6.0 PROJECT SPECIFIC REQUIREMENTS FORT CARSON, CO *<VER>*(REV 3.1 – 30 APR 2012)*</VER>*

6.1. GENERAL

The requirements of this paragraph augment the requirements indicated in Paragraphs 3 through 5.

6.2. APPROVED DEVIATIONS

The following are approved deviations from the requirements stated in Paragraphs 3 through 5 that only apply to this project. NONE

6.3. SITE PLANNING AND DESIGN

6.3.1. General:

6.3.1.1. Omaha District Corps of Engineers Standard Details and CADD Cells

The Omaha District's Civil CADD standard details and cells are available at:

https://www.nwo.usace.army.mil/html/ed-d/civil.html. The Omaha District's Environmental standard details and CADD cells are available on the Omaha District FTP site. These standards and cells are available for the Contractor's use. References to using exact details and drawings are found in this section. In those cases, use the referenced standard drawings and or details.

6.3.1.2. Contractor's Staging Area

Locate the Contractor's staging area as shown on the RFP drawings. Return the staging area to its original condition upon completion of construction.

6.3.1.3. Project Sign

Provide a project sign in accordance to Omaha District Standard drawing C8-2 PROJECT SIGN DETAILS.

6.3.1.4. New Construction

All new construction is located entirely within the limits of Government-controlled lands. Develop the design drawings using the same vertical and horizontal datum's as the engineering survey.

6.3.1.5. Building Site

«SITE_PLANNING»

6.3.2. Site Structures and Amenities

6.3.2.1. Dumpster and Recycle Bin Pads and Screen Wall Enclosures

Provide concrete pads and dumpster and recycle bin screen wall enclosures at the location(s) shown in Appendix J - Drawings. Construct screen wall enclosures and gates of materials compatible with the new facility exterior walls. Coordinate the color with the installation. Provide 8 cubic yard size dumpsters. Provide openings to the dumpsters that are large enough to allow the dump truck to access the dumpters without having to move them outside of the enclosure.

6.3.2.2. Retaining Walls

Provide interlocking segmental concrete block retaining walls where required. Engineer the storm drainage to flow around the top and not over the walls. Color, design and size of the concrete blocks for retaining walls need to compliment the building.

SAMPLE

6.3.2.3. Exterior Equipment Pads

Provide P.C. concrete pads for exterior equipment. Design and size pads to accommodate the furnished equipments weight and dimensions.

«SITE_STRUCTURES_AMENITIES»

6.3.3. Site Functional Requirements:

6.3.3.1. Fort Carson Stormwater Management Plan (SWMP)

The stormwater management requirements in this paragraph are only applicable for projects that disturb more than 5,000 square feet. Fort Carson has been divided into three distinct zones for stormwater management. Each zone represents a different environmental stormwater setting requiring specific Best Management Practices (BMPs). Review the Fort Carson SWMP to determine which zone the project is located within.The Fort Carson SWMP is available at http://sems.carson.army.mil/environmental/water/stormwater/. Fort Carson's goal is to maximize the utilization of multiple BMP placements at each new construction site by focusing on Low Impact Development and other green strategies. Unless otherwise indicated, large structures such as detention basins will be subject to approval.

(a) Peak Flow and Runoff Volume

(1) Construct BMPs to mitigate 110 percent of the difference in peak discharge and runoff volume between the pre-development and post-development conditions to the maximum extent technically feasible. "Pre-development" refers to the natural condition before any development. The peak flow and volume of runoff will be determined using the 5-year, 24-hour duration SCS Type II storm. The 5-Year, 24-hour rainfall depth at Fort Carson is 2.7 inches.

(2) For example, assume the pre-development peak flow for a site is 12 cfs and the post-development peak flow (without mitigation) is 15 cfs. 110% of the difference is 1.1 x (15 - 12) = 3.3 cfs. Construct BMPs so that the final post-development peak flow is equal to 15 – 3.3 = 11.7 cfs.

(3) Assume a 4.0 acre site has a pre-development runoff volume of 0.80 ac-ft and a post-development runoff volume (without mitigation) of 0.90 ac-ft. 110% of the difference is 1.1 x (0.90 – 0.80) = 0.11 ac-ft. Construct BMPs to infiltrate 0.11 ac-ft of storm runoff.

(4) The Project Information Form included in Appendix E - Environmental Information provides site runoff calculations for the site plan furnished with this solicitation. If the Contractor modifies the site plan and changes the impervious area, submit a revised Project Information Form to the Fort Carson Stormwater Program Office. The Fort Carson Stormwater Program Office will provide the revised peak flow and runoff volume for the site.

(5) Determine peak flow and runoff volumes for subbasins within the project site. For purposes of determining compliance with the SWMP, calculate the peak flow and runoff volume using the methodology contained within TR-55 "Urban Hydrology for Small Watersheds".

(6) Unless otherwise specified, design BMPs to mitigate the 5-year storm event as described above while passing the 25-year storm without damage to the BMP.

(7) 24-hour rainfall depths for Fort Carson are as follows:

Frequency	24-Hour Depth
5-Year	2.7 inches
10-Year	3.2 inches
25-Year	3.7 inches
100-Year	4.6 inches

(b) Water Quality Capture Volume (WQCV) BMPs

SAMPLE

(1) The WQCV is equal to 110 percent of the difference in runoff volume from the site between the pre-development and post-development conditions.

(2) Runoff from the impervious surfaces of the site must flow though one or more WQCV BMPs to the maximum extent technically feasible.

(c) Post-Construction BMP Requirements.

(1) Select amongst the BMPs listed in paragraph 10.5.2 of the SWMP for the zone where the project is located . Unless otherwise specified below, design post-construction BMPs to the requirements in Appendix J of the Fort Carson Stormwater Management Plan.

(2) PC-09 Bioretention Areas. Drainage area for each bioretention area shall not exceed 2 acres and shall preferably be less than 1 acre. Design bioretention areas to draw down any pooled water within 12 hours after a storm event. Locate bioretention areas at least 25-feet from buildings with basements and 10-feet from buildings without basements. Where the in situ soil has an infiltration rate of less than 0.5 inches/hour, design bioretention areas with an underdrain discharge pipe. The bottom and sides of bioretention areas adjacent to pavements may require an impervious liner to prevent damage to the pavement. Provide an overflow structure or outlet to convey flow from storms that are not treated by the bioretention facility.

(3) PC-13 Dry Detention Ponds. Use Dry Detention Ponds only when indicated (see Appendix J Drawings). Design the outlet works to release the WQCV over a 40-hour period. Design the embankment not to fail during 100-year and larger storms.

(d) Technical Infeasibility. Document and quantify in the design analysis that the stormwater strategies included in the design meet the requirements for peak flow, runoff volume, and WQCV to the maximum extent technically feasible. Provide documentation in the Design Analysis if it is determined that it is technically infeasible to meet the requirements for peak flow, runoff volume, and WQCV. Documentation of technical infeasibility should include, but may not be limited to, engineering calculations, geologic reports, hydrologic analyses, and site maps. A determination that the performance design goals cannot be met on site should include analyses that rule out the use of an adequate combination of infiltration, evapotranspiration, and use measures.

(e) Operations & Maintenance Plan.Describe any operations and maintenance requirements for all BMPs in the design analysis.

6.3.3.2. Stormwater Management (SWM) Systems.

(a) Determination of Storm Runoff. Determine discharges from storm event using the methodology contained within TR-55 “Urban Hydrology for Small Watersheds

(b) Design Storm Return Period. Size storm drains and culverts for a design storm with a return period of 10 years. Unless otherwise indicated or specified, size cross culverts beneath roads and streets for a design storm with a return period of 25 years and a maximum headwater depth/pipe diameter ratio of 1.25. The maximum allowable depth of overtopping at the road centerline during the 100 year storm shall be 6 inches. Make provisions to protect all buildings and critical structures from a major storm event with a return period of 100 years.

(c) Rainfall Depth-Duration-Frequency Data . See paragraph above for 24-hour rainfall depths for Fort Carson.

(d) Storm Drainage System Design. Design the storm drainage system. Submittals of pipe samples are not required. Design the storm drainage system so as to minimize the number of drainage structures required. Locate structures at all changes in direction of storm drain line, at the intersection of two or more storm drain lines, and where required to intercept rainfall runoff. The maximum distance between drainage structures shall be approximately 300 feet for conduits less than 30 inches in diameter. The maximum distance between drainage structures shall be approximately 500 feet for conduits 30 inches and greater in diameter. Where possible, provide a minimum drop of 0.2 feet between inverts of equal diameter storm drain pipes at the centerline of drainage structures. Where storm drain pipes are of different diameters, match the pipe crown elevations at the

SAMPLE

drainage structure. Storm drain pipes shall have a minimum diameter of 12 inches. Locate storm drain lines outside of paved areas to the extent possible. Do not locate storm drain lines beneath buildings.

(e) Hydraulic Design. Design new storm drain pipes for gravity flow during the 10-year design storm unless otherwise approved by the Government. Calculate the hydraulic grade line for the storm drain system and all energy losses accounted for. Design storm drain systems to provide a minimum flow velocity of 2.5 feet per second when the drains are one-third or more fill.

(f) Manholes. Diameter of manholes needs to be large enough to accommodate pipes entering/exiting the manhole. Provide manhole cast iron frames with a minimum opening diameter of 24 inches.

(g) Area Inlets. Size and design area inlets to accommodate the design flows.

(h) Curb Inlets. Avoid locating parking area curb inlets at building entrances and handicap ramps. Space and size curb inlets along two-lane streets so that the flow in the gutter and ponded areas at low points do not cover the crown of the street.

(i) Headwalls and Flared End Sections. Unless otherwise approved, provide headwalls or flared end sections at the ends of culverts and at storm drain outfalls. Provide protection from erosion and scouring at headwall and flared end section outfalls as needed. Use the design storm frequency for the culvert design to design energy dissipaters at outfalls.

(j) Culverts. Provide culvert pipes with a minimum diameter of 18 inches wherever possible.

(k) Roof Drain Outfall Lines. Where downspouts discharge onto rock mulched beds, concrete splash blocks are required as a minimum. Downspouts may not discharge onto turfed areas or sidewalks. Where downspouts discharge onto paved areas, connect to the storm drainage system with PVC or HDPE pipe. The minimum diameter for roof drain lines is 6 inches. Use 45 degree bends for all changes in direction.

(l) Storm Drain and Culvert Pipe Materials. Select the appropriate storm drain and culvert pipe materials from the list below. Pipe, bedding, and backfill shall be of adequate strength (or stiffness) to support the earth, live, and construction loads imposed on the pipe. Only pipe materials which have a minimum design service life of 25 years are allowed for permanent installations. As a minimum, provide soil tight pipe joints. Specify watertight pipe joints and flexible resilient pipe connectors at drainage structures when the water table is at or above the pipeline.

(1) Concrete Pipe. Reinforced concrete pipe shall be a minimum of Class III. Assume concrete pipe to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life. Protect concrete culverts and storm drains by a minimum of 3 feet of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction.

(2) Plastic Pipe. Stiffness of the plastic pipe and soil envelope shall be such that the predicted long-term deflection shall not exceed 7.5 percent. Protect plastic culverts and storm drains by a minimum of 3 feet of cover during construction to prevent damage before permitting heavy construction equipment to pass over them during construction. Split couplers shall not be allowed for corrugated high-density polyethylene pipe. Assume plastic pipe to have a minimum design service life of 50 years unless the Contractor determines that conditions at the site will reduce the service life.

(m) Storm Drainage Security Requirements. Install bars on drainage structures and water passages penetrating under a security fence or boundary to provide penetration resistance equivalent to the fence itself. Protect openings to the drainage structures having a cross-sectional area greater than 96 square inches and a smallest dimension greater than 6 inches by securely fastened welded bar grills. As an alternative, drainage structures may be constructed of multiple pipes, each pipe having a diameter of 10 inches or less, joined to each other and to the drainage culvert.

«STORMWATER_MANAGEMENT»

6.3.3.3. Erosion and Sediment Control

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Select and implement Best Management Practices (BMPs) to minimize pollutants in storm water discharges associated with construction activity at the construction site. Maintain all erosion and sediment measures and other protective measures in effective operating condition. Remove all temporary structural practices once the corresponding disturbed drainage area has been permanently stabilized. In the State of Colorado, EPA has authority for the National Pollutant Discharge Elimination System (NPDES) on Federal Facilities. If construction activities results in the disturbance of 1 acre of land or more, coverage under the EPA Storm Water General Permit For Construction Activities (Permit No. COR10000F) is required. The Contractor is the responsible permittee. Comply with the requirements in Appendix E. Fort Carson Army installation is required to comply with EPA Region 8 MS4 (Municipal Separate Storm Sewer Systems) for federal facilities. To the maximum extent possible within the government identified contract cost limitation (CCL), the design should retain or utilize existing landscape vegetation in the Contractor's landscape and architectural design development.

(a) Temporary Construction Entrance. Keep tracking of mud from the construction site onto adjacent roads and streets to a minimum. Construct a temporary stabilized stone pad at points where vehicular traffic will be leaving the construction site and moving directly onto a paved road or street. It shall extend the fill width of the vehicular ingress and egress area and have a minimum length of 70 feet. Maintain the entrance in a condition which will prevent tracking or flow of mud onto adjacent roads or streets. If conditions on the site are such that the majority of the mud is not removed by the vehicles traveling over the stone, wash the tires of the vehicles before entering the road or street. Remove any mud which is tracked onto roads or streets at least once daily.

(b) Erosion Control Blanket.. Cover bottoms and side slopes of ditches and any other disturbed slopes 1V on 3H or steeper with an erosion control blanket immediately after seeding.

(c) Silt Fence. Install silt fencing below disturbed areas where erosion would occur in the form of sheet and rill erosion. The size of the drainage area above the silt fence shall not exceed one fourth of an acre per 100 feet of silt fence length. Silt fencing may be installed across ditches only when the maximum contributing drainage area is not greater than 1 acre. Silt fence constructed across a ditch shall have wire support and shall be of sufficient length to eliminate endflow.

(d) Outlet Protection. Install preformed riprap lined scour holes or other suitable measures at outlets of culverts and storm drains as needed to prevent erosion.

(e) Storm Drain Inlet Protection. Install storm drain inlet protection around any new or existing storm drain inlets that will become operational before permanent stabilization of the corresponding disturbed drainage area has occurred. Include either a sediment filter or an excavated area around the storm drain inlet for storm drain inlet protection.

(f) Rock Check Dam. Rock check dams may be installed in ditches which drain 2 to 10 acres. The allowable drainage area will be dependent on the gradation of the rock used to construct the check dam. The maximum height of the dam is 3 feet. The center of the dam shall be at least 6 inches lower than the outer edges. For added stability, the base of the check dam may be keyed into the soil approximately 6 inches. The maximum spacing between the dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

(g) Temporary Sediment Trap. Temporary sediment traps may be constructed below disturbed areas where the total drainage area is less than 3 acres.

(h) Temporary Sediment Basin. Temporary sediment basins may be constructed below disturbed areas where the total drainage area is equal to or greater than 3 acres.

(i) Other Controls. Other controls such as diversion dikes, level spreaders, temporary seeding, etc. may be used if the Contractor deems necessary

6.3.3.4. Vehicular Circulation.

«VEHICULAR_CIRCULATION»

6.4. SITE ENGINEERING

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6.4.1. Existing Topographical Conditions

Existing Topographical Conditions:

«SITE_EXIST_TOPO»

6.4.2. Existing Geotechnical conditions: See Appendix A for a preliminary geotechnical report.

«SITE_EXIST_GEO»

6.4.3. Fire Flow Tests. See Appendix D for results of fire flow. See paragraph 6.4.6.2.2 Dedicated Fire Water Service Lines for additional information.

«SITE_FIREFLOW»

6.4.4. Pavement Engineering and Traffic Estimates:

6.4.4.1. Pavement Design

Design pavements for permanent installations for a life of 25 years. Design pavements for seasonal frost conditions. Base final pavement design on the Final Geotechnical Report. Design all pavements using the State of Colorado DOT requirements. For the AASHTO design method, use the following parameters:

Reliability = 90 percent
Standard Deviation = 0.35 for rigid and 0.45 for flexible pavement
Initial Serviceability Index = 4.2
Terminal Serviceability Index = 2.5
Aggregate Base Course = Class 4 or 5

6.4.4.2. Sidewalks and Curb and Gutter

(a) Sidewalks

Sidewalks shall conform to the applicable State of Colorado DOT requirements. Provide sidewalks as shown on Appendix J – Drawings and connect to other existing walks in the immediate vicinity.

(b) Sidewalks for Fire Department (Emergency Vehicle) Access

Concrete sidewalks used for Fire Department access shall be a minimum 8 inches Portland Cement Concrete and 10 inches of base course material with 12 inches of compacted subgrade to 90%.

6.4.4.3. Curb and Gutter

Curb and gutter shall conform to the applicable State of Colorado DOT requirements. Curb face shall be 1/2-inch off of vertical with straight faces and a 1-1/2 inch radius maximum at the gutter line and at the top of curb.

6.4.4.4. Joint Sealing

Joint Sealing shall conform to the applicable State of Colorado DOT requirements.

6.4.4.5. Additional Information

«SITE_PAVEMENT_ENGINEERING_AND_TRAFFIC»

Comment [sdn1]: NOTE TO SPECIFIER: Describe the performance requirements for roadways, parking and other pavements, including classification, vehicle types, loadings, design volume, climatic conditions, frost penetration Zones, etc. that is not already described above.

6.4.5. Traffic Signage and Pavement Markings Provide traffic signage and striping for all new roads and parking areas. Design signage and striping in accordance with MUTCD Manual on Uniform Traffic Control Devices for Streets and Highways. Provide striped parking areas, roads and streets with non-reflectorized paint that contains low volatile organic compounds (VOCs). Provide exterior signage for handicap parking stalls,

SAMPLE

including van accessible parking areas. Provide stop signs at intersections where access roads from parking areas enter roadways. Provide pedestrian signage and striping at all crosswalks.

6.4.6. Base Utility Information

6.4.6.1. Existing Base Utility Information

(a) Electrical Service

The Fort Carson Department of Public Works (DPW) provides electrical service on this installation Coordinate with DPW / Base Operations Division (BOD) for points of connection to the base electrical system. Contact DPWIBOD, «SITE_ELEC». See Appendix J for drawings of existing utilities and also utilities that may be proposed or under construction but is relevant to this project.

Comment [g2]: Use carsdpwelectrical@conuse.army.mil unless directed otherwise.

(b) Communications Service

The Fort Carson Network Enterprise Center (NEC) provides communications service on this installation. Coordinate with NEC, «SITE_COMMO». See Appendix J for drawings of existing utilities and also utilities that may be proposed or under construction but is relevant to this project.

(c) Cable TV Service

Cable TV service on this installation is privatized and is provided by:

Baja Broadband
521 Corporate Center Drive
Suite 100
Fort Mill, SC 29707

Contact «SITE_CABLE_TV». Coordinate with cable TV service for cable TV provisions. Provide all cabling back to the cable television backboard. Baja Broadband will bring cable plant to the building entrance and will connect all terminations at the backboard.

(d) Local Telephone Service

CenturyLink Communications provides commercial local telephone service on this installation .

6.4.6.2. Waterlines

(a) Design and construct water distribution systems and service lines in accordance with applicable criteria. Protect existing waterlines. If any potable waterlines are damaged during construction, immediately notify the Contracting Officer. Disinfect all new water lines and any remaining lines which do not remain fully pressurized during construction or connection in accordance with state and local criteria. Notify the Contracting Officer prior to disinfection of the water lines. The disinfection methods utilized will be in accordance with the American Water Works Association Standard AWWA C651 and shall not be considered complete until two consecutive days of bacteriological samples show no contamination. Colorado Department of Public Health and Environment (CDPHE) certified laboratories shall perform all bacteriological, lead and copper tests. Bac-T test results are valid for 5 calendar days from the time the sample was taken. Water service lines not activated within this time frame require another Bac-T test before line activation. Forward copies of results of the analyses to the Contracting Officer and the DPW upon receipt and prior to placing the water line in service.

(b) Design and provide all facilities required to deliver adequate water to the project. Make service connections or extensions to the existing water distribution system without interruption to service, using standard “wet-tap” fittings and methods. Be cognizant of the different pressure zones existing in the Ft Carson Water distribution system and coordinate with the installation to ensure new waterlines do not cross connect pressure zones. Loop new water distribution mains in accordance with UFC 3-600-01. Design the domestic demand for the new facility served in accordance with the International Plumbing Code Fixture Count Method. For design of the waterlines, use maximum Hazen-Williams "C" value of 130 for plastic pipe and 120 for other pipe materials. Waterlines shall have a minimum depth of bury of 5 feet and fire waterlines shall have an additional 6 inches of depth of bury. Limit water lines to a maximum depth of 84 inches from proposed finished grade. Exceeding the maximum depth should only used in rare cases when topographical or other utility interferences prevent other economical alternatives and shall be approved by the Contracting Officer. Limit all buried water line valves to a maximum

SAMPLE

depth of 84 inches to allow operation with standard valve wrenches. An air relief valve is required at the high point of all water mains. A blow-off valve or hydrant shall not be considered as a substitute for an air relief valve. Design pipe grades to minimize the use of air relief valves wherever possible. Stainless steel tapping sleeves are allowed where the branch line is less than or equal to one half the size of the line being tapped. Use cast iron tapping sleeves if the tap size is greater than 50% of the pipe being tapped. Use only a mechanical joint tee fitting when tapping into existing asbestos cement (AC) piping where the tap size is greater than 2-inch in diameter.

6.4.6.2.1. Water Service Lines

(a) Flow Requirements. Supply water by service lines of appropriate capacity to provide the flows and pressure determined to be necessary to meet all requirements of the new facility. The requirements include all domestic use, interior and exterior fire protection water, and lawn sprinkler/irrigation systems, as required.

(b) Service Connections. Make service connections using corporation stops, appropriate gooseneck and service connection fittings connections, or tapping sleeves and valves.

(c) Dewatering, Hydrostatic Testing, and Flushing of Lines. Implement the terms and requirements of AWWA C605 and AWWA M55 for dewatering, hydrostatic testing, and flushing of lines prior to disinfection.

(d) Valves on Domestic Services. Provide a valve on each domestic service line(s) serving a facility. Locate valves in areas readily accessible to maintenance and emergency personnel. Valves located in walks are prohibited. Provide all valves with a cast iron valve box and removable lid for operating wrench access. All valve boxes, whether located in pavement or other landscaped areas, shall be surrounded by an 18-inch concrete ring 4-inch thick at final grade. When located in a paved area the top of the valve box and concrete ring shall be flush with the finished grade.

(e) For all service valves larger than 2-inch, use gate valves, with non-rising stems and 2-inch operating nuts (open left).

(f) Potable water service lines shall be a minimum of 3/4- inch in diameter. Non-potable water service lines shall be a minimum of 1-1/2-inches in diameter. Type “K” copper is approved for water service lines. When using copper, do not place flared joints under a vertical foundation wall or footer. Poly Ethylene (PE) DR9, CTS (Copper Tubing Size), 200 PSI or PE 3408, AWWA C901, ASTM D2737 is also approved for water service lines for pipe sizes 1-inch to 2-inch service lines only.

(g) For service lines 2-inches and smaller, provide a corporation stop at the point of tap to the water main. Provide a curb stop valve on each service line. The location of the curb stop is normally between the street curbing and the building as close to the main as possible.

(h) For water service lines, the following materials are not allowed: PVC schedule 40, PVC schedule 80, galvanized steel pipe, black iron steel pipe, and PEX plastic tubing.

(i) Water service lines larger than 2-inches can be ductile iron, plastic (PVC, AWWA C-900 or C-905, Class 200, DR 14) or HDPE (DR 13.5) only. The above piping is not allowed under the structure foundation or slab with the exception of Ductile Iron. For any piping larger than 2-inches, transition to ductile iron pipe no closer than 5 feet from the structure they service. Water service piping shall not come into contact with the buildings concrete foundation or slab. Use a pressure-rated plastic casing to protect the pipe as it passes through any concrete structure.

(j) When tapping an existing distribution line for a service line 2-inches or larger, use a split-sleeve mechanical joint tapping sleeve designed for service for the material of the distribution line to be tapped. For service lines less than 2-inches, use direct corporation tap or appropriate service saddle connections in accordance with the tapped piping manufacturer’s recommendations. Use only a mechanical joint tee fitting when tapping into existing asbestos cement (AC) piping where the tap size is greater than 2-inch in diameter.

6.4.6.2.2. Dedicated Fire Water Service Lines

(a) Fire Flow Data. Government has provided the fire flow test for this site as part of this RFP for bidding purposes only. See Appendix D. For determination and documentation of fire protection, conduct and provide all fire hydrant flow tests. Data to be included with the flow tests are static pressures, residual pressures, flowrates, date, domestic and fire pumps in operation, and PRV setting (open/close), time tests were conducted, and name of personnel conducting the fire hydrant flow tests. Show the static pressures, residual pressures, flowrates, test hydrant and flow hydrants on the appropriate contract drawings. Conduct fire hydrant flow tests required for fire

SAMPLE

protection design in accordance with the procedures specified in AWWA M17, Installation, Field Testing, and Maintenance of Fire Hydrants. Coordinate with the Contracting Officer prior to conducting such tests. Submit fire hydrant flow test data to the Corps of Engineers prior to performing the design calculations. Become familiar with the existing water system prior to conducting the hydrant flow test(s). If actual conditions vary from the presumed conditions depicted in the government furnished flow tests, which require a change in the design from that assumed in the proposal, contact the government immediately for a determination of whether a changed site condition exists.

(b) Fire Hydrants. Install fire hydrants for the new facility. Locate one fire hydrant within a minimum of 150 feet (unobstructed) of the building fire department connection. Locate all other hydrants in accordance with NFPA 24 or such that all portions of the facility (and hardstand, where applicable) can be reached by 350 foot length of hose. ***<COF>***Locate fire hydrants off of the hardstand if possible. If any hydrant is located on the hardstand, protect it with 6 inch steel pipe bollards, filled with concrete, painted and spaced in accordance with the installation requirements.***</COF><TEMF>***Locate fire hydrants off of the hardstand if possible. If any hydrant is located on the hardstand, protect it with 6 inch steel pipe bollards, filled with concrete, painted and spaced in accordance with the installation requirements.***</TEMF>*** Assure the Fire Department has access to all fire hydrants. Fire hydrant branches (from the main to the hydrant) shall not be less than 6 inches in diameter and preferably not longer than 50 feet from the main. Install a fire hydrant isolation valve and valve box at the tap point for each new or relocated fire hydrant.

(c) Dedicated Fire Line. Provide a separate fire water service line to the building for interior fire sprinkler protection in accordance with NFPA 24 and UFC 3-600-01. Equip the fire water service line to the building with a Post Indicator Valve (PIV) that can be readily located by the fire department. Do not place the PIV closer than 40 feet to the building it is serving and provide it with a tamper switch connected to the building fire control panel.***<COF>*** Locate the PIV off the hardstand if possible. If the PIV is located on the hardstand, protect it with 6 inch steel pipe bollards, filled with concrete, painted and spaced in accordance with the installation requirements.***</COF><TEMF>*** Locate the PIV off the hardstand if possible. If the PIV is located on the hardstand, protect it with 6 inch steel pipe bollards, filled with concrete, painted and spaced in accordance with the installation requirements.***</TEMF>***

(d) The Government desires a fire protection system which avoids the use of fire pumps. If fire pumps are utilized, provide complete calculations and documentation verifying the need for fire pumps.

(e) For building fire suppression and domestic service lines, provide an independent tap connection to the main water line when the fire suppression line is less than 100 linear feet from the system riser. When the Building fire suppression and domestic service line is greater than 100 linear feet from the system riser, provide the connection point for the domestic water supply upstream and just prior to the fire system's post indicator valve.

(f) Unified Facilities Criteria UFC 3-600-01 Hydrant Color Coding. Hydrants on both potable and non-potable water systems must be color coded to avoid cross-connections during firefighting. Hydrant barrels shall be red for non-potable water and equipment yellow for potable water. Regardless of water source, hydrant bonnet color shall be in accordance with NFPA 291, Fire Flow and Marking of Hydrants, based on flow capacity.

(g) NFPA 291 Information - Fire Hydrants identification shall be colored to denote flow capability. Classification and Color Marking:

Class AA – Capacity of 1500 GPM – Blue

Class A – Capacity of 1000-1499 GPM – Green

Class B – Capacity of 500-999 GPM – Orange

Class C – Capacity less than 500 GPM – Red

(h) Fire Hydrants shall open left with pentagon operation nut, dry barrel (5 1/4-inch), two (2) each (2-1/2) inch hose outlets and one (4-1/2) inch suction connection with national standard fire hose threads.

6.4.6.2.3. Water Distribution Lines

(a) Water main lines sizes 6 inch and larger shall be non-metallic Polyvinyl Chloride (PVC) or High Density Polyethylene Pipe (HDPE). PVC pressure pipe shall be (Slip Joint) elastomeric gasket joint type. Unless expected pressure service conditions dictate more stringent ratings, PVC pipe 6-inch through 12-inch shall be pressure Class 305 (DR-14), AWWA C900. PVC pipe 14 inch through 24 inch shall be Pressure Class 235 (DR-

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18), AWWA C905 (Transmission-Pipe Pressure Rating). HDPE pipe shall be SDR 13.5, AWWA C906, PE 3408, ductile iron pipe size (DIPS).

(b) For all water distribution line valves, use gate valves or buried-service butterfly valves, with non-rising stems and 2 inch operating nuts (open left). Provide all valves with a cast iron valve box and removable lid for access. Buried-service butterfly valve boxes shall indicate the position of the valve and prevent soil from entering the box. Surround all valve boxes with a 18 inch concrete ring 4 inch thick at final grade. When located in a paved area the top of the valve box and concrete ring shall be flush with the finished grade. Use only butterfly valves on water lines larger than 12-inches in diameter.

(c) Follow all applicable codes for horizontal and vertical separation from non-potable water and sewer lines. Where codes dictate a procedure to follow if separations cannot be provided, follow that procedure. If silent, the following shall be used:

Where water mains and sewers must cross, the sewer can have no joint within 3 feet of the water main unless the sewer is encased in concrete for a distance of at least 10 feet each side of the crossing. If special conditions dictate that a water main be laid under a gravity-flow sewer, the sewer pipe shall be fully encased in concrete per requirements of the Colorado Springs Utilities for a distance of 10 feet each side of the crossing, or can be made of pressure pipe with no joint located within 3 feet horizontally of the water main, as measured perpendicular to the water main. The sewer must be adequately supported to prevent settling. Sewer force main pressure piping shall always cross beneath water pipe. Maintain a minimum vertical separation of 18-inches between the sewer and water main piping.

(d) Pressure Regulating Valves (PRV), where required, shall be single-seated, hydraulically operated, pilot controlled, diaphragm type globe valves. Valves manufactured by CLA-VAC are currently in use at Fort Carson, however, valves of equal construction and performance may be used.

(e) A pipe casing is not required for HDPE water lines under roadways; however, to avoid road collapse the HDPE pipe shall be bored at a 7 foot depth under existing roadways. Install all other underground utility lines going under roadways, streams, creeks or rivers in a pipe casing. For lines constructed below railroad tracks, consult the Owner of the Railroad for applicable crossing requirements.

6.4.6.3. Wastewater

6.4.6.3.1. Design Criteria

Design and construct sewage system ***<TEMF>***and industrial waste system ***</TEMF>***in accordance with applicable criteria. ***<TEMF>***Provide industrial waste system conveying industrial wastewater to the Ft Carson Industrial Waste Sewer System. Do not provide oil/water separators.***</TEMF>***Provide a system which will last a minimum of 50 years in service without major repairs or operating expense. Field verify the sewer system capacity and invert elevations to ensure that it is adequate for the flows generated by the new facilities. No interruption of service shall be allowed on the existing sewer line. Coordinate the sequencing of construction as it affects the existing sewer line with the Contracting Officer. Exterior building sanitary sewer service lines shall be 6 inch minimum diameter. The minimum pipe size between manholes shall be 8 inches. Calculate all design slopes using the Manning formula. Provide all calculations.

6.4.6.3.2. Manholes

Manholes are required at all changes of direction, slope, and size. Space manholes not more than 400 feet apart. Locate manholes at intersections of streets when possible. Avoid placing manholes where the tops will be submerged or subject to surface water inflow. Where the invert of the inlet pipe would be more than 1.5 feet above the manhole floor. provide an exterior drop connection. Provide all calculations.

6.4.6.4. Gas Distribution

6.4.6.4.1. Design, install, and test in accordance with:

(a) National Fuel Gas Code 2009 as applicable.

(b) International Code Council International Fuel Gas Code 2009 exterior to the building limits of construction shall be by the site contractor only.

SAMPLE

6.4.6.4.2. Gas Distribution System

Install all new gas lines exterior to the building structure with medium density polyethylene (MDPE), DR-11. Valve and cap service lines at the limits of construction as equired.

(1) Bury natural gas lines to a depth of thirty-six (36) inches in new and existing open areas and under new and existing parking lots; forty-eight (48) inches under new and existing paved or dirt roads and new and existing drainage ditches in the limits of construction by the building Contractor.

(2) Provide meter and pressure regulator assembly ***<50PSIG>***(reduce from 50 psig to 2 psig)***</50PSIG><25PSIG>*** (reduce from 25 psig to 2 psig)***</25PSIG>*** exterior of building, outside mechanical room, prior to entrance.

Comment [JTH3]: NOTE TO WIZARD TEAM: NEW NOTE TO SPECIFIER: Select appropriate gas pressure reduction value depending on location on base

6.4.6.4.3. Natural Gas Meters for Buildings Only

Building Meter/Regulator Assembly: Install a shutoff valve, anodeless riser, meter set assembly, and service regulator set assembly on the service line outside each building, eighteen (18) inches above the ground on the building gas service riser. Install an insulating joint on the inlet side of the meter set assembly and service regulator to prevent flow of electrical current. Provide a 3/8 inch tapped fitting equipped with a plug on both sides of the service regulator, downstream of the gas shutoff valve, for installation of pressure gages for adjusting the regulator. Terminate all service regulator vents and relief vents in the outside air in rain and insect resistant fittings. Locate the open end of the vent where gas can escape freely into the atmosphere, away from any openings into the building and above areas subject to flooding. Provide meters that have a pulse generator with each pulse representing an adjustable volume of gas. The meter shall be capable of operating up to speeds of five hundred (500) pulses per minute with no false pulses. Pulse generators shall provide the maximum number of pulses up to five hundred (500) per minute that is obtainable from the manufacturer. Connect meters to the Post wide Utility Control System (UCS). Provide meters that are temperature and pressure compensating. The preferred gas meter is a Dresser Roots Micro Series PTZ-LOG ML-241 or equal.

6.4.6.4.4. Natural Gas Calorific Value

The calorific value of the natural gas supplied to Fort Carson by Colorado Springs Utilities is 805 BTU/ft3. Use the aforementioned value in any applicable calculations.

6.4.6.5. Utility Installation

Avoid running utilities underneath buildings, streets, and parking lots. In cases where it is necessary for the utilities to cross existing streets, install the lines by boring and jacking methods. No open trenching will be allowed through existing streets unless written permission is obtained and approved by the Contracting Officer. Case wet utilities (including water, sanitary sewer, storm sewer, industrial waste, gas) crossing under roads or tank trails in steel pipe or approved equal and vented or grouted as necessary.

6.4.6.5.1. Trenches

Jacking and boring is required when an underground utility line crosses any roadway. Place sewer and water lines, mains or laterals in separate trenches. The separate trenches shall maintain a minimum horizontal separation of 10 feet and the bottom of the water line shall be at least 1.5 feet above the top of the sewer. Sewers crossing above potable water lines shall maintain a vertical separation of 1.5 feet and must be constructed of suitable pressure pipe or fully encased in a minimum of 6-inch thick concrete for a distance of 10 feet on each side of the crossing. Excavate the trench as recommended by the manufacturer of the pipe to be installed. Bedding and initial backfill material shall consist of select granular material. Select granular material shall consist of materials classified as GW, SW, GW-SW or SW-SM by ASTM D 2487. Select granular material shall have 100 percent by weight passing the 1-inch sieve size and not more than 15 percent by weight passing the No. 200 sieve. Do not use material referred to locally as "Squeegee" or "Pea Gravel". Where no manufacturer's installation manual is available, excavate trench walls to a stable angle of repose as required to properly complete the work. Trench excavations shall adhere to requirements prescribed in EM 385-1-1, Safety and Health Requirements Manual. Give special attention to slopes which may be adversely affected by weather or moisture content.

6.4.6.5.2. Tracer Wire and Utility Warning Tape:

SAMPLE

Tracer wire leads shall be brought up, identified, and protected by test stations of the flush-curb-box type and shall be the standard product of a recognized manufacturer (HANDLEY or equal). Test stations shall have a cast iron lid and be mounted in 18 inches of concrete. When test station structures and lids area located in paved areas provide products that are H-20 rated. Where possible, combine the Cathodic Test Station, Valve Box, and Tracer Wire Test Stations in the same concrete pad. Do not place test stations further that 400-ft apart. Coil 18-inches of extra wire into the test stations for maintenance. See standard detail C1-29a Fort Carson UTILITY TRACER WIRE INSTALLATION DETAILS. Apply the following items to tracer wires and utility warning tape:

(a) Tracer Wire:

(1) Gas lines; #6 AWG type RHW-2, UF Tracer wire or HMWPE CU, (Direct Bury application) stranded copper, colored yellow, installed 6 inches above the pipe.

(2) All other utilities; #12 AWG type RHW-2, UF Tracer wire or HMWPE CU, (Direct Bury application) stranded copper installed along top surface of the utility, wire color to match warning tape color, placed on top of the utility. Tracer wire should be secured to the utility pipe every 3 feet with duct tape (except gas) to hold it in place during backfilling.

(b) Utility Warning Tape:

All underground utilities shall have a 3 to 6-inch wide, non-detectable warning tape, buried 12 to 18-inches below the surface of the ground. Color and marking to match “Warning Tape Color Codes”. Warning tape shall have the utility being identified written in discernable, non-degrading letters spaced in increments of not more than 3 feet.

(c) Wire / Warning Tape Color:

Color	**Utility**
Red;	Electric
Yellow;	Gas, Oil, Dangerous Materials
Orange;	Telephone & Other Communications
Blue or Purple;	Water Systems
Green;	Sewer Systems

6.4.7. Cut and Fill

Cut and Fill requirements include the following:

6.4.7.1. General

Provide positive drainage for all areas and utilize existing drainage ways to the extent possible. It is desirable to direct drainage away from buildings to curb and gutter or road ditches. Avoid swales between buildings and parking areas, if possible. Grade parking areas such that storm water is directed off to the sides, with curbs and gutters to control drainage, and not down the center of the parking area, where possible. Balance earthwork, cut and fill, to the extent possible without compromising the design. Keep the number of existing trees to be removed to a minimum. Do not grade within drip lines of existing trees to be preserved. Provide final grading plans.

6.4.7.2. Adjustment of Existing Structures

Adjust all manholes, valve boxes, or inlets of any nature within the project that do not conform to the new finish grade in either surfaced or unsurfaced areas to the new finish grade. Where inlets, manholes, or valve boxes fall within a surfaced or unpaved roadway or parking, remove and replace the existing frame and cover with a heavy-duty frame and cover. Adjust the structure as needed to fit the new conditions. Provide structures that are of a type suitable for the intended use.

6.4.7.3. Sidewalks

SAMPLE

Concrete walks shall have a transverse grade of 2 percent. Maximum longitudinal walk grade shall be 5 percent. Walks designed to provide a handicapped accessible route shall conform to 28 CFR Part 36 ADA Standards for Accessible Design. Give special attention to sidewalks that are on the north (shaded) side of buildings. Design these walks to ensure a freeze/thaw cycle does not result in the formation of ice on the walk. Ice on walks should be a safety consideration for all areas. Double purpose walks are a combination of a straight curb and a concrete walk. Limit their use to areas where the drainage flows away from the curb line or gutter.

6.4.7.4. Stairs

Avoid the use of stairs in sidewalks whenever possible. When stairs are unavoidable, provide at least three risers and handrails. All steps within a stair shall have a uniform tread width and riser height. Risers shall have a height of 4.5 to 6 inches and treads shall have a width of 12 to 17 inches. Treads should slope 2 percent for positive drainage. Keep the height between landings to a maximum of 5 feet to allow a view of the next higher landing whenever possible. The height between landings shall not exceed 12 feet. Landings shall be at least 4 feet long.

6.4.7.5. Transverse Parking Area Grades

(a) Desirable minimum of 2 percent.

(b) Absolute minimum of 1.5 percent for flexible pavement and 1 percent for rigid pavement.

6.4.7.6. Longitudinal Parking Area Grades

Maximum of 4 percent.

6.4.7.7. Road and Street Longitudinal Grades

Desirable maximum grade of 7 percent and absolute maximum grade of 10 percent (absolute maximum grade is subject to government approval.

6.4.7.8. Gutter Grades

(a) Desirable minimum of 0.8 percent.

(b) Absolute minimum of 0.5 percent.

6.4.7.9. Building Floor Elevation

Set building finished floor elevation to ensure that the required minimum and maximum grades are met. Do not construct buildings within a 100-year floodway. Construct first floor of new buildings a minimum of 1 foot above the 100-year flood plain elevation. The finished grades adjacent to the new building will be a minimum of 6 inches below finished floor except where grades are required on walk ways and entrances to buildings that are handicap accessible.

6.4.7.10. Grades Away From Building

(a) Minimum of 5 percent for 10 feet.

(b) Maximum of 10 percent for 10 feet.

6.4.7.11. Overlot Grades

(a) Minimum 1 percent for cohesionless sandy soils.

(b) Minimum 2 percent for cohesive soils or turfed areas.

(c) Sideslopes for ditches, roads, and other turfed areas shall be no steeper than 1V on 3H.

6.4.7.12. Ditches

Grade ditches at non-erodible slopes or line the ditch with an appropriate material to prevent erosion. Use a design storm with a return period of at least 2 years to determine erodibility of ditches and swales. The depth of

SAMPLE

ditches along pavement shoulders shall be such that the water surface from the 10 year design storm is below pavement subbase and base courses which daylight through the adjacent shoulder.

6.4.8. Borrow Material

Comment [sdn4]: NOTE TO SPECIFIER: DESCRIBE SOURCES OF ACCEPTABLE BORROW, OR STATE THAT NO BORROW IS AVAILABLE ON THE INSTALLATION, ETC.

«BORROW_MATERIAL»

6.4.9. Haul Routes and Staging Areas

«SITE_HAUL_ROUTES»

6.4.10. Clearing and Grubbing:

«SITE_CLEAR_GRUB»

6.4.11. Landscaping:

«LANDSCAPING»

6.4.12. Turf:

«TURF»

6.5. ARCHITECTURE

6.5.1. General: To the maximum extent possible within the contract cost limitation, the buildings shall conform to the look and feel of the architectural style and shall use the same colors as adjacent facilities as expressed herein. The Government will evaluate the extent to which the proposal is compatible with the architectural theme expressed in the RFP during the contract or task order competition. The first priority in order of importance is that the design provides comparable building mass, size, height, and configuration compared to the architectural theme expressed herein. The second priority is that design is providing compatible exterior skin appearance based upon façade, architectural character (period or style), exterior detailing, matching nearby and installation material/color pallets, as described herein.

6.5.2. **Design**

6.5.2.1. Appendix F is provided "For Information Only", to establish the desired site and architectural themes for the area. Appendix F identifies the desired project look and feel based on Fort Carson's Installation Architectural Theme from existing and proposed adjacent building forms; i.e. building exterior skin, roof lines, delineation of entrances, proportions of fenestration in relation to elevations, shade and shadow effects, materials, textures, exterior color schemes, and organizational layout.

6.5.2.2. The design should address Fort Carson's identified preferences. Implement these preferences considering the following:

(a) Achievable within the Construction Contract Cost Limitation (CCL)

(b) Meets Milestones within Maximum Performance Duration.

(c) Achieves Full Scope indentified in this Solicitation

(d) Best Life-Cycle Cost Design

(e) Meets the Specified Sustainable Design and LEED requirements.

(f) Complies with Energy Conservation Requirements Specified in this RFP.

6.5.2.3. Priority #1. Visual Compatibility: Facility Massing (Size, Height, Spacing, Architectural Theme, etc.) Exterior Aesthetic Considerations: The buildings massing, exterior functional aesthetics, and character shall create a comprehensive and harmonious blend of design features that are sympathetic to the style and context of the Installation. The Installation's intent for this area is:

SAMPLE

«THEME_DESCRIPTION»

6.5.2.4. Priority #2. Architectural Compatibility: Exterior Design Elements (Materials, Style, Construction Details, etc.) Roofs, Exterior Skin, and Windows & Door Fenestrations should promote a visually appealing compatibility with the desired character while not sacrificing the integrity and technical competency of building systems.

6.5.2.5. See Appendix F for exterior colors that apply to Architectural character at Fort Carson. The manufacturers and materials referenced are intended to establish color only, and are not intended to limit manufacturers and material selections.

6.5.2.6. Additional architectural requirements:

(a) Install fall protection anchor points on all roofs with a slope greater than 2:12

(b) Design quality is achieved through the integration of buildings with the site, sustainability, selection of building systems for low-cost maintenance and operation, and an overall balance of aesthetics and functionality. Innovative, creative, or cost-saving proposals, which meet or exceed these requirements are encouraged and will be considered more favorably.

(c) Corridors. With the exception of fire sprinkler heads, no piping, conduit or ductwork shall be exposed in corridors.

(d) Mechanical, Electrical and Communications Rooms. Access to Mechanical, Electrical and Communications spaces shall be limited to authorized personnel through lockable doors. Locate exterior Mechanical, Electrical, Communications Equipment, Air intake and openings in exterior walls to comply with force protection standards.

(e) As a minimum provide Moisture Resistant Gypsum Board (MR) on walls of all Toilet Rooms.

(f) Pre-decorated gypsum board panels and trim system or similar type products and assemblies are not permitted.

(g) The facilities shall have a non-combustible roof covering that meets or exceeds Class 4 impact resistance rating when tested in accordance with UL 22 18.1. Provide permanently attached snow and ice guards above entrances, pedestrian walkways, play areas and hardstand surfaces, where due to the roof layout, there is the potential for moisture runoff (snow, water or ice) at roof edges.

(h) For roof coverings with standing seam metal, provide the material with 22 gauge minimum steel panels that are textured, ribbed, or striated to minimize possibility of oil canning.

(i) If operable windows are provided, install insect screens.

(j) Exterior guard and stair railings shall have a non painted durable weather resistant finish.

(k) Do not expose Insulation on interior wall surfaces accessible to building occupants. As a minimum, provide wall surfaces from finished floor to a height of 8 feet-0 inches or 4inches above finished ceilings as applicable, with gypsum board or similar products that are durable and easy to maintain. Note that this also applies to wall surfaces of mezzanines. Where pipe insulation is exposed in maintenance areas, use insulation jackets of durable, protective fabric, in accordance with the applicable criteria.

(l) Where gypsum wall board is provided, except as otherwise indicated, as a minimum use Impact Resistant Gypsum Board from T.O.S. to 8feet above finished floor along walls of Corridors, Stairs, Conference Rooms, Training Rooms, Break Rooms, Storage Rooms, Supply Rooms, Vending Rooms Recycle Rooms and similar type spaces.

(m) Stairs as applicable. Provide fully enclosed stairs as required to allow circulation to upper floors of the building, and to comply with applicable code egress requirements and to facilitate the movement of people and equipment. Except for egress only, open stairs, risers and metal grating treads are prohibited.

(n) Minimum roofing warranty: Manufacturer's comprehensive non-pro-rated material and labor, no-dollar limit liability, edge to edge coverage, including membrane and accessories, from single source manufacturer for a period of at least 25 years. Warranty is to cover leaks, incidental punctures resulting from normal rooftop inspection, maintenance and/or service, hail up to 2" diameter, and sustained wind speed and/or peak wind gusts up to the structural design wind speed as stated within this RFP. A manufacturer authorized roofing applicator shall install the roofing system, using compatible materials and accessories that will not void or otherwise compromise the integrity of the warranty.***<COF>***

SAMPLE

(o) Design and construct Company Operations Facility (COF) buildings with attached covered Hardstands.

(p) Arms Vaults shall be cast in place concrete conforming to AR 190-11 Appendix G. Do not use modular vaults. Provide 3/8-inch thick recessed eye bolts that will accept two 3/8-inch chains. Provide two eye bolts in each wall at 48-inches above finish floor, coordinate with Contracting Officer.

(q) Readiness Module separation walls (demising wall) between each Companies Bay space shall comply with AR 190-51, Risk Level II. Demising walls shall extend from floor to structure, with gaps between it and intersecting walls, ducts and other penetrations no greater then 4-inches. Do not use chain link fencing.

(r) Wire mesh cages which are required for the secure storage of equipment in the Readiness Module for the Unit Storage, NBS Storage and Communication Equipment Storage spaces. Provide walls that extend from floor to structure or caged spaces that are capped at a minimum height of 9 feet with construction equal to or greater than the wall construction. Minimum Wall construction is heavy duty 9 gage woven wire mesh construction with gaps between it and intersecting walls, ducts and other penetrations no greater then 4-inches. Do not use chain link fencing.

(s) Carson prefers that the Company Operations Facility buildings incorporate natural day lighting (i.e. clearstory windows and/or skylights) into the design of the Readiness Bay areas to the maximum extent possible, if consistent with the energy conservation requirements of the contract.***</COF><TEMF>***

(o) Arms Vaults shall be cast in place concrete conforming to AR 190-11 Appendix G. Do not use modular vaults. Provide 3/8-inch thick recessed eye bolts that will accept two 3/8-inch chains. Provide two eye bolts in each wall at 48-inches above finish floor, coordinate with Contracting Officer.

(p) COMSEC Vaults for the TEMF shall be cast in place concrete conforming to AR 380-5 Appendix G. Do not use modular vaults. Provide day gates with issue windows. Day gates may be either single leaf or split (Dutch) door type.

(q) If wire mesh walls and cages are utilized in the TEMF, provide walls that either extend from floor to structure or cap the enclosures at a minimum height of 9 feet with construction equal to or greater than the wall construction. Minimum Wall construction is heavy duty 9 gage woven wire mesh construction with gaps between it and intersecting walls, ducts and other penetrations no greater then 4-inches. Do not use chain link fencing

(r) Fort Carson prefers that the Tactical Equipment Maintenance Facility buildings incorporate natural day lighting (i.e. clearstory windows and/or skylights) into the design of the Maintenance and Repair Bay areas to the maximum extent possible, if consistent with the energy conservation requirements of the contract. ***</TEMF><UEPH>***

(o) (Provide acrylic placard on the inside face of all Module (1 + 1) entry doors, which will accept an 8-1/2-inch X 11-inch sheet of paper. Mount placard at 66-inches above finish floor.

(p) Ft Carson prefers that counter/dining tables in Modules, that are provided for dining of two people be standard table height, 30-inches above finish floor.***</UEPH>***

6.5.3. Programmable Electronic Key Card Access Systems:

Comment [sdn5]: NOTE TO SPECIFIER: For non-UEPH type facilities only. If the installation has information on brand names of existing key card access system, identify here and coordinate with paragraph 3. For UEPH type Facilities NOT USED

6.5.3.1. Hardware Requirements:***<UEPH>***

(a) Provide Keyless Access Entry Control for all UEPH doors as indicated in paragraph 3. Except for exit only doors, provide Keyed Access Entry Control for all other doors, including all bedroom closet doors, as indicated in paragraph 6.5.3.2.

(b) Provide padlock strike plates on all bedroom closet doors and frames to protect door and frame finishes from occupants padlock that are attached to padlock eyes as required in paragraph 3.2.2.1.

(c) Use lever handles per ADA.

(d) Provide a Knox Box, series 3200, as manufactured by Knox Company Phoenix, Arizona, at the main entrance to each building.

«PROGRAMMABLE_KEY_CARD»

(e) For all Public and Module Toilet Rooms, provide dead bolt lock on the main entry door(s) into the space, so that the entire space can be closed off for maintenance or other access control purposes.***</UEPH><UEPH_NOT>***

SAMPLE

(f) Provide Keyless Access Entry Control for all Facility doors as indicated in paragraph 6.5.3.3. Except for exit only doors, provide Keyed Access Entry Control for all other doors, as indicated in paragraph 6.5.3.2.

(g) Provide a keyed lockset for Janitor Closets.

(h) Use lever handles per ADA.

(i) Provide a Knox Box, series 3200, as manufactured by Knox Company Phoenix, Arizona, at the main entrance to each.

«PROGRAMMABLE_KEY_CARD»

(j) ***<COF>***For COF Latrines, Showers and Locker Rooms, provide a dead bolt lock on the main entry door(s) into the space, so that the entire space can be closed off for maintenance or other access control purposes.***</COF><TEMF>***(For TEMF Latrines, Showers and Locker Rooms UEPH, provide a dead bolt lock on the main entry door(s) into the space, so that the entire space can be closed off for maintenance or other access control purposes.***</TEMF><BN>***For BNHQ Toilets and Shower Rooms, provide a dead bolt lock on the main entry door(s) into the space, so that the entire space can be closed off for maintenance or other access control purposes.***</BN><PFF>***For PFF Toilet Rooms, Toilet/Shower and Locker Rooms, provide a dead bolt lock, keyed from both sides on the main and exit door(s) into the space, so that the room or space can be closed off for maintenance or other access control purposes.***</PFF><DF>***For DFAC Toilet Rooms, provide a dead bolt lock on the main entry door(s) into the space, so that the entire space can be closed off for maintenance or other access control purposes. ***</DF><CDC>***Provide a door buzz at the main entrance to the CDC and at the kitchen entrance. For CDC's, provide a duress alarm at the front entrance, tied directly to the MP office, thru the Fire Alarm system. Coordinate with the Contracting Officer for specifics on MP office location.***</CDC><BDE_BN>***For BBHQ Latrines, Showers and Locker Rooms, provide with a dead bolt lock on the main entry door(s) into the space, so that the entire space can be closed off for maintenance or other access control purposes. ***</BDE_BN></UEPH_NOT>***

6.5.3.2. Keyed Access Entry Control System

(a) Install all locksets and exit devices, including combination and installation of any required cores and key duplication. The core type and combination shall meet the requirements of the Installation's master key system.

(b) To meet the Ft Carson master key plan, provide all keyed lockset devices with patented Best Lock Corporation or ASSA ABLOY Corporation cores. The type of core required will be dependent on the security requirement for the building and/or room. Security requirements do not allow a master/sub-master keying system, unless directed otherwise. During the planning phase in coordination with the Contracting Office, Directorate of Public Works (DPW), the Fort Carson O&M locksmith and Post Physical Security may assist in determining the core type.

(c) Install all permanent lock cores. Coordinate with Best Lock Corporation or ASSA ABLOY Corporation for installation of the cores. Prepare the core schedule, install all cores and validate functionality of all keys for the respective core including the master key(s). Submit a keying schedule prior to making any keys for the project.

(d) Provide cylinders and cores for new locks, including locks provided under other sections of this RFP. Provide fully compatible cylinders with products of the Best Lock Corporation or ASSA ABLOY Corporation with Small Format Interchangeable Cores (SFIC), which are removable by a special control key. Factory set the cores with seven pin tumblers using the BEST or MEDECO Keymark x4 patented keyways. Submit a core code sheet with the cores. Provide master keyed cores in one system for this project. Provide construction interchangeable cores. DPW areas (Equipment spaces; electrical, communications and mechanical rooms) shall be keyed independently from the building master system. The communication room door(s) shall be on a different core than the DPW areas.

(e) For medical projects, key all pharmacy door locks separately from the building master key system.

(f) All cores shall include four keys for each interior doors and five keys for each exterior doors and with two master keys for each KNOX box placed at the building location. Furnish a quantity of key blanks equal to 20-percent of the total number of file keys. Stamp all keys with "U.S. GOVERNMENT DO NOT DUPLICATE". In addition, stamp the keys and cores with the core number. Do not place room number on keys. Turn over all master keys provided to the Fort Carson O&M locksmith for security control through the COR. Inventory and turn over all other keys to the Government for issue to the building occupants through the COR. Provide a key cabinet and control system for all facility keys, including a floor plan cross referenced to all key locations

<UEPH_NOT>

SAMPLE

6.5.3.3. Keyless Access Entry Control System

(a) Where required, provide infrastructure for a hard-wired keyless access entry control system, as manufactured by Lenel Systems International Inc. to meet remote unlocking requirements related to access/entry control functions for the facilities, to include junction boxes, conduit, pull wires, and electric strikes wired back to a junction box. Coordinate with the Contracting Officer's Representative (COR) for specific system requirements. The user provided keyless access control system will provide controlled keyless entry to all regularly used exterior and interior door locations in each facility.

(b) The user provided keyless access entry control system will utilize proximity sensors and electric strike plates. Under this contract the system will require infrastructure provisions for the installation of low voltage and communication lines. Communication lines will be terminated at a secure server within the Telecommunication Equipment Room. Ft. The COR will provide Carson's entry control system specifications, which will include voltage and data line specifications. In addition to the keyless access control system requirements, in conformance with provisions of this paragraph hardware for keyed access control shall also be provided on these doors.

<COF>For COF's This shall include main exterior entry doors into the Admin Module, one door into each Company Office Area (Suite), One door into each Conference room unless access to the conference room is only provided by way of the Company Office Area (Suite), interior and exterior doors into each Readiness Module, interior doors into Unit Storage, doors into Secure Storage rooms, and doors into SIPRNet and Communications rooms.***</COF><TEMF>***For TEMF's, this shall include at least one door into each exterior side of the Core Area and at least one door into each exterior side of each Structural bay, and at the primary interior and exterior entrances into the following rooms; Consolidated Bench, Tool Rooms, Tool Box Storage Areas, Combat Spares Storage Rooms, Telecommunication Equipment Rooms and SIPRNet Rooms.***</TEMF><BN>***For BNHQ's, this shall include Main Exterior Entry Doors into the facility, Exterior Doors providing access into the facility from a parking lot, one door into the Classroom module, Main door into each Section, one door into each Conference room unless access to the conference room is by direct access through an office suite, Interior and Exterior Doors into the Mailroom if both are provided, and doors into SIPRNET and Telecommunication Equipment Rooms.***</BN><PFF>***For PFF's, this shall include Main Exterior Entry Doors into the facility, Exterior Service Entry Doors, Exterior Entry Doors providing access into the facility from a parking lot, one door into the Gymnasium, one door into the Gym/Fitness Storage Space, all doors from the Shower/Locker Room and public spaces that provide access to the Natatorium, Main Door into the Admin Area and one door into each Exercise Module.***</PFF><DF>***For DFAC's, this shall include all main exterior entry doors into the Dining Facility, The entry doors from the exterior into the Receiving Vestibule, Exterior Doors to the Private Dining Area, exterior doors to the Carryout Area, interior door into the Private Dining Area and doors into Communications rooms. ***</DF><BDE_BN>***For BBHQ's, the user provided keyless access control system for the BBHQ Building will provide controlled keyless entry for all regularly used exterior entry locations into the facility (this shall include a least one door at each public and service exterior entry location). For interior doors, the user provided keyless access control system shall provide controlled keyless entry into each of the following types of spaces; SCIF, NOC, BOC, Classrooms, Conference Rooms, Storage Rooms, Message/Mail Centers, main door into each open office space, all doors providing access to each command office suite, Telecommunication Equipment Rooms and SIPRNet Rooms. Except as specifically noted otherwise, as a minimum, if spaces are accessed by more than one door, then only one of the doors are required to be provided with the keyless access entry control system. ***</BDE_BN><CDC>***For CDC's, this shall include all main exterior entry doors into the Child Development Center, The entry doors from the exterior into each Activity Room, one door from the exterior into the Multi-Purpose Room, the exterior door into the kitchen, the exterior door into the corridor that leads into the Multi-Purpose Room, interior door into the kitchen, and all interior doors that provide access into Activity Rooms, Storage Room doors and Video Monitoring Room door.***</CDC></UEPH_NOT>***

6.5.4. INTERIOR DESIGN

«INTERIORS»

Interior building signage requirements:

«INTERIOR_SIGNAGE»

6.6. STRUCTURAL DESIGN

SAMPLE

6.6.1. Minimum Design Wind Load Requirements

Determine wind loads in accordance with ASCE 7, and based upon the following parameters:

Design Wind Speed: 100 mph
Exposure Category: "C".
Wind Load Importance Factor: See Table 6-1, in ASCE 7, based on the Occupancy Category.

6.6.2. Minimum Design Snow Load Requirements

Determine snow loads including flat and sloped roof snow loads; drift loads; sliding snow loads; and windward and leeward snow loads in accordance with ASCE 7, using a ground snow load of 15 psf. However, regardless of the snow load values determined in accordance with ASCE 7, the snow loads shall not be less than those required by the most recent edition of the Pikes Peak Regional Building Code (PPRBC). To determine the snow load Importance Factor see Table 7-4, in ASCE 7, based on the Occupancy Category.

6.6.3. Minimum Roof Live Load

Provide for a minimum roof live load of 20 psf, reducible based on tributary area and slope in accordance with ASCE 7, in the design to account for construction and maintenance loads.

6.6.4. Minimum Design Seismic Load Requirements

Determine the seismic design loads in accordance with ASCE 7, and based upon the following parameters:

Site Classification: Based on Final Geotechnical Report
Mapped MCE Short Period Spectral Response Acceleration: Ss =21%
Mapped MCE 1 Second Period Spectral Response Acceleration: S1 = 6%
Seismic Design Category: Based on the Occupancy Category.

6.7. THERMAL PERFORMANCE

There are no additional requirements other than those previously stated/referenced.

6.8. PLUMBING

6.8.1. General Plumbing Requirements

6.8.1.1. Mount equipment in mechanical rooms on four (4) inch thick reinforced concrete housekeeping pads that shall extend six (6) inches beyond the edges of the equipment.

6.8.1.2. Install backflow preventers for accessibility, complying with the requirements of the Colorado Department of Public Health and Environment (CDPHE), the International Building Code, and the International Plumbing Code. State licensed plumbers shall install and/or test backflow preventers and cross connection devices. Perform initial testing and certification of new backflow devices and submit for approval prior to domestic water usage. Do not provide bypass piping around backflow preventers.

6.8.1.3. Install trap seal primer valves in floor drains in accordance with International Plumbing Code, where applicable to a facility type.

6.8.1.4. Unless otherwise specified, locate exterior (key-operated) freeze-proof wall hydrants with vacuum-breaker backflow-preventer on outside walls at 100 feet intervals. Provide a wall hydrant near all Mechanical Room exterior doors. Mount exterior wall hydrants thirty-six (36) inches above finished grade.

6.8.1.5. Urinals. Do not use copper pipe for urinal drain connections to the rest of the plumbing system. The Government prefers one pint flush type urinals.

6.8.1.6. Water Meters. For domestic water supply to each building provide a water meter located inside the building. Meters shall have a pulse generator with each pulse representing an adjustable volume of water. The

SAMPLE

meter shall be capable of operating up to speeds of 500 pulses per minute with no false pulses. Pulse generators shall provide the maximum number of pulses up to five hundred (500) per minute that is obtainable from the manufacturer. Connect meters to the Post Utility Control System (UCS). Provide isolation valves upstream and downstream of the meter with a building piping drain valve downstream of the meter.

6.8.1.7. Natural gas-fired domestic water heater or boiler used as a domestic water heater shall produce no greater than twenty (20) parts per million (ppm) nitrogen oxides NOx) in the flue gases, at 3% excess oxygen and a combustion air temperature of 68 degrees F.

6.8.1.8. Provide equipment suitable for use at the project altitude, which is approximately 6,000 feet above mean sea level (MSL).

6.8.1.9. Steel domestic water piping is not permitted.

6.8.1.10. Showers as applicable. When vinyl, resin or similar type shower pans are utilized, set in grout mortar bed. Fiberglass showers are not preferred at Ft. Carson.***<COF>***

6.8.1.11. Provide heavy duty stainless steel mud wash utility sinks as required in the Readiness Bays. Sink basins may be arranged in pairs. Basins shall be at least 24 inches square and at least 18 inches deep.***</COF>***

6.9. SITE ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.9.1. Exterior Primary Electrical Distribution System (15kV)

6.9.1.1. The exterior primary electrical distribution system on Fort Carson is a 12,470Y/7200 volt, 3-phase, 4-wire, 60 hertz, and grounded neutral system.

6.9.1.2. Provide the primary feeder to the facility transformer from the Fort Carson Distribution system connection point using a concrete duct-vault/manhole system. Design all Electrical distribution systems in such a way to allow for switching and sectionalizing to be achieved from above ground. Fort Carson Operations and Maintenance Contractor will energize all new 15 kV systems under separate contract with the Government.

«SITE_ELECTRICAL»

Comment [B6]: Every building connection Must be coordinated with **carsdpwelectric@conus.army.mil** ,Alan Davis to determine system capacity or you have the option of doing a system study to verify the existing circuit and all back up circuits can support the new building loads to maintain emergency switching capability . Provide necessary load data requirements.

6.9.1.3. Run secondary power to the building through a duct system containing copper conductors. The service is to be metered and provide outputs to the base wide utility monitoring and control system (see paragraph 6.9.7 for electric meter values). Install meters in the main switchgear.

Install primary exterior power underground utilizing S&C PMH style pad mounted switches, and/or 4 feet x 7 feet-8 inches x 4 feet sectionalizing vaults, and/or 6 feet x 16 feet-6inches x 7 feet vaults. See paragraph: Electric Vaults and Switches.

6.9.1.4. Primary Cables

(a) The primary cable shall be 15 kV rated, aluminum conductor cable. Insulation shall be 133 percent ethylene-propylene rubber (EPR) not less than 220 mils average thickness. Concentric neutral shall be bare copper wires spaced uniformly around the insulation screen. EPR cable insulation shall conform to the requirements of ICEA S-94-649 and AEIC CS8. Cable jacket shall be black polyethylene with red extruded stripe(s). The cable shall be suitable for wet or dry locations, in conduit, underground duct systems, and direct buried.

6.9.1.4.1. Cable shall be one of three standard sizes used on Fort Carson #2 AWG, 4/0 or 350 kcml. The three sizes, number of strands (concentric neutral), size of neutral wire (No. X AWG), max outside diameter (in) are as follows:

350 kcmil, 37 1/3, 18 X 14, 1.52

4/0 AWG, 19 1/3, 12 X 14, 1.33

SAMPLE

2 AWG, 7 Full, 10 X 14, 1.09

6.9.1.4.2. Selection of cable size shall be: 350 kcmil for main 600 amp distribution lines, 4/0 AWG for 200 amp sub-loop feeders, between 4'x7'x4' vaults and 2 AWG or 4/0 for radial building feeds. Color code phase conductors as follows:

Phase A-1 "RED", Phase B-2 "YELLOW", Phase C-3 "BLUE". After installation of the l5KV cable feeding transformers, all load break elbow are to be placed on insulated parking bushings attached to the transformer parking stand. The DPW operations and Maintenance contractor will check for operation and energize the transformer. (Insulated parking stand will be provided by DPW upon request.)

(a) Install medium voltage 15kv primary conductor in a underground duct in accordance with 6.9.1.5 Underground Duct .

(b) Not Used.

(c) Provide test points for all elbows and separable connectors. **Fault indicators may be required.**

6.9.1.5. Underground Duct

Install primary cable in concrete encased Schedule 40 PVC conduit duct bank. Top of concrete shall be at least 42 inches below finished grade. Concrete cover shall be 3 inches over the duct. Install one spare duct in each primary power duct bank. Duct seal all spare conduits and around conductors and provide pull string in spare duct. Provide red marker maker tape 12 inches above conduit.

6.9.1.6. Pad Mount Transformers

(a) Three Phase transformers shall have the following parameters: internal loop feed type, dead-front, compartmentalized, Bay-O-Net oil immersed in series w/ ELS-P Current limiting fuse, "3 Switch" 200 amp load break internal type switch, internal tap changer, oil temperature gauge, liquid level gauge, pressure vacuum gauge, drain valve, surge arrestors (8.40 MCOV for Solidly Grounded Neutral Circuits), ANSI standard transformer impedances, Aluminum or Copper windings, Delta-Wye. Transformers shall comply with DOE 2010 Transformer efficiency standards and ANSI standard transformer impedances. Transformers shall contain Less-flammable biodegradable fluid with no detectable level of PCB. TRANSFORMER SECONDARY must have: "CLOCK WISE ROTATION".

(b) Single phase transformers shall have the following parameters: loop feed, dead-front, internal Bay-O-Net fusing with ELS-P current limiting fuse and a load break switch bayonet fusing, internal tap changer, oil temperature gauge, liquid level gauge, pressure vacuum gauge, drain valve, surge arrestors required at the end of line (8.40 MCOV), Less-Flammable biodegradable fluid with no detectable level of PCB and have aluminum or copper windings. Transformers shall comply with DOE 2010 transformer efficiency standards and ANSI standard transformer impedances.

6.9.1.7. Primary System Grounding

(a) Primary electrical grounding shall be irreversible compression style crimps or Exothermic welded. Crimps shall be listed & rated for wire sized used, approved crimping tool with proper size dies.

(b) Transformer grounding. Provide #2AWG continues bare copper loop inside the transformer compartment from the tank ground in the primary compartment to the tank ground in the secondary compartment. Extend to the ground rod.

(c) 200 Amp 4 foot X 7 foot – 8 inches x 4 foot self grounding vault. Provide a continuous #2 AWG bare copper wire loop between the vault lid grounding connect studs. Route the ground loop approx one foot below the junction points. Install two each #2 AWG support conductors from each junction point ground lugs to ground to loop. Connect with compression crimps for support, connect vault electrode and 15kv concentric neutral connections.

(d) 600 Amp 6 foot X 12 foot X 7 foot self grounding vault, provide a continuous, bare copper #2/0 AWG wire loop for at the approximate level of the vault electrode level connection, to connect all concentric neutrals, provide a #6 AWG bare copper ground conductor to locater test station pin in top of vault lid.

(e) Pad mounted switch grounding. Provide a continuous bare copper #2/0 AWG ground loop in the base of the switch that is mechanically connected and bonded in the four corners of the switch. Provide two separate

SAMPLE

ground conductors from opposite corner and connect to two each 10’ X 3/4" ground rods. Ground loop must be installed to allow for switch removal without cutting the ground loop.

6.9.1.8. Electrical Vaults and Switches

(a) Electrical vaults 200 amp sectionalizing for 200 amp feeders shall be 4 feet x7 feet self grounding bottomless type with a torsion assisted vault lid, pentagon head closing bolt, 200 amp 4 point junction points, 6 inches’ of 3/8 inch gravel in the bottom with stairs. 800 foot maximum spacing..

(b) Electric vaults for 600 amp feeders shall be 6’ wide, 12’ long 7’ deep with two each 36 inch lids for vaults without switches one each 36 inch lid and one each switch lid. NO SEPARABLE CONNECTORS ARE ALLOWED IN VAULT.

(1) Use 600 amp vaults for splices, pad mounted switches, capacitor banks, meter stations and pull points in 600 amp lines. Determine manhole spacing per cable pulling limitations and do not spaced more than 1000 feet apart under any circumstance. All vaults require a service loop in the cable, racked to the wall and grounded with proper cable and phasing identification (350 MCM cable minimum).

(2) Use 200 amp vaults for 200 amp sub loop feeds for service extensions, multiple tap locations, and pull points and sectionalizing in 200 amp lines sub feeders lines. (4/0 between vaults)

(3) All separable connectors must be accessible from above grade with a clear level 10 foot working space.

(4) All other switch types are subject to the Contracting Officer’s approval.

(c) Pad Mounted Switch shall be PMH style pad mount live front on top of 600 amp vaults. Approved switch configurations are PMH-9, 10 or 11 with required options: P1 Arrestor Provisions, G7 Inner Barriers.

(1) PMH-9 style shall be two 200 amp fused compartments, two 600 amp gang operated switch compartments.

(2) PMH-10 style shall be four 600 amp gang operated switch compartments.

(3) PMH-11 style shall be three 600 amp gang operated switch compartments, one 200 amp fused compartment.

6.9.1.9. Protective Coordination Study

Protective devices proposed shall be based on recommendations of this study. The Government shall not be held responsible for any changes to equipment, device ratings, settings, or additional labor for installation of equipment or devices ordered and/or procured prior to approval of the study. Data consisting of manufacturer's time-current characteristic curves for individual protective devices, recommended settings of adjustable protective devices, and recommended ratings of non-adjustable protective devices shall be submitted. Coordinate medium voltage system fusing with the Contracting Officer’s Representativefor fuse size or available system fault data.

6.9.1.10. Field Testing

The proposed test plan, prior to field tests, consisting of complete field test procedure including tests to be performed, test equipment required, and tolerance limits, including complete testing and verification of the ground fault protection equipment, where used. Performance test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall indicate the final position of controls.

6.9.2. Exterior Secondary Electrical Distribution System (600V)

6.9.2.1. Service Entrance (duct, conductors, depth)

Install building service entrances underground, consisting of copper conductors in Schedule 80 PVC duct, with the top of duct 24" below finished grade. Run a spare duct to the service entrance.

6.9.3. Underground Lighting Circuits

SAMPLE

Install exterior lighting circuits underground, consisting of copper conductors in PVC duct, minimum size ¾ inch, and with top of duct 24 inches below finished grade. For each ungrounded conductor, install inline fusing at the base of the pole.

6.9.4. Exterior Feeders and Branch Circuits

Install exterior feeder and branch circuits underground, consisting of copper conductors in Schedule 80 PVC duct, with the top of duct 24 inches below finished grade. Include an insulated equipment grounding conductor in all circuits.

6.9.5. Exterior Lighting System

Provide area lighting for all walkways, above all exit doors and area signage. Pole mounted fixtures shall be square or rectangular, shoebox type, and shall be cutoff type to limit light from spilling off-site. Lamps shall be high pressure sodium (HPS) or metal halide (MH) to match surrounding fixture types.. Coordinate fixture types and lamp sizes to meet IESNA illumination criteria. Provide photocell and HOA control and power to all exterior fixtures. Design exterior lighting circuits such that half of all lighting can be turned off. Control the half of the lights that will be turned off from a breaker or breakers or UFS controlled contactor. Provide a lighting design and construct a lighting layout to achieve the Sustainable Site LEED Credit 8 for Light Pollution Reduction. Provide LEED documentation that Credit 8 has been achieved.

6.9.5.1. Parking Lot Lighting

Parking lot lighting shall be HPS or MH to match surrounding fixtures. The light poles shall be square, non-tapered or round tapered aluminum with a dark bronze anodized finish. All poles exceeding 30 feet in height shall have vibration dampers. Provide lighting for all parking provided as part of this project. Limit pole height to 35 feet or less if possible. The lighting system shall be provided with a time clock, a photo cell and a hand off auto switch.

6.9.5.2. Walkway Lighting

Walkway lighting shall HPS or MH (to match surrounding area lighting), Shoebox type. Square Pole, Helix base top of base at ground level, 15 feet in height. Install inline fusing in each ungrounded conductor at the pole base. All poles must have access door in the base to allow access to fuses. Buried junction boxes are not allowed. Square steal pole shall have vibration dampeners factory installed. Where poles are not appropriate, or where barriers are needed between pedestrian and vehicular traffic, lighting bollards may be used. Bollards shall be square, non-tapered aluminum with a dark bronze anodized finish, 42 inches in height.

6.9.5.3. Building Lighting

Provide wall mounted light fixtures above the door at all building entrances , exits, mechanical and electrical room exterior access. Light fixtures shall be designed to illuminate the immediate area around the door, but also minimize light spillage. Light the area around the building to a level of 5 foot-candles over door entrances and 0.5 foot-candles around the rest of the building.

6.9.5.4. Exterior Lighting Control

Provide a Hand-Off-Auto switch to control all exterior lights. Locate this switch in the main electrical room with outside access. Provide a single, north-facing, roof-mounted, photocell and connect to the “Auto” position of the HOA switch. Connect the time clock to the “Auto” position. The photocell shall be the primary controlling device but allow the time clock to override the photo cell if manually selected.

6.9.6. Underground Circuits

Provide parking and walkway lighting with underground branch circuits originating in the building served by the lights. Underground branch circuits shall be insulated copper conductors with an insulated grounding conductor in PVC conduit. Aluminum or direct buried conductors are not permitted. Ground all lighting poles at the base of the pole. Provide a ¾ inch x 10 feet copper clad ground rod at each pole.

SAMPLE

6.9.7. Electrical Metering

(a) Electric services are required to be metered for facilities less than 30,000 sq ft. Install watt hour meter for each service. Services 200 amp single phase and less can be dial or digital. Services 200 amps and larger, single or three-phase require digital LCD meter, transformer rated CT meters, factory programmed for 1 to 1 ratio with registers reading KWH and KW 15 minute demand. ANSI/CEA-709-1 b (LonTalk) protocol compatible connected to the UCS JACE controller. MOD buss or other protocol substitution must have additional licensing and programming needed to communicate correct data (SNVTs) Standard Network Variable Types to the JACE controller.

(b) Meter electric services for facilities of 30,000 Sq ft and larger with smart meter and the following values reported to the base UCS (Utility control system) though the building Tridium JACE controller.

KWH
Current phase A-B-C-N, current unbalance, (coincidence).
Current Average phase A-B-C-N
Current Maximum, date & time, phase A-B-C-N
Voltage coincidence A-B-C
Voltage minimum maximum A-B-C date & time
Phasor angle voltage A-B-C
Phasor angle current A-B-C
Power factor 3 phase (coincidence)
Power factor 3 phase maximum date & time
Power
3 Phase real power (coincidence)
3 Phase reactive power (coincidence)
3 Phase apparent power (coincidence)
Demand 15 min intervals
3 Phase real power demand date & time
3 Phase reactive power demand date & time
3 Phase apparent power demand date & time

(c) The meters shall also meet the following specifications:

(1) Quantities Measured: Power (kilowatt), average demand over 15 minute intervals.
Energy (kilowatt-hours)

(2) Measurement Configuration: For single phase application, 120 - 240V

For three phase application, 208 - 600V, 3 wire delta or 4 wire wye

(3) Operating Temperatures: -20 degrees C to +60 degrees C. For exterior mounting, consider the local ambient temperature extremes and moisture proof enclosures.

(4) Humidity Operating Range: 5% to 90% RH (non-condensing)

(5) Accuracy: Revenue grade:
+ 0.2% at unity power factor
+ 0.5% at 0.5 power factor

(6) Frequency: 60 Hz +I- 5%

(7) Digital Output Only: ANSI/CEA-709.1 b protocol (LonTalk) output for communications using Standard Network Variable

(8) Types (SNVTs) Standard Network Variable Types for measured values.

6.9.8. Cathodic Protection Systems

6.9.8.1. General

SAMPLE

Cathodic protection for non-metallic underground utilities (i.e. water, sewer, industrial waste, gas, & storm drainage) that have metal fittings in contact with the earth shall consist of a sacrificial anode system. A "Corrosion Expert" shall design the sacrificial system. Such a person must be accredited or certified by the National Association of Corrosion Engineers (NACE) as a NACE Accredited Corrosion Specialist or a NACE certified Cathodic Protection (CP) Specialist or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control of buried or submerged metallic piping and tank systems.

6.9.8.2. Cathodic Protection for Non-Metallic Underground Utilities

The sacrificial anode system shall consist of the following:

(a) Design and installation shall meet the requirements of National Association of Corrosion Engineers (NACE) standard RP0169 for metallic piping and metallic components and RP0285 for underground storage tanks. Provide proper protection by showing that one of the criteria in NACE TM0497 is met.

(b) Minimum 25 year life span for the cathodic protection system

(c) Pre-packaged magnesium anodes. Magnesium anode shall be high-potential.

(d) Install anodes at or below the depth of the metallic structure.

(e) Color coded wiring: Black or white for anodes; Red for metallic structure; Blue for reference cell; Yellow for foreign line crossing.

(f) Conductors shall be 12 AWG minimum and shall be rated for direct burial (wet locations) as defined by the latest edition of the National Electric Code (NEC). Conductors shall be solid wire copper.

(g) Continuity bonds between different metallic structures shall consist of two 8 AWG. Conductor shall be rated for use in direct bury wet environments per the NEC.

(h) Coating compound shall be cold-applied wax base material. Wax-tape primer and #1 wax-tape shall be used to cover bolts and exposed uncoated metal fittings. (Trenton Corporation, 313-426-3955, Wax-tape primer / #1 Wax-tape or approved equal).

(i) Test Stations:

1. Flush, curb-type that is H-20 rated.

2. Standard, off-the-shelf product. (Handley or equal).

3. Install in a concrete ring that is at least 4 inches thick and 12-18 inches in diameter.

4. Lockable cover

5. Labeled "C.P. Test"

6. Test stations shall be located not more than 10 feet from the metallic structure.

7. Test station cover shall be color coded to match the type of structure as follows:
a. Yellow - Gas, oil, dangerous materials.
b. Blue - Water systems
c. Green - Sewer systems

8. Test stations shall have two leads to the structure and one lead from the anode. Provide an appropriately rated shunt to tie the anode and one structure lead together. The second structure lead is a spare.

(j) Install a statistical/representative sample of Cathodic Protection Test Stations to provide continued maintenance data and represent all cathodic protection installed in that area. This means that not all of the metallic structures will have a test station, but instead will have the anode connected directly to the metallic structure. This item is specific to metallic fittings on a non-metallic pipeline.

(k) In situations where you have a cluster of fittings provide one statistical/representative reference test station for the below situations:

1. Tee with valves (1-2 or 3 valves)

2. Tee with valve and hydrant within 50-feet

SAMPLE

3. Tee with valve to one service line

4. Mechanical joint and valve (same location)

6.9.8.3. Cathodic Protection for Metallic Underground Utilities

Design and construction of the sacrificial anode system shall comply with all the applicable items indicated for metallic fittings on a non-metallic line and the following additional items:

(a) Provide a foreign line crossing test station for metallic lines that cross another metallic line. Run two conductors to each structure. The Corrosion Expert shall verify through testing if the two structures need to be tied together and by what method.

(b) Anodes can be installed on a header in order to reduce the number of test stations.

6.9.8.4. Cathodic Protection for Metallic Underground Storage Tanks (UST)

Cathodic protection design and construction of the sacrificial anode system shall comply with all the applicable items indicated for metallic fittings on a non-metallic line and the following additional items:

(a) An UST that is a certified by the Steel Tank Institute (STI) is typically provided with an anode solidly attached to each end. This may be appropriate for small tanks. The Corrosion Expert will determine the number of anodes required. If more than two anodes are required, then place the additional anodes along the sides of the tank in pairs. Connect the additional anodes shall be connected through a test station to the UST in a method approved by STI.

(b) Provide all tanks with a test station for taking potential readings.

6.9.8.5. Cathodic Protection for Tracer Wire

Design and construction of the sacrificial anode system shall comply with all the applicable items indicated for metallic fittings on a non-metallic line and the following additional items:

(a) Protect underground utility tracer wires with a 1-lb anode for every 400-feet of wire (no CP test station is needed for this situation).

(b) Where possible combine the cathodic protection test station, utility locate tracer wire test station and valve box in the same concrete pad.

6.9.8.6. Installation Documentation.

The following items are common to all sacrificial anode systems, except for the tracer wire cathodic protection:

(a) Identify each protected fitting(s)/structure with a unique alphanumeric number.

(b) Identify each protected fitting(s)/structure with a GPS coordinate.

(c) Provide photographs for each installation of a protected fitting(s)/structure showing the following:

1. Location of the anode in reference to the protected fitting/structure. (Both items should be visible in the picture)

2. Alpha numeric reference number; (that can be related to an exact location on the drawings).

3. Date of installation.

4. Contract description.

5. Contract number.

(d) Conduct and document soil resistivity testing. Soil resistivity testing must be performed to help verify the assumptions made in the calculations. Provide information in the report on where the soil sample was obtained and show soil resistivity locations on the scaled CADD drawings.

(e) Provide a test report with the readings for each location. This shall include the date, time, native, instant off and connected.

SAMPLE

(f) Provide a scaled CADD drawing showing the protected fitting(s)/structure with its unique alphanumeric number, structure layout and route, location of anodes, GPS coordinates, and location of soil samples. Provide sufficient landmark information to easily find the items.

(g) Corrosion Expert shall provide training for the system installed.

6.9.9. Telecommunications Outside Plant

6.9.9.1. Outside plant includes all cable pathways, splicing, trenching, plowing, pole mounting hardware, duct banks, cable vaults, main distribution frames and building entrance conduits. «SITE_TELECOM»

Comment [sdn7]: Insert verbal description of the routing of telecommunications to the facility or refer to the site utility drawings.

6.9.9.2. Building Entrance Protector Terminal (BEP) / Protected Entrance Terminal (PET) / and Labeling

6.9.9.3. Terminate all copper and fiber on BEP/PET that are labeled according to paragraph 6.10.1.2 Building Entrance Protector Terminal (BEP) / Protected Entrance Terminal (PET) / and Labeling and 6.10.1.3 Fiber Optic Patch Panel (FOPP) Labeling.

6.9.9.4. Underground and Direct Buried Cable

Label underground cable, including maintenance loop, where it enters and exits a maintenance hole or Telecommunication Room and on each service loop. Label in accordance with (IAW) specifications identified in section one (1) for copper cable and section two (2) for fiber optic cable of this supplement. Label direct buried cable at every pedestal and at every junction where the cable is exposed.

6.9.9.5. Underground Duct

(a) Duct bank shall consist of «CARSON_DUCTS» 4 inch inside diameter (ID) concrete encased ducts.

Comment [sdn8]: NEW SPECIFIER FILL-IN: "Insert number of 4" Outer-ducts in duct bank. Default is 4 (3 plus spare)."

(b) The inner duct system shall consist of only three-1 1/4" inner ducts. Do not use Multi Cell or fabric inner duct. Use the 1 1/4" inner ducts for FO cable runs. Install pre-lubricated measuring pulling tape with a minimum breaking strength of 200 lbs (i.e. Mule Tape) secured at each end. When performing duct placement, sweep new ducts and install in the lowest available duct position within the lowest available duct window in the MH.

(c) Install #12 AWG insulated solid copper tracer wire in all ductbanks. Terminate tracer wire at MH in a test well to allow for base locators not to have to enter the MH. In the main telecommunications room or terminate tracer wire on test lug on backboard.

6.9.9.5.1. Fiber Optic Cable

(a) Fiber Optic Cable shall be manufactured by major well-recognized manufacturers with experience in the manufacturing, assembly, and factory testing of cable and components which comply with, EIA TIA/EIA-568-C, and with optical and mechanical performance requirements in accordance with ICEA S-87-640.

(b) The type of protective covering required for fiber optic cables installed in a variety of methods and differing environments situations are as follows:

Type	Installation	Jacket Layers	Armor
(1)	Direct Burial	Double	Double
(2)	Duct Bank	Single	Single
(3)	Concrete Encased Duct Bank	Single	Dielectric

(c) Use Lucent Connectors for terminating connectors on fiber optic cable.

6.9.9.6. Maintenance Holes (MH) and Hand Holes (HH)

(a) Install maintenance holes for all changes in direction. Do not space maintenance holes more than 600 feet apart. Provide the padlock per the specifications of the NEC.

SAMPLE

(b) Maintenance hole placement and specifications shall be in accordance with I3A Technical Criteria of sections 3.7.1 – 3.8.1.3. Additional requirements for every newly installed standard MH shall include an approved ladder, support bar and C-Steps placed 18" apart.

(c) Provide a locking lid for maintenance holes. Provide padlocks per NEC specifications. The locking system shall be equivalent or better than the LockDown-System produced by the Barton Southern Company Incorporated. Specifications for the LockDown System are available at: http://www.LockDown-LockDry.com.

(d) Orient maintenance holes so that the top of the "T" is facing away from the Dial Central Office (DCO) or Communication Node (CN). The top or the "T" is the end of the maintenance hole that has conduit knockouts on all 3 sides.

(e) Schedule maintenance hole placement to allow a Quality Assurance Representative from the NEC to observe.

(f) Stencil maintenance holes, using NEC numbers (contact NEC Project POC for MH/HH numbering Scheme and stencil size).

(g) Hand-holes shall be precast with the preferred size of 4 feet wide x 4 feet long x 4 feet high standard type with pull hooks.

(h) Install a ground rod of iron or steel that is galvanized or copper clad (Copper clad steel is preferred) to at least 3/4 inch (19 mm) in diameter and at least 10 feet (2.75 mm) long installed in the floor of each MH or HH, connected to the internal bonding system.

(i) Horizontal Unistrut channels are the preferred method of anchoring the vertical cable racks in MH's.

6.9.9.7. Splices and Splice Cases

When existing copper splice cases are re-entered to place an additional cable, replace the entry end cap and all sealing tape on the cable going through that end cap followed by the closing of the case. Depending on the type of case and manufacturers recommendations, perform a sustainment test by pressurizing the splice case. Filled splice cases are not the preferred method of installation. Do not place re-enterable compound in a splice case. Preferred splice case type is a "PLP" or equivalent.

6.9.9.8. Existing Cable Usage

(a) Follow the procedures below and report the results back to the NEC. Within a reasonable time frame, the NEC project manager or Quality Assurance Representative will make a repair effort with little or no impact on the project. Consider an alternative routing or repair, where such is feasible.

(b) Evaluating Existing Copper Cable/Testing New Cable. When the installation includes work on an existing cable, test all affected pairs before completing any throws or splices. Submit a list of the defective pairs before the work proceeds. After the cable work is completed, test all affected cable pairs. Clear trouble on any existing pairs that were not on the original list. Test existing copper cable using Multi-pair tester and verify noted issues with a loop analyzer (TDR).

(c) Fiber Optic Existing Cable Guidelines. Use of existing fiber optic cables is acceptable if the following conditions are achieved. Accomplish these determinations during the survey and design phase of the project.

(1) The number of existing strands are adequate to support the required number of links (transmit and receive, multiple closet uplinks, dual uplinks, etc.).

(2) Test the strands to verify that they meet the requirements/specifications of the proposed transport method (1Gig, 10 Gig, DWDM, etc.). Test existing fiber cable using an optical time domain relectometer.

6.9.9.9. As-Built Drawings

(a) Record Drawings of as-built conditions for exterior communications shall include the following: a table of contents, a legend of all symbols, line-types and abbreviations, shop drawings, bore logs, (T0) site plan, outside plant route drawing, (T3) equipment elevations, logical diagrams (T4) details, (T5) schedules and test results. Reference TIA/EIA-606-A, annex C for explanations of the T-series drawings and for drawing symbols.

(b) Accurately reflect the actual installation, specific as to type, size and placements. Show all items installed as a part of the infrastructure and call out.

SAMPLE

(c) Supply one electronic copy of all record drawings to the NEC at the completion of the contracted performance of work. The preferred electronic format is a geospatial sub-meter accurate drawing supplied in Bentley .dgn formats.

(d) Show measurements on all drawings.

(e) Show all numbers assigned, applied, stenciled, or labeled during design, construction or installation.

(f) Indicate references to details and other drawings.

(g) T0 Campus or Site Plans

(1) Cable route drawings shall show measurements to all placements, changes of path direction and transitions in path types. Reference: RUS 1751F-643, figure 11 and figure 13. See: http://www.usda.gov/rus/telecom/publications/bulletins.htm

(2) Identify all conduits and ducts on the OSP routing as to the type, size and length to include burial type and depth of cover. Show duct assignment for each section of duct/conduit. Include bore logs.

(3) Identify all tracer wire and grounding.

(4) Identify all maintenance holes, hand holes, pedestals and splices.

(5) Identify all cable using the NEC labeling scheme. Call out cable type, cable sheathing, length of cable between splices. If re-labeling is required then show all re-labeling.

(6) Show the Building Entrance Facilities on the Outside Plant route drawings. Include measurements of where the cable goes under or through the foundation of the building.

(7) A maintenance hole detail is required for all maintenance holes, hand holes and vaults installed or where a change in the existing infrastructure occurred. Maintenance hole/hand-hole/vault details shall be of the butterfly configuration. The BICSI Outside Plant Design reference manual 4th edition chapter 10 Figure 10.16 and 10.17 provide examples of butterfly details. Show splices on the MH details.

(8) Include shop drawings of new MHs/HHs.

(h) T4 Details. Typical details allow one to present a lot of information that otherwise would be redundantly called out many times on the drawings. IE; duct bank sections including tracer wires and typical duct assignments. But do show out all non-typical variations.

(i) Schedules. A splice schedule is required for every splice that is not a 1 to 1 splice. Use schedules for the elimination of redundant information I.E. maintenance hole schedules stating size, type, locking covers etc, pedestal schedule stating size, type, etc.., and conduit schedule, stating cables, duct assignments, etc.

(j) Test results. Include test plans, test results, test equipment calibration certification and test documentation.

6.10. FACILITY ELECTRICAL AND TELECOMMUNICATIONS SYSTEMS

6.10.1. Interior Communications

6.10.1.1. General

The premise distribution system shall consist of inside plant, horizontal, riser cables (both copper and fiber optic) and connecting of all station locations to Main Telecommunication Room and Secondary Telecommunication Rooms within a building. Standard outlet configuration shall provide one data and one voice outlet. All wall phone outlets shall be metal chrome plated with two (2) posts

6.10.1.2. Terminate incoming outside plant cables on protector modules, 110-type blocks, R399 Central Office blocks with fuses, with separate patch panels. Terminate the incoming fiber cable on a 19 inch 24-port single-mode fiber optic patch panel. Terminate the patch panel with LC connectors. Racks for all patch panels shall be standard self standing 7 feet high, 19 inches wide racks Run the interior communications in cable trays for the major runs around the building. Supply all the rack(s), patch panels, patch cables and fiber patch cords for the telecommunication rooms. Cables shall be colored accordingly: white for data, blue for voice and red for SIPRNet (if applicable).

6.10.1.3. Building Entrance Protector Terminal (BEP) / Protected Entrance Terminal (PET) / and Labeling

SAMPLE

(a) Label BEPs and Fiber Optic Distribution Panels, using yellow 1-inch x 1-inch sized labels. The following are examples for the labeling of BEPs to include BLDG #, CA ID, CA Count:

BLDG#	B3450
CA ID #	CA-07-05
CA Count	CT-601-800+100XD
CA ID #	CA-07-05
CA Count	CT-601-800+100XD
CA ID #	CA-07-05
CA Count	CT-100XD

(b) Identify copper cables with the SIZE + TYPE and CABLE ID + COUNT. For example: 300-pair (P3) cable shall be identified as, P3-24PF CA 07-05 PAIR 601-800+100XD.

6.10.1.4. Fiber Optic Patch Panel (FOPP) Labeling

(a) Below is an example for labeling Single-Mode (SM) fiber optic distribution panel to include fiber optic ID, fiber strands count and labeling scheme.

FIBER OPTIC ID	FO 07-07
# FIBER STRANDS	12 FO SM
CA COUNT	1-12

(b) Below is an example for labeling Multi-Mode (MM) fiber optic distribution panel to include fiber optic ID, fiber strands count and labeling scheme.

FIBER OPTIC ID	FO 07-07
# FIBER STRANDS	12 FO MM
CA COUNT	1-12

(c) Label fiber optic cables with the following: SIZE, MODE, CABLE ID, CABLE COUNT

For example: 12 FO SM, 07- 07, 1-12 Strands

6.10.1.5. Locate cable TV equipment in the telecommunications room.

6.10.1.6. For electrical, mechanical, SIPRNet (where applicable to the project) and telecommunications rooms provide a single phone outlet located on the wall for phones that can be mounted on lugs. Wire all telephone voice & data jacks from jack locations on floor plan back to floor mounted voice and data racks in telecommunications room.

6.10.1.7. Horizontal Cable Copper

(a) Sheath colors are as follows: white for data, blue for voice, red shielded twisted pair (STP) for SIPRNET (where applicable). Secure all cables only with Velcro type cable retainers. Do NOT use ratchet type cable (zip) ties on horizontal cabling.

(b) Label cable, using scheme in accordance with TIA/EIA-606-A Standard. Starting at the main entrance of a building, label each outlet clockwise around the room continuing to the left clockwise around the building.

Example: 140-A-2-48 means, Telecomm Room # “140”, Data Rack “A”, Patch panel “2”, Port # “48.”

SAMPLE

The removal of the dashes between the first three (3) designators are allowed for more space on faceplate and patch panel “designator strips”.

6.10.1.8. Riser Cable Copper.

Riser cable is that portion of the wiring system that extends vertically to provide connectivity between Telecommunication Rooms or between the BEP and the Telecommunication Rooms located on different floors. Riser cable shall meet the requirements of TIA/EIA-568-B for category 3 Unshielded Twisted Pair. Cable shall be 24 AWG solid copper, labeled and verified with jacket markings.

6.10.1.9. Backbone Cable – Fiber Optic

Backbone fiber optic cable is that portion of the system that provides interconnections between the Main Telecommunication Room and Secondary Telecommunication Rooms. Single-Mode fiber shall meet ICEA S-83-596 requirements. Install backbone fiber in 1-1/4 inch ISP orange HDPE inner-duct.

6.10.1.10. Cable Termination Station Location

The face-plate shall be a minimum of four (4) ports and of the type used with removable/interchangeable snap-in jacks. Install blanks in unused ports that can be removed for later use. The jacks shall be RJ-45 snap-in type and color coded with data jacks- orange and voice jacks- blue.

6.10.1.11. Installation

(a) Cables shall be "home run" to the nearest TR and supported by conduit, cable tray, and ladder rack. J-hooks shall only be used as stated above. J hooks may only be used above suspended ceilings and no more than 25 feet from the conduit outlet above ceiling to the cable tray,

(b) Install signal wire to projectors from the ceiling down the wall into a dedicated outlet for use by a computer and/or run into a cable tray and back to the telecommunications room.

(c) Protected distribution systems (PDS) shall be an approved PDS system that is surface attached. Use in all zone one (1) rated building areas requiring SIPRNET drops (where applicable to the project). The current approved systems by Certified TEMPEST Technical Authority are produced by Holocom Incorporated or Wiremold Incorporated. All Protective Distribution System designs need approval of the Network Enterprise Center Information Assurance Policy Branch section before being installed. Justification for deviation from the NSTISSI No7003 is to allow for future expansion and diverse use of building infrastructure. The Information Assurance point of contact is Cindy Thornburg, (719) 526-1386.

6.10.1.12. Telecommunications Room.

(a) Label equipment racks, using consecutive letters, starting with “A” for the first DATA rack and continue with the next letter for each DATA rack on to the VOICE racks labeled with the next available letter. Label patch panels (PP) consecutively, including Voice Tie Patch Panels. Example: if there are four (4) Voice Tie patch panels, port one of the fourth station’s patch panel would be labeled: TR#-RACK# 4-01.

(b) Maintain a minimum of three feet separation between unclassified and classified equipment racks.

(c) Provide a single wall mounted voice jack outlet for the SIPRNet room (where applicable).

6.10.1.13. Fiber Optic Inner Duct

Install a 1-1/4 inch ISP orange HDPE split inner-duct (or appropriate size) in the wire management section of data and voice racks (when needed). The purpose of the inner duct is to prevent fiber optic patch cables from being crushed and or damaged by other cables i.e. Cat-6 Patch Cords

6.10.1.14. Voice Tie Cables

Terminate pairs of all tie cables on wall mounted 110 type punch-down blocks and on to the other end of CAT-6 patch panels. Size tie cables so that each station location to include a four (4) pair straight thru configuration. This is facilitated by the use of C4 clips.

SAMPLE

6.10.1.15. Testing.

(a) Conduct testing, using TIA/EIA standards and with all equipment within current manufacture's recommended time frame for calibration. Carry a copy of the calibration certification all test equipment and present upon request by NEC's designated representative (PM or QA). If equipment is not within current manufacture's recommended time frame, NEC will reject test results and telecommunication services will not be activated in the tested facility until corrected and retested. All work is subject to NEC visual and operational inspection prior to acceptance.

(b) OSP Fiber Optic Cable

(1) Test all OSP fiber strands with Optical Time Domain Reflectometer (OTDR) and power meter / light source. OTDR shall be dual frequency, launch and receive cable. Power meter / light source shall be dual frequency / bi-directional.

(2) Test Result Formatting. Submit test reports in softcopy format in either original or PDF format. All failed readings found require a description of corrective actions taken. NEC must receive a copy of the test documentation a minimum of 10 days prior to pre-final inspection of facility or building complex (2 or more buildings sharing infrastructure resources).

6.10.1.16. As Built Drawings

(a) General Requirements: Record Drawings, accurately reflecting actual as-built installation for interior communications, include the following: a table of contents, a legend of all symbols, line-types and abbreviations, shop drawings, (T1, T2, T3) floor plans, (T3) equipment elevations, logical diagrams (T4) details, (T5) schedules and test results. Reference TIA/EIA-606-A annex C for explanations of the T-series drawings and for drawing symbols. Drawings shall be specific as to type, size and placements. Show and call out all items installed as a part of the infrastructure. Supply one electronic set to the NEC at the completion of the contracted performance of work. The preferred electronic format is a geospatial sub-meter accurate drawing supplied in AutoDesk .dwg or Bentley .dgn formats. Show measurements on all drawings. Include T1 & T2 drawings to show the demarcation points. Show all numbers assigned, applied, stenciled, or labeled during design, construction or installation. Show references to details and other drawings, where applicable.

(b) T1 Layout of complete building per floor. Show and call out sizes of all cable trays, ducts, and main conduits (to include the entrance of the OSP). Also note the use of J-hooks along runs. Show and call out all backbone cable, vertical riser locations, main conduits, chases, pathways. If the complete grounding path is not shown on the T2 or T3 drawings, then show it on the T1 drawings.

(c) T2 Serving zones building areas drop locations and cable IDs. Call out pathway conditions. Label drops on the T2 drawings as they are labeled in the building.

(d) T3 Telecommunications rooms, Enlarged plans, Elevations of racks, backboards etc.

(1) In general, show measurements for all items in the rack elevation. Call out and show all cables and grounding when they appear in elevation. The scale of drawing elevations shall show all measurements and the required details.

(2) Provide elevation drawings of all backboards. Provide an elevation, showing of all racks, cabinets, shelves or other telecommunication Information system equipment.

(3) Provide a floor plan of all telecommunications rooms at a scale no less than 1/4" =1'0" showing all items installed in this space. If this is a newly renovated or constructed room then show every item in this room.

(4) Provide Logical/Riser/One-line diagrams. This is a diagram showing the logical architecture from the OSP to the end user stations. This drawing is also required for all OSP projects containing more than 2 demarcation points. Provide a grounding diagram, which may be incorporated into these diagrams if clarity allows. Show all MDFs. BETs, PETs, 110 blocks, horizontal and vertical backbone cabling, and major equipment items including hubs switches routers etc., from the OSP to the end-user stations. For clarity, vertical and horizontal drawings may be separated. If clarity allows these may be combined with the rack/backboard elevations.

(e) T4 Details. Typical details allow one to present a lot of information that otherwise would be redundantly called out many times on the drawings. IE; duct bank sections including tracer wires and typical duct assignments. But do show out all non-typical variations.

(f) T5 Schedules. A splice schedule is required for every splice that is not a 1 to 1 splice. Use schedules for the elimination of redundant information.

SAMPLE

(g) Test results. Include test plans, test results, test equipment calibration certification and test documentation.

6.10.2. Interior Power

The electrical room shall contain the main service to the building and shall have an exterior entrance. Locate all panel boards in the electrical room or non public area. Do not install panel boards in hallways or general access areas. There shall be electrical room on each floor to serve the power needs of each respective floor. Coordinate with the systems furniture supplier to assure that the proper wiring is provided at each outlet for the systems furniture. After coordination, submit the plan to the Contracting Officer for information.

6.10.3. Interior Lighting

Provide 50 foot-candles lighting level in mechanical, communications and electrical rooms.

6.10.4. Equipment Special Conditions

All electrical equipment shall be derated for an altitude of 5900 feet.

6.10.5. Keyless Access and ICIDS

The Government reserves the right to modify the contract to include the installation of keyless access and/or ICIDS.

6.11. HEATING, VENTILATING, AND AIR CONDITIONING

6.11.1. Integrate the control system to the installation's existing UMCS. The existing UMCS is Tridium.

6.11.1.1. The Fort Carson workstation operator, which runs Tridium Niagara AX Framework software and is located in building 214.

6.11.1.2. As part of the HVAC DDC system, provide a JACE controller or approved equal, including the required Tridium Niagara AX Framework software, in the building to allow communication between the building DDC system and the Post Utility Control System (UCS).

(a) Locate JACE controller adjacent to the main building DDC equipment panel in the building mechanical room(s).

(b) Install latest version of graphics within the JACE controller. Use existing media for communication between the building DDC system(s) and the post UCS. Provide a WebUi to each installed JACE panel.

6.11.1.3. Supply the DDC/UCS and coordinate with the Ft. Carson Post Operation Contractor. All HVAC functions and input/output points in the building DDC system(s) shall be capable of being monitored and/or controlled by the Ft. Carson Post UCS at the Ft. Carson operator workstation.

The Ft. Carson Post Operation's Contractor operating the existing UCS server/operator workstation will re-program the UCS operator server, under separate contract, during normal business hours to accommodate the integration of the new building(s) into the existing UCS. Reprogramming will include, but not be limited to, software database programming, development of trend logs, alarm reporting, graphics generation, system calibration, and end-to-end testing of the DDC integration into the UCS.

6.11.1.4. Provide full support to the post Operations Contractor, providing all necessary information to complete the reprogramming of the UCS server and testing of the DDC integration into the UCS, prior to the contract final completion date.

6.11.1.5. If emergency generator(s) and/or UPS are included in the contract, provide the following information, as applicable to the post Operations Contractor, including (but not limited to): equipment data sheets, written control sequences, IF files, and input/output points list.

(a) Generator

SAMPLE

(1) Status On/Off

(2) Load KW, KVa, Kvars

(3) Amps A-B-C

(4) Output Voltage

(5) Fuel Level

(6) Battery voltage

(7) Alarms

(b) Uninterruptable Power Supply (UPS)

(1) Contact #1 Status

(2) Contact #2 Status

(3) Battery Test

(4) AC power

(5) UPS Switched

(6) UPS notice

(7) Load, amps, voltage, True Power, apparent Power Bypass Status Net Time Used

6.11.2. General Requirements. The following requirements apply to all heating and cooling systems in the building:

6.11.2.1. Provide refrigeration equipment with an ozone depletion factor of 0.0. Provide manufacturer's optional hail guard for exposed coils on condensers. Provide chillers with manufacturer's standard debris guards enclosing the base of the chiller. For systems utilizing outdoor chillers or cooling coils exposed to outside air, the chilled water shall be a mixture of 35% propylene glycol and 65% distilled or reverse osmosis water. Where available, provide with manufacturer's standard packaged controls:

6.11.2.2. Heating fluid (if used) shall be a mixture of 35% propylene glycol and 65% distilled or reverse osmosis water.

6.11.2.3. Heating and cooling systems with glycol shall include an automatic glycol makeup system.

6.11.2.4. The use of evaporative cooling (including cooling towers, etc) is not permitted.

6.11.2.5. For water source heat pumps, closed-circuit or conventional cooling towers are not permitted.

6.11.2.6. For water cooled chillers, cooling towers are not permitted.

6.11.2.7. Natural gas-fired water boiler shall produce no greater than twenty (20) parts per million (ppm) nitrogen oxides (NOx) in the flue gases, at 3% excess oxygen and a combustion air temperature of 68 degrees F.

6.11.2.8. Install P/T taps on the entering and leaving side of each coil, boiler, chiller, pump, HVAC control sensing device and strainer. Provide a strainer prior to each control valve and pump ***<COF_TEMF>***

6.11.2.9. Make-up air units, shall be either the direct fired type and shall produce no greater than 0.5 NO2 and no greater than 50 ppm NOx or be hydronic type.***</COF_TEMF>***

SAMPLE

6.11.3. Communications Room (Including SPIRNET if applicable)

Provide stand alone, split system, direct expansion cooling systems for communications rooms, which shall operate independent of the building heating and cooling system. Reject heat to the mechanical room or to the building exterior. Design the communications room cooling equipment to maintain a temperature of 72 degrees F.

6.11.4. Electrical Rooms

Consider providing building relief air through the electrical room providing conditioned air through the room.

6.11.5. Mechanical Rooms

Provide mechanical ventilation whenever the mechanical room temperature exceeds 84 degrees F.

6.11.6. Outdoor Design Conditions

«HVAC»

6.12. ENERGY CONSERVATION

6.12.1. Inclusion of Renewable Energy Features. The following renewable energy features have been determined lifecycle cost effective, are included in the project budget and shall be provided:

«RENEWABLE_ENERGY_FEATURES»***<TEMF>***

6.12.2. Solar Walls. Consider new construction and major renovation of vehicle and aviation maintenance facilities at Fort Carson that require large amounts of heated ventilation air for the application of transpiration heating (solar wall). ***</TEMF>***

«ENERGY_CONSERVATION»

6.13. FIRE PROTECTION

6.13.1. Fire detection And Mass Notification

Provide a tamper switch for the Post Indicator Valve (PIV). The tamper switch serving the PIV must report a trouble signal to the Fire Alarm Control Panel (FACP).The system shall be addressable looped with all devices interconnected. The fire alarm system shall communicate to the Fort Carson central fire system which is a radio based Monaco system. Place the Local Operator Control (LOC) near the entrance and the Fire Alarm panel. Provide a LCD and graphic map showing the zone of coverage for the fire alarm system. Coordinate location of exterior horn and light within 20 feet of the Fire Department Connection.

6.13.2. Use Schedule 40 piping for steel sprinkler system piping that is 50 mm (2 inches) and larger.

6.13.3. Location of Fire Department Connection shall be visible and unobstructed.

6.13.4. Provide fire extinguisher cabinet as required by the applicable criteria listed in chapter four of this section. Provide semi recessed fire extinguisher cabinets capable of housing a 10 pound ABC extinguisher. Fire extinguisher cabinet doors shall not be lockable and shall not be breakable.

6.13.5. For any coordination issue or question to the local AHJ please contact the Fort Carson Fire Department Fire Prevention Division (telephone: 719-526-3559).

6.14. SUSTAINABLE DESIGN

6.14.1. LEED Rating Tool Version. This project shall be executed using «LEED_VERSION».

Comment [sdn9]: NOTE TO SPECIFIER: In accordance with paragraph 5.9.2, provide the outdoor design conditions that are referred to in paragraph 2.2 in UFC 3-410-01FA.

Comment [sdn10]: Indicate here all renewable energy features that are included in project DD1391 and supported by LCCA. Be specific in description of features.

Comment [sdn11]: [LEED-NC Version 2.2][LEED-NC Version 3][*text block for other to be filled in by specifier*]

SAMPLE

6.14.2. *<ONLY_EXEMPT>*LEED Minimum Rating. This project includes no facilities that are required to achieve a specific LEED achievement level. Project shall achieve and document all points required by other portions of the RFP and all points that are feasible, but there is no minimum required LEED achievement level.*</ONLY_EXEMPT><NOT_ONLY_EXEMPT>* The minimum requirement for this project is to achieve LEED «LEED_MIN» level. Each non-exempt facility (building plus sitework) must achieve this level. In addition to any facilities indicated as exempt in paragraph 3, the following facilities are exempt from the minimum LEED achievement requirement: «SD_EXEMPT_FACILITIES».*</NOT_ONLY_EXEMPT>*

6.14.3. *<SINGLECO>*Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the «FEES_PAID_BY». Administration/team management of the online project will be by the «ADMIN_PERFORMED_BY». *<USGBC>*Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is required. The Contractor will obtain LEED certification prior to project closeout. Application, payment of certification of fees and all coordination with USGBC during the certification process will be by the Contractor. GBCI interim review of design phase data is not required by the Government but is recommended. Government validation during project execution does not relieve or modify in any way the Contractor's responsibility to satisfy all requirements for certification as defined by LEED and GBCI. Contractor is not responsible for design phase LEED documentation of any unaltered portion of the design that is accomplished by others. If the project includes unaltered complete design by others, during the certification process Contractor will coordinate all GBCI comments on LEED credits that fall outside Contractor's scope of responsibility with the Government for coordination with the Designer of Record, and Contractor will not be penalized if project fails to achieve certification at the minimum required level due to loss of credits that are the responsibility of others.*</USGBC><USGBC_NO>*Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with the GBCI and the Contractor will furnish audit data as requested at no additional cost.*</USGBC_NO>*
*</SINGLECO><SITE_BLDGOTHER>*Credit Validation: The project is the site work *<ADDITIONAL>*and building(s)*</ADDITIONAL>* portion of a multiple contractor Combined Project. LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required Registration and payment of registration fees will be by the «FEES_PAID_BY». *<ADMINGOV>*Administration/team management of the online project will be by the Government.*</ADMINGOV><ADMINSHARED>*Administration/team management of the online project will be shared between the Contractor and the Government per Appendix LEED Requirements for Multiple Contractor Combined Projects.*</ADMINSHARED> <ADMINCONTRACTOR>*Administration/team management of the online project will be by the Contractor per Appendix LEED Requirements for Multiple Contractor Combined Projects. *</ADMINCONTRACTOR>*Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with GBCI and the Contractor will furnish audit data as requested at no additional cost.*</SITE_BLDGOTHER><STDANDSITE>*Credit Validation: The project is a standard design building(s) portion of a multiple contractor Combined Project. LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the «FEES_PAID_BY». Administration/team management of the online project will be by the «ADMIN_PERFORMED_BY». See Appendix LEED Requirements for Multiple Contractor Combined Projects for information about registered standard designs. Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with GBCI and the Contractor will furnish audit data as requested at no additional cost.*</STDANDSITE><NSTDMULTI>*Credit Validation: The project is a non-standard design building(s) portion of a multiple contractor Combined Project. LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is required. Registration and payment of registration fees will be by the «FEES_PAID_BY». Administration/team management of the online project will be by the «ADMIN_PERFORMED_BY». Validation of credits will be accomplished by the Government. LEED certification of the project by the Contractor is not required. The Government may choose to seek LEED certification of the project, in which case the Government will pay certification fees and coordinate with GBCI and the Contractor will furnish audit data as requested at no additional cost.*</NSTDMULTI><ONLY_EXEMPT>*Credit Validation: LEED registration, compiling of documentation at LEED OnLine and use of the LEED Letter Templates is *<CREDIT_NO>*not required. Contractor has the option to register the project, compiling of documentation at LEED OnLine and use the LEED Letter Templates. In this case, payment of registration fees and administration/team management of the online project will be by the Contractor.*</CREDIT_NO><CREDIT>*required. Registration and payment of fees will be by the

Comment [sdn12]: [Silver][Gold][Platinum]

Comment [sdn13]: Select paragraph below if the project includes COS standard design buildings and a single contractor is doing all buildings and site work in the project. Edit for either Contractor or Government fees and administration (PDT choice). Registration is required.

Comment [sdn14]: Select paragraph below if the project includes the site work for COS standard design buildings by others. Include bracketed text in first sentence as applicable if project also includes standard design and/or non-standard design buildings in addition to site work for COS buildings by others. Registration and fees may be either by Contractor or Government (PDT choice). Administration may be by Government or shared - Contractor administers until construction phase, when Government must take over administration in order to compile and summarize data from the other contractors (PDT choice).

Comment [sdn15]: Select paragraph below if the project includes COS standard design building(s) only and site work is by others. If only a single contractor will ever be working on all the projects for a particular standard design, the COS may require the Contractor to register the standard design as part of the initial project and administer the online standard design on all subsequent projects. If multiple contractors will be working on projects for a particular standard design, registration and administration must be by the Government (COS).

Comment [sdn16]: Select paragraph below if the project includes non-standard design building(s) only and site work and COS standard design buildings are by others. Edit for either Contractor or Government fees and administration (PDT choice).

Comment [sdn17]: Select paragraph below if the project ONLY has exempt facilities and is not required to achieve LEED Silver.

SAMPLE

«FEES_PAID_BY». Administration/team management of the online project will be by the «ADMIN_PERFORMED_BY». ***</CREDIT></ONLY_EXEMPT>***

6.14.4. Commissioning: See Appendix M for Owner's Project Requirements document(s).

6.14.5. LEED Credits Coordination. The following information is provided relative to Sustainable Sites and other credits. ***<MULTI_NOT>***

SS Credit 1 Site Selection:

Project site **«FARMLAND»** considered prime farmland.

<FLOOD1>Project site is five feet or more above 100-year flood elevation.***</FLOOD1><FLOOD2>***Delineation of 100-year flood elevation is shown on site drawings provided in this CONTRACT.***</FLOOD2>***

<HABITAT1>Project site contains no habitat for threatened or endangered species.***</HABITAT1><HABITAT2>***Delineation of threatened or endangered species habitat is shown on site drawings provided in this CONTRACT.***</HABITAT2>***

<WETLAND1>No portion of project site lies within 100 feet of any water, wetlands or areas of special concern.***</WETLAND1><WETLAND2>***Delineation of water, wetlands and areas of special concern is shown on site drawings provided in this CONTRACT.***</WETLAND2>***

Project site **«PARKLAND»** previously used as public parkland.

SS Credit 2 Development Density & Community Connectivity.

Project site **«DENSITY»** meets the criteria for this credit.

SS Credit 3 Brownfield Redevelopment.

Project site **«BROWN»** meets the criteria for this credit.

SS Credit 4.1 Public Transportation Access.

Project site **«TRANS»** meets the criteria for this credit.

EA Credit 6 Green Power.

35% of the project's electricity **«GREEN»** will be provided through an Installation renewable energy contract. Do not purchase Renewable Energy Credits (REC's) to earn this credit.

</MULTI_NOT>**MR Credit 2 Construction Waste Management.**

The Installation ***<DOESNOT>***does not have an on-post recycling facility available for Contractor's use.***</DOESNOT><DOES>***has an on-post recycling facility.***</DOES> <CONTACT_KNOWN>***Contact «CONSTRUCTION_WASTE_CONTACT» for information about materials accepted.***</CONTACT_KNOWN><LEED3>***

Regional Priority Credits (Version 3 only)

The project zip code is «ZIP_CODE».***</LEED3>***

<MULTIPLE>See LEED Multiple Contractor Responsibilities Table(s) for additional information.***</MULTIPLE>***

6.14.6. LEED Credit Preferences, Guidance and Resources. See Appendix L LEED Project Credit Guidance for supplemental information relating to individual credits.

Comment [sdn18]: Attach Owner Project Requirements (OPR) document for each climate controlled facility/facility type in the project. Obtain OPR for Standard Designs from COS. Develop OPR for each non-standard facility using USACE template at http://en.sas.usace.army.mil. Refer to SOW whenever possible in this document to avoid conflict with SOW.

Comment [sdn19]: If site work and building(s) are by separate contractors, this is a MULTIPLE CONTRACTOR COMBINED PROJECT and you should skip to the MR2 section (edit to indicate whether buildings or site is by others and identify the buildings by others).

SAMPLE

6.14.7. *<MULTI_NOT>*Not Used*</MULTI_NOT><MULTIPLE>*Multiple Contractor Combined Project. When site work and building(s) are accomplished by separate contractors, it is a Multiple Contractor Combined Project for purposes of LEED scoring and documentation. This project is part of a Multiple Contractor Combined Project that includes site work and building(s) accomplished by separate contractors. See Appendix LEED Requirements for Multiple Contractor Combined Projects and Appendix LEED Multiple Contractor Responsibilities Table(s) for special requirements for this project.*</MULTIPLE>*

6.14.8. Additional Information

«MR2»

6.15. ENVIRONMENTAL

Refer to Paragraph 6.16, and to Appendix E - Environmental Information for additional environmental design statement of work information.

6.16. PERMITS

6.16.1. The following is a list of site specific Federal and State and local Environmental Regulations and Requirements for projects being constructed at Fort Carson. See also Contract Clause 52.236-7, "Permits and Responsibilities."

6.16.1.1. Environmental Protection Agency (EPA) Region 8

(a) National Pollution Discharge Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction Activities. A copy of the permit may be found in Appendix E - Environmental Information. The Building Contractor will be the permitee for this permit.

(1) The Building Contractor will develop a Storm Water Pollution Prevention Plan (SWPPP), which will be approved by the Contracting Office Representative (COR) and Fort Carson. NOTE: The Notice of Intent cannot be filed before SWPPP review has been signed off by the COR and Fort Carson. Fort Carson Storm Water SWPPP Review Form is attached in Appendix E – Environmental Information.

(2) Provide and submit electronically an EPA Notice of Intent (NOI) to EPA Region 8 and Omaha District US Army Corps of Engineers.

(3) Provide and submit an EPA Notice of Termination (NOT) to EPA Region 8 and Omaha District US Army Corps of Engineers once final ground cover is complete and growing. NOTE: Before Notice of Termination is submitted a NOT Form from Fort Carson must be signed off by the COR and Fort Carson. Fort Carson NOT Inspection Form is attached in Appendix E – Environmental Information.

(b) Municipal Separate Storm Sewer System (MS4) Permit. Fort Carson is under a Municipal Separate Storm Sewer System (MS4) permit, issued by the US Environmental Protection Agency (EPA), which allows discharges of storm water from Fort Carson. The MS4 permit also requires Fort Carson to manage a storm water program and enforce compliance with EPA-issued permits. Attached is a Fort Carson Storm water Program Project Information Form which needs to be completed and submitted to the Fort Carson Storm Water Program Manager with Fort Carson Directorate of Public Works, Environmental Division prior to the start of the project. The following are requirements under the MS4 which are not required in the Construction General Permit for NPDES and must be included in the SWPPP.

- Include a dewatering plan in the SWPPP, as the State of Colorado dewatering permit does not apply on Fort Carson.

- Cover trash containers at all times. When trash containers is approximately 85% full, haul container to approved dump location.

- Line all concrete washouts. Exchangeable pans are acceptable, as long as the washout water is managed adequately.

6.16.1.2. State of Colorado Fugitive Dust Permit

Comment [sdn20]: If site work and building(s) are accomplished by separate contractors, identify the project as a Combined Project

If site work and building(s) are accomplished by separate contractors, include general instructions on how LEED is handled for Combined Projects (standard text appendix LEED Requirements for Multiple Contractor Combined Projects), (STANDARD APPENDIX "N" IN WIZARD)

If site work and building(s) are accomplished by separate contractors, include LEED Strategy Tables (STANDARD APPENDIX "O" IN WIZARD), which indicate the status of site selection points, establish the number of points each contractor must earn relative to each building, and establish each contractor's requirements for shared building/site points.

If site work and building(s) are by separate contractors, add the MULTIPLE CONTRACTOR COMBINED PROJECT paragraph below.

Comment [sdn21]: Indicate here all project-specific differences from the default assumptions in Appendix L. For Multiple Contractor Combined Projects, describe here the other contacts and buildings in the combined project.

SAMPLE

(a) Land Development Application. Form located in Appendix E - Environmental Information.

(b) Fugitive Dust Control Plan for Land Development - Notice of Start Up Form. Air Pollution Emission Notice (APEN) is required if project last longer than 6 months construction time and/or is more than 25 acres. Form is located in Appendix E - Environmental Information.

6.16.1.3. Fort Carson Environmental Requirements

(a) Air Emissions. Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards. All air emissions sources (boilers, hot water heaters, air conditioners, chillers, make up air units, emergency generators, etc..) will need to be sized, specified, or otherwise determined prior to construction (ground breaking), and reviewed by the air program to determine permitting requirements and PSD (prevention of significant deterioration) applicability. Information Required for Environmental Air Quality Assessment located in Appendix E - Environmental Information, Contractor needs to complete.

(1) Particulates. Control dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; at all times, including weekends, holidays and hours when work is not in progress. Maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Provide sufficient, competent equipment available to accomplish these tasks. Perform particulate control as the work proceeds and whenever a particulate nuisance or hazard occurs. Comply with all State and local visibility regulations.

(2) Odors. Control odors from construction activities at all times. The odors will not cause a health hazard and will be in compliance with State regulations and/or local ordinances.

(3) Sound Intrusions. Keep construction activities under surveillance and control to minimize environment damage by noise. Comply with the provisions of the state and Installation rules.

(4) Burning. Burning is not allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer Representative. The specific time, location, and manner of burning will be subject to approval.

(5) CO Emissions. Fort Carson is located in a CO Emissions Maintenance Area. Provide the number and types of vehicle and equipment to be utilized during the project to the Directorate of Public Works, Environmental Division. Directorate of Public Works, Environmental Division will use this information to perform an Impact Analysis as part of the Environmental Assessment to determine if the project will meet conformity requirements of the Clean Air Act. Worksheet is provided in Information Required for Environmental Air Quality Assessment in Appendix E - Environmental Information.

(6) Low NOx Burners. All Fuel burning sources will have Low NOx burners capable of meeting NOx emissions of 20ppm or less.

(7) Non Ozone Depleting Refrigerants. All Air conditioning and chiller units will use Non Ozone depleting refrigerants such as R134a, R407, R410, etc.

(8) Emergency Generators. Any emergency generator to be installed will be EPA certified to Tier I11 emissions standards for engines with less than 750hp and Tier I1 for engines above 750hp.

(9) Fort Carson maintains a Title V air permit with a specific condition requiring the permit holder to track insignificant sources of Hazardous Air Pollutant Emissions in order to maintain our classification as a Synthetic Minor Area Source. The requirements for contractors, contract managers, and project proponents is to provide the Air Program with a listing of materials used such as paint, sealers and adhesives by completing the Product Use Data section of page 6 of the Air Quality Assessment form in its entirety.

(b) The POC at the Directorate of Public Works, Environmental Division is the Air Specialist for the Air Program.

(c) Notification of Demolition and Renovation Information Form located in Appendix E - Environmental Information.

SAMPLE

(d) Provide Non Hazardous Solid Waste Diversion Report to Directorate of Public Works, Environmental Division. Form located in Appendix E - Environmental Information.

(e) Recycle and Waste Minimization. Fort Carson will provide receptacles, pick-up and dispose of cardboard and paper products. Call Fort Carson's Environmental Compliance Division Office of Solid Waste to arrange for this free service. Recycle materials that are recyclable, e.g., concrete, asphalt, aluminum, copper, brass, steel, plastic, cardboard, glass, etc. There are several recycling points on post.

(f) Fuel and Lubricants

(1) Fuel and lubricants must be brought to the site each day. Storage of these items beyond daily use is not allowed.

(2) Dispose of used lubricants per 40 CFR 279.

(g) Wetland. Do not enter, disturb, destroy or allow discharge of contaminants into wetlands except as authorized.

(h) Disposal of Waste Water

(1) Waste water from construction activities will not be allowed to enter waterways or be discharged prior to being treated to remove pollutants.

(2) Groundwater encountered during construction activities will be land applied.

(3) Discharge water generated from flushing lines after disinfection or on conjunction with hydrostatic testing into the sanitary sewer with prior approval of the Fort Carson Waste Water Treatment Plant. The discharged water must be dechlorinated prior to discharge to the sanitary sewer.

(i) Historical, Archaeological and Cultural Resources. If historical, archaeological or cultural resources are encountered during construction activities, temporarily suspend work and contact the Contracting Officer Representative (COR) and Fort Carson's Cultural Resources Manager.

(j) Integrated Pest Management. Coordinate with the Contracting Officer Representative and the Installation Pest Management Coordinator (IMPC) prior to pesticide application.

(k) Clean Equipment. Clean all equipment prior to arrival at Fort Carson. Remove soil residue egg deposits from plants and pests, noxious weeds and plant seeds.

(l) Military Munitions. Military munitions are defined in 40 CFR 260. Upon discovery, cease work immediately and contact the Contracting Office Representative (COR).

6.17. DEMOLITION

«DEMOLITION»

6.18. ADDITIONAL FACILITIES

«ADDITIONAL_FACILITIES»

SAMPLE

End of Section 01 10 00***<TO>***.«TONUM»***</TO>***