boiler system shall also run for freeze protection whenever the outside air temperature is less than 38°F (adj.).

Hot Water Pump:

A hot water pump shall run anytime the boiler is called to run and shall have a user definable delay (adj.) on stop. Hot water pumps shall modulate to maintain system pressure. Upon failure of the lead pump, the standby pump will be energized and an alarm shall be generated.

Alarms shall be provided as follows:

- Hot Water Pump Failure: Commanded on, but the status is off.
- Hot Water Pump Running in Hand: Commanded off, but the status is on.
- Hot Water Pump Runtime Exceeded: Status runtime exceeds a user definable limit.

Circulation Pump 1:

The Circulation Pump 1 shall run anytime Boiler 1 is called to run and shall have a user definable delay (adj.) on stop.

Alarms shall be provided as follows:

- Circulation Pump 1 Failure: Commanded on, but the status is off.
- Circulation Pump 1 Running in Hand: Commanded off, but the status is on.
- Circulation Pump 1 Runtime Exceeded: Status runtime exceeds a user-definable limit.

Circulation Pump 2:

The Circulation Pump 2 shall run anytime Boiler 2 is called to run and shall have a user definable delay (adj.) on stop.

Alarms shall be provided as follows:

- Circulation Pump 2 Failure: Commanded on, but the status is off.
- Circulation Pump 2 Running in Hand: Commanded off, but the status is on.
- Circulation Pump 2 Runtime Exceeded: Status runtime exceeds a user-definable limit.

Boiler Lead/Standby Operation:

The two boilers shall operate in a lead/standby fashion when called to run and flow is proven.

- The lead boiler shall run first.
- On failure of the lead boiler, the standby boiler shall run and the lead boiler shall turn off.

The designated lead boiler shall rotate upon one of the following conditions: (user selectable):

- manually through a software switch
- if boiler runtime (adj.) is exceeded
- daily
- weekly
- monthly

Alarms shall be provided as follows:

- Boiler 1
 - Failure: Commanded on but the status is off.
 - Running in Hand: Commanded off but the status is on.
 - Runtime Exceeded: Status runtime exceeds a user definable limit.
- Boiler 2
 - Failure: Commanded on but the status is off.
 - Running in Hand: Commanded off but the status is on.
 - Runtime Exceeded: Status runtime exceeds a user definable limit.
- Lead Boiler Failure: The lead boiler is in failure and the standby boiler is on.

Hot Water Supply Temperature Setpoint:

The boiler shall maintain a hot water supply temperature setpoint as determined by its own internal controls (provided by others).

Primary Hot Water Temperature Monitoring:

The following temperatures shall be monitored:

- Primary hot water supply.
- Primary hot water return.

Alarms shall be provided as follows:

- High Primary Hot Water Supply Temp: If greater than 160°F (adj.).
- Low Primary Hot Water Supply Temp: If less than 100°F (adj.).

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Point Name	Hardware Points				Software Points						Show On Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Primary Hot Water Return Temp	x								x		x
Primary Hot Water Supply Temp	x								x		x
Boiler 1 Status			x						x		x
Boiler 2 Status			x						x		x
Circulation Pump 1 Status			x						x		x
Circulation Pump 2 Status			x						x		x
Hot Water Pump 1 Status			x						x		x
Boiler 1 Enable				x							x
Boiler 2 Enable				x							x
Circulation Pump 1 Start/Stop				x					x		x
Circulation Pump 2 Start/Stop				x					x		x
Outside Air Temp					x						x
Boiler 1 Failure										x	
Boiler 1 Running in Hand										x	
Boiler 1 Runtime Exceeded										x	
Boiler 2 Failure										x	
Boiler 2 Running in Hand										x	
Boiler 2 Runtime Exceeded										x	
Circulation Pump 1 Failure										x	
Circulation Pump 1 Running in Hand										x	
Circulation Pump 1 Runtime Exceeded										x	
Circulation Pump 2 Failure										x	
Circulation Pump 2 Running in Hand										x	
Circulation Pump 2 Runtime Exceeded										x	
High Primary Hot Water Supply Temp										x	
Hot Water Pump Failure										x	
Hot Water Pump Running in Hand										x	
Hot Water Pump Runtime Exceeded										x	
Lead Boiler Failure										x	x
Low Primary Hot Water Supply Temp										x	

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Point Name	Hardware Points				Software Points						Show On Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Hot Water Pump 1 Status			x						x		x
Hot Water Pump 2 Status			x						x		x
Hot Water Pump 1 Start/Stop				x					x		x
Hot Water Pump 2 Start/Stop				x					x		x
Outside Air Temp					x						x
Hot Water Pump 1 Failure										x	
Hot Water Pump 1 Running in Hand										x	
Hot Water Pump 1 Runtime Exceeded										x	
Hot Water Pump 2 Failure										x	
Hot Water Pump 2 Running in Hand										x	
Hot Water Pump 2 Runtime Exceeded										x	

Variable Air Volume – AHU

Run Conditions - Requested:

The unit shall run whenever:

- Any zone is occupied.
- OR a definable number of unoccupied zones need heating or cooling.

Freeze Protection:

The unit shall shut down and generate an alarm upon receiving a freezestat status.

High Static Shutdown:

The unit shall shut down and generate an alarm upon receiving an high static shutdown signal.

Supply Air Smoke Detection:

The unit shall shut down and generate an alarm upon receiving a supply air smoke detector status.

Supply Fan:

The supply fan shall run anytime the unit is commanded to run, unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.

Alarms shall be provided as follows:

- Supply Fan Failure: Commanded on, but the status is off.
- Supply Fan in Hand: Commanded off, but the status is on.
- Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).

Supply Air Duct Static Pressure Control:

The controller shall measure duct static pressure and shall modulate the supply fan VFD speed to maintain a duct static pressure setpoint of 1.5in H2O (adj.). The supply fan VFD speed shall not drop below 30% (adj.).

Alarms shall be provided as follows:

- High Supply Air Static Pressure: If the supply air static pressure is 25% (adj.) greater than setpoint.
- Low Supply Air Static Pressure: If the supply air static pressure is 25% (adj.) less than setpoint.
- Supply Fan VFD Fault.

Supply Air Temperature Setpoint - Optimized:

The controller shall monitor the supply air temperature and shall maintain a supply air temperature setpoint reset based on zone cooling and heating requirements

The supply air temperature setpoint shall be reset for cooling based on zone cooling requirements as follows:

- The initial supply air temperature setpoint shall be 55°F (adj.).
- As cooling demand increases, the setpoint shall incrementally reset down to a minimum of 53°F (adj.).
- As cooling demand decreases, the setpoint shall incrementally reset up to a maximum of 72°F (adj.).

If more zones need heating than cooling, then the supply air temperature setpoint shall be reset for heating as follows:

- The initial supply air temperature setpoint shall be 82°F (adj.).
- As heating demand increases, the setpoint shall incrementally reset up to a maximum of 85°F (adj.).
- As heating demand decreases, the setpoint shall incrementally reset down to a minimum of 72°F (adj.).

Cooling Coil Valve:

The controller shall measure the supply air temperature and modulate the cooling coil valve to maintain its cooling setpoint.

The cooling shall be enabled whenever:

- Outside air temperature is greater than 60°F (adj.).
- AND the economizer (if present) is disabled or fully open.
- AND the supply fan status is on.
- AND the heating (if present) is not active.

The cooling coil valve shall open to 50% (adj.) whenever the freezestat (if present) is on.

Alarms shall be provided as follows:

- High Supply Air Temp: If the supply air temperature is 5°F (adj.) greater than setpoint.

Heating Coil Valve:

The controller shall measure the supply air temperature and modulate the heating coil valve to maintain its heating setpoint.

The heating shall be enabled whenever:

- Outside air temperature is less than 65°F (adj.).
- AND the supply fan status is on.
- AND the cooling (if present) is not active.

The heating coil valve shall open whenever:

- Supply air temperature drops from 40°F to 35°F (adj.).
- OR the freezestat (if present) is on.

Alarms shall be provided as follows:

- Low Supply Air Temp: If the supply air temperature is 5°F (adj.) less than setpoint.

Minimum Outside Air Ventilation - Fixed Minimum Flow:

The outside air dampers shall modulate position during building occupied hours to maintain monitored minimum outdoor air flow rate and be closed during unoccupied hours.

Mixed Air Temperature:

The controller shall monitor the mixed air temperature and use as required for economizer control (if present) or preheating control (if present).

Alarms shall be provided as follows:

- High Mixed Air Temp: If the mixed air temperature is greater than 90°F (adj.).
- Low Mixed Air Temp: If the mixed air temperature is less than 45°F (adj.).

Return Air Temperature:

The controller shall monitor the return air temperature and use as required for setpoint control or economizer control (if present).

Alarms shall be provided as follows:

- High Return Air Temp: If the return air temperature is greater than 90°F (adj.).
- Low Return Air Temp: If the return air temperature is less than 45°F (adj.).

Supply Air Temperature:

The controller shall monitor the supply air temperature.

Alarms shall be provided as follows:

- High Supply Air Temp: If the supply air temperature is greater than 120°F (adj.).
- Low Supply Air Temp: If the supply air temperature is less than 45°F (adj.).

Point Name	Hardware Points				Software Points						Show On Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Mixed Air Temp	x								x		x
Return Air Temp	x								x		x
Supply Air Static Pressure	x								x	x	x
Supply Air Temp	x								x		x
Cooling Valve		x							x		x
Heating Valve		x							x		x
Mixed Air Dampers		x							x		x
Supply Fan VFD Speed		x							x		x

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Point Name	Hardware Points				Software Points						Show On Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Freezestat			x						x	x	x
High Static Shutdown			x						x	x	x
Supply Air Smoke Detector			x						x	x	x
Supply Fan Status			x						x		x
Supply Fan VFD Fault			x							x	x
Supply Fan Start/Stop				x					x		x
Supply Air Static Pressure Setpoint					x				x		x
Supply Air Temp Setpoint					x				x		x
High Mixed Air Temp										x	
High Return Air Temp										x	
High Supply Air Static Pressure										x	
High Supply Air Temp										x	
High Supply Air Temp										x	
Low Mixed Air Temp										x	
Low Return Air Temp										x	
Low Supply Air Static Pressure										x	
Low Supply Air Temp										x	
Low Supply Air Temp										x	
Supply Fan Failure										x	
Supply Fan in Hand										x	
Supply Fan Runtime Exceeded										x	

Variable Air Volume - Terminal Unit

Run Conditions - Scheduled:

The unit shall run according to a user definable time schedule in the following modes:

- Occupied Mode: The unit shall maintain
 - A 73°F (adj.) cooling setpoint
 - A 73°F (adj.) heating setpoint.
- Unoccupied Mode (night setback): The unit shall maintain
 - A 85°F (adj.) cooling setpoint.
 - A 55°F (adj.) heating setpoint.

Alarms shall be provided as follows:

- High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
- Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).

Zone Setpoint Adjust:

The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.

Zone Unoccupied Override:

A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.

Reversing Variable Volume Terminal Unit - Flow Control:

The unit shall maintain zone setpoints by controlling the airflow through one of the following:

Occupied:

- When zone temperature is greater than its cooling setpoint, the zone damper shall modulate between the minimum occupied airflow (adj.) and the maximum cooling airflow (adj.) until the zone is satisfied.
- When the zone temperature is between the cooling setpoint and the heating setpoint, the zone damper shall maintain the minimum required zone ventilation (adj.).
- When zone temperature is less than its heating setpoint, the controller shall enable heating to maintain the zone temperature at its heating setpoint. Additionally, if warm air is available from the AHU, the zone damper shall modulate between the minimum occupied airflow (adj.) and the maximum heating airflow (adj.) until the zone is satisfied.

Unoccupied:

- When the zone is unoccupied the zone damper shall control to its minimum unoccupied airflow (adj.).
- When the zone temperature is greater than its cooling setpoint, the zone damper shall modulate between the minimum unoccupied airflow (adj.) and the maximum cooling airflow (adj.) until the zone is satisfied.
- When zone temperature is less than its unoccupied heating setpoint, the controller shall enable heating to maintain the zone temperature at the setpoint. Additionally, if warm air is available from the AHU, the zone damper shall modulate between the minimum unoccupied airflow (adj.) and the auxiliary heating airflow (adj.) until the zone is satisfied.

Point Name	Hardware Points				Software Points						Show On Graphic
	AI	AO	BI	BO	AV	BV	Loop	Sched	Trend	Alarm	
Airflow	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Zone Damper		x							x		x
Zone Override			x						x		x
Airflow Setpoint					x				x		x
Cooling Setpoint					x				x		x
Heating Setpoint					x				x		x
Heating Mode						x			x		
Schedule								x			
High Zone Temp										x	
Low Zone Temp										x	

**DB Hurricane Florence Recovery MILCON Package 3,
Training and Storage Facilities, MCB Camp Lejeune, NC**

Electrical Basis of Design:

P1338F: MEF SIMULATION/TRAINING CENTER REPLACEMENT

Abbreviated name: P1338F MEF Simulation Training Center

BASIS OF DESIGN: P1338F MEF Simulation Training Center

This project scope includes demolition of existing buildings and construction of the MEF Simulation Training Center, at Camp Lejeune, NC.

The electrical systems are described within this narrative to assist with the cost estimating process. This narrative is to be used in conjunction with the associated pricing narratives developed for other design disciplines as well as any architectural/civil drawings and sketches developed to assist in the estimating process.

Contractors shall be familiar with the RFP and Camp Lejeune standards, particularly the key areas pertinent to the electrical design.

Demolition

This package includes demolition of an existing buildings No. 125, 125A, 127, H13 and prefab trailers 125B and 125C. The electrical demolition will involve removal of the existing electrical services and equipment back to the utility main point of connection.

Electrical Distribution

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served. Electrical exterior equipment to be designed and rated for coastal and high humidity areas. Provide NEMA 4X stainless steel enclosures.

Contractor shall connect the new MEF Simulation Training Centers electrical systems to the existing overhead 12.47 kV electrical power system. The existing power is located on Birch Street or McHugh Boulevard. Contractor to make new connection from overhead power source. Coordinate connection point with Camp Lejeune Public Works Department. Provide additional pole to transition overhead to underground concrete encased duct bank to pad mounted transformer. Contractor to run 3-Phase, #2 ACSR wiring overhead and transition to underground with insulated #2 AWG 15kV cable in concrete encased duct bank to buildings. The new feeds off the existing power system will connect to new pad mounted transformer. Provide an automatic transfer switch an a 24-hour diesel emergency generator with level III sound attenuated type weather enclosure. Provide an Emergency Power Off (EPO) system for this facility.

Provide L6-30 type rack receptacles for rack mounted telecommunications equipment.

The available fault current for MEF Simulation Training Center at the transformer primary point of connection must be assumed to be an infinite bus.

Provide 600-Volt secondary underground electrical power distribution systems to meet the connection requirements. Provide fused cut-outs on connections to overhead distribution systems.

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Electrical Basis of Design:

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Abbreviated name: P1338F MEF Simulation Training Center

Provide a separate solid-state meter for each Pad Mounted Transformer per specification section UFGS 26 27 14.00 20 ELECTRICITY METERING. Meter to have the capability of communicating wirelessly to the base meter reading system.

Provide a 225kVA transformer and an 208Y/120V, 3PH, 4W, outdoor distribution panel to power 10 power pedestals located on the site. Each pedestal requires a dedicated 50A feeder and a NEMA 4X stainless steel and fused disconnect switch with color-coded quick connect receptacles.

Service Entrance Requirements

- Provide a minimum of 15 percent spare circuit and load capacity at all levels of the power distribution system including any stand-by power systems.
- Provide an interior distribution system consisting of insulated conductors in conduit.
- Provide underground service to the exterior of the facilities.
- Provide a main distribution panel or switchboard as service equipment at each building. A Switchboard must be utilized for the central distribution if size required is over 1200 amps. Provide each switchboard with digital metering. The service entrance panel must be in same location as existing where practical.
- Provide service entrance meter at central transformer that meet current Camp Lejeune metering requirements and compatible with base AMI system.

Provide distribution and branch circuit panel boards with door-in-door type construction and bolt-on type circuit breakers throughout the facilities to serve loads as required. Panelboards must be located throughout the facilities to reduce voltage drop on branch circuit loads, efficiently serve equipment and provide system flexibility. Panel boards must be located on the same floor as the loads they serve, must be hinged and lockable. Provide enclosed circuit breakers as required. Provide transient voltage surge protective devices (SPD's) at the service entrance equipment.

Transformers:

Provide three-phase pad mounted transformers to feed the facilities with:

- 1) Dead-front Design with ANSI specific front plate spacing
- 2) 15kV, 200A minimum, load break connectors
- 3) Three 10kV minimum, surge arresters
- 4) Tap changer with two 2.5% taps above rated voltage and two 2.5% taps below rated voltage
- 5) Biodegradable less-flammable liquid-insulated

**DB Hurricane Florence Recovery MILCON Package 3,
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Electrical Basis of Design:

P1338F: MEF SIMULATION/TRAINING CENTER REPLACEMENT

Abbreviated name: P1338F MEF Simulation Training Center

Site Lighting

Site lighting is to be provided for all parking areas, building exteriors, and security lighting.

- Provide 4000K CCR LED high efficiency Luminaires with integral photocell. Bi-level occupancy-based lighting controls for all exterior lighting per UFC-3-530-01.
- Provide automatic lighting control system that will automatically turn “ON” at dusk and “OFF” at dawn.
- Provide concrete light poles in accordance with MCB Lejeune BEAP. Match existing where possible.
- Provide underground electrical distribution system to all site lighting systems.
- Provide complete grounding system for all site lighting systems.

Building Electrical

Lighting and Branch Wiring

- Provide electrical connections for all systems requiring electrical service.
- Provide LED high efficiency lighting and general-purpose receptacles throughout all spaces as required per relevant UFC’s, NFPA 70, and the proposed equipment and furniture layouts. Refer to Chapter 5, “Room Requirements”, and UFC 3-520-01 for minimum receptacle locations. See UFC 3-530-01 for lighting design guidance.
- Provide power connection to Fire Pump.
- Provide floor mounted receptacles under conference room tables.
- Provide dedicated circuits and special outlets for classroom equipment indicated in Chapter 6.
- Provide power for telecommunications systems.
- Provide power for all exhaust and HVAC equipment.

Lighting Equipment

Provide a complete lighting system consisting of exit and emergency lighting utilizing integral battery backup and area lighting consisting of LED high efficiency lighting including switches and automatic controls including daylighting controls, occupancy sensors, vacancy sensors, automatic lighting shutoff systems and dimming systems.

Illumination Levels:

Lighting intensity/design must be in accordance with IES Lighting Handbook, MIL-HDBK, DOD construction Criteria Manual 4270.1M, NAVAIR 51-50AAA-2 and UFC 3-520-01.

Interior Lighting:

Lighting and lighting controls must comply with the recommendations of the Illumination Engineering Society of North America (IESNA) and the requirements of ASHRAE 90.1.

**DB Hurricane Florence Recovery MILCON Package 3,
Training and Storage Facilities, MCB Camp Lejeune, NC**

Electrical Basis of Design:

P1338F: MEF SIMULATION/TRAINING CENTER REPLACEMENT

Abbreviated name: P1338F MEF Simulation Training Center

Grounding

Provide a complete grounding system for all facilities electrical systems.

Lightning Protection

Provide a complete lightning protection system in accordance with UFC 3-575-01, *Lightning and Static Electricity Protection System*, with a UL Lightning Protection Inspection Certificate certified to NFPA 780, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.

Must not void the roof warranty.

Energy Management Control System

Supervisory Building Controllers (SBC) must be powered from a dedicated transformer for the SBC only. Each control cabinet must have a dedicated 24-volt transformer. The 120VAC power branch circuit must be dedicated to the DDC control system. Factory provided transformers in equipment must be used as a source of power only for the control devices intended by the equipment manufacturer.

For controller power, provide new 120VAC circuits. Provide each circuit with a dedicated breaker, and run wiring in its own conduit, separate from any control wiring. Connect the controller's ground wire to the electrical panel ground; conduit grounds are not acceptable.

Package 3 Hurricane Florence
Training and Storage Facilities Package
At MCB Camp Lejeune, NC.

Building P1338F II MEF Simulation/Training Center Replacement

The scope of project includes the entire telecommunications and Security installation for building P1338. The contractor shall be responsible for the installation of low-voltage infrastructure, including security system infrastructure and AV equipment and system infrastructure.

Demolition

Coordinate demo and removal of all telecommunications systems with the Base Communications Group via ROICC a minimum of 30 days prior to beginning any work. Contact Steve Daigle at (910) 451-9439 to schedule the removal of existing telecommunications components if deemed valuable.

Site Utility Telecommunications

The connection point for the site telecommunications systems is underground at manhole 15. Extend telecommunications services to the project site underground in a system of manholes and ductbank to the telecommunications equipment room. Provide OSP fiber and copper cabling from existing demarcation point (manhole 15) to the new Main Distribution Frame (MDF). Contractor must coordinate with the base telephone office 30 days prior to demolition of existing telecommunication services

OSP Pathways and Cabling

- Install new site MHE near McHugh Blvd, install min (3) 4" FM site to new site MH approximately 300'. Install 6-way 4" concrete encased ductbank to tie into existing duct bank at MH15 approximately 1000'.
- Install 300 PR OSP copper FM site to MHWC1-2-9 via new and existing ductbank approximately 2300'. INST 24 FOC FM site to MH15 via new ductbank approximately 1300'. Leave 50FT for fiber splicing and leave 30' for copper loop at applicable MH locations for Government terminations.
- Preserve and protect RORP211-5 and direct buried cabling to FORP211-5.
- Preserve and protect HH211-5-4, cabling and ductbank from HH211-5-4 to 1248.
- Coordinate with base telephone provider for cable identifications and pair allocations.
- Provide two 2-inch conduits from an existing manhole will coordinate with government for actual location to the building Main Distribution Frame.
- Provide a Building Entrance Terminal with integral surge protection for termination of the service provider's cabling.

Communication network on campus via a new duct bank that will need to extend from building P1338 with Contractor shall provide a new 4-way 4" duct bank system for the main trunk line from building P1338 to existing underground duct bank. In (2) of the 4" conduits provide a minimum of 3-3" three cell, non-detectable, fabric mesh inner ducts for fiber optic cable. The multi-cell fabric mesh shall be cut off in each hole, leaving a minimum of 2 feet of slack in the material and a minimum of 5 feet of pull

string that will be attached to a permanent part of the maintenance structure, such as tied to the pulling irons. Contractor shall provide and install all required conduit tie-in. Provide underground electrically detectable film warning tape with two-line messaging in permanent one-inch bold letters continuously for the entire length for underground duct banks. Provide Innerduct in one of the three ducts. Provide the point of building entry hidden below ground. Seal all incoming communications ducts to resist liquid and gas infiltration at all maintenance holes and building entrance point locations.

Telecommunications Premise distribution

The contractor scope for the facility includes all material for an interior premise distribution for telecommunications cabling. This cabling shall consist of incoming backbone cabling, horizontal cabling to individual work outlets for Communications, Security and CATV services, including accessories and devices as necessary and required for a complete and usable system.

Contractor shall furnish and install pathways for telecommunications cabling above ceiling and under raised floor and equipment shall be for the sole use of communications cabling. Other utilities (e.g., CCTV, Fire Alarm cabling, mass Notification Systems cabling, ICIDS, etc.) shall have a cabling pathway that is separate and distinct from the telecommunications cabling pathway. All telecommunications pathways (conduits, basket trays, cable trays, J-hooks, etc.) shall maintain a minimum 6" clearance from fluorescent light fixtures. Unless stated otherwise, a minimum 2" separation must be maintained between communications pathways and any other trades (e.g. electric, plumbing, HVAC ductwork, sprinkler piping, Fire Alarm, etc.). Pathways for telecommunications installed under slab/in a "Wet Location" as defined by the National Electric Code, shall have OSP or Indoor/Outdoor Cat6 cabling installed that is rated for use in wet locations. If the pathway for OSP or Indoor/Outdoor cabling passes through a plenum area, then they will need to be indoor/outdoor plenum rated cable.

- All comm rooms Provide (4) 4" sleeves to provide riser access for the backbone cabling.
- Secondary fiber backbone is to provide (1) 12-strand OS2 single-mode fiber optical and (1) 12-strand OM4 multi-mode fiber optic cable.
- Provide 48 strand multi-mode fiber per enclave (classified and unclassified) from CACCTUS IG servers to CACCTUS Switch racks.
- Secondary copper backbone is to provide 50 PR CAT.3 cabling from the MDF to each IDF.
- Comm rooms Provide 50' of 22" W cable runway with (4) series 44+ fire-Rated Pathways, 19" free standing relay racks with vertical managers on both sides of each rack.
- Comm rooms require ¾" fire-rated plywood mounted on three walls of the room. 4' X 8' sheets will be mounted vertically 6" A.F.F
- All cabling will be Cat.6 (UTP) green color copper cable for unclassified networks, voice and data cable locations.
- All CAT6A UTP cabling for simulation networks (i.e. CACCTUS, etc) from rack-mounted patch panels (in each IDF) to each WAO.
- Provide (4) RED Category 6 (UTP)copper cable for SIPRNET horizontal voice and data cables.
- Provide (1) CAT.5e (UTP) for synchronized clocks and wall phones. At each located synchronized clocked provide RJ-11 jack.
- Provide (2) CAT 6 UTP green color for WAP /DDC / FACP/ Elevators/ TV displays/Utility Monitoring or metering.
- Jack colors must be the same as CAT 6 cable colors.

- Provide a dedicated above ceiling basket-type cable tray system for NIPR/VOIP, SIPR and Training Networks.
- If SIPR outlets are outside the classified areas, then provide a Protected Distribution System (PDS) as required.
- Provide rooms adjacent to SIPR telecom rooms if possible, to minimize PDS. Provide Harden Lock box if SPIR outlets are in an unclassified area.

MAIN DISTRIBUTION FRAME (MDF)

- Provide minimum dimensions 10 feet by 10 feet or larger as needed to provide adequate working clearance around equipment. Adequate working clearance is defined as a minimum of
- 42 inches from an adjacent wall and 36 inches in aisles between racks.
- All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.
- The MDF will be considered a dedicated space and not house any equipment not specifically
- associated with the telecommunications infrastructure.
- The MDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39" separation between NIPR and SIPR cabinets. Provide a wall telephone in each room.

INTERMEDIATE DISTRIBUTION FRAME (IDF)

- Provide minimum dimensions of 10 feet by 10 feet, or larger as needed to provide adequate
- working clearance around equipment. Adequate working clearance is defined as a minimum of
- 42 inches from an adjacent wall and 36 inches in aisles between racks.
- All telecommunications rooms will be securable in order to restrict access to authorized government personnel only.
- The IDF will be considered a dedicated space and not house any equipment not specifically associated with the telecommunications infrastructure. Each IDF will house Ethernet switches, an active equipment rack, relay racks, patch panels to serve horizontal network cabling, fiber-optic cable termination cabinets for NIPR and SIPR networks. Provide a minimum 39" separation between NIPR and SIPR cabinets.
- Provide a wall telephone in each room.
- Provide a dedicated IDF for training network servers and distribution equipment. Coordinate with government for requirements.

WORK AREA OUTLET

- Provide double-gang steel electrical boxes for voice/data work area outlets. Provide boxes with a minimum dimension of 5-inches square in standard gypsum board walls and 4-11/16 inches square in CMU block walls.
- Provide a 1-1/4-inch conduit from each double-gang outlet box to the cable tray system. Mount voice/data work area outlet boxes at 18" above finished floor and minimum 6 inches away from any power receptacle.
- Provide voice/data outlet locations with a 4-position faceplate with four RJ-45 (8P8C) connectors. All work areas will contain a minimum of two communications face plates. Any work area larger than 80 sq. feet will require additional face plates to service any work location in the room within 6 feet of a faceplate.

- Refer to section 27 10 00 for WAO details.
- Provide RJ-11 jack at synchronized clock locations.
- Provide single gang steel electrical boxes at wall telephone locations with a 1-inch conduit from the outlet box to the cable tray system. Example locations for wall telephones are utility spaces, IDF. Mount wall telephone work area outlet boxes at 48" AFF. Provide wall telephone outlet locations with a 1-position faceplate with metal mounting studs.
- Provide two (2) CAT6 cables from the Fire alarm Panel to the telecommunications closet for Cybersecurity connection.
- Provide 1 wall mounted telecom outlet with Cat.6 cable in each utility room to accommodate energy management systems in accordance with RFP.
- Outlet boxes with (4) Cat6 drops in all offices and work areas or areas that can be converted to offices or work areas.
- Provide CATV/Display double gang box with (1) coax cable and (2) cat6 cables per location to facilitate IPTV and or CATV.
- Provide two (2) CAT6 cables from the Supervisory Panel to the telecommunications closet for Cybersecurity connection to Energy management system/buildings automated systems.
- Provide public address system with speakers in all common spaces and exterior speakers for outside activity spaces.
- Provide RG-6 coaxial and (2) CAT.6 cables form the closest IDF to each television location.
- All CATV need to be coordinate with CATV service provider for requirements.

Ready Room/Auditorium

- The following room require WAO every 6ft. along the wall.
- Provide WAO sets in multi-service, recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service, recessed floor boxes.
- Each WAO set includes:
 - o (MCEN-N/POTS Phone)
 - o (MCEN-S/VOSIP)
 - o (Exercise NIPR)
 - o (Exercise SIPR)
- Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others).

Exercise Control Room

- The following room require WAO every 4 ft. along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO includes:
 - o (MCEN-N/POTS Phone)
 - o (MCEN-S/VOSIP)
 - o (Exercise NIPR)

- o (Exercise SIPR)
- Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Brief and Debrief Room

- Provide WAO every 6 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO includes:
 - o (MCEN-N/POTS Phone)
 - o (MCEN-S/VOSIP)
 - o (Exercise NIPR)
 - o (Exercise SIPR)
 - o Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Secure VTC Room

- Provide WAO at location of VTC equipment.
- Secure VTC Room WAO on each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
 - o (MCEN-N/POTS Phone)
 - o (MCEN-S/VOSIP)
 - o (Exercise NIPR)
 - o (Exercise SIPR)

Classified Simulation Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
 - o (MCEN-N/POTS Phone)
 - o (MCEN-S/VOSIP)
 - o (Exercise NIPR)
 - o (Exercise SIPR)
 - o Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Unclassified Simulation Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
 - (MCEN-N/POTS Phone)
 - MCEN-S/VOSIP)
 - (Exercise NIPR)
 - (Exercise SIPR)
 - Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)

Simulation Control Secure Comm Room - Vault

- Provide WAO every 4 feet along each wall.
- Each WAO set includes:
 - (MCEN-N/POTS Phone)
 - (MCEN-S/VOSIP)
 - (Exercise NIPR)
 - Exercise SIPR)
- Provide (2) 24 port CAT 6 connection panels, one from unclassified panel and one from classified panel to Sim Control Room connection panel.
- Provide fiber connectivity to Simulation Control Secure Comm Room and TR. Coordinate fiber types and counts with user.

Simulation Operator

- Provide WAO at each workstation.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and
 - D5020.
- Each WAO set includes:
 - (MCEN-N/POTS Phone)
 - (Exercise NIPR)

Secure Workstation Room - Vault

- Provide WAO at each workstation.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020.
- Each WAO set includes:
 - (VOIP/POTS Phone)
 - (MCEN-S/VOSIP)

FIRE Rooms

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:

- (Exercise NIPR)
- (Exercise SIPR)
- Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)
- Provide WAO (MCEN-N/POTS Phone) located both sides of door

Simulation Control Room

- Provide WAO every 4 feet along each wall.
- Provide WAO in multi-service recessed floor boxes described in Part 3 Chapter 5 and D5020. Install classified voice and data WAO and unclassified voice and data WAO in separate multi-service recessed floor boxes.
- Each WAO set includes:
 - (MCEN-N/POTS Phone)
 - (MCEN-S/VOSIP)
 - (Exercise NIPR)
 - (Exercise SIPR)
- Exercise NIPR or SIPR could contain MTWS/CACCTUS/DVTE, plus system station tables can have multiple network devices (Simulation Laptop/Desktop, VOIP, POTS Phone and C2 System devices (Email, C2PC, AFATDS and others)
- Provide two 24 port CAT 6 connection panels, one from unclassified panel and one from classified panel to Simulation Control Secure Comm Room connection panel.
- Provide fiber connectivity to Simulation Control Secure Comm Room and TR. Coordinate fiber types and counts with user.
- Provide (4) 19-inch enclosed equipment racks to house network equipment for Simulation Control Secure Comm Room (Vault).

SIMULATION CONTROL SECURE COMM ROOM - VAULT

- Provide (4) 19-inch enclosed equipment racks network equipment.

SIMULATION CONTROL ROOM

- for CACCTUS equipment per enclave (2 NIPR, 2 SIPR racks), with 8 rackmount computer shelves per rack.
- Provide (2) 19-inch enclosed equipment racks for Unclassified MTWS equipment (Servers), with 8 rackmount computer shelves per rack.
- Provide (2) 19-inch enclosed equipment racks for Classified MTWS equipment (Servers), with 8 rackmount computer shelves per rack.
- Provide (3) 19-inch equipment racks per enclave (Exercise Classified, Unclassified) network and patch panel to simulation rooms.

Public Address System

Provide a Public Address system with speakers in all common spaces and exterior speakers for outside activity spaces.

- Interface the Public Address System with the Mass Notification System.

Electronic Security Systems (ESS)

Provide an electronic security system including equipment and supporting infrastructure complete, tested, and operational. Provide ESS that is compatible with the Installation's central monitoring system and monitored within the secure/protected area and at the Installation central monitoring station. Provide an ACS utilizing credential devices to monitor and control personnel movement into the secure area. The ACS must log and archive all transactions and alert authorities of unauthorized entry attempts. Provide an IDS to detect attempts or access by unauthorized personnel into secure/protected areas. Provide point sensors on all windows, doors, and man-passable openings. Provide volumetric sensors within secure/protected areas to detect movement within the area. Emergency exit doors must be alarmed 24 hours per day. Alarm condition must result in an audible annunciation that alerts occupants within the secure/protected area of an attempted egress.

GPS System

Provide LMR400 Coaxial cable (or approved equivalent) from the training network server room to GPS Model 8225 antenna. Coordinate with government of location of antenna. Provide mount for GPS.

Audio Visual Systems

System design must be completed by an individual with a CTS-D certification. Refer to E20 for the Best Value Determination process for AV systems.

GROUNDING SYSTEMS

Provide ground bars in electrical and telecommunications rooms. In multi-story buildings, provide a common grounding electrode riser to bond the secondary electrical ground bars (EGB) to the electrical main ground bar (EMGB) located in the main electrical room.

Provide a main telecommunications ground bar (TMGB) in the main Communications Equipment Room and bond to the EMGB. Provide secondary telecommunications ground bars (TGB) in each secondary telecommunications room and bond to the TMGB using a common bonding conductor. The common bonding conductor and common grounding electrode must be separate conductors.

Provide minimum 24"x4"x1/4" copper main ground bars minimum 12"x2"x1/4" copper secondary ground bars. Provide electrical ground bars pre-drilled with a standard NEMA two-hole configuration for the entire length of the bar. Provide telecommunications ground bars pre-drilled with a TIA-607 hole pattern for the entire length of the bar.

Design

- **G2050 LANDSCAPING**
Provide complete landscaping consisting of lawn groundcover trees shrubs ornamental grasses and organic mulches and inorganic mulches as required to provide a quality, cost-effective, functional and visually appealing landscape program that will enhance the development, while complying with all applicable anti-terrorism, force protection and physical security requirements. The landscape design must reinforce the facility entry and complement existing landscapes in the vicinity. Provide a 5' wide inorganic rock cobble mulch mow strip around the building with weed barrier fabric below rock. Provide concrete edging along mow strip where edging is adjacent to a turf area. Provide landscaping resistant to deer. G2050 Landscaping - Newly graded areas and area affected or disturbed by construction activities must be planted with a simple and low maintenance planting or landscaping scheme grass such as Bermuda grass.
- Trees, shrubs, and ground covers are acceptable within the AT/FP unobstructed space. Trees must have a 3-inch minimum caliper and branching structure that provides a 3-foot clear zone above the finished grade. Shrubs must be trimmed to provide a 3-foot clear zone above the finished grade and ground covers must not exceed 6-inches in height.
- Provide mechanical equipment screening wall on three sides of new equipment
- Provide plantings to frame the new building and lessen the visual impact of parking areas. Provide planted strip between any sidewalk and any Primary, Secondary and Tertiary streets.

Plantings:

1338 Quantities: Based on 1 tree per 1000 sf of landscape area. Landscape Area: 270,955 sf

Shade Trees: 150

Ornamental Trees: 120

Evergreen Screen Trees: 10

Shrubs: 510

1527 Quantities: Based on 1 tree per 1000 sf of landscape area. Landscape Area: 67,950 sf

Shade Trees: 38

Ornamental Trees: 29

Evergreen Screen Trees: 10

Shrubs: 150

- Shade trees must be a minimum size of 3 inch caliper at breast height and 14 to 16 feet tall minimum unless specified for Antiterrorism Force Protection measures where the trees are integrated into the vehicle-deterrent perimeter. See Antiterrorism Large Diameter Trees in PART 3 - CHAPTER 2 PROJECT OBJECTIVES. Flowering trees must be minimum 2 inch caliper and evergreen trees 8-10 feet tall. In general, select trees that have a normal lifespan over 60 years and a strong branch and limb structure. Trees must be relatively clean and free of potential nuisances such as fruit, berries, sap, thorns and pitch. In addition, trees must not have surface roots which will potentially uplift sidewalks and pavements. For palm trees, identify sizes on plans by brown trunk height (BTH) or clear trunk height (CTH). Unless otherwise approved by the reviewing government landscape architect, provide minimum BTH or CTH of 8 feet.
- POV parking lots must have a minimum of one (1) canopy tree every five (5) parking spaces

around parking lot perimeter including entrance drives and service areas. Tree plantings along perimeter of lot must follow the Camp Lejeune Base Exterior Architecture Plan (BEAP) for a natural, native appearance. Parking lots must have no more than two tree species unless authorized by Government Landscape Architect.

- Parking areas must be screened using a variety of tree and shrub planting to reduce visual impact from adjacent roadways. A minimum of 15 percent of the surface area of the parking lot must be shaded by deciduous trees within 10 years of installation. A minimum of 5 percent of the parking lot must be pervious planting bed.
- Provide deciduous shrubs along the parking lot perimeter to create an informal opaque screen.

Bicycle Racks – Quantity – 5% of FTE

- G2030 Pedestrian Paving - Bike racks must be provided to support 5% of the building FTE and can be divided into more than one location.

Lawn

1338 Quantity of sod: 270,955 sf

1527 Quantity of sod: 67,950 sf

- G205004 SODDING
Sod all areas intended to be turf. Restore existing turf areas disturbed by Contractor operations that are to remain as turf areas. Restore by means of sodding and provide same guarantee and maintenance as for new landscape areas. Sod species must be Centipede – *Eremochloa ophiuroides*.
- G204090 OTHER SITE IMPROVEMENTS - Provide a 50,000 square foot grass training space. Outdoor space must be grass-pave to support emergency vehicles and turf areas for communications tents.

Guarantee

- G2050 LANDSCAPING
Guarantee all landscaping for a period of one year. Provide a one-year Establishment and Maintenance period. Landscaping Guarantee and Establishment and Maintenance periods must commence on the date that the inspection by the Contracting Officer shows that all landscaping under this contract has been satisfactorily installed.

Landscape Maintenance and Establishment Period

- G2050 LANDSCAPING
Provide complete landscaping maintenance, including but not limited to, routine lawn mowing, edging, pruning, pest inspection/treatment, re-mulching of mulch products, watering, weeding, fertilizing, and restaking, throughout the guarantee period.

Soil

- G205001 FINE GRADING AND SOIL PREPARATION Provide 4" of topsoil for lawn areas and fine grade.
- G205003 TOPSOIL AND PLANTING BEDS
Provide a planting soil mixture composed of 50% native soil blended with 50% topsoil and other

amendments as recommended by the soil testing laboratory around root balls of shrubs, trees, groundcovers, perennials, and ornamental grasses that is at a minimum, twice as wide and equally as deep as the plant's root balls. Set tops of plant root balls 2 inches above adjacent grades

Mulch

- Inorganic: For inorganic granular mulch applications, provide 3 to 5 inch diameter river stone mulch over weed control fabric at mow strips around buildings. For organic mulch applications, provide 3 inches of shredded hardwood mulch over weed control fabric at planting beds except for spreading groundcover planted areas.
- Organic: Provide 3 inches of shredded hardwood, pine bark or pine needle mulch at all planting beds.

Edging and Maintenance Strip

1338 Quantity of edging : 941 lf

1527 Quantity of edging: 372 lf

- G205005 Provide 6-inch-wide (minimum) by 12-inch-deep concrete band edging for each of the following conditions: between rock mulch/cobble area and turf area, between rock mulch/cobble area and planting area, and between turf area and planting area. Contain turf areas adjacent to building walls, site walls, columns, stairs, and other structures by a 6-inch-wide (minimum) concrete header with a minimum separation of concrete header from walls, columns, and other structures of 2 feet to minimize damage to site improvements.

Weed Barrier Fabric

G205005 1.4.7 Weed Fabric and Erosion Control Fabric Provide a weed barrier fabric of sheet polypropylene or polyester fabric specifically designed for weed control purposes beneath planted or mulched non-planted areas. Treat fabric for protection against deterioration due to ultraviolet radiation. Provide fabric that is a minimum 99 percent opaque to prevent photosynthesis and seed germination from occurring, yet allowing air, water and nutrients to pass through to the roots. Minimum weight must be 5 ounces per square yard (0.11 kg per square meter) with a minimum thickness of 20 mils (0.50 mm) with a 20 year minimum guarantee. Provide a biodegradable product designed specifically for erosion control on sloped areas 3 (horizontal):1 (vertical) and steeper in slope

Irrigation

- G205007 IRRIGATION SYSTEM Not Used
- G205007 1.4 TEMPORARY IRRIGATION
Provide ultra-violet resistant pipe and fittings for above-grade, temporary irrigation. Only non-pressure pipe is allowed above grade.