CONTRACT N40085-25-B-0081
NAVFAC SPECIFICATION
NO. 25-0081

BUILDING G560 MECHANICAL REPLACEMENT

AT THE

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

DESIGN BY:

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Design Branch, Mechanical Section

SPECIFICATION PREPARED BY:
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Date: May 21, 2026

SPECIFICATION APPROVED BY:

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Jonathan D. McGuire, Commander, CEC, U.S. Navy for
Commander, Naval Facilities Engineering

25-0081

PROJECT DESCRIPTION

The work includes - Demolish and replace two 7.5-ton AHU and condensing units. AHU located in an open/panel ceiling, condensing units located exterior to building. Replace manual and controlled outdoor air dampers. Cap exists existing isolated exhaust duct. Replace bathroom exhaust fan and grills. All new refrigerant and condensate lines. Replace electric panel for circuit breakers. Replace condenser disconnects. Supply concrete pad for condensing units and incidental related work.

The work shall be located at:

Building G560

Marine Corps Base, Camp Lejeune, North Carolina

SUPERVISION

One person may fill the roles of Superintendent, Quality Control Manager, and Safety & Health Officer, if duly qualified for all three positions as defined in the project specification.

DISTRIBUTION: DoW COMMUNITY ONLY

SECTION 01 11 00

SUMMARY OF WORK

04/22

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The work includes all items of work as described in the attached project description.

1.1.2 Location

The work shall be located at the Marine Corps Base Camp Lejeune, North Carolina, at the building and/or area as described in the attached project description. The exact location will be indicated by the Contracting Officer.

1.2 PHASED CONSTRUCTION SCHEDULE

Within the overall project schedule, commence and complete the work in phases as described in the attached project description.

1.3 EXISTING WORK

In addition to "FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements":

a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.

b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

1.4 LOCATION OF UNDERGROUND FACILITIES

The Contractor will be responsible for obtaining the services of a professional utility locator to scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground where existing underground utilities are discovered. Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated or specified to be removed but indicated or discovered during scanning in locations to be traversed by piping, ducts, and other work to be installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.4.1 Notification Prior to Excavation

Notify the Contracting Officer's Representative (COR) 48 hours prior to starting excavation work.

1.5 GOVERNMENT-FURNISHED MATERIAL AND EQUIPMENT

Government furnished material and equipment will be indicated on drawings and in scope of work if applicable.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS (MCBL)
04/22

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel

1.2 SPECIAL SCHEDULING REQUIREMENTS

a. The Contractor shall comply with all special scheduling requirements as described in the attached project description.

d. Permission to interrrupt any Station roads, railroads, and/or utility service shall be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear appropriate personal protective equipment (PPE) in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Ensure all Contractor equipment, include delivery vehicles, are clearly identified with their company name.

1.3.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

1.3.1.2 Installation Access

Obtain access to Navy installations through participation in the Defense Biometrics Identification System (DBIDS). Requirements for Contractor employee registration, and transition for employees currently under Navy Commercial Access Control System (NCACS), are available at https://www.cnic.navy.mil/om/dbids.html. No fees are associated with obtaining a DBIDS credential.

Participation in the DBIDS is not mandatory, and Contractor personnel may apply for One-Day Passes at the Base Visitor Control Office to access an installation.

The following are specific details regarding contractor personnel

requirements. For the most up-to-date information regarding Base Access please visit https://www.lejeune.marines.mil/Base-Access/.

1.3.1.2.1 Registration for DBIDS

Registration for DBIDS is available at https://www.cnic.navy.mil/om/dbids.html. Procedure includes:

a. Present a letter or official award document (i.e. DD Form 1155 or SF 1442) from the Contracting Officer, that provides the purpose for access, to the base Visitor Control Center representative.

b. Present valid identification, such as a passport or Real ID Act-compliant state driver's license.

c. Provide completed SECNAV FORM 5512/1 to the base Visitor Control Center representative to obtain a background check. This form is available for download at https://www.cnic.navy.mil/om/dbids.html.

d. Upon successful completion of the background check, the Government will complete the DBIDS enrollment process, which includes Contractor employee photo, fingerprints, base restriction and several other assessments.

e. Upon successful completion of the enrollment process, the Contractor employee will be issued a DBIDS credential, and will be allowed to proceed to worksite.

1.3.1.2.2 DBIDS Eligibility Requirements

Throughout the length of the contract, the Contractor employee must continue to meet background screen standards. Periodic background screenings are conducted to verify continued DBIDS participation and installation access privileges. DBIDS access privileges will be immediately suspended or revoked if at any time a Contractor employee becomes ineligible.

An adjudication process may be initiated when a background screen failure results in disqualification from participation in the DBIDS, and Contractor employee does not agree with the reason for disqualification. The Government is the final authority.

1.3.1.2.3 DBIDS Notification Requirements

a. Immediately report instances of lost or stolen badges to the Contracting Officer.

b. Immediately collect DBIDS credentials and notify the Contracting Officer in writing under the following circumstances:

(1) An employee has departed the company without having properly returned or surrendered their DBIDS credentials.

(2) There is a reasonable basis to conclude that an employee, or former employee, might pose a risk, compromise, or threat to the safety or security of the Installation or anyone therein.

1.3.1.2.4 One-Day Passes

Personnel applying for One-Day passes at the Base Visitor Control Office are subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government is not responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the DBIDS.

1.3.2 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

1.3.3 Working Hours

Regular working hours shall be 0730-1600, Monday through Friday, excluding Government holidays.

1.3.4 Work Outside Regular Hours

Work outside regular working hours requires COR approval. Provide written request at least 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress. During periods of darkness, the different parts of the work shall be lighted in a manner approved by the COR.

1.3.5 Occupied Building and Existing Buildings

The Contractor shall be working in a a portion of an existing building which is not occupied. The existing building and its contents shall be kept secure at all times.

1.3.6 Utility Cutovers and Interruptions

a. The Contractor shall coordinate a minimum of 14 calendar days prior to any planned utility cutover / interruption. Make utility cutovers and interruptions during normal working hours.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, and compressed air shall be considered utility cutovers. This time limit includes time for deactivation and reactivation.

d. Operation of Station Utilities: The Contractor shall not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor shall notify the Contracting Officer at least 15 days prior to such operation.

1.4 SECURITY REQUIREMENTS

Contract Clause "FAR 52.204-2, Security Requirements and Alternate II," "FAC 5252.236-9301, Special Working Conditions and Entry to Work Area," apply.

1.5 EMERGENCY UNEXPLODED ORDNANCE (UXO) RESPONSE

In the event that UXO, as defined in 40 CFR 260 is encountered during the construction activities that are deemed to be a threat to human health or the environment, Camp Lejeune Military Police and EOD professionals shall be immediately contacted to conduct an emergency response. Additionally, immediately contact the Contracting Officer if UXO is encountered. An evaluation of this scenario and procedures, with contract numbers, shall be included in the Health and Safety Plan (HASP) for the fieldwork.

1.5.1 3R TRAINING

All Contractor personnel performing ground disturbing activities must complete contractor awareness training related to recognizing UXO. This training (3R TRAINING) is available online at: http://www.lejeune.marines.mil/OfficesStaff/EnvironmentalMgmt/TrainingVideo.aspx

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES (MCBCL)
04/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 1110-1-8	(2021) Engineering and Design -- Construction Equipment Ownership and Operating Expense Schedule

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Schedule of Prices; G

1.3 SCHEDULE OF PRICES

1.3.1 Data Required

Within 15 calendar days of notice of award, prepare and deliver to COR a schedule of prices (construction contract). Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices therefor. Schedule of prices shall be separated by individual building numbers with subtotals for each building.

1.3.2 Payment Schedule Instructions

Payments will not be made until the Schedule of Prices has been submitted to and accepted by the Contracting Officer.

Additionally, the Schedule of Prices must be separated as follows:

a. Primary Facilities Cost Breakdown:

Defined as work on the primary facilities out to the 5 foot line. Work out to the 5 foot line includes construction encompassed within a theoretical line 5 foot from the face of exterior walls and includes attendant construction, such as pad mounted HVAC cooling equipment, cooling towers, and transformers placed beyond the 5 foot line.

b. Supporting Facilities Cost Breakdown:

Defined as site work, including incidental work, outside the 5 foot line.

1.4 CONTRACT MODIFICATIONS

In conjunction with the Contract Clause DFARS 252.236-7000 Modification Proposals-Price Breakdown, and where actual ownership and operating costs of construction equipment cannot be determined from Contractor accounting records, base equipment use rates upon the applicable provisions of the EP 1110-1-8.

1.5 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

1.5.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract Clause FAR 52.232-27 Prompt Payment for Construction Contracts and FAR 52.232-5 Payments Under Fixed-Price Construction Contracts. Invoices not completed in accordance with contract requirements will be returned to the Contractor for correction of the deficiencies. The requests for payment shall include the documents listed below.

a. The Contractor's invoice, on NAVFAC Form 7300/30 furnished by the Government, showing in summary form, the basis for arriving at the amount of the invoice. Form 7300/30 must include certification by Quality Control (QC) Manager as required by the Contract.

b. The Estimate for Voucher/ Contract Performance Statement on NAVFAC Form 4330/54 furnished by the Government. Use NAVFAC Form 4330, unless otherwise directed by the Contracting Officer, on NAVFAC Contracts when a Monthly Estimate for Voucher is required.

c. Contractor's Monthly Estimate for Voucher and Contractors Certification (NAVFAC Form 4330) with Subcontractor and supplier payment certification. Other documents, including but not limited to, that need to be received prior to processing payment include the following submittals as required. These items are still required monthly even when a pay voucher is not submitted.

d. Monthly Work-hour report.

e. Updated Construction Progress Schedule and tabular reports required by the contract.

f. Contractor Safety Self Evaluation Checklist.

g. Updated submittal register.

h. Solid Waste Disposal Report.

i. Certified payrolls.

j. Updated testing logs.

k. Other supporting documents as requested.

1.5.2 Submission of Invoices

If DFARS Clause 252.232-7006 Wide Area WorkFlow Payment Instructions is included in the Contract, provide the documents listed in above paragraph CONTENT OF INVOICE in their entirety as attachments in Wide Area Work Flow

(WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction, provide it as instructed by the Contracting Officer.

Monthly invoices and supporting forms for work performed through the anniversary award date of the Contract must be submitted to the Contracting Officer within 5 calendar days of the date of invoice. For example, if Contract award date is the 7th of the month, the date of each monthly invoice must be the 7th and the invoice must be submitted by the 12th of the month.

1.5.3 Final Invoice

a. A final invoice must be accompanied by the certification required by DFARS 252.247.7023 Transportation of Supplies by Sea, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release must contain the corporate seal. An officer of the corporation must sign and the corporate secretary must certify the Final Release.

b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form and required certification of Transportation of Supplies by Sea must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form and required certification of Transportation of Supplies by Sea has been confirmed by the Contracting Officer, the Contractor must then submit final invoice and attach a copy of the Final Release Form and required certification of Transportation of Supplies by Sea in WAWF.

c. Final invoices not accompanied by the Contractor's Final Release and required certification of Transportation of Supplies by Sea will be considered incomplete and will be returned to the Contractor.

1.6 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of itemized requests by the Contractor which comply with the requirements of this section, and will be subject to reduction for overpayments or increase for underpayments made on previous payments to the Contractor.

1.6.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this Contract will, at the discretion of the Contracting Officer, be subject to reductions and suspensions permitted under the FAR and agency regulations including the following in accordance with FAR 32.103 Progress Payments Under Construction Contracts:

a. Reasonable deductions due to defects in material or workmanship;

b. Claims which the Government may have against the Contractor under or in connection with this Contract;

c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and

d. Failure to maintain accurate "as-built" or record drawings in

accordance with FAR 52.236.21.

1.6.2 Payment for Onsite and Offsite Materials

Progress payments may be made to the Contractor for materials delivered on the site, for materials stored off construction sites, or materials that are in transit to the construction sites under the following conditions:

a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.

b. Materials delivered on the site but not installed, including completed preparatory work, and off-site materials to be considered for progress payment must be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site. Examples of materials acceptable for payment consideration include, but are not limited to, structural steel, non-magnetic steel, non-magnetic aggregate, equipment, machinery, large pipe and fittings, precast/prestressed concrete products, plastic lumber (e.g., fender piles/curbs), and high-voltage electrical cable. Materials not acceptable for payment include consumable materials such as nails, fasteners, conduits, gypsum board, glass, insulation, and wall coverings.

c. Materials to be considered for progress payment prior to installation must be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Schedule of Prices requirement of this Contract. Requests for progress payment consideration for such items must be supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 Payments Under Fixed-Price Construction Contracts have been met.

d. Materials are adequately insured and protected from theft and exposure.

e. Provide a written consent from the surety company with each payment request for offsite materials.

f. Materials to be considered for progress payments prior to installation must be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval by the Contracting Officer.

g. Materials in transit to the job site or storage site are not acceptable for payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS
01/23

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map

Progress and Completion Pictures

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten different viewpoints selected by the Contractor unless otherwise directed by the Contracting Officer. Submit with the monthly invoice two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch on the CD or DVD as a digital file. Include a date designator in file names. Photographs provided are for unrestricted use by the Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 Liability, during the entire period of performance under this contract. Provide other insurance coverage as required by State law.

1.6 ELECTRONIC MAIL (EMAIL)

a. The Contractor is required to establish and maintain electronic mail (email) capability along with the capability to open various electronic attachments in Microsoft, Adobe Acrobat, and other similar formats.

b. Within 10 days after contract award; the Contractor shall provide the Contracting Officer a single (only one) email address for the ROICC office to send communications related to this contract correspondence. The ROICC office may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes, terrorist threats, etc.

c. Multiple email addresses are not authorized.

d. It is the Contractor's responsibility to make timely distribution of all ROICC email within its own organization, including field office(s).

e. The Contractor shall promptly notify the Contracting Officer, in writing, of any changes to their email address.

1.7 SUPERVISION

1.7.1 Superintendent Qualifications

Provide project superintendent with a minimum of 10 years experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

For projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 10 QUALITY CONTROL, the superintendent must have qualifications in accordance with that section.

1.7.2 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of Contract work.In addition, if a Quality Control (QC) representative is required on the Contract, then that individual must also have fluent English communication skills.

1.7.3 Duties

The project superintendent is primarily responsible for managing subcontractors and coordinating day-to-day production and schedule adherence on the project. The superintendent is required to attend Red

Zone meetings, partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.7.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to ensure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time for excess costs or damages by the Contractor.

1.8 PRECONSTRUCTION MEETING

Immediately after award, prior to commencing any work at the site, coordinate with the Contracting Officer a time and place to meet for the Preconstruction Meeting. The meeting must take place within 35 calendar days after award of the contract, but prior to commencement of any work at the site. The purpose of this meeting is to discuss and develop a mutual understanding of the administrative requirements of the Contract including but not limited to: daily reporting, invoicing, value engineering, safety, base-access, outage requests, hot work permits, schedule requirements, quality control, schedule of prices or earned value report, shop drawings, submittals, cybersecurity, prosecution of the work, government acceptance, final inspections and contract close-out. Contractor must present and discuss their basic approach to scheduling the construction work and any required phasing.

1.8.1 Attendees

Contractor attendees must include the Project Manager, Superintendent, Site Safety and Health Officer (SSHO), Quality Control Manager and major subcontractors.

1.9 FACILITY TURNOVER PLANNING MEETINGS (Red Zone Meetings)

Meet with the Government to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start planning the turnover process at the Pre-Construction Conference meeting with a discussion of the Red Zone process and convene at regularly scheduled NRZ Meetings beginning at approximately 75 percent of project completion. Include the following in the facility Turnover effort:

1.9.1 Red Zone Checklist

a. Contracting Officer's Technical Representative (COTR) will provide the Contractor a copy of the Red Zone Checklist template.

b. Prior to 75 percent completion, modify the Red Zone Checklist template by adding or deleting critical activities applicable to the project and assign planned completion dates for each activity. Submit the modified Red Zone Checklist to the Contracting Officer. The Contracting Officer may request additional activities be added to the Red Zone Checklist at any time as necessary.

1.9.2 Meetings

a. Conduct regular Red Zone Meetings beginning at approximately 75 percent project completion, or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first.

b. The Contracting Officer will establish the frequency of the meetings, which is expected to increase as the project completion draws nearer. At the beginning, Red Zone meetings may be every two weeks then increase to weekly towards the final month of the project.

c. Using the Red Zone Checklist as a Plan of Action and Milestones (POAM) and basis for discussion, review upcoming critical activities and strategies to ensure work is completed on time.

d. During the Red Zone Meetings discuss with the COTR any upcoming activities that require Government involvement.

e. Maintain the Red Zone Checklist by documenting the actual completion dates as work is completed and update the Red Zone Checklist with revised planned completion dates as necessary to match progress. Distribute copies of the current Red Zone Checklist to attendees at each Red Zone Meeting.

1.10 PARTNERING

Contractor shall host the partnering session within 45 calendar days of contract award. To most effectively accomplish this Contract, the Contractor and Government must form a cohesive partnership with the common goal of drawing on the strength of each organization in an effort to achieve a successful project without safety mishaps, conforming to the Contract, within budget and on schedule. The partnering team must consist of personnel from both the Government and Contractor including project level and corporate level leadership positions. Key Personnel from the supported command, end user, NAVFAC, PWD, FEAD/ROICC, Contractor, key subcontractors and the Designer of Record are required to participate in the Partnering process.

1.10.1 Team-Led (Informal) Partnering

a. The Contracting Officer will coordinate the initial Team-Led (Informal) Partnering Session with key personnel of the project team, including Contractor and Government personnel. The Partnering Session will be co-led by the Government Construction Manager and Contractor's Project Manager.

b. The Initial Team-led Partnering session may be held concurrently with the Pre-Construction Post-Award Kickoff meeting. Partnering sessions will be held at a location mutually agreed to by the Contracting Officer and the Contractor, typically at a conference room on-base or at the Contractor's temporary trailer.

c. The Initial Team-Led Partnering Session will be conducted and facilitated using electronic media (a video and accompanying forms) provided by Contracting Officer.

d. The Partners will determine the frequency of the follow-on sessions.

e. Participants will bear their own costs for meals, lodging and

transportation associated with Partnering.

1.11 MOBILIZATION

Contractor shall mobilize to the jobsite within 60 calendar days after contract award. Mobilize is defined as having equipment AND having a physical presence of at least one person from the contractor's team on the jobsite.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 31 23.13 20

ELECTRONIC CONSTRUCTION AND FACILITY SUPPORT CONTRACT MANAGEMENT SYSTEM
05/17, CHG 7: 11/21

PART 1 GENERAL

1.1 CONTRACT ADMINISTRATION

Utilize the Naval Facilities Engineering Command's (NAVFAC's) Electronic Construction and Facility Support Contract Management System (eCMS) for the transfer, sharing, and management of electronic technical submittals and documents. The web-based eCMS is the designated means of transferring technical documents between the Contractor and the Government. Paper media or e-mail submission, including originals or copies, of the documents identified in Table 1 are not permitted, except where eCMS is unavailable, non-functional, or specifically requested in addition to electronic submission.

1.1.1 Format Naming Convention for Files Uploaded Into eCMS

Include the identification number of the document, the type of document, the name/subject or title, and for daily reports, the date (day of work) with format YYYY/MM/DD in the filename. For example, for RFI's, 0011_RFI_Roof_Leaking.doc; for submittals, 0032a_Submittals_Light_Fixture.pdf; for Daily Reports, 0132_Daily_Report_20190504.xls. Contact the Contracting Officer's Representative (COR) regarding availability of eCMS training and reference materials.

1.1.2 Uploading Documents Processed Outside of eCMS

When specifically requested to provide documents outside of eCMS, upload all final project documentation (e.g., documents that are signed and/or adjudicated by the Government) mentioned in Table 1 into eCMS by creating a record in the module associated with that document type and uploading the document(s). Subject/title of the record should include the type of record i.e., RFI/Submittal/Other, the identification number(s), and the statement "Processed Outside of eCMS". For example, "RFI 001-012 Processed Outside of eCMS".

1.2 USER PRIVILEGES

The Contractor will be provided access to eCMS. All technical submittals and documents must be transmitted to the Government via the COR. Project roles and system roles will be established to control each user's menu, application, and software privileges, including the ability to create, edit, or delete objects.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contractor's Personnel; G

1.4 SYSTEM REQUIREMENTS AND CONNECTIVITY

1.4.1 General

The eCMS requires a web-browser (platform-neutral) and Internet connection. Obtain from an approved vendor an External Certification Authority (ECA), Primary Key Infrastructure (PKI) certificate, or other similar digital identification to support two-factor authentication and access to eCMS. Provide and maintain computer hardware and software for the eCMS access throughout the duration of the contract for all Contractor-designated users. Provide connectivity, speed, bandwidth, and access to the Internet to ensure adequate functionality. 70 mbps download speed recommended, 40 mbps minimum for loading large files. Neither upgrading of the Contractor's computer system nor delays associated from the usage of the eCMS will be justification or grounds for a time extension or cost adjustment to the Contract.

1.4.2 Contractor Personnel List

Within 20 calendar days of contract award, provide to the Contracting Officer a list of Contractor's personnel who will have the responsibility for the transfer, sharing and management of electronic technical submittals and documents and will require access to the eCMS. Project personnel roles to be filled in the eCMS include the Contractor's Project Manager, Superintendent, Quality Control (QC) Manager, and Site Safety and Health Officer (SSHO). Personnel must be capable of electronic document management. Notify the COR immediately of any personnel changes to the project. The Contracting Officer reserves the right to perform a security check on all potential users. Provide the following information:

First Name
Last Name
E-mail Address
Office Address
Project Role (e.g. Project Manager, QC Manager, Superintendent)

1.5 SECURITY CLASSIFICATION

In accordance with Department of Navy guidance, all military construction contract data are unclassified, unless specified otherwise by a properly designated Original Classification Authority (OCA) and in accordance with an established Security Classification Guide (SCG). Refer to the project's OCA when questions arise about the proper classification of information.

The eCMS and tablet computer must only be used for the transaction of unclassified information associated with construction projects. In conformance with the Freedom of Information Act (FOIA), DoD INSTRUCTION 5200.48 CONTROLLED UNCLASSIFIED INFORMATION (CUI), and DoD requirements, any unclassified project documentation uploaded into the eCMS must be designated either "U - UNCLASSIFIED" (U) or "CUI - CONTROLLED UNCLASSIFIED INFORMATION"
(CUI).

1.6 ECMS UTILIZATION

Establish, maintain, and update data and documentation in the eCMS throughout the duration of the contract.

Personally Identifiable Information (PII) transmittal is not permitted in

the eCMS.

1.6.1 Information Security Classification/Identification

The eCMS must be used for the transmittal of the following documents. This requirement supersedes conflicting requirements in other sections, however, submittal review times in Section 01 33 00 SUBMITTAL PROCEDURES remain applicable. Table 1 - Project Documentation Types provides the appropriate U and CUI designations for various types of project documents. Construction documents requiring CUI status must be marked accordingly. Apply the appropriate markings before any document is uploaded into eCMS. Markings are not required on U documents.

Table 1 also identifies which eCMS application is to be used in the transmittal of data (these are subject to change based on the latest software configuration). If a designated application is not functional within 4 hours of initial attempt, defer to the Submittal application and submit the required data as an uploaded portable document (e.g. PDF), word processor, spreadsheet, drawing, or other appropriate format. Hard copy or e-mail submission of these items is acceptable only if eCMS is documented to be not available or not functional or specifically requested in addition to electronic submission. After uploading documents to the Submittal application, transmit the submittals and attachments to the COR via the Transmittal application. For Submittals, select the following:

Preparation by = Contractor personnel assigned to prepare the submittal
Approval by = Contracting Officer Representative (COR)
Returned by = Design Lead/Manager
Forwarded to = Contractor project manager

Table 1 - Project Documentation Types

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
As-Built Drawings	U	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals and Transmittals
Building Information Modeling (BIM)	U	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals and Transmittals
Construction Permits	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Construction Schedules (Activities and Milestones)	U	After the schedule submittal is approved by the COR, import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Submittals, Transmittals and Scheduling App
Construction Schedules (Cost-Loaded)	CUI	After the schedule submittal is approved by the COR, import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Submittals, Transmittals and Scheduling App
Construction Schedules (3-Week Lookahead)	U	Import the schedule file into the scheduling application, and select "Approve" to establish a new schedule baseline	Scheduling App
DD 1354 Transfer of Real Property	U		Submittals and Transmittals
Daily Production Reports	CUI	Provide weather conditions, crew size, man-hours, equipment, and materials information	Daily Report
Daily Quality Control (QC) Reports	CUI	Provide QC Phase, Definable Features of Work Identify visitors	Daily Report
Designs and Specifications	U	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals and Transmittals
Environmental Notice of Violation (NOV), Corrective Action Plan	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Environmental Protection Plan (EPP)	CUI		Submittals and Transmittals

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Invoice (Supporting Documentation)	CUI	Applies to supporting documentation only. Invoices are submitted in Wide-Area Workflow (WAWF)	Submittals and Transmittals
Jobsite Documentation, Bulletin Board, Labor Laws, SDS	U		Submittals and Transmittals
Meeting Minutes	CUI		Meeting Minutes
Modification Documents	CUI	Provide final modification documents for the project. Upload into "Modifications - RFPs	Document Management
Operations & Maintenance Support Information (OMSI/eOMSI), Facility Data Worksheet	U	1. Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager 2. Design reviews will be performed in existing "Dr Checks"	Submittals and Transmittals
Photographs	U	Subject to base/installation restrictions	Submittals and Transmittals
QCM Initial Phase Checklists	CUI		Checklists (Site Management)
QCM Preparatory Phase Checklists	CUI		Checklists (Site Management)
Quality Control Plans	CUI		Submittals and Transmittals
QC Certifications	U		Submittals and Transmittals
QC Punch List	U		Punch Lists (Testing Logs)
Red-Zone Checklist	U		Checklists (Site Management)
Rework Items List	CUI		Punch Lists (Testing Logs)

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Request for Information (RFI) Post-Award	CUI		RFIs
Safety Plan	CUI		Daily Report
Safety - Activity Hazard Analyses (AHA)	CUI		Daily Report
Safety - Mishap Reports	CUI		Daily Report
SCIF/SAPF Accreditation Support Documents	CUI	Note: Some Construction Security plans may be classified as Secret. Classified information must not be uploaded into eCMS. Refer to the Site Security Manager, as applicable.	Submittals and Transmittals
Shop Drawings	U	Locations of sensitive areas must be labeled as either "Controlled Area" or "Restricted Area" and may be shown on unclassified documents with the approval from Site Security Manager	Submittals and Transmittals
Storm Water Pollution Prevention (Notice of Intent - Notice of Termination)	U	Refer to rules of the issuing activity, state or jurisdiction	Submittals and Transmittals
Submittals and Submittal Log	U		Submittals and Transmittals
Testing Plans, Logs, and Reports	CUI		Submittals and Transmittals
Training/Reference Materials	U		Submittals and Transmittals
Training Records (Personnel)	CUI		Submittals and Transmittals
Utility Outage/Tie-In Request/Approval	CUI		Submittals and Transmittals
Warranties/BOD Letter	CUI		Submittals and Transmittals

SUBJECT/NAME	DESIG	REMARKS	ECMS APPLICATION
Quality Assurance Reports	CUI		Checklists (Government initiated)
Non-Compliance Notices	CUI		Non-Compliance Notices (Government initiated)
Other Government-prepared documents	CUI		GOV ONLY
All Othere Documents	CUI	Refer to FOIA guidelines and contact the FOIA official to determine whether exemptions exist	As applicable

1.6.2 Markings on CUI documents

a. Only CUI documents being electronically uploaded into the eCMS (.docx, .xlsx, .pptx, and others as appropriate), and associated paper documents described in the paragraph CONTRACT ADMINISTRATION require CUI markings as indicated in the subparagraphs below.

b. CUI documents that are originally created within the eCMS application using the web-based forms (RFIs, Daily Reports, and others as appropriate) will be automatically watermarked by the eCMS software, and these do not require additional markings.

c. CUI documents must be marked "CONTROLLED UNCLASSIFIED INFORMATION" at the bottom of the outside of the front cover (if there is one), the title page, the first page, and the outside of the back cover (if there is one).

d. CUI documents must be marked on the internal pages of the document as "CONTROLLED UNCLASSIFIED INFORMATION" at top and bottom.

e. Where Installations require digital photographs to be designated CUI, place the markings on the face of the photograph.

f. For visual documentation, other than photographs and audio documentation, mark with either visual or audio statements as appropriate at both the beginning and end of the file.

1.7 QUALITY ASSURANCE

Requested Government response dates on Transmittals and Submittals must be in accordance with the terms and conditions of the Contract. Requesting response dates earlier than the required review and response time, without concurrence by the Government COR, may be cause for rejection.

Incomplete submittals will be rejected without further review and must be resubmitted. Required Government response dates for resubmittals must reflect the date of resubmittal, not the original submittal date.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
G560 AHU AND CONDENSER REPLACEMENT

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 41 00	SD-01 Preconstruction Submittals															
			Demolition Plan		G													
			Deconstruction Plan		G													
			Existing Conditions	1.10														
			SD-07 Certificates															
			Notification	1.6	G													
			SD-11 Closeout Submittals															
			Receipts															
		23 05 93	SD-01 Preconstruction Submittals															
			Records Of Existing Conditions	1.3														
			Independent TAB Agency and	1.5.1	G													
			Personnel Qualifications															
			TAB Design Review Report	1.6.1	G													
			Pre-Field TAB Engineering	1.6.1														
			Report															
			TAB Work Execution Schedule	1.6.1	G													
			SD-02 Shop Drawings															
			TAB Schematic Drawings and	1.3.3														
			Report Forms															
			SD-03 Product Data															
			Equipment and Performance	1.3	G													
			Data															
			SD-06 Test Reports															
			Final TAB Report for Proportional	1.6.8	G													
			Balancing															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
G560 AHU AND CONDENSER REPLACEMENT

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 05 93	Pre-Final TAB For Proportional	1.6.6	G													
			Balancing Report															
			SD-07 Certificates															
			Independent TAB agency and	1.5.1														
			personnel qualifications															
		23 09 00	SD-02 Shop Drawings															
			Control System Drawings Title	3.1.1	G													
			Sheet															
			List Of I/O Points	3.1.2	G													
			Control System Components List	3.1.3	G													
			Control System Schematics	3.1.4	G													
			Hvac Equipment Control Ladder	3.1.5	G													
			Diagrams															
			Sequence Of Operations	3.1.6	G													
			Component Wiring Diagrams	3.1.7	G													
			Terminal Strip Diagrams	3.1.8	G													
			Bacnet Communication	3.1.9	G													
			Architecture Schematic (Network															
			Riser)															
			Control Panel Layout	3.1.10	G													
			SD-06 Test Reports															
			Existing Conditions Report	3.3.1	G													
			Control Contractor's Performance	3.8.5	G													
			Verification Testing Plan															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
G560 AHU AND CONDENSER REPLACEMENT

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 09 00	Equipment Supplier's	3.8.5	G													
			Performance Verification Testing															
			Plan															
			Performance Verification Testing	3.8.14	G													
			Report															
			Trends	3.9	G													
			Bus Waveform Report	3.10.1	G													
			SD-07 Certificates															
			Contractor's Qualifications	1.7.6	G													
			Contractor's Training	1.7.6	G													
			Certifications															
			SD-10 Operation and Maintenance															
			Data															
			Controls System Operators	3.7	G													
			Manuals															
			SD-11 Closeout Submittals															
			Training Documentation	3.11.1	G													
			Warranty Information	3.7	G													
		23 09 13	SD-03 Product Data															
			Sensors And Input Hardware	2.3	G													
			Output Hardware	2.4	G													
			Duct Smoke Detectors	2.6.1	G													
			Variable Frequency (Motor)	2.7	G													
			Drives															
			SD-06 Test Reports															
			Vfd Start-Up Test Documentation	2.7.2	G													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
G560 AHU AND CONDENSER REPLACEMENT

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							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		23 09 13	SD-10 Operation and Maintenance															
			Data															
			Vfd Service Manuals	2.7.2	G													
		23 73 33	SD-02 Shop Drawings															
			Temperature control systems	1.3.1	G													
			SD-03 Product Data															
			Split-System Air-Conditioners	2.1.1	G													
			Air-Handling Units	2.1.2	G													
			Pipe Hangers And Supports	2.5.1	G													
			Dampers	2.3.3	G													
			Flexible Pipe Connectors	2.5.6	G													
			Filter Boxes	2.3.5	G													
			Valves	2.4.5	G													
			Pipe And Fittings	2.4	G													
			Duct Lining	2.3.6	G													
			SD-10 Operation and Maintenance															
			Data															
			Air-Handling Units, Data Package		G													
			3															
			Variable Air Volume (Vav)		G													
			Terminals, Data Package 3															
			SD-11 Closeout Submittals															
			Air Filter Inventory	1.3.5	G													
		25 05 11.00	SD-01 Preconstruction Submittals															
			Qualifications	1.7.1	G													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
G560 AHU AND CONDENSER REPLACEMENT

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		25 05 11.00	Device Account Lock Exception	3.1.2.2	G													
			Request															
			Contractor Computer	1.10.1.4	G													
			Cybersecurity Compliance															
			Statements															
			Contractor Temporary Network	1.10.6	G													
			Cybersecurity Compliance															
			Statements															
			SD-02 Shop Drawings															
			Cybersecurity Riser Diagram	1.8.4	G													
			Control System Inventory Report	1.8.2	G													
			SD-03 Product Data															
			Control System Cybersecurity	1.8.5	G													
			Documentation															
			SD-06 Test Reports															
			Wireless Communication Test	3.1.3.3	G													
			Report															
			SD-07 Certificates															
			Software Licenses	1.9	G													
			SD-11 Closeout Submittals															
			Password Summary Report	3.4.2.2.3	G													
			Software Recovery And	1.8.3	G													
			Reconstitution Images															
			Device Audit Record Upload	3.2.2.1	G													
			Software															
		28 31 76	SD-01 Preconstruction Submittals															

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
G560 AHU AND CONDENSER REPLACEMENT

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG # RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY					
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		28 31 76	Qualified Fire Protection Engineer	1.3.2	G													
			(QFPE)															
			SD-02 Shop Drawings															
			Wiring Diagrams	1.9.1.4	G													
			System Layout	1.9.1.5	G													
			Voltage Drop Calculations	1.9.1.10	G													
			SD-06 Test Reports															
			Test Procedures	3.8.1	G													
			SD-07 Certificates															
			Verification of Compliant	3.8.2.1	G													
			Installation															
			Request for Government Final	3.8.2.2	G													
			Test															
			SD-10 Operation and Maintenance															
			Data															
			Operation and Maintenance	3.10	G													
			(O&M) Instructions															
			Instruction of Government	3.11	G													
			Employees															
			SD-11 Closeout Submittals															
			As-Built Drawings	1.9.1.13														
			Spare Parts	1.11.1														

SECTION 01 31 50

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

04/22

PART 1 GENERAL

1.1 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

Interim DD-1354, Transfer & Acceptance of Military Real Property

1.2 Interim DD-1354, Transfer & Acceptance of Military Real Property

Submit Interim DD-1354 thirty (30) days prior to beneficial occupancy date (draft copy attached).

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 32 16

CONSTRUCTION PROGRESS DOCUMENTATION

04/12

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section 01 33 00, "Submittal Procedures."

SD-01 Preconstruction Submittals

Construction schedule

Equipment delivery schedule

1.2 CONSTRUCTION SCHEDULE

Within 15 days after receipt of the Notice of Award, prepare and submit to the COR for approval a Construction Schedule in accordance with the terms in Contract Clause "FAR 52.236-15, Schedules for Construction Contracts," except as modified in this contract.

1.3 EQUIPMENT DELIVERY SCHEDULE

1.3.1 Initial Schedule

Within 30 calendar days after approval of the proposed construction schedule, submit for Contracting Officer approval a schedule showing procurement plans for materials, plant, and equipment. Submit in the format and content as prescribed by the Contracting Officer, and include as a minimum the following information:

a. Description.

b. Date of the purchase order.

c. Promised shipping date.

d. Name of the manufacturer or supplier.

e. Date delivery is expected.

f. Date the material or equipment is required, according to the current construction schedule.

1.4 NETWORK ANALYSIS SYSTEM (NAS)

The schedule shall identify as a minimum:

a. Construction time for all major systems and components;

b. Major submittals and submittal processing time; and

c. Major equipment lead time.

1.4.1 CPM Submittals and Procedures

The Contractor shall use the critical path method (CPM) to schedule and control project activities. The network analysis system shall be kept current, with changes made to reflect the actual progress and status of the construction.

1.5 UPDATED SCHEDULES

Update the construction schedule and equipment delivery schedule at monthly intervals or when schedule has been revised. Reflect any changes occurring since the last update. Submit copies of the purchase orders and confirmation of the delivery dates as directed.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

04/22

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Government-Furnished Information

Submittal register will be delivered to the contractor in hard copy format. Register will have the following fields completed, to the extent that will be required by the Government during subsequent usage.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD No. and type, e.g. SD-04 Drawings) required in each specification section.

Column (e): Lists one principal paragraph in specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting project requirements.

Column (f): Indicate approving authority for each submittal. The Contracting Officer is approving authority for all submittals.

1.2 DEFINITIONS

1.2.1 Submittal

Shop drawings, product data, samples, and administrative submittals presented for review and approval. Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.2.2 Types of Submittals

All submittals are classified as indicated in paragraph "Submittal Descriptions (SD)". Submittals also are grouped as follows:

a. Shop drawings: As used in this section, drawings, schedules, diagrams, and other data prepared specifically for this contract, by contractor or through contractor by way of subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate portion of work.

b. Product data: Preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate portion of work, but not prepared exclusively for this contract.

c. Samples: Physical examples of products, materials, equipment, assemblies, or workmanship that are physically identical to portion of work, illustrating portion of work or establishing standards for evaluating appearance of finished work or both.

d. Administrative submittals: Data presented for reviews and approval to ensure that administrative requirements of project are adequately met but not to ensure directly that work is in accordance with design concept and in compliance with contract documents.

1.2.3 Submittal Descriptions (SD)

SD-01 Preconstruction Submittals

Submittals that are required prior to or commencing with the start of work on site.

Preconstruction Submittals include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates Of Insurance

Surety Bonds

List Of Proposed Subcontractors

List Of Proposed Products

Baseline Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Accident Prevention Plan

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the contractor for integrating the product or system into the project.

Drawings prepared by or for the contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and (SDS)concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to maintain and install equipment, for operating and maintenance use by facility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings, as-built drawings and training plan. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

1.2.4 Approving Authority

Office or designated person authorized to approve the submittal.

1.2.5 Work

As used in this section, on-site and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction. In exception, excludes work to produce SD-01 submittals.

1.3 SUBMITTALS

Submit the following in accordance with the requirements of this section.

SD-11 Closeout Submittals

Submittal register

Complete Submittal Package 2 CD/DVD's

1.4 USE OF SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. Use the hard copy submittal register furnished by the Government or other approved format. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by government; retain data which is output in columns (a), (g), (h), and (i) as approved.

1.4.1 Submittal Register

Submit submittal register as a hard copy. Submit with quality control plan and project schedule required by Section01 45 10 Quality Control. Do not change data in columns (c), (d), (e), and (f) as delivered by the government. Verify that all submittals required for project are listed and add missing submittals. Complete the following on the register:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for approving authority to receive submittals.

Column (h) Contractor Approval Date: Date contractor needs approval of submittal.

Column (i) Contractor Material: Date that contractor needs material delivered to contractor control.

1.4.2 Contractor Use of Submittal Register

Update the following fields in the government-furnished submittal register.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (j) Action Code (k): Date of action used to record contractor's review when forwarding submittals to QC.

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.4.3 Approving Authority Use of Submittal Register

Update the following fields in the government-furnished submittal register.

Column (b).

Column (l) List date of submittal receipt.

Column (m) through (p).

Column (q) List date returned to contractor.

1.4.4 Contractor Action Code and Action Code

Entries used will be as follows (others may be prescribed by Transmittal Form):

NR - Not Received

AN - Approved as noted

A - Approved

RR - Disapproved, Revise, and Resubmit

1.4.5 Copies Delivered to the Government

Deliver one copy of submitted register updated by contractor to government with each invoice request.

1.4.6 Submittals reserved for Marine Corps North Carolina IPT approval

a. Section 27 10 00 BUILDING TELECOMMUNICATIONS CABLING SYSTEM: All submittals. Provide an information copy of all submittals to Base Telephone through the Contracting Officer. Base Telephone will coordinate their review and approval through the Marine Corps

North Carolina IPT.

b. Section 33 82 00 TELECOMMUNICATIONS OUTSIDE PLANT (OSP): All submittals. Provide an information copy of all submittals to Base Telephone through the Contracting Officer. Base Telephone will coordinate their review and approval through the Marine Corps North Carolina IPT.

1.5 PROCEDURES FOR SUBMITTALS

1.5.1 Reviewing, Certifying, Approving Authority

QC organization shall be responsible for reviewing and certifying that submittals are in compliance with contract requirements. The Contracting Officer is the approving authority for all submittals.

1.5.2 Constraints

a. Submittals listed or specified in this contract shall conform to provisions of this section, unless explicitly stated otherwise.

b. Submittals shall be complete for each definable feature of work; components of definable feature interrelated as a system shall be submitted at same time.

c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, submittal will be returned without review.

d. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

1.5.3 Scheduling

a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.

b. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working days for submittals for QC manager approval and 20 working days for submittals for contracting officer approval. Period of review for submittals with contracting officer approval begins when Government receives submittal from QC organization. Period of review for each resubmittal is the same as for initial submittal.

c. For submittals requiring review by fire protection engineer, allow review period, beginning when government receives submittal from QC organization, of 45 working days for return of submittal to the contractor. Period of review for each resubmittal is the same as for initial submittal.

1.5.4 Variations

Variations from contract requirements require Government approval pursuant to contract Clause entitled "FAR 52.236-21, Specifications and Drawings for Construction" and will be considered where advantageous to government.

1.5.4.1 Considering Variations

Discussion with contracting officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

1.5.4.2 Proposing Variations

When proposing variation, deliver written request to the contracting officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to government. If lower cost is a benefit, also include an estimate of the cost saving. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

1.5.4.3 Warranting That Variation Are Compatible

When delivering a variation for approval, contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

1.5.4.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of 10 working days will be allowed for consideration by the Government of submittals with variations.

1.5.5 Contractor's Responsibilities

a. Determine and verify field measurements, materials, field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and contract documents.

b. Transmit submittals to QC organization in accordance with schedule on approved Submittal Register, and to prevent delays in the work, delays to government, or delays to separate contractors.

c. Advise contracting officer of variation, as required by paragraph entitled "Variations."

d. Correct and resubmit submittal as directed by approving authority. When resubmitting disapproved transmittals or transmittals noted for resubmittal, the contractor shall provide copy of that previously submitted transmittal including all reviewer comments for use by approving authority. Direct specific attention in writing or on resubmitted submittal, to revisions not requested by approving authority on previous submissions.

e. Furnish additional copies of submittal when requested by contracting officer, to a limit of 20 copies per submittal.

f. Complete work which must be accomplished as basis of a submittal in time to allow submittal to occur as scheduled.

g. Ensure no work has begun until submittals for that work have been

returned as "approved," or "approved as noted", except to the extent that a portion of work must be accomplished as basis of submittal.

1.5.6 QC Organization Responsibilities

a. Note date on which submittal was received from contractor on each submittal.

b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.

c. Review submittals for conformance with project design concepts and compliance with contract documents.

d. Act on submittals, determining appropriate action based on QC organization's review of submittal.

(1) When QC manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Actions Possible."

(2) When contracting officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When approving authority is contracting officer, QC organization will certify submittals forwarded to contracting officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract Number N40085-17-B-0056, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC manager _____, Date _____"
(Signature)

g. Sign certifying statement or approval statement. The person signing certifying statements shall be QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

h. Update submittal register as submittal actions occur and maintain the submittal register at project site until final acceptance of all work by contracting officer.

i. Retain a copy of approved submittals at project site, including contractor's copy of approved samples.

1.5.7 Government's Responsibilities

When approving authority is contracting Officer, the Government will:

a. Note date on which submittal was received from QC manager, on each submittal for which the contracting officer is approving authority.

b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

c. Identify returned submittals with one of the actions defined in paragraph entitled "Actions Possible" and with markings appropriate for action indicated.

1.5.8 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required , does not have evidence of being reviewed and approved by contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by contractor or for being incomplete, with appropriate action, coordination, or change.

b. Submittals marked "approved" "approved as submitted" authorize contractor to proceed with work covered.

c. Submittals marked "approved as noted" authorize contractor to proceed with work as noted provided contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate submittal is incomplete or does not comply with design concept or requirements of the contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until resubmittal is approved.

1.6 FORMAT OF SUBMITTALS

1.6.1 Complete Submittal Package

Contractor shall make electronic copies of all submittals, including the approved transmittal sheets, and provide two (2) CD/DVD's containing all submittals for the project.

The CD/DVD's shall be marked "Complete Submittal Package - Contract # _____"

1.6.2 Transmittal Form

Transmit each submittal, except sample installations and sample panels, to office of approving authority. Transmit submittals with transmittal form

prescribed by contracting officer and standard for project. The transmittal form shall identify contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

1.6.3 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form. Mark each copy of each submittal identically, with the following:

a. Project title and location.

b. Construction contract number.

c. Section number of the specification section by which submittal is required.

d. Submittal description (SD) number of each component of submittal.

e. When a resubmission, alphabetic suffix on submittal description, for example, SD-10A, to indicate resubmission.

f. Name, address, and telephone number of subcontractor, supplier, manufacturer and any other second tier contractor associated with submittal.

g. Product identification and location in project.

1.6.4 Format for Product Data

a. Present product data submittals for each section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product which is being submitted; indicate specification section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for project.

1.6.5 Format for Shop Drawings

a. Shop drawings shall not be less than 8 1/2 by 11 inches nor more than 30 by 42 inches.

b. Present 8 1/2 by 11 inches sized shop drawings as part of the bound volume for submittals required by section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph entitled "Identifying Submittals."

d. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Shop drawing dimensions shall be the same unit of measure as indicated on the contract drawings. Identify materials and products for work shown.

1.6.6 Format of Samples

a. Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified:

(1) Sample of Equipment or Device: Full size.

(2) Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.

(3) Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.

(4) Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

(5) Sample of Non-Solid Materials: Pint. Examples of non-solid materials are sand and paint.

(6) Color Selection Samples: 2 by 4 inches.

(7) Sample Panel: 4 by 4 feet.

(8) Sample Installation: 100 square feet.

b. Samples Showing Range of Variation: Where variations are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range.

c. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples shall be in undamaged condition at time of use.

d. Recording of Sample Installation: Note and preserve the notation of area constituting sample installation but remove notation at final clean up of project.

e. When color, texture or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.6.7 Format of Administrative Submittals

a. When submittal includes a document which is to be used in project or become part of project record, other than as a submittal, do not apply contractor's approval stamp to document, but to a separate sheet accompanying document.

b. Operation and Maintenance Manual Data: Submit in accordance with Section 01 78 23, "Operation and Maintenance Data." Include components required in that section and the various technical

sections.

1.7 QUANTITY OF SUBMITTALS

1.7.1 Number of Copies of Product Data

a. Submit five copies of submittals of product data requiring review and approval only by the Contracting Officer. Submit three copies of submittals of product data for operation and maintenance manuals.

1.7.2 Number of Copies of Shop Drawings

Submit shop drawings in compliance with quantity requirements specified for product data.

1.7.3 Number of Samples

a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to contractor.

b. Submit one sample panel. Include components listed in technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of non-solid materials.

1.7.4 Number of Copies of Administrative Submittals

a. Unless otherwise specified, submit administrative submittals compliance with quantity requirements specified for product data.

b. Submit administrative submittals required under "SD-19 Operation and Maintenance Manuals" to conform to Section 01 78 23, "Operation and Maintenance Data."

1.8 FORWARDING SUBMITTALS

1.8.1 Samples and Submittals

Except as otherwise noted, submit samples and submittals to:

ROICC/OICC
Jacksonville, North Carolina Area
1005 Michael Road
Camp Lejeune, NC 28542-2521

--OR--
Architect-Engineer Firm
Full Address

1.8.1.1 Administrative Submittals

Submit administrative submittals for asbestos/lead removal and environmental protection plan to the Resident Officer in Charge of Construction (ROICC/OICC).

1.8.1.2 Fire Protection and Fire Alarm System Submittals

Submit fire protection and fire alarm system submittals to ROICC/OICC.

1.8.1.3 TAB Submittals

Submit to ROICC/OICC for all projects.

1.8.2 Shop Drawings, Product Data, and O&M Data

As soon as practicable after award of the contract, and before procurement or fabrication, submit shop drawings, product data and O&M Data required in the technical sections of this specification.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS
11/20, CHG 3: 02/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B30.3	(2020) Tower Cranes
ASME B30.5	(2021) Mobile and Locomotive Cranes
ASME B30.7	(2021) Winches
ASME B30.8	(2020) Floating Cranes and Floating Derricks
ASME B30.9	(2018) Slings
ASME B30.20	(2018) Below-the-Hook Lifting Devices
ASME B30.22	(2016) Articulating Boom Cranes
ASME B30.23	(2016) Personnel Lifting Systems Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
ASME B30.26	(2015; R 2020) Rigging Hardware

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.22	(2007; R 2017) Safety Requirements for Rope-Guided and Non-Guided Workers' Hoists
ASSP A10.34	(2021) Protection of the Public on or Adjacent to Construction Sites
ASSP A10.44	(2020) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSP Z244.1	(2016) The Control of Hazardous Energy Lockout, Tagout and Alternative Methods
ASSP Z359.0	(2018) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSP Z359.1	(2020) The Fall Protection Code
ASSP Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection

	Program
ASSP Z359.3	(2019) Safety Requirements for Lanyards and Positioning Lanyards
ASSP Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSP Z359.6	(2016) Specifications and Design Requirements for Active Fall Protection Systems
ASSP Z359.7	(2019) Qualification and Verification Testing of Fall Protection Products
ASSP Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSP Z359.12	(2019) Connecting Components for Personal Fall Arrest Systems
ASSP Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSP Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSP Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSP Z359.16	(2016) Safety Requirements for Climbing Ladder Fall Arrest Systems
ASSP Z359.18	(2017) Safety Requirements for Anchorage Connectors for Active Fall Protection Systems

ASTM INTERNATIONAL (ASTM)

ASTM F855	(2019) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2016) Guide for Protective Grounding of Power Lines
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA Z535.2	(2011; R 2017) Environmental and Facility Safety Signs

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2022) Standard for Portable Fire Extinguishers
NFPA 51B	(2019; TIA 20-1) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA 20-1; TIA 20-2; TIA 20-3; TIA 20-4) National Electrical Code
NFPA 70E	(2021) Standard for Electrical Safety in the Workplace
NFPA 241	(2022) Standard for Safeguarding Construction, Alteration, and Demolition Operations

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-222	(2018H; Add 1 2019) Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures
TIA-1019	(2012; R 2016) Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety -- Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1919	Gear Certification

29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
29 CFR 1926.552	Material Hoists, Personal Hoists, and Elevators
29 CFR 1926.553	Base-Mounted Drum Hoists
29 CFR 1926.1400	Cranes and Derricks in Construction
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
CPL 02-01-056	(2014) Inspection Procedures for Accessing Communication Towers by Hoist
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

1.2 DEFINITIONS

1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person requirements, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSP Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented including experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the training material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

1.2.11 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even when provided by a physician or registered personnel.

1.2.12 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

1.2.14 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the definition requirements of EM 385-1-1 Appendix Q, and ASSP Z359.2 standard, having a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

1.2.16 Recordable Injuries or Illnesses

Recordable Injuries or Illnesses are any work-related injury or illness that results in:

a. Death, regardless of the time between the injury and death, or the length of the illness;

b. Days away from work (any time lost after day of injury/illness onset);

c. Restricted work;

d. Transfer to another job;

e. Medical treatment beyond first aid;

f. Loss of consciousness; or

g. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (a) through (f) above

1.2.17 Government Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

1.2.18 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over). Document an LHE mishap or accident using the NAVFAC prescribed Navy Crane Center (NCC) accident form.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

APP - Construction; G

Dive Operations Plan; G

Accident Prevention Plan (APP); G

SD-06 Test Reports

Monthly Exposure Reports

Notifications and Reports

Accident Reports; G

LHE Inspection Reports

SD-07 Certificates

Contractor Safety Self-Evaluation Checklist

Crane Operators/Riggers

Standard Lift Plan; G

Critical Lift Plan ; G

Naval Architecture Analysis; G

Activity Hazard Analysis (AHA)

Confined Space Entry Permit

Hot Work Permit

Certificate of Compliance

Third Party Certification of Floating Cranes and Barge-Mounted Mobile Cranes

License Certificates

Radiography Operation Planning Work Sheet; G

Portable Gauge Operations Planning Worksheet; G

1.4 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher.

1.5 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction meeting. Complete the checklist monthly and submit with each request for payment voucher. An acceptable score of 90 or greater is required. Failure to submit the completed safety self-evaluation checklist or achieve a score of at least 90 may result in retention of up to 10 percent of the voucher. The Contractor Safety Self-Evaluation checklist can be found on the Whole Building Design Guide website at www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-35-26

1.6 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this Contract, comply with the most recent edition of USACE EM 385-1-1, and the following federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

1.6.1 Subcontractor Safety Requirements

For this Contract, neither Contractor nor any subcontractor may enter into Contract with any subcontractor that fails to meet the following requirements. The term subcontractor in this and the following paragraphs means any entity holding a Contract with the Contractor or with a subcontractor at any tier.

1.6.1.1 Experience Modification Rate (EMR)

Subcontractors on this Contract must have an effective EMR less than or equal to 1.10, as computed by the National Council on Compensation Insurance (NCCI) or if not available, as computed by the state agency's rating bureau in the state where the subcontractor is registered, when entering into a subcontract agreement with the Prime Contractor or a subcontractor at any tier. The Prime Contractor may submit a written request for additional consideration to the Contracting Officer where the specified acceptable EMR range cannot be achieved. Relaxation of the EMR range will only be considered for approval on a case-by-case basis for special conditions and must not be anticipated as tacit approval. Contractor's Site Safety and Health Officer (SSHO) must collect and maintain the certified EMR ratings for all subcontractors on the project and make them available to the Government at the Government's request.

1.6.1.2 OSHA Days Away from Work, Restricted Duty, or Job Transfer (DART) Rate

Subcontractors on this Contract must have a DART rate, calculated from the most recent, complete calendar year, less than or equal to 3.4 when entering into a subcontract agreement with the Prime Contractor or a subcontractor at any tier. The OSHA Dart Rate is calculated using the following formula:

$$(N/EH) \times 200{,}000$$

where:

N = number of injuries and illnesses with days away, restricted work, or job transfer

EH = total hours worked by all employees during most recent, complete calendar year

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year)

The Prime Contractor may submit a written request for additional consideration to the Contracting Officer where the specified acceptable OSHA Dart rate range cannot be achieved for a particular subcontractor. Relaxation of the OSHA DART rate range will only be considered for approval on a case-by-case basis for special conditions and must not be anticipated as tacit approval. Contractor's Site Safety and Health Officer (SSHO) must collect and maintain self-certified OSHA DART rates for all subcontractors on the project and make them available to the Government at the Government's request.

1.7 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.7.1 Personnel Qualifications

1.7.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and Government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

1.7.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the Contracting Officer for information in consultation with the Safety Office.

1.7.1.2.1 Competent Person for Confined Space Entry

Provide a Confined Space (CP) Competent Person who meets the requirements of EM 385-1-1, Appendix Q, and herein. The CP for Confined Space Entry must supervise the entry into each confined space in accordance with EM 385-1-1, Section 34.

When the work involves marine operations that handle combustible or hazardous materials, this qualified person shall be a NFPA certified marine chemist.

1.7.1.2.2 Competent Person for the Health Hazard Control and Respiratory Protection Program

Provide a competent person meeting the requirements of EM 385-1-1 who is:

a. Capable by education, specialized training and/or experience of

anticipating, recognizing, and evaluating employee exposure to hazardous chemical, physical and biological agents in accordance with USACE EM 385-1-1, Section 6.

b. Capable of specifying necessary controls and protective actions to ensure worker health.

1.7.1.2.3 Competent Person for Scaffolding

Provide a Competent Person for Scaffolding who meets the requirements of EM 385-1-1, Section 22.B.02 and herein.

1.7.1.2.4 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04, 21.B.03, and herein.

1.7.1.3 Qualified Trainer Requirements

Individuals qualified to instruct the 40 hour contract safety awareness course, or portions thereof, must meet the definition of a Competent Person Trainer, and, at a minimum, possess a working knowledge of the following subject areas: EM 385-1-1, Electrical Standards, Lockout/Tagout, Fall Protection, Confined Space Entry for Construction; Excavation, Trenching and Soil Mechanics, and Scaffolds in accordance with 29 CFR 1926.450, Subpart L.

Instructors are required to:

a. Prepare class presentations that cover construction-related safety requirements.

b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.

c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

d. Provide a written exam of at least 50 questions. Students are required to answer 80 percent correctly to pass.

e. Request, review and incorporate student feedback into a continuous course improvement program.

1.7.1.4 Dredging Contract Requirements

1.7.1.4.1 Dredging Safety Personnel Requirements

a. Provide a minimum of one SSHO assigned per project site for the primary working shift.

b. For a project involving multiple work shifts, provide one collateral duty SSHO for each additional shift.

c. For individual dredging projects or sites with a dredge crew and fill

crew on watch of eight employees or less, a CDSO must be appointed, instead of an SSHO. The CDSO assumes the same responsibilities as a full-time SSHO.

d. An example of one dredging project site is reflected in each of the following:

(1) a mechanical dredge, tug(s) and scow(s), scow route, and material placement site; or

(2) a hydraulic pipeline dredge, attendant plant, and material placement site; or,

(3) a hopper dredge (include land-based material placement site - if applicable.)

e. For Hopper Dredges with the U.S. Coast Guard, documented crews may designate an officer as a Collateral Duty Safety Officer (CDSO) instead of having a full-time SSHO onboard if the officer meets the SSHO training and experience requirements.

1.7.1.4.2 SSHO Requirements for Dredging

a. In addition to requirements stated elsewhere in this specification, an individual serving as a SSHO must be present at the project site, located so that they have full mobility and reasonable access to all major work operations, for at least one shift in each 24 hour period when work is being performed. The SSHO must be available during their shift for immediate verbal consultation and notification, either by phone or radio.

b. The SSHO is a full-time, dedicated position, except as noted above, who must report to a senior project (or corporate) official. When the SSHO is permitted to be a collateral duty, the SSHO is not permitted to be in another position requiring continuous mechanical or equipment operations, such as equipment operators.

c. The SSHO must inspect all work areas and operations during initial set-up and at least monthly observe and provide personal oversight on each shift during dredging operations for projects with many work sites, more often for those with less work sites.

1.7.1.4.3 Collateral Duty Safety Officer (CDSO) Requirements for Dredging

a. A CDSO is an individual who is assigned collateral duty safety responsibilities in addition to their full-time occupation, and who supports and supplements the SSHO efforts in managing, implementing and enforcing the Contractor's Safety and Health Program. The assigned CDSO must be an individual(s) with work oversight responsibilities, such as master, mate, fill foreman, or superintendent. A CDSO must not be an employee responsible for continuous mechanical or equipment operations, such as an equipment operator.

b. A CDSO performs safety program tasks as assigned by the SSHO and must report safety findings to the SSHO. The SSHO must document results of safety findings and provide information for inclusion in the CQC reports to the Contracting Officer.

1.7.1.4.4 Safety Personnel Training Requirements for Dredging

A SSHO and a CDSO for dredging Contracts must take either a formal classroom or online OSHA 30-hour Construction Safety Course, or an equivalent 30 hours of formal classroom or online safety and health training covering the subjects of the OSHA 30-hour Course in accordance with EM 385-1-1 Appendix A, paragraph 3.d.(3), applicable to dredging work, and given by qualified instructors. In exception to EM 385-1-1, Section 01.A.17, comply with the following:

a. The SSHO must maintain competency through having taken 8 hours of formal classroom or online safety and health related coursework every year. Hours spent as an instructor in such courses will be considered the same as attending them, but each course only gets credit once (for example, instructing a 1-hour asbestos awareness course five times in a year provides one hour credit for training).

b. The SSHO and a CDSO must have a minimum of three years of experience within the past five years in one of the following:

(1) Supervising/managing dredging activities

(2) Supervising/managing marine construction activities

(3) Supervising/managing land-based construction activities

(4) Work managing safety programs or processes

(5) Conducting hazard analyses and developing controls in activities or environments with similar hazards

1.7.1.5 Crane Operators/Riggers

Provide Operators, Signal Persons, and Riggers meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators and Signal Persons. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators qualified by a source that qualifies crane operators (i.e., union, a Government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification.

1.7.2 Personnel Duties

1.7.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.

b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.

c. Use and maintain OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors, and make available to the Contracting Officer upon

request. Post and maintain the Form 300A on the site Safety Bulletin Board.

d. Maintain applicable safety reference material on the job site.

e. Attend the pre-construction meeting, pre-work meetings including preparatory meetings, and periodic in-progress meetings.

f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.

g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.

h. Ensure subcontractor compliance with safety and health requirements.

i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).

j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.

k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above or any other required duties are not being effectively carried out. If either the Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.7.3 Meetings

1.7.3.1 Preconstruction Meeting

a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction meeting. This includes the project superintendent, Site Safety and Occupational Health Officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the Contract. This list of proposed AHAs will be reviewed and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.

c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin until an APP is established that is acceptable to the Contracting

Officer.

1.7.3.2 Safety Meetings

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent Safety and Occupational Health (SOH) training and motivation. Conduct meetings at least once a month for all supervisors at the project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.8 ACCIDENT PREVENTION PLAN (APP)

1.8.1 APP - Construction

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the Contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction meeting for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the Contract. Disregarding the provisions of this Contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the Contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the

original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSP A10.34), and the environment.

1.8.2 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.

b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.

1.8.3 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

1.8.3.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this Contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by Contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

1.8.3.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of three months.

1.8.3.3 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. In addition, Critical Lift Plans are required for the following:

a. Lifts over 50 percent of the capacity of barge mounted mobile crane's hoist.

b. When working around energized power lines where the work will get closer than the minimum clearance distance in EM 385-1-1 Table 16-1.

c. For lifts with anticipated binding conditions.

d. When erecting cranes.

1.8.3.3.1 Critical Lift Plan Planning and Schedule

Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

1.8.3.3.2 Lifts of Personnel

In addition to the requirements of EM 385-1-1, Section 16.H.02, for lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

1.8.3.4 Barge Mounted Mobile Crane Lift Plan

Provide a Naval Architecture Analysis and include an LHE Manufacturer's Floating Service Load Chart in accordance with EM 385-1-1, Section 16.L.03.

1.8.3.5 Multi-Purpose Machines, Material Handling Equipment, and Construction Equipment Lift Plan

Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Written approval from a qualified registered professional engineer, after a safety analysis is performed, is allowed in lieu of the OEM's approval. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

1.8.3.6 Fall Protection and Prevention (FP&P) Plan

The plan must be in accordance with the requirements of EM 385-1-1, Section 21.D and ASSP Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum

every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

1.8.3.7 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSP Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

1.8.3.8 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSP Z244.1, and ASSP A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

1.8.3.9 Excavation Plan

Identify the safety and health aspects of excavation, and provide and prepare the plan in accordance with EM 385-1-1, Section 25.A.

1.8.3.10 Lead, Cadmium, and Chromium Compliance Plan

Identify the safety and health aspects of work involving lead, cadmium and chromium, and prepare in accordance with Section 02 83 00 LEAD REMEDIATION.

1.8.3.11 Asbestos Hazard Abatement Plan

Identify the safety and health aspects of asbestos work, and prepare in accordance with Section 02 82 00 ASBESTOS REMEDIATION.

1.8.3.12 Site Safety and Health Plan

Identify the safety and health aspects, and prepare in accordance with Section 01 35 29.13 HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES.

1.8.3.13 Polychlorinated Biphenyls (PCB) Plan

Identify the safety and health aspects of Polychlorinated Biphenyls work, and prepare in accordance with Sections 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs) and 02 61 23 REMOVAL AND DISPOSAL OF PCB CONTAMINATED SOILS.

1.8.3.14 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION and referenced sources. Include engineering survey as applicable.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

1.9.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

1.9.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFOW must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

1.10 DISPLAY OF SAFETY INFORMATION

1.10.1 Safety Bulletin Board

Prior to commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.07. Additional items required to be posted include:

a. Confined space entry permit.

b. Hot work permit.

1.10.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project. The list must be posted on the project bulletin board and updated daily, and provide the following information:

a. Date deficiency identified;

b. Description of deficiency;

c. Name of person responsible for correcting deficiency;

d. Projected resolution date;

e. Date actually resolved.

1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

1.12 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment in accordance with EM 385-1-1. Government has no responsibility to provide emergency medical treatment.

1.13 NOTIFICATIONS and REPORTS

1.13.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, or any property damage. For LHE or rigging mishaps, notify the Contracting Officer as soon as practical but not more than four hours after mishap. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; Contractt title; type of Contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

1.13.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). Complete and submit an accident investigation report in ESAMS within 5 days for mishaps defined in EM 385-1-1 01.D.03 and 10 days for accidents defined by EM 385-1-1 01.D.05. Complete an investigation report within 30 days for those mishaps defined by EM 385-1-1 01.D.04. Mishaps defined by EM 385-1-1 01.D.04 and 01.D.05 must include a written report submitted as an attachment in ESAMS using the following outline: (1) Mishap summary description to include process, findings and outcomes; (2) Root Cause; (3) Direct Factors; (4) Indirect and Contributing Factors; (5) Corrective Actions; and (6) Recommendations. The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: For Navy Projects, complete the applicable documentation in NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). Near miss reports are considered positive and proactive Contractor safety management actions.

c. Conduct an accident investigation for any load handling equipment accident (including rigging accidents) to establish the root cause(s) of the accident. Complete the LHE Accident Report (Crane and Rigging Accident Report) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the Contracting Officer. The Contracting Officer will provide a blank copy of the accident report form.

1.13.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

1.13.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this Contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

1.13.5 Third Party Certification of Floating Cranes and Barge-Mounted Mobile Cranes

Floating cranes and barge-mounted mobile cranes used to perform work under the terms of this Contract must be certified in accordance with 29 CFR 1919 by an OSHA accredited person prior to submitting the required Lift Plan. Include proof of certification with the initial Lift Plan submission.

1.14 HOT WORK

1.14.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

1.14.2 Work Around Flammable Materials

Obtain permit approval from a NFPA Certified Marine Chemist, or Certified Industrial Hygienist for "HOT WORK" within or around flammable materials (such as fuel systems or welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, or vaults) that have the potential for flammable or explosive atmospheres.

Whenever these materials, except beryllium and chromium (VI), are encountered in indoor operations, local mechanical exhaust ventilation systems that are sufficient to reduce and maintain personal exposures to within acceptable limits must be used and maintained in accordance with manufacturer's instruction and supplemented by exceptions noted in EM 385-1-1, Section 06.H

1.15 RADIATION SAFETY REQUIREMENTS

Submit License Certificates, employee training records, and Leak Test Reports for radiation materials and equipment to the Contracting Officer and Radiation Safety Office (RSO), and Contracting Oversight Technician (COT) for all specialized and licensed material and equipment proposed for use on the construction project (excludes portable machine sources of ionizing radiation including moisture density and X-Ray Fluorescence (XRF)). Maintain on-site records whenever licensed radiological materials or ionizing equipment are on Government property.

Protect workers from radiation exposure in accordance with 10 CFR 20, ensuring any personnel exposures are maintained As Low As Reasonably Achievable.

1.15.1 Radiography Operation Planning Work Sheet

Submit a Gamma and X-Ray Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. For portable machine sources of ionizing radiation, including moisture density and XRF,

use and submit the Portable Gauge Operations Planning Worksheet instead. The Contracting Officer and COT will review the submitted worksheet and provide questions and comments.

Contractors must use primary dosimeters process by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

1.15.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer and COT for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. For gamma radiography materials and equipment, a Government escort is required for any travels on the Installation. The Navy COT or Government authorized representative will meet the Contractor at a designated location outside the Installation, ensure safety of the materials being transported, and will escort the Contractor for gamma sources onto the Installation, to the job site, and off the Installation. For portable machine sources of ionizing radiation, including moisture density and XRF, the Navy COT or Government authorized representative will meet the Contractor at the job site.

Provide a copy of all calibration records, and utilization records to the COT for radiological operations performed on the site.

1.15.3 Loss or Release and Unplanned Personnel Exposure

Loss or release of radioactive materials, and unplanned personnel exposures must be reported immediately to the Contracting Officer, RSO, and Base Security Department Emergency Number.

1.15.4 Site Demarcation and Barricade

Properly demark and barricade an area surrounding radiological operations to preclude personnel entrance, in accordance with EM 385-1-1, Nuclear Regulatory Commission, and Applicable State regulations and license requirements, and in accordance with requirements established in the accepted Radiography Operation Planning Work Sheet.

Do not close or obstruct streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

1.15.5 Security of Material and Equipment

Properly secure the radiological material and ionizing radiation equipment at all times, including keeping the devices in a properly marked and locked container, and secondarily locking the container to a secure point in the Contractor's vehicle or other approved storage location during transportation and while not in use. While in use, maintain a continuous visual observation on the radiological material and ionizing radiation equipment. In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, make no assumptions as to building occupancy. Where necessary, the Contracting Officer will direct the Contractor to conduct an actual building entry, search, and alert. Where removal of personnel from such a building cannot be accomplished and it is otherwise safe to proceed with the radiography, position a fully instructed employee inside the building or area to prevent exiting while external radiographic operations are in process.

1.15.6 Transportation of Material

Comply with 49 CFR 173 for Transportation of Regulated Amounts of Radioactive Material. Notify Local Fire authorities and the site Radiation Safety Officer (RSO) of any Radioactive Material use.

1.15.7 Schedule for Exposure or Unshielding

Actual exposure of the radiographic film or unshielding the source must not be initiated until after 5 p.m. on weekdays.

1.15.8 Transmitter Requirements

Adhere to the base policy concerning the use of transmitters, such as radios and cell phones. Obey Emissions control (EMCON) restrictions.

1.16 CONFINED SPACE ENTRY REQUIREMENTS

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA 29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

1.16.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

1.16.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

1.16.3 Sewer Wet Wells

Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

1.16.4 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

1.17 DIVE SAFETY REQUIREMENTS

Develop a Dive Operations Plan, AHA, emergency management plan, and personnel list that includes qualifications, for each separate diving operation. Submit these documents to the District Dive Coordinator (DDC) via the Contracting Officer or Government Designated Authority (GDA), for review and approval at least 15 working days prior to commencement of

diving operations. These documents must be at the diving location at all times. Provide each of these documents as a part of the project file.

1.18 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must comply with the applicable Storm Plan and:

a. Secure outside equipment and materials and place materials that could be damaged in protected areas.

b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.

c. Ensure that temporary erosion controls are adequate.

PART 2 PRODUCTS

2.1 CONFINED SPACE SIGNAGE

Provide permanent signs integral to or securely attached to access covers for new permit-required confined spaces. Signs for confined spaces must comply with NEMA Z535.2. Provide signs with wording: "DANGER--PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" in bold letters a minimum of one inch in height and constructed to be clearly legible with all paint removed. The signal word "DANGER" must be red and readable from 5 feet.

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

a. Hard Hat

b. Long Pants

c. Appropriate Safety Shoes

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the

area/environment. Develop an employee check-in/check-out communication procedure to ensure employee safety.

3.1.2 Hazardous Material Use

Each hazardous material must receive approval from the Contracting Office or their designated representative prior to being brought onto the job site or prior to any other use in connection with this Contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material.

3.1.3 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this Contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

3.1.4 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4 Changes and FAR 52.236-2 Differing Site Conditions.

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 30 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1, Section 11.A.02 (Isolation). Some examples of energy isolation devices and procedures are highlighted in EM 385-1-1, Section 12.D. In accordance with EM 385-1-1, Section 12.A.01, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of HECP and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1, Section 11.A.02 and NFPA 70E, work on energized electrical circuits must not be performed without prior Government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are

considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

3.3 OUTAGE COORDINATION MEETING

After the utility outage request is approved and prior to beginning work on the utility system requiring shut-down, conduct a pre-outage coordination meeting in accordance with EM 385-1-1, Section 12.A. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, and the Public Utilities representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1, Section 12.C. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, ASSP A10.44, NFPA 70E, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

For electrical distribution equipment that is to be operated by Government or Utility personnel, the Prime Contractor and the subcontractor performing the work must attend the safety preparatory inspection coordination meeting, which will also be attended by the Contracting Officer's Representative, and required by EM 385-1-1, Section 12.A.02. The meeting will occur immediately preceding the start of work and following the completion of the outage coordination meeting. Both the safety preparatory inspection coordination meeting and the outage coordination meeting must occur prior to conducting the outage and commencing with lockout/tagout procedures.

3.4.2 Lockout/Tagout Isolation

Where the Government or Utility performs equipment isolation and lockout/tagout, the Contractor must place their own locks and tags on each energy-isolating device and proceed in accordance with the HECP. Before any work begins, both the Contractor and the Government or Utility must perform energy isolation verification testing while wearing required PPE detailed in the Contractor's AHA and required by EM 385-1-1, Sections 05.I and 11.B. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1, Section 12.E.06.

3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECP. In accordance with EM 385-1-1, Section 12.E.08, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if provided by Contracting Officer's Representative), confirming that steps of

de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

3.5 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSP Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

3.5.1 Training

Institute a fall protection training program. As part of the Fall Protection Program, provide training for each employee who might be exposed to fall hazards and using personal fall protection equipment. Provide training by a competent person for fall protection in accordance with EM 385-1-1, Section 21.C. Document training and practical application of the competent person in accordance with EM 385-1-1, Section 21.C.04 and ASSP Z359.2 in the AHA.

3.5.2 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M,ASSP Z359.0, ASSP Z359.1, ASSP Z359.2, ASSP Z359.3, ASSP Z359.4, ASSP Z359.6, ASSP Z359.7, ASSP Z359.11, ASSP Z359.12, ASSP Z359.13, ASSP Z359.14, ASSP Z359.15, ASSP Z359.16 and ASSP Z359.18.

3.5.2.1 Additional Personal Fall Protection Measures

In addition to the required fall protection systems, other protective measures such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.O through 21.O.06. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

3.5.2.2 Personal Fall Protection Equipment

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap

hooks and carabineers must be self-closing and self-locking, capable of being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. Equip all full body harnesses with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

3.5.3 Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 6 feet from unprotected edge of a roof having a slope less than or equal to 4:12 (vertical to horizontal), protect personnel from falling by the use of conventional fall protection systems (personal fall arrest/restraint systems, guardrails, or safety nets) in accordance with EM 385-1-1, Section 21 and 29 CFR 1926.500. A safety monitoring system is not adequate fall protection and is not authorized.

(2) For work greater than 6 feet from the unprotected roof edge, addition to the use of conventional fall protection systems the use of a warning line system is also permitted, in accordance with 29 CFR 1926.500 and EM 385-1-1, Section 21.L.

b. Steep-Sloped Roofs: Work on a roof having a slope greater than 4:12 (vertical to horizontal) requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also applies to residential or housing type construction.

3.5.4 Horizontal Lifelines (HLL)

Provide HLL in accordance with EM 385-1-1, Section 21.I.08.d.2. Commercially manufactured horizontal lifelines (HLL) must be designed, installed, certified and used, under the supervision of a qualified person, for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500). The competent person for fall protection may (if deemed appropriate by the qualified person) supervise the assembly, disassembly, use and inspection of the HLL system under the direction of the qualified person. Locally manufactured HLLs are not acceptable unless they are custom designed for limited or site specific applications by a Registered Professional Engineer who is qualified in designing HLL systems.

3.5.5 Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with EM 385-1-1, Section 21.F.01 and 29 CFR 1926 Subpart M.

3.5.6 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must be in accordance with the requirements of EM 385-1-1, ASSP Z359.2, and ASSP Z359.4.

3.6 WORK PLATFORMS

3.6.1 Scaffolding

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Comply with the following requirements:

a. Scaffold platforms greater than 20 feet in height must be accessed by use of a scaffold stair system.

b. Ladders commonly provided by scaffold system manufacturers are prohibited for accessing scaffold platforms greater than 20 feet maximum in height.

c. An adequate gate is required.

d. Employees performing scaffold erection and dismantling must be qualified.

e. Scaffold must be capable of supporting at least four times the maximum intended load, and provide appropriate fall protection as delineated in the accepted fall protection and prevention plan.

f. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.

g. Special care must be given to ensure scaffold systems are not overloaded.

h. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited. The first tie-in must be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

i. Scaffolding other than suspended types must bear on base plates upon wood mudsills (2 in x 10 in x 8 in minimum) or other adequate firm foundation.

j. Scaffold or work platform erectors must have fall protection during the erection and dismantling of scaffolding or work platforms that are more than 6 feet.

k. Delineate fall protection requirements when working above 6 feet or above dangerous operations in the Fall Protection and Prevention (FP&P)

Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.6.2 Elevated Aerial Work Platforms (AWPs)

Workers must be anchored to the basket or bucket in accordance with manufacturer's specifications and instructions (anchoring to the boom may only be used when allowed by the manufacturer and permitted by the CP). Lanyards used must be sufficiently short to prohibit worker from climbing out of basket. The climbing of rails is prohibited. Lanyards with built-in shock absorbers are acceptable. Self-retracting devices are not acceptable. Tying off to an adjacent pole or structure is not permitted unless a safe device for 100 percent tie-off is used for the transfer.

Use of AWPs must be operated, inspected, and maintained as specified in the operating manual for the equipment and delineated in the AHA. Operators of AWPs must be designated as qualified operators by the Prime Contractor. Maintain proof of qualifications on site for review and include in the AHA.

3.7 EQUIPMENT

3.7.1 Material Handling Equipment (MHE)

a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.

c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

3.7.2 Load Handling Equipment (LHE)

The following requirements apply. In exception, these requirements do not apply to commercial truck mounted and articulating boom cranes used solely to deliver material and supplies (not prefabricated components, structural steel, or components of a systems-engineered metal building) where the lift consists of moving materials and supplies from a truck or trailer to the ground; to cranes installed on mechanics trucks that are used solely in the repair of shore-based equipment; to crane that enter the activity but are not used for lifting; nor to other machines not used to lift loads suspended by rigging equipment. However, LHE accidents occurring during such operations must be reported.

a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Prior to cranes entering federal activities, a Crane Access Permit must be obtained from the Contracting Officer. A copy of the permitting process will be provided at the Preconstruction Meeting. Contractor's operator must remain with the crane during the spot check. Rigging

gear must be in accordance with OSHA, ASME B30.9 Standards safety standards.

c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.

e. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.

f. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.

g. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

h. All employees must keep clear of loads about to be lifted and of suspended loads, except for employees required to handle the load.

i. Use cribbing when performing lifts on outriggers.

j. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

k. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.

l. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.

m. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.

n. Certify that all LHE operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

o. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all

crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

p. On mobile cranes, lifts where the load weight is greater than 90 percent of the equipment's capacity are prohibited.

q. Follow FAA guidelines when required based on project location.

3.7.3 Machinery and Mechanized Equipment

a. Proof of qualifications for operator must be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.7.4 Base Mounted Drum Hoists

a. Operation of base mounted drum hoists must be in accordance with EM 385-1-1 and ASSP A10.22.

b. Rigging gear must be in accordance with applicable ASME/OSHA standards.

c. When used on telecommunication towers, base mounted drum hoists must be in accordance with TIA-1019, TIA-222, ASME B30.7, 29 CFR 1926.552, and 29 CFR 1926.553.

d. When used to hoist personnel, the AHA must include a written standard operating procedure. Operators must have a physical examination in accordance with EM 385-1-1 Section 16.B.05 and trained, at a minimum, in accordance with EM 385-1-1 Section 16.U and 16.T. The base mounted drum hoist must also comply with OSHA Instruction CPL 02-01-056 and ASME B30.23.

e. Material and personnel must not be hoisted simultaneously.

f. Personnel cage must be marked with the capacity (in number of persons) and load limit in pounds.

g. Construction equipment must not be used for hoisting material or personnel or with trolley/tag lines. Construction equipment may be used for towing and assisting with anchoring guy lines.

3.7.5 Use of Explosives

Explosives must not be used or brought to the project site without prior written approval from the Contracting Officer. Such approval does not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations.

Storage of explosives, when permitted on Government property, must be only where directed and in approved storage facilities. These facilities must be kept locked at all times except for inspection, delivery, and withdrawal

of explosives.

3.8 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

3.8.1 Utility Locations

Provide a third party, independent, private utility locating company to positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

3.8.2 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within 3 feet of the underground system.

3.8.3 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever Contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

3.9 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Sections 11 and 12.

3.9.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

3.9.2 Qualifications

Electrical work must be performed by QP with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA. Journeyman/Apprentice ratio must be in accordance with State, Local requirements applicable to where work is being performed.

3.9.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

3.9.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

3.9.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

-- End of Section --

SECTION 01 35 29.13

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES

11/15, CHG 1: 08/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

API RP 2219	(2016) Safe Operation of Vacuum Trucks Handling Flammable and Combustible Liquids in Petroleum Service

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z358.1	(2014) American National Standard for Emergency Eyewash and Shower Equipment

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH 85-115	(1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety -- Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1904	Recording and Reporting Occupational Injuries and Illnesses
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

1.2 PRECONSTRUCTION SAFETY CONFERENCE

Conduct a preconstruction safety conference prior to the start of site activities and after submission of the Accident Prevention Plan/Site Safety And Health Plan (APP/SSHP). The objective of the meeting is to discuss health and safety concerns related to the impending work, discuss project health and safety organization and expectations, review and answer comments and concerns regarding the APP/SSHP or other health and safety concerns . Ensure that those individuals responsible for health and safety at the project level are available and attend this meeting.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Work Zones; G

Decontamination Facilities; G

SD-03 Product Data

Amendments to the APP/SSHP; G

Exposure Monitoring/Air Sampling Program

Site Control Log

SSHO's Daily Inspection Logs

SD-07 Certificates

Certificate Of Worker/Visitor Acknowledgement

SD-11 Closeout Submittals

Safety And Health Phase-Out Report; G

1.4 ACCIDENT PREVENTION PLAN/SITE SAFETY AND HEALTH PLAN (APP/SSHP)

Develop and implement a Site Safety and Health Plan in accordance with Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS, and attach to the Accident Prevention Plan (APP) as an appendix (APP/SSHP). Address all occupational safety and health hazards (traditional construction as well as contaminant-related hazards) associated with cleanup operations within the APP/SSHP. Cover each SSHP element in sections 28.A.01 and 33.B of EM 385-1-1 and each APP element in Appendix A of EM 385-1-1. There are overlapping elements in Section 28.A.01 and Appendix A of EM 385-1-1. SSHP appendix elements that overlap with APP elements need not be duplicated in the APP/SSHP provided each safety and occupational health (SOH) issue receives adequate attention and is documented in the APP/SSHP. The APP/SSHP is a dynamic document, subject to change as project operations/execution change. Modify the APP/SSHP to address changing and previously unidentified health and safety conditions. Ensure that the APP/SSHP is updated accordingly. Submit amendments to the APP/SSHP to the Contracting Officer as the APP/SSHP is updated. For long duration projects

resubmit the APP/SSHP to the Contracting Officer annually for review. The APP/SSHP must contain all updates.

1.4.1 Acceptance and Modifications

Prior to submittal, the APP/SSHP must be signed and dated by the Safety and Health Manager and the Site Superintendent. Submit for review 14 days prior to the Preconstruction Safety Conference. Deficiencies in the APP/SSHP will be discussed at the preconstruction safety conference, and must be revised to correct the deficiencies and resubmitted for acceptance. Onsite work must not begin until the plan has been accepted. Maintain a copy of the written APP/SSHP onsite. Changes and modifications to the APP/SSHP must be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Bring to the attention of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer any unforeseen hazard that becomes evident during the performance of the work, through the Site Safety and Health Officer (SSHO) for resolution as soon as possible. In the interim, take necessary action to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted APP/SSHP is cause for stopping work until the matter has been rectified.

1.4.2 Availability

Make available the APP/SSHP in accordance with 29 CFR 1910.120, (b)(1)(v) and 29 CFR 1926.65, (b)(1)(v).

1.5 STAFF ORGANIZATION, QUALIFICATION AND RESPONSIBILITIES

Provide hazardous waste operations and emergency response organization in accordance with EM 385-1-1, Section 33.

1.5.1 Safety and Health Manager

Safety and Health Manager must be an Industrial Hygienist certified by the American Board of Industrial Hygiene.

Apply the following in conjunction with the required qualifications and responsibilities stated in EM 385-1-1, Section 33.C.01.

1.5.1.1 Additional Qualifications

The Safety and Health Manager must have the following qualifications:

a. A minimum of 3 years experience in developing and implementing safety and occupational health programs .

b. Documented experience in supervising professional and technician level personnel.

c. Documented experience in developing worker exposure assessment programs and air monitoring programs and techniques.

d. Documented experience in managing personal protective equipment (PPE) programs and conducting PPE hazard evaluations for the types of activities and hazards likely to be encountered on the project.

e. Working knowledge of state and Federal occupational safety and health regulations.

1.5.1.2 Responsibilities and Duties

a. Development, implementation, oversight, and enforcement of the APP/SSHP.

b. Provide onsite consultation as needed to ensure the APP/SSHP is fully implemented.

c. Conduct initial site-specific training.

d. Be present onsite during the before start of remedial activities and at the startup of each new major phase of work.

e. Visit the site as needed and at least once per week for the duration of activities, to audit the effectiveness of the APP/SSHP.

f. Be available for emergencies.

g. Coordinate any modifications to the APP/SSHP with the Site Superintendent, the SSHO, and the Contracting Officer.

h. Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE.

i. Provide continued support for upgrading/downgrading of the level of personal protection.

j. Serve as a member of the quality control staff.

k. Review accident reports and results of daily inspections.

l. Sign and date the APP/SSHP prior to submittal.

1.5.2 Site Safety and Health Officer

Designate an individual and one alternate as the Site Safety and Health Officer (SSHO). Include the name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer and alternate in the APP/SSHP.

The Apply the following in conjunction with the required qualifications and responsibilities stated in EM 385-1-1, Section 33.C.02.

1.5.2.1 Qualifications

The following requirements are in addition to those in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

a. A minimum of 1 year experience in implementing SOH programs where personal protective equipment was required.

b. Meet 29 CFR 1910.120/29 CFR 1926.65 requirements for 40-hour initial and 8-hour supervisor training and, maintain 8-hour refresher training requirements.

c. Specific training in personal and respiratory protective equipment,

confined space entry and in the proper use of air monitoring instruments and air sampling methods including monitoring for ionizing radiation.

d. Documented experience in construction techniques and construction safety procedures.

e. Working knowledge of Federal and state occupational SOH regulations.

1.5.2.2 Responsibilities and Duties

The following requirements are in addition to those in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.

a. Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted APP/SSHP.

b. Be assigned to the site on a full time basis for the duration of field activities. The SSHO can have collateral duties in addition to SOH related duties. If operations are performed during more than 1 work shift per day, a site Safety and Health Officer must be present for each shift and when applicable, act as the radiation safety officer (RSO) as defined in paragraph 06.F.02 of EM 385-1-1 on radioactive waste cleanup projects.

c. Have authority to stop work if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.

d. Have authority to ensure site compliance with specified SOH requirements, Federal, state and OSHA regulations and all aspects of the APP/SSHP including, but not limited to, activity hazard analyses, air monitoring, monitoring for ionizing radiation, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment program, and preparation of records by performing a daily SOH inspection and documenting results on the Daily Safety Inspection Log in accordance with 29 CFR 1904.

e. In coordination with site management and the Safety and Health Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.

f. Consult with and coordinate any modifications to the APP/SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.

g. Conduct daily safety inspection and document SOH findings into the Daily Safety Inspection Log. Track noted SOH deficiencies to ensure that they are corrected.

h. Conduct accident investigations and prepare accident reports.

i. Serve as a member of the quality control staff on matters relating to SOH.

1.5.3 Additional Certified Health and Safety Support Personnel

Retain industrial hygiene support from an industrial hygienist certified by the American Board of Industrial Hygiene to develop occupational health practices for the APP/SSHP and, if necessary, visit the site to help implement APP/SSHP requirements.

1.5.4 Occupational Physician

Utilize the services of a licensed physician, who is certified in occupational medicine by the American Board of Preventative Medicine, or who, by necessary training and experience is Board eligible. The physician must be familiar with the site's hazards and the scope of this project. Include the medical consultant's name, qualifications, and knowledge of the site's conditions and proposed activities in the APP/SSHP. The physician is responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120, (f) and 29 CFR 1926.65, (f) and paragraph MEDICAL SURVEILLANCE PROGRAM.

1.5.5 Persons Certified in First Aid and CPR

At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency must be onsite at all times during site operations. They must be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030. These persons may perform other duties but must be immediately available to render first aid when needed.

1.5.6 Safety and Health Technicians

For each work crew in the exclusion zone, one person, designated as a Safety and Health technician, must perform activities such as air monitoring, decontamination, and safety oversight on behalf of the SSHO. They must have appropriate training equivalent to the SSHO in each specific area for which they have responsibility and report to and be under the supervision of the SSHO.

1.6 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Develop and implement an Emergency Response Plan, that meets the requirements of EM 385-1-1 Section 33.G, 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l), as a section of the APP/SSHP. In the event of any emergency associated with remedial action, without delay, alert all onsite employees and as necessary offsite emergency responders that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Train employees that are required to respond to hazardous emergency situations to their level of responsibility according to 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) requirements. Rehearse the plan regularly as part of the overall training program for site operations. Review the plan periodically and revised as necessary to reflect new or changing site conditions or information. Provide copies of the Emergency Response Portion of the accepted APP/SSHP to the affected local emergency response agencies. Address, as a minimum, the following elements in the plan:

a. Pre-emergency planning. Coordinate with local emergency response

providers during preparation of the Emergency Response Plan. At a minimum, coordinate with local fire, rescue, hazardous materials response teams, police and emergency medical providers to assure all organizations are capable and willing to respond to and provide services for on-site emergencies. Ensure the Emergency Response Plan for the site is compatible and integrated with the local fire, rescue, medical and police security services available from local emergency response planning agencies.

b. Personnel roles, lines of authority, communications for emergencies.

c. Emergency recognition and prevention.

d. Site topography, layout, and prevailing weather conditions.

e. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

f. Route maps to nearest prenotified medical facility. Site-support vehicles must be equipped with maps. At the beginning of project operations, drivers of the support vehicles must become familiar with the emergency route and the travel time required.

g. Specific procedures for decontamination and medical treatment of injured personnel.

h. Emergency alerting and response procedures including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, Federal, state, and local environmental agencies; as well as Safety and Health Manager, the Site Superintendent, the Contracting Officer and their alternates).

i. Criteria for initiating community alert program, contacts, and responsibilities.

j. Procedures for reporting incidents to appropriate government agencies. In the event that an incident such as an explosion or fire, or a spill or release of toxic materials occurs during the course of the project, the appropriate government agencies must be immediately notified. In addition, verbally notify the Contracting Officer and the local district safety office immediately and submit a written notification within 24 hours. Include within the report the following items:

(1) Name, organization, telephone number, and location of the Contractor.

(2) Name and title of the person(s) reporting.

(3) Date and time of the incident.

(4) Location of the incident, i.e., site location, facility name.

(5) Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.

(6) Cause of the incident, if known.

(7) Casualties (fatalities, disabling injuries).

(8) Details of any existing chemical hazard or contamination.

(9) Estimated property damage, if applicable.

(10) Nature of damage, effect on contract schedule.

(11) Action taken to ensure safety and security.

(12) Other damage or injuries sustained, public or private.

k. Procedures for critique of emergency responses and follow-up.

1.7 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

A copy of a certificate of worker/visitor acknowledgement must be completed and submitted for each visitor allowed to enter contamination reduction or exclusion zones, and for each employee, following the Example Certificate Of Worker/Visitor Acknowledgement at the end of this section.

1.8 INSPECTIONS

Attach to and submit with the Daily Quality Control reports the SSHO's Daily Inspection Logs. Include with each entry the following: date, work area checked, employees present in work area, PPE and work equipment being used in each area, special SOH issues and notes, and signature of preparer.

1.9 SAFETY AND HEALTH PHASE-OUT REPORT

Submit a Safety and Health Phase-Out Report in conjunction with the project close out report, prior to final acceptance of the work. Include the following minimum information :

a. Summary of the overall performance of SOH (e.g., accidents or incidents including near misses, unusual events, lessons learned).

b. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and on site facilities.

c. Summary of exposure monitoring and air sampling accomplished during the project.

d. Signatures of Safety and Health Manager and SSHO.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

Comply with EM 385-1-1, 29 CFR 1926.65, 29 CFR 1910.120, OSHA requirements in 29 CFR 1910 and 29 CFR 1926 with work performed under this contract, and state specific OSHA requirements where applicable. Submit to the Contracting Officer for resolution matters of interpretation of standards before starting work. The most stringent requirements apply where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary.

2.2 PERSONAL PROTECTIVE EQUIPMENT

2.2.1 Site Specific PPE Program

Provide onsite personnel exposed to contaminants with appropriate personal protective equipment. Components of levels of protection (B, C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Use only respirators approved by NIOSH.

Keep protective equipment and clothing clean and well maintained. Include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, cartridge change out, and storage of PPE within the PPE section of the APP/SSHP.

2.2.2 Levels of Protection

The Safety and Health Manager must establish and evaluate as the work progresses the levels of protection for each work activity. Also establish action levels for upgrade or downgrade in levels of PPE. Describe in the SSHP the protocols and the communication network for changing the level of protection. Address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, and individual medical considerations within the PPE evaluation protocol.

2.2.3 PPE for Government Personnel

Three clean sets of personal protective equipment and personal dosimeters for work on radioactive waste cleanup sites and clothing (excluding air-purifying negative-pressure respirators and safety shoes, which will be provided by individual visitors), as required for entry into the Exclusion Zone and Contamination Reduction Zone, must be available for use by the Contracting Officer or official visitors. The items must be cleaned, maintained and stored and clearly marked: "FOR USE BY GOVERNMENT ONLY." Provide basic training in the use and limitations of the PPE provided.

2.3 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

Maintain, as a minimum, the following items onsite and available for immediate use:

a. First aid equipment and supplies approved by the consulting physician.

b. Emergency eyewashes and showers that comply with ANSI/ISEA Z358.1.

c. Provide fire extinguishers of sufficient size and type at site facilities and in all vehicles and at any other site locations where flammable or combustible materials present a fire risk.

PART 3 EXECUTION

3.1 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

3.1.1 Project/Site Conditions

Refer to the following reports and information for the site description and contamination characterization. They are located at the ROICC offices.

3.1.2 Ordnance and Explosives (OE)

Stop work and contact the Contracting Officer if ordnance and explosives (OE), explosive media or chemical agent contaminated media (CACM) are discovered during HTRW site cleanup activities.

3.2 TASK SPECIFIC HAZARDS, INITIAL PPE, HAZWOPER MEDICAL SURVEILLANCE AND TRAINING APPLICABILITY

Task specific occupational hazards, task specific HAZWOPER medical surveillance and training applicability and task specific initial PPE requirements for the project are listed on the Task Hazard and Control Sheets at the end of this section. Reevaluate occupational safety and health hazards as the work progresses and to adjust the PPE and onsite operations, if necessary, so that the work is performed safely and in compliance with occupational safety and health regulations.

3.3 TRAINING

In conjunction with EM 385-1-1, Section 33D, meet the training program requirements for workers performing cleanup operations and who will be exposed to contaminants.

3.3.1 General HTRW Operations Training

All Personnel performing duties with potential for exposure to onsite contaminants must meet and maintain the following 29 CFR 1910.120/ 29 CFR 1926.65 (e) training requirements:

a. 40 hours of off site HTRW instruction.

b. 3 days actual on-the-job field experience under the direct supervision of a trained, experienced supervisor.

c. 8 hours refresher training annually.

Onsite supervisors must have an additional 8 hours management and supervisor training specified in 29 CFR 1910.120/29 CFR 1926.65 (e) (4).

3.3.2 Pre-Entry Briefing

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, must attend a site-specific SOH training session. This session will be conducted by the Safety and Health Manager and the Site Safety and Health Officer to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Thoroughly discuss procedures and contents of the accepted APP/SSHP and Sections 01.B.02 and 28.D.03 of EM 385-1-1 . Each employee must sign a training log to acknowledge attendance and understanding of the training. Notify the Contracting Officer at least 5 days prior to the initial site-specific training session so government personnel involved in the project may attend.

3.3.3 Periodic Sessions

Conduct periodic onsite training by the SSHO at least weekly for personnel assigned to work at the site during the following week. Address SOH procedures, work practices, any changes in the APP/SSHP, activity hazard

analyses, work tasks, or schedule; results of previous week's air monitoring, review of safety discrepancies and accidents. Convene a meeting prior to implementation of the change should an operational change affecting onsite field work be made, to explain SOH procedures. Conduct a site-specific training sessions for new personnel, visitors, and suppliers by the SSHO using the training curriculum outlines developed by the Safety and Health Manager. Each employee must sign a training log to acknowledge attendance and understanding of the training.

3.3.4 Other Training

3.4 MEDICAL SURVEILLANCE PROGRAM

Meet all requirements of 29 CFR 1910.120/29 CFR 1926.65 medical surveillance program and EM 385-1-1, Section 33.G for workers performing cleanup operations and who will be exposed to contaminants. Ensure the Occupational Physician or the physician's designee performs the physical examinations and reviews examination results. Participation in the medical surveillance program is without cost to the employee, without loss of pay and at a reasonable time and place.

3.5 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Prepare and implement by the Safety and Health Manager an exposure monitoring/air sampling program to identify and quantify SOH hazards and airborne levels of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment for affected site personnel. Include action levels for upgrading/downgrading PPE in the program. Submit personnel exposure monitoring/sampling results.

3.6 HEAT STRESS MONITORING AND MANAGEMENT

Document in the APP/SSHP and implement the procedures and practices in section 06.J. in EM 385-1-1 to monitor and manage heat stress.

3.7 SPILL AND DISCHARGE CONTROL

Develop and implement written spill and discharge containment/control procedures. Address radioactive wastes, shock sensitive wastes, laboratory waste packs, material handling equipment, as well as drum and container handling, opening, sampling, shipping and transport. Describe prevention measures, such as building berms or dikes; spill control measures and material to be used (e.g. booms, vermiculite); location of the spill control material; personal protective equipment required to cleanup spills; disposal of contaminated material; and who is responsible to report the spill. Storage of contaminated material or hazardous materials must be appropriately bermed, diked and contained to prevent any spillage of material on uncontaminated soil. If the spill or discharge is reportable, or human health or the environment are threatened, notify the National Response Center, the state, and the Contracting Officer as soon as possible. Provide control as required by Section 01 57 19 TEMPORARY ENVIRONMENT CONTROLS. Reporting requirements must be in accordance with .

3.8 MATERIALS TRANSFER SAFETY

Remove liquids and residues from the tanks using explosion-proof or air-driven pumps. In accordance with EM 385-1-1, Section 9, electrically

bond the tank and ground pump motors and suction hoses to prevent electrostatic ignition hazards. Use of a hand pump will be permitted to remove the last of the liquid from the bottom of the tanks. If a vacuum truck is used for removal of liquids or residues, the area of operation for the vacuum truck must be vapor free. Locate the truck upwind from the tank and outside the path of probable vapor travel. Discharge the vacuum pump exhaust gases through a hose of adequate size and length downwind of the truck and tank area. Vacuum truck operating and safety practices must conform to API RP 2219. Collect tank residues in drums, tanks, or tank trucks labeled according to 49 CFR 171 and 49 CFR 172 and disposed of as specified. Disconnect and drain fittings and lines of their contents after the materials have been transferred and the tanks have been exposed. Do not spill contents into the environment during cutting or disconnecting of tank fittings. Transfer materials drained into DOT-approved drums for storage and transportation. Use only non-sparking or non-heat producing tools to disconnect and drain or to cut through tank fittings. Electrical equipment (e.g., pumps, portable hand tools) used for tank preparation must be explosion-proof. Following cutting or disconnecting of the fittings, plug openings leading to the tanks.

3.9 SITE CONTROL MEASURES

Coordinate site control measures with Section 01 57 19 TEMPORARY ENVIRONMENT CONTROLS.

3.9.1 Work Zones

Initial anticipated work zone boundaries (exclusion zone, contamination reduction zone, support zone, all access points and decontamination areas) are to be clearly delineated on the site drawings. Base delineation of work zone boundaries on the contamination characterization data and the hazard/risk analysis to be performed as described in EM 385-1-1 06.A.02. As work progresses and field conditions are monitored, work zone boundaries may be modified (and site drawings modified) with approval of the Contracting Officer. Clearly identify work zones and mark in the field (using fences, tape, or signs). Submit and post a site map, showing work zone boundaries and locations of decontamination facilities in the onsite office. Work zones must consist of the following:

3.9.1.1 Exclusion Zone (EZ)

The exclusion zone is the area where hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Control entry into this area and exit may only be made through the Contamination Reduction Zone (CRZ).

3.9.1.2 Contamination Reduction Zone (CRZ)

The CRZ is the transition area between the Exclusion Zone and the Support Zone. The personnel and equipment decontamination areas must be separate and unique areas located in the CRZ.

3.9.1.3 Support Zone (SZ)

The Support Zone is defined as areas of the site, other than exclusion zones and contamination reduction zones, where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from HTRW operations. Secure the Support Zone against active or passive contamination. Site offices, parking areas, and other support

facilities must be located in the Support Zone.

3.9.2 Site Control Log

A log of personnel visiting, entering, or working on the site must be maintained. Include the following: date, name, agency or company, time entering and exiting site, time entering and exiting the exclusion zone (if applicable). Before visitors are allowed to enter the Contamination Reduction Zone or Exclusion Zone, they must show proof of current training, medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and fill out a Certificate of Worker or Visitor Acknowledgment. Record this visitor information, including date, in the log.

3.9.3 Communication

Provide and install an employee alarm system that has adequate means of on and off site communication in accordance with 29 CFR 1910 Section .165. The means of communication must be able to be perceived above ambient noise or light levels by employees in the affected portions of the workplace. The signals must be distinctive and recognizable as messages to evacuate or to perform critical operations.

3.9.4 Site Security

Provide the following site security: Print signs in bold large letters on contrasting backgrounds. Signs must be visible from all points where entry might occur and at such distances from the restricted area that employees may read the signs and take necessary protective steps before entering.

3.10 PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the Exclusion or Contamination Reduction Zones or otherwise exposed to hazardous chemical vapors, gases, liquids, or contaminated solids must decontaminate themselves and their equipment prior to exiting the contamination reduction zone (CRZ) and entering the support zone. Consult Chapter 10.0 of NIOSH 85-115 when preparing decontamination procedures. Submit a detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers as part of the APP/SSHP. Train employees in the procedures and enforce the procedures throughout site operations.

3.10.1 Decontamination Facilities

Submit drawings showing the layout of the personnel and equipment decontamination areas.

3.10.2 Personnel Decontamination

Initially set up a decontamination line in the CRZ. Employees must exit the exclusion zone through the CRZ and implement the following decontamination procedures and techniques: Scrub and rinse water proof outer garments hand and face wash. Showers, if needed, must comply with 29 CFR 1910, Section.141 and EM 385-1-1, 02 F, Washing Facilities. It is the Site Safety and Health Officer's responsibility to recommend techniques to improve personnel decontamination procedures, if necessary.

3.10.3 Equipment Decontamination

Decontaminate the vehicles and equipment used in the EZ in the CRZ prior to leaving the EZ.

3.10.3.1 Facilities for Equipment and Personnel

Provide a vehicle/equipment decontamination station within the CRZ for decontaminating vehicles and equipment leaving the EZ.

3.10.3.2 Procedures

Procedures for equipment decontamination must be developed and utilized to prevent the spread of contamination into the SZ and offsite areas. These procedures must address disposal of contaminated products and spent materials used on the site, including, as a minimum, containers, fluids, and oils. Assume any item taken into the EZ to be contaminated and perform an inspection and decontaminate. Vehicles, equipment, and materials must be cleaned and decontaminated prior to leaving the site. Handle construction material in such a way as to minimize the potential for contaminants being spread or carried offsite. Prior to exiting the site, vehicles and equipment must be monitored to ensure the adequacy of decontamination.

Task Hazard and Control Requirements Sheet	
Task	
Initial Anticipated Hazards	
Initial PPE	
Initial Controls	
Initial Exposure Monitoring	
No	HAZWOPER Medical Surveillance Required
Yes	HAZWOPER Training Required

-- End of Section --

SECTION 01 42 00

SOURCES FOR REFERENCE PUBLICATIONS
02/19

PART 1 GENERAL

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g., ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AMERICAN PETROLEUM INSTITUTE (API)
1220 L Street, NW
Washington, DC 20005-4070
Ph: 202-682-8000
Internet: https://www.api.org/

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
Two Park Avenue
New York, NY 10016-5990
Ph: 800-843-2763
Fax: 973-882-1717
E-mail: customercare@asme.org
Internet: https://www.asme.org/

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)
520 N. Northwest Highway
Park Ridge, IL 60068
Ph: 847-699-2929
E-mail: customerservice@assp.org
Internet: https://www.assp.org/

AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 W. Quincy Avenue
Denver, CO 80235 USA
Ph: 303-794-7711 or 800-926-7337
Fax: 303-347-0804
Internet: https://www.awwa.org/

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555

E-mail: service@astm.org
Internet: https://www.astm.org/

GREEN SEAL (GS)
1001 Connecticut Avenue, NW
Suite 827
Washington, DC 20036-5525
Ph: 202-872-6400
Fax: 202-872-4324
E-mail: greenseal@greenseal.org
Internet: https://www.greenseal.org/

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
445 and 501 Hoes Lane
Piscataway, NJ 08854-4141
Ph: 732-981-0060 or 800-701-4333
Fax: 732-981-9667
E-mail: onlinesupport@ieee.org
Internet: https://www.ieee.org/

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)
1901 North Moore Street
Arlington, VA 22209-1762
Ph: 703-525-1695
Fax: 703-528-2148
Internet: https://safetyequipment.org/

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 900
Arlington, VA 22209
Ph: 703-841-3200
Internet: https://www.nema.org

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
Quincy, MA 02169-7471
Ph: 800-344-3555
Fax: 800-593-6372
Internet: https://www.nfpa.org

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
Patriots Plaza 1
395 E Street, SW, Suite 9200
Washington, DC 20201
Ph: 800-232-4636
Fax: 513-533-8347
Internet: https://www.cdc.gov/niosh/

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)
1320 North Courthouse Rosd, Suite 200
Arlington, VA 22201
Ph: 703-907-7700
Fax: 703-907-7727
E-mail: marketing@tiaonline.org
Internet: https://www.tiaonline.org/

U.S. ARMY CORPS OF ENGINEERS (USACE)
CRD-C DOCUMENTS available on Internet:
http://www.wbdg.org/ffc/army-coe/standards
Order Other Documents from:
Official Publications of the Headquarters, USACE
E-mail: hqpublications@usace.army.mil
Internet: http://www.publications.usace.army.mil/
or
https://www.hnc.usace.army.mil/Missions/Engineering-Directorate/TECHINFO/

U.S. DEPARTMENT OF DEFENSE (DOD)
Order DOD Documents from:
Room 3A750-The Pentagon
1400 Defense Pentagon
Washington, DC 20301-1400
Ph: 703-571-3343
Fax: 215-697-1462
E-mail: customerservice@ntis.gov
Internet: https://www.ntis.gov/
Obtain Military Specifications, Standards and Related Publications from:
Acquisition Streamlining and Standardization Information System (ASSIST)
Department of Defense Single Stock Point (DODSSP)
Document Automation and Production Service (DAPS)
Building 4/D
700 Robbins Avenue
Philadelphia, PA 19111-5094
Ph: 215-697-6396 - for account/password issues
Internet: https://assist.dla.mil/online/start/; account registration required
Obtain Unified Facilities Criteria (UFC) from:
Whole Building Design Guide (WBDG)
National Institute of Building Sciences (NIBS)
1090 Vermont Avenue NW, Suite 700
Washington, DC 20005
Ph: 202-289-7800
Fax: 202-289-1092
Internet:
https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272
Internet: https://www.archives.gov/
Order documents from:
Superintendent of Documents
U.S. Government Publishing Office (GPO)
732 N. Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800 or 866-512-1800
Bookstore: 202-512-0132
Internet: https://www.gpo.gov/

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

-- End of Section --

SECTION 01 45 10

QUALITY CONTROL

12/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A 880	(1996) Criteria for Use in Evaluation of Testing Laboratories and Organizations for Examination and Inspection of Steel, Stainless Steel, and Related Alloys
ASTM C 1077	(1998) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM D 3666	(2000) Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials
ASTM D 3740	(1999c) Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2009) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
ASTM E 543	(1999) Evaluating Agencies that Perform Nondestructive Testing

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00, "Submittal Procedures."

SD-11 Closeout Submittals

Quality Control Plan (QC PLAN)

Submit a QC plan within 15 calendar days after receipt of Notice of Award.

1.3 INFORMATION FOR THE CONTRACTING OFFICER

Deliver the following to the Contracting Officer:

a. Combined Contractor Production Report/Contractor Quality Control Report (1 sheet): Original and 1 copy, by 10:00 AM the next work ing day after each day that work is performed;

b. QC Specialist Reports and Test Results: Originals and 1 copy, by 10:00 AM the next working day after each day that work is per formed;

c. Testing Plan and Log, 1 copy, at the end of each month;

d. QC Meeting Minutes: 1 copy, within 2 calendar days of the meeting;

e. Rework Items List: 1 copy, by the last working day of the month and;

f. QC Certifications: As required by the paragraph entitled "QC Certifications".

1.4 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. The QC program consists of a QC Organization, a QC Plan, attending a QC Plan meet ing, attending a Coordination and Mutual Understanding Meeting, conducting QC meetings, performing three phases of control, performing submittal review, ensuring testing is performed, and preparing QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program shall cover construction operations on-site and off-site and shall be keyed to the proposed construction sequence.

1.5 QC ORGANIZATION

1.5.1 QC Manager

1.5.1.1 Duties

Provide a QC Manager at the work site to manage and implement the QC program. The QC Manager is required to attend the QC Plan meeting, attend the Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control, perform submittal review, ensure testing is performed and prepare QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by the QC specialists. In addition to managing and implementing the QC program, the QC Manager may perform the duties of project superintendent.

1.5.1.2 Qualifications

An individual with a minimum of five years experience as a foreman, super intendent, inspector, QC Manager, project manager, or construction manager on similar size construction contracts which included the major trades that are part of this Contract.

Provide a separate QC Specialist at the work site for each of the areas of responsibilities for the following:

Electrical and Telecommunication Systems QC Specialists.

Provide ICC IBC Special Inspection Certification from the following specialist:

Telecommunications Systems Installation Specialist, (10) years minimum experience in Telecommunication Systems Installation.

Area of responsibility:

Telecommunication Systems, all Division 27, Division 28, and Division 33 Outside Plant work.

Frequency of specialists is full time during systems installation and testing. QC Specialists are required to attend the Coordination and Mutual Understanding Meeting, QC meetings and be physically present at the construction site to perform the three phases of control and prepare documentation for each definable feature of work in their area of responsibility.

1.5.1.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager shall have completed the course entitled "Construction Quality Management for Contractors." This course is periodically offered by the Navy and the Corps of Engineers. However, it is sponsered by both the AGC and the ABC of Charlotte, North Carolina. Call one of the following to sign up for the next available class:

The Army Corps of Engineers, Baltimore District;
(Offered in Baltimore, MD)
Contact: Corps of Engineers, Baltimore District
10 South Howard Street
Baltimore, MD 21201
Phone: 410-962-2323

The Associated General Contractors (AGC), Virginia Chapter
in Cooperation with the Army Corps of Engineers, Norfolk District, and
the Naval Facilities Engineering Command, Atlantic Division.
(Offered at rotating locations in Norfolk, Williamsburg, and Richmond)
Contact: AGC of Virginia
8631 Maylan Drive, Parham Park
Richmond, VA 23294
Phone: 804-346-3383

Carolinas Associated General Contractors (CACG)
Contact: CACG
1100 Euclid Avenue
Charlotte, NC 28203
Phone: 704-372-1450 (ext. 5248)

Associated Builders and Contractors (ABC), Carolinas Chapter
Contact: ABC, Carolinas Chapter
3705 Latrobe Drive
Charlotte, NC 28211
Phone: 704-367-1331
or: 877-470-4819

1.5.2 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager shall be three years of experience in one of the specified positions.

1.6 QC PLAN

1.6.1 Requirements

Provide for approval by the Contracting Officer, a QC plan submitted in a 3-ring binder with pages numbered sequentially that covers, both on-site and off-site work and includes, the following:

a. A table of contents listing the major sections identified with tabs in the following order:

I. QC ORGANIZATION
II. NAMES AND QUALIFICATIONS
III. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL
IV. OUTSIDE ORGANIZATIONS
V. APPOINTMENT LETTERS
VI. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER
VII. TESTING LABORATORY INFORMATION
VIII. TESTING PLAN AND LOG
IX. PROCEDURES TO COMPLETE REWORK ITEMS
X. DOCUMENTATION PROCEDURES
XI. LIST OF DEFINABLE FEATURES
XII. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL
XIII. PERSONNEL MATRIX
XIV. PROCEDURES FOR COMPLETION INSPECTION

b. A chart showing the QC organizational structure and its relationship to the production side of the organization.

c. Names and qualifications, in resume format, for each person in the QC organization.

d. Duties, responsibilities and authorities of each person in the QC organization.

e. A listing of outside organizations such as, architectural and consulting engineering firms that will be employed by the Contractor and a description of the services these firms will provide.

f. A letter signed by an officer of the firm appointing the QC Manager and stating that he/she is responsible for managing and implementing the QC program as described in this contract. Include in this letter the QC Manager's authority to direct the removal and replacement of non-conforming work.

g. Procedures for reviewing, approving and managing submittals. Provide the names of the persons in the QC organization authorized to review and certify submittals prior to approval.

h. Testing laboratory information required by the paragraphs entitled

"Accredited Laboratories" or "Testing Laboratory Requirements", as applicable.

i. A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.

j. Procedures to identify, record, track and complete rework items.

k. Documentation procedures, including proposed report formats.

l. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and requires separate control requirements. As a minimum, if approved by the Contracting Officer, consider each Section of the Specifications as a definable feature of work. However, at times, there may be more than one definable feature of work in each Section of the Specifications.

m. A personnel matrix showing, for each section of the specification, who will perform and document the three phases of control, and who will perform and document the testing.

o. Procedures for Identifying and Documenting the Completion Inspection process. Include in these procedures the responsible party for punch out inspection, prefinal inspection, and final acceptance inspection.

1.6.2 Preliminary Work Authorized Prior to Approval

The only work that is authorized to proceed prior to the approval of the QC plan is mobilization of storage and office trailers and surveying.

1.6.3 Approval

Approval of the QC plan is required prior to the start of construction. The Contracting Officer reserves the right to require changes in the QC plan and operations as necessary to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC organization at any time in order to verify his/her submitted qualifications.

1.6.4 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed change, including changes in the QC organization personnel, a minimum of seven calendar days prior to a proposed change. Proposed changes must be approved by the Contracting Officer.

1.7 QC PLAN MEETING

Prior to submission of the QC plan, meet with the Contracting Officer to discuss the QC plan requirements of this Contract. The purpose of this meeting is to develop a mutual understanding of the QC plan requirements prior to plan development and submission.

1.8 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC Plan, but prior to the start of construction,

meet with the Contracting Officer to discuss the QC program required by this Contract. The purpose of this meeting is to develop a mutual understanding of the QC details, including forms to be used for documentation, administration for on-site and off-site work, and the coordination of the Contractor's management, production and QC personnel with the Contracting Officer. As a minimum, the Contractor's personnel required to attend shall include the project manager, project superintendent, and QC Manager. Minutes of the meeting shall be prepared by the QC Manager and signed by both the Contractor and the Contracting Officer.

1.9 QC MEETINGS

After the start of construction, the QC Manager shall conduct weekly QC meetings at the work site with the project superintendent and QC specialists. The QC Manager shall prepare the minutes of the meeting and provide a copy to the Contracting Officer within 2 working days after the meeting. The Contracting Officer may attend these meetings. The QC Manager shall notify the Contracting Officer at least 48 hours in advance of each meet ing. As a minimum, the following shall be accomplished at each meeting:

a. Review the minutes of the previous meeting;

b. Review the schedule and the status of work:

- Work or testing accomplished since last meeting
- Rework items identified since last meeting
- Rework items completed since last meeting;

c. Review the status of submittals:

- Submittals reviewed and approved since last meeting
- Submittals required in the near future;

d. Review the work to be accomplished in the next 2 weeks and documen tation required. Schedule the three phases of control and testing:

- Establish completion dates for rework items
- Preparatory phases required
- Initial phases required
- Follow-up phases required
- Testing required
- Status of off-site work or testing
- Documentation required;

e. Resolve QC and production problems; and

f. Address items that may require revising the QC plan:

- Changes in QC organization personnel
- Changes in procedures.

1.9.1 THREE PHASES OF CONTROL

The QC Manager shall perform the three phases of control to ensure that work complies with Contract requirements. The Three Phases of Control shall adequately cover both on-site and off-site work and shall include the following for each definable features of work: A definable feature of work

is a task which is separate and distinct from other tasks and requires separate control requirements.

1.9.2 Preparatory Phase

Notify the Contracting Officer at least 48 hours in advance of each preparatory phase. Conduct the preparatory phase with the superintendent, and the foreman responsible for the definable feature. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report. Perform the following prior to beginning work on each definable feature of work:

a. Review each paragraph of the applicable specification sections;

b. Review the Contract drawings;

c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;

d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;

e. Examine the work area to ensure that the required preliminary work has been completed;

f. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data;

g. Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted; and

h. Discuss construction methods

1.9.3 Initial Phase

Notify the Contracting Officer at least 48 hours in advance of each initial phase. When construction crews are ready to start work on a definable feature of work, conduct the initial phase with the QC Specialists, the super intendent, and the foreman responsible for that definable feature of work. Observe the initial segment of the definable feature of work to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily Contractor Quality Control Report. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each definable feature of work:

a. Establish the quality of workmanship required;

b. Resolve conflicts;

c. Review the Safety Plan and the appropriate activity hazard analysis to ensure that applicable safety requirements are met; and

d. Ensure that testing is performed by an approved laboratory.

1.9.4 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary until the completion of each definable feature of work and document in the daily Contractor Quality Control Report:

a. Ensure the work is in compliance with Contract requirements;

b. Maintain the quality of workmanship required;

c. Ensure that testing is performed by an approved laboratory; and

d. Ensure that rework items are being corrected.

1.9.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.10 SUBMITTAL REVIEW

Procedures for submittals are as described in Section entitled "01 33 00 Submittal Procedures."

1.11 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this Contract.

1.11.1 Testing Laboratory Requirements

Provide an independent testing laboratory or establish a laboratory quali fied to perform sampling and tests required by this Contract. When the proposed testing laboratory is not accredited by an acceptable accreditation program as described by the paragraph entitled "Accredited Laboratories", submit to the Contracting Officer for approval, certified statements signed by an official of the testing laboratory attesting that the proposed laboratory meets or conforms to the following requirements:

a. Sampling and testing shall be under the technical direction of a Registered Professional Engineer (P.E) with at least 5 years of experience in construction material testing.

b. Laboratories engaged in testing of concrete and concrete aggregates shall meet the requirements of ASTM C 1077.

c. Laboratories engaged in testing of bituminous paving materials shall meet the requirements of ASTM D 3666.

d. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, shall meet the requirements of ASTM D 3740.

e. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A 880. Laboratories shall meet the requirements of ASTM E 329.

f. Laboratories engaged in nondestructive testing (NDT) shall meet the requirements of ASTM E 543.

g. Laboratories engaged in hazardous materials testing shall meet the requirements of OSHA and EPA.

1.11.2 Accredited Laboratories

Acceptable accreditation programs are the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO) program and the American Association for Laboratory Accreditation (A2LA) program. Furnish to the Contracting Officer, a copy of the Certificate of Accreditation, Scope of Accreditation and latest directory of the accrediting organization for accredited laboratories. The scope of the laboratory's accreditation shall include the test methods required by the Contract.

1.11.3 Inspection of Testing Laboratories

Prior to approval of non-accredited laboratories, the proposed testing laboratory facilities and records shall be subject to inspection by the Contracting Officer. Records subject to inspection include equipment inventory, equipment calibration dates and procedures, library of test procedures, audit and inspection reports by agencies conducting laboratory evaluations and certifications, testing and management personnel qualifications, test report forms, and the internal QC procedures.

1.11.4 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.

1.11.5 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results shall be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Contracting Officer via the QC Manager. Furnish a summary report of field tests at the end of each month. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month.

1.12 QC CERTIFICATIONS

1.12.1 Contractor Quality Control Report Certification

Each Contractor Quality Control Report shall contain the following statement: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report".

1.12.2 Invoice Certification

Furnish a certificate to the Contracting Officer with each payment request, signed by the QC Manager, attesting that as-built drawings are current and attesting that the work for which payment is requested, including stored material, is in compliance with contract requirements.

1.12.3 Completion Certification

Upon completion of work under this Contract, the QC Manager shall furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract".

1.13 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

1.13.1 Contractor Production Report

Reports are required for each day that work is performed and shall be attached to the Contractor Quality Control Report prepared for the same day. Account for each calendar day throughout the life of the Contract. The reporting of work shall be identified by terminology consistent with the construction schedule. Contractor Production Reports are to be prepared, signed and dated by the project superintendent and shall contain the following information:

a. Date of report, report number, name of contractor, contract number, title and location of Contract and superintendent present.

b. Weather conditions in the morning and in the afternoon including maximum and minimum temperatures.

c. A list of Contractor and subcontractor personnel on the work site, their trades, employer, work location, description of work performed and hours worked.

e. A list of job safety actions taken and safety inspections conducted. Indicate that safety requirements have been met including the results on the following:

(1) Was a job safety meeting held this date? (If YES, attach a copy of the meeting minutes.)

(2) Were there any lost time accidents this date? (If YES, attach a copy of the completed OSHA report.)

(3) Was crane/manlift/trenching/scaffold/hv electrical/high work/hazmat work done? (If YES, attach a statement or checklist showing inspection performed.)

(4) Was hazardous material/waste released into the environment? (If YES, attach a description of incident and proposed action.)

f. A list of safety actions taken today and safety inspections conducted.

g. A list of equipment/material received each day that is

incorporated into the job.

h. A list of construction and plant equipment on the work site including the number of hours used, idle and down for repair.

i. Include a "remarks" section in this report which will contain pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site.

1.13.2 Contractor Quality Control Report

Reports are required for each day that work is performed and for every seven consecutive calendar days of no-work and on the last day of a no-work period. Account for each calendar day throughout the life of the Contract. The reporting of work shall be identified by terminology consistent with the construction schedule. Contractor Quality Control Reports are to be prepared, signed and dated by the QC Manager and shall contain the following information:

a. Identify the control phase and the definable feature of work.

b. Results of the Preparatory Phase meetings held including the location of the definable feature of work and a list of personnel present at the meeting. Indicate in the report that for this definable feature of work, the drawings and specifications have been reviewed, submittals have been approved, materials comply with approved submittals, materials are stored properly, preliminary work was done correctly, the testing plan has been reviewed, and work methods and schedule have been discussed.

c. Results of the Initial Phase meetings held including the location of the definable feature of work and a list of personnel present at the meeting. Indicate in the report that for this definable feature of work the preliminary work was done correctly, samples have been prepared and approved, the workmanship is satisfactory, test results are acceptable, work is in compliance with the Contract, and the required testing has been performed and include a list of who performed the tests.

d. Results of the Follow-up Phase inspections held including the location of the definable feature of work. Indicate in the report for this definable feature of work that the work complies with the Contract as approved in the Initial Phase, and that required testing has been performed and include a list of who performed the tests.

e. Results of the three phases of control for off-site work, if applicable, including actions taken.

f. List the rework items identified, but not corrected by close of business.

g. List the rework items corrected from the rework items list along with the corrective action taken.

h. Include a "remarks" section in this report which will contain pertinent information including directions received, quality control problem areas, deviations from the QC plan, construction deficiencies encountered, QC meetings held, acknowledgement that as-built drawings have been updated, corrective direction given by the QC Organization and corrective action taken by the Contractor.

i. Contractor Quality Control Report certification.

1.13.3 Testing Plan and Log

As tests are performed, the QC Manager shall record on the "Testing Plan and Log" the date the test was conducted, the date the test results were forwarded to the Contracting Officer, remarks and acknowledgement that an accredited or Contracting Officer approved testing laboratory was used. Attach a copy of the updated "Testing Plan and Log" to the last daily Contractor Quality Control Report of each month.

1.13.4 Rework Items List

The QC Manager shall maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the "Contractor Rework Items List" to the last daily Contractor Quality Control Report of each month. The Contractor shall be responsible for including on this list items needing rework including those identified by the Contracting Officer.

1.13.5 As-Built Drawings

The QC Manager is required to review the as-built drawings required by Section 01 78 00, "Closeout Submittals", to ensure that as-built drawings are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. The QC Manager shall initial each deviation and each revision. Upon completion of work, the QC Manager shall furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

1.13.6 Report Forms

The following forms, which are attached at the end of this section, are acceptable for providing the information required by the paragraph entitled "Documentation". While use of these specific formats are not required, any other format used shall contain the same information:

a. Combined Contractor Production Report and Contractor Quality Control Report (1 sheet), with separate continuation sheet

b. Testing Plan and Log

c. Rework Items List

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
12/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511	(2017) Reduced-Pressure Principle Backflow Prevention Assembly

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic Control Plan - if applicable

SD-03 Product Data

Backflow Preventers

SD-06 Test Reports

Backflow Preventer Tests

SD-07 Certificates

Backflow Tester Certification

Backflow Preventers Certificate of Full Approval

1.3 BACKFLOW PREVENTERS CERTIFICATE

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of provisional Approval will not be acceptable.

1.3.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by

the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with a company participating in other phases of this Contract.

1.3.2 Backflow Prevention Training Certificate

Submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours of training in backflow preventer installations. The certificate must be current.

1.4 WEATHER PROTECTION

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

1.5 DOD CONDITION OF READINESS (COR)

DOD will set the Condition of Readiness (COR) based on the weather forecast for sustained winds 50 knots (60 mph) or greater. Contact the Contracting Officer for the current COR setting.

Monitor weather conditions a minimum of twice a day and take appropriate actions according to the approved Emergency Plan in the accepted Accident Prevention Plan, EM 385-1-1 Section 01 Emergency Planning and the instructions below.

Unless otherwise directed by the Contracting Officer, comply with:

a. Condition FOUR (Sustained winds of 58 mph or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 3.3 feet high. Remove all debris, trash, or objects that could become missile hazards. Review requirements pertaining to "Condition THREE" and continue action as necessary to attain "Condition FOUR" readiness. Contact Contracting Officer for weather and COR updates and completion of required actions.

b. Condition THREE (Sustained winds of 58 mph or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Reinforce or remove formwork and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and COR updates and completion of required actions. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness.

c. Condition TWO (Sustained winds of 58 mph or greater expected within 24 hours): Secure the jobsite, and leave Government premises.

d. Condition ONE. (Sustained winds of 58 mph or greater expected within 12 hours): Contractor access to the jobsite and Government premises is prohibited.

1.6 TRAILERS OR STORAGE BUILDINGS

Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Contracting Officer. The trailer or building shall be in good condition, free from visible damage, rust, and deterioration, and meet all applicable safety requirements. Trailers shall be roadworthy and comply with all appropriate State and local vehicle requirements. Failure to maintain storage trailers or buildings to these standards shall result in the removal of non-complying units at the Contractor's expense. A sign not smaller than 24 by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers shall be anchored to resist high winds and must meet applicable state and local standards for anchoring mobile trailers.

Trailers that are placed outside of project boundaries will require base site approval and NEPA review. Any temporary trailer utilities outside the project boundary limit also will require base site approval and NEPA review. Allow 30 days for approval processing and NEPA documentation.

1.7 STORAGE AREAS

The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" applies.

PART 2 PRODUCTS

2.1 BACKFLOW PREVENTERS

Reduced pressure principle type conforming to the applicable requirements AWWA C511.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Construction Contract employees must park privately owned vehicles in an area designated by the Contracting Officer. Employee parking must not interfere with existing and established parking requirements of the Government installation.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

3.2.1 Temporary Utilities

a. The Contract clause related to utilities applies. Reasonable amounts of water and electricity from the nearest outlet will be provided free of charge for pursuance of work within a facility under this contract. If the nearest available outlet cannot be utilized by the Contractor because of improper voltage, insufficient current, improper pressure, incompatible connectors, etc., it shall be the responsibility of the Contractor to provide temporary utilities as

required.

b. Reasonable amounts of utilities for contractor trailers and storage buildings will be made available to the Contractor, when available. The Contractor shall be responsible for providing transformers, electrical service poles and drops for electrical services, and backflow preventer devices on connections to domestic water lines. Final taps and tie-ins to the Government utility grid will be made by the Contractor after approval by the Contracting Officer. Tap-in cost, if any, shall be the responsibility of the Contractor. Under no circumstances will taps to base fire hydrants be allowed for obtaining domestic water.

c. Any and all utilities outside the established site boundary in support of trailers or temporary facilties will require both a Site Approval and REIR, which can either be routed separately from the trailer approvals or under the same request.

3.2.2 Energy and Utilites Conservation

The Contractor shall carefully conserve utilities furnished without charge. The Contractor, at his own expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines and remove the same prior to final acceptance of the construction.

3.2.3 Location of Underground Utilites

Location and Protection of underground utilities shall be the responsibility of the Contractor. Where existing-to-remain piping, utilities, and underground obstructions of any type are indicted in locations to be traversed by new piping, ducts, and other excavations the elevations of the existing utilities and obstructions shall be determined before the new work is completed.

a. In addition, the Contractor will be responsible for obtaining the services of a professional utility locator prior to digging. Contractor will provide documentation that the site has been surveyed and checked for underground utilities. All utilities must be located, including but not limited to power, water, sewer, storm drains, fiber optics, T.V. cable, telephone, and intrusion detection wiring. A set of known utility drawings will be available in the ROICC office for review to assist the locator.

b. It is mandatory that the Contractor also contact the Base Telephone Office (451-2531) prior to accomplishing any digging at Camp Lejeune. A telephone office representative will assist in locating telephone lines.

c. It is mandatory that the Contractor also contact Charter Communications, cable TV service prior to accomplishing any digging at Camp Lejeune, to ensure that all buried cable lines are identified. Contact Mr. Olin Criswell at 353-8677 for assistance.

d. It is mandatory that the contractor also contact the North Carolina One-Call Center to coordinate the location of underground natural gas infrastructure. North Carolina 811, Inc. can be reached at 811 on a touch-tone phone in the state of North Carolina or toll-free at 1.800.632.4949 if calling from out of state.

3.2.4 Damage to Underground Utilities

Immediate notice shall be delivered to the Contracting Officer of any damage. The Contractor shall make temporary repairs immediately, and shall provide permanent repairs as soon as practicable. For any additional work required by reason of conflict between the new and existing work, an adjustment in contract price will be made in accordance with Contract clause entitled "Differing Site Conditions", if appropriate.

3.2.5 Sanitation

Provide adequate sanitary conveniences of a type approved for the use of persons employed on the work, properly secluded from public observation, and maintained in such a manner as required and approved by the Contracting Officer. Maintain these conveniences at all times without nuisance. Upon completion of the work, remove the conveniences from the premises, leaving the premises clean and free from nuisance. Dispose of sewage through connection to a municipal, district, or station sanitary sewage system. Where such systems are not available, use chemical toilets or comparably effective units, and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility. Include provisions for pest control and elimination of odors.

3.3 STATION OPERATION AFFECT ON CONTRACTOR OPERATIONS

3.3.1 Restricted Access Areas

Follow guidelines identified on drawings and in scope of work.

3.4 TRAFFIC PROVISIONS

3.4.1 Traffic Control Plan

If during the performance of work, it becomes necessary to modify vehicular traffic patterns at any locations, notify the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plans shall be in accordance with State and local regulations and the MUTCD, Part VI. Make all notifications and obtain any permits required for modification to traffic movements outside Station'a jurisdiction. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic.

3.4.2 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Coordinate dust control methods with 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.5 REDUCED PRESSURE BACKFLOW PREVENTERS

Provide an approved reduced pressure backflow prevention assembly at each location where the Contractor taps into the Government potable water supply.

Perform backflow preventer tests using test equipment, procedures, and certification forms conforming to those outlined in the latest edition of the Manual of Cross-Connection Control published by the FCCCHR Manual. Test and tag each reduced pressure backflow preventer upon initial installation (prior to continued water use). Tag must contain the

following information: make, model, serial number, dates of tests, results, maintenance performed, and signature of tester. Record test results on certification forms conforming to requirements cited earlier in this paragraph.

3.6 DUMPSTERS

Equip dumpsters with a secure cover and paint the standard installation color. Keep dumpster closed, except when being loaded with trash and debris. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker installation color to collect debris in the construction site area. For large demolitions, large dumpsters without lids are acceptable, but must not have debris higher than the sides before emptying.

3.7 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store all salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.8 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and all other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence. Restore areas used during the performance of the Contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

05/12

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-S-16165	(Rev E) Shielding Harnesses, Shielding Items and Shielding Enclosures for Use in the Reduction of Interference from Engine Electrical Systems
MIL-STD-461	(2015; Rev G) Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-462	(Rev D; Notice 4) Electromagnetic Interference Characteristics

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations

49 CFR 178 Shipping Container Specification

1.2 Contractor Liabilities for Environmental Protection

Contractors shall complete and provide environmental training documentation for training required by Federal, State, and local regulations.

1.3 DEFINITIONS

1.3.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.3.2 Solid Waste

Rubbish, debris, garbage, and other discarded solid materials, except recyclables and hazardous waste as defined in paragraph entitled "Hazardous Waste," resulting from industrial, commercial, and agricultural operations and from community activities.

1.3.3 Sanitary Wastes

Wastes characterized as domestic sanitary sewage.

1.3.4 Rubbish

Combustible and noncombustible wastes such as non-recyclable paper and cardboard, crockery, and bones.

Recyclables includes: clean paper, cardboard, glass, plastics (No. 1 & 2), metal, and cans.

Non-recyclable paper and cardboard are defined as material that has become wet or contaminated with food or other residue that render it un-acceptable for recycling.

Treated wood/lumber is defined as wood that has been stained or treated to prevent rot, or composite wood products such as OSB, pressboard furniture, etc.

Untreated wood is defined as lumber, trees, stumps, limbs, tops, and shrubs.

1.3.5 Debris

Combustible and noncombustible wastes such as ashes and waste materials resulting from construction or maintenance and repair work, (excluding organic matter) leaves, pine straw, grass and shrub clippings.

1.3.6 Chemical Wastes

This includes salts, acids, alkalies, herbicides, pesticides, and organic chemicals.

1.3.7 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.3.8 Hazardous Waste

Hazardous substances as defined in 40 CFR 261 or as defined by applicable State and local regulations.

1.3.9 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

1.3.10 Landscape Features

Trees, plants, shrubs, and ground cover.

1.3.11 Lead Acid Battery Electrolyte

The electrolyte substance (liquid medium) within a battery cell.

1.3.12 Oily Waste

Petroleum products and bituminous materials.

1.3.13 Class I Ozone Depleting Substance (ODS)

Class I and Class II ODS are defined in Sections 602 (a and b) of The Clean Air Act.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00, "Submittal Procedures."

SD-01 Preconstruction Submittals

Environmental Protection Plan

SD-06 Test Reports

Abrasive blasting

waste materials - if applicable

Submit a copy of an approved laboratory analysis of materials collected as a result from abrasive blasting operations before disposing of waste materials.

SD-11 Closeout Submittals

Solid waste disposal permit

Disposal permit for hazardous waste

Environmental training documentation

Permit to transport hazardous waste

Hazardous waste certification

Environmental Plan Review

Annual Report of Products Containing Recovered Materials

1.4.1 Solid Waste Disposal Permit

Submit one copy of a State permit or license for the solid waste disposal facility. If the contract permits the use of the Base Landfill, request a letter from the Contracting Offcier authorizing permission to dump on base; submit the letter to the Base Landfill Office. In lieu of the letter a copy of the contract must be delivered to the Landfill Office for review.

1.4.2 Disposal Permit for Hazardous Waste

Submit a copy of the applicable EPA and State permits, manifests, or licenses for transportation, treatment, storage, and disposal of hazardous waste by permitted facilities.

1.4.3 Permit to Transport Hazardous Waste

Submit one copy of the EPA or State permit license, or regulation for the transporter who will ship the hazardous waste to the permitted Treatment, Storage, and Disposal (TSD) facility.

1.4.4 Hazardous Waste Certification

Submit written certification that hazardous waste turned in for disposal was generated on Government property and is identified, packaged, and labeled in accordance with 40 CFR 261, 40 CFR 262, and 40 CFR 263.

1.5 ENVIRONMENTAL PROTECTION REGULATORY REQUIREMENTS

Provide and maintain, during the life of the contract, environmental protection as defined in this Section. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including but not limited to water, air, solid waste, and noise pollution.

1.6 ENVIRONMENTAL PROTECTION PLAN

1.6.1 Contents of environmental Protection PlanEnvironmental protection plan

a. Include any hazardous materials (HM) planned for use on the station shall be included in the station HM Tracking Program maintained by the Safety Department. To assist this effort, submit a list (including quantities) of HM to be brought to the station and copies of the corresponding material safety data sheets (MSDS). Submit this list to the Contracting Officer. At project completion, remove any hazardous material brought onto the station. Account for the quantity of HM brought to the station, the quantity used or expended during the job, and the leftover quantity which (1) may have additional useful life as a HM and shall be removed by the Contractor, or (2) may be a hazardous waste, which shall then be removed as specified herein.

b. The Environmental Protection Plan shall list and quantify any Hazardous Waste (HW) to be generated during the project.

c. In accordance with station regulations, store HW near the point of generation up to a total quantity of one quart of hazardous waste or 55 gallons of hazardous waste. Move any volume exceeding these quantities to a HW permitted area within 3 days. Prior to generation of HW, contact Contracting Officer for labeling requirements for storage of hazardous wastes.

d. In accordance with station regulations, substitute materials as necessary to reduce the generation of HW and include a statement to that effect in the Environmental Plan.

e. Contact Contracting Officer for conditions in the area of the project which may be subject to special environmental procedures. Include this information in the Preconstruction Survey. Describe in the Environmental Protection Plan any permits required prior to working the area, and contingency plans in case an unexpected environmental condition is discovered.

f. Obtain permits for handling HW, and deliver completed documents to Contracting Officer for review. File the documents with the appropriate agency, and complete disposal with the approval of Contracting Officer. Deliver correspondence with the State concerning the environmental permits and completed permits to Contracting Officer.

1.6.2 Environmental Protection Plan Format

The Environmental Protection Plan shall follow the following format:

ENVIRONMENTAL PROTECTION PLAN

Contractor Organization
Address and Phone Numbers

1. Hazardous materials to be brought onto the station
2. MSDS package
3. Employee training documentation
4. HW storage plan
5. HW to be generated
6. Preconstruction survey results
7. Permitting requirements identified

1.6.3 Environmental Plan Review

Fourteen days after the environmental protection meeting, submit the proposed environmental plan for further discussion, review, and approval.

1.7 ADMINISTRATIVE REQUIREMENTS

1.7.1 Licenses and Permits

Obtain licenses and permits pursuant to "FAR 52.236-7, Permits and Responsibilities" .

For permits obtained by the Contracting Officer, whether or not required by

the permit, perform inspections of the work in progress, and submit certifications to the applicable regulatory agency, via the Contracting Officer, that the work conforms to the contract and permit requirements. The inspections and certifications shall be provided through the services of a Professional Engineer, registered in the State where the work is being performed. As a part of the quality control plan, which is required to be submitted for approval by the quality control section, provide a subitem containing the name, P.E. registration number, address, and telephone number of the professional engineer(s) who will be performing the inspections and certifications for each permit listed above.

1.8 GENERAL ENVIRONMENTAL MANAGEMENT SYSTEM AND ENVIRONMENTAL AWARENESS

The Contractor shall familiarize himself with requirements of the attached "Marine Corps Base (MCB), Camp Lejeune, Contractor Environmental Guide."

1.9 CAMP LEJEUNE SANITARY LANDFILL INFORMATION SHEET

a. Contractors may ONLY use the Camp Lejeune Sanitary Landfill for the disposal of asbestos containing materials, building products with tightly adhered lead containing paint, non-contaminated clean dirt and clean gravel. The hours of operation are 0730-1530.

b. Delivery of acceptable materials (identified above) shall be by appointment only. Appointments made by phone at 910-451-5011 or 910- 451-2946. ALL other contractor generated material shall be weighed through the Base Landfill scales before being removed from the Base. Contractors utilizing the base scales will require Contracting Officer assisted pre-registration with the Landfill Manager.

c. The Contracting Officer will register the contract via E-mail, with the base landfill. All haul vehicles will maintain a secure vehicle placard as a condition to utilize the scale. E-mail the contract information to the Landfill Clerk, including the name on the Prime Contractor, contract number, job name/description, completion date and whether or not any of the above materials will be delivered to the Landfill.

d. As of May 01 2014 the above supersedes any other statements/specifications pertaining to the delivery of materials to the Base Landfill.

PART 2 PRODUCTS

2.1 ANNUAL REPORT OF PRODUCTS CONTAINING RECOVERED MATERIALS

The Contractor shall submit data annually (by December 1) products used during the previous fiscal year (October 1 - September 30) as required by 6002 of the Solid Waste Disposal Act as amended by Resource Conservation and Recovery Act (RCRA). Report forms is attached to end of this section as "Appendix A."

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved

condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. Conform to the state permitting requirements of the Clean Water Act.

3.1.1 Land Resources

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by Contracting Officer. Where such use of attach ropes, cables, or guys is authorized, the Contractor shall be responsible for any resultant damage.

3.1.1.1 Protection of Trees

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Removal of trees and the procedure for removal requires approval of the Contracting Officer.

3.1.1.2 Landscape Replacement

Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before removal or replacement.

3.1.1.3 Temporary Construction

Remove traces of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other signs of construction. Grade temporary roads, parking areas, and similar temporarily used areas to conform with surrounding contours.

3.1.2 Water Resources

3.1.2.1 Stream Crossings

The Contracting Officer's approval is required before any equipment will be permitted to ford live streams.

3.1.2.2 Oily Wastes

Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil or petroleum storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of leakage or spillage.

3.1.3 Fish and Wildlife Resources

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

3.3 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Contracting Officer, and then only during designated times.

3.4 RESTRICTIONS ON EQUIPMENT

3.4.1 Electromagnetic Interference Suppression

a. Electric motors must comply with MIL-STD-461 relative to radiated and conducted electromagnetic interference. A test for electromagnetic interference will not be required for motors that are identical physically and electrically to those that have previously met the requirements of MIL-STD-461. An electromagnetic interference suppression test will not be required for electric motors without commutation or sliprings having no more than one starting contact and operated at 3,600 revolutions per minute or less.

b. Equipment used by the Contractor shall comply with MIL-S-16165for internal combustion engines and MIL-STD-461 for other devices capable of producing radiated or conducted interference.

c. Conduct tests for electromagnetic interference on electric motors and Contractor's construction equipment in accordance with MIL-STD-461 and MIL-STD-462. Test location shall be reasonably free from radiated and conducted interference. Furnish testing equipment, instruments, and personnel for making the tests; a test location; and other necessary facilities.

3.4.2 Radio Transmitter Restrictions

Conform to the restrictions and procedures for the use of radio transmitting equipment, as directed. Do not use transmitters without prior approval.

3.5 CONTROL AND DISPOSAL OF SOLID WASTES

Pick up and separate solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean.

3.5.1 Disposal of Metal Paint Cans

All metal paint cans shall be taken to Building 962 for recycling. The cans shall be empty and completely dry. The cans shall be triple rinsed and stenciled "Triple Rinsed" prior to turn in. The Contractor shall give

the Government 72 hours advance notice prior to turn-in. Contractor is responsible for rinsing, stenciling, crushing, and deposting in Government owned receptable, located at Building 962.

3.5.2 Disposal of Rubbish and Debris, Metal and Dirt

Rubbish and debris shall be taken off-base for disposal, unless specifically directed otherwise below:

Metals shall be taken to the DRMO disposal area at Lot 203, as specified.

CATEGORY	CONSTRUCTION DEBRIS DISPOSAL - BASE SANITARY LANDFILL EXAMPLE/GENERAL INFORMATION FOR DEPOSIT IN THE LANDFILL
Recyclable Cardboard	Breakdown corrugated cardboard boxes and deliver to the Base Recycling Center located at Building 982. If base personnel rejects the cardboard, take cardboard for off-base disposal.
Recyclable Wood Pallets	Deliver usable pallets to the Base Recycling Center located at Building 982. If base personnel rejects the pellets, take pallets for off-base disposal.
Organic Matter	Organic matter will not be accepted at the landfill.
*****	Weigh each and every vehicle delivering debris upon entrance and exit. Cover debris.
Metals	Metals will not be accepted at the landfill. Remove metals from each and every category before delivery to landfill. (Example: Remove hardware from doors and windows.) Dispose of metal construction debris at Defense Reutilization Maintenance Office (DRMO). Aluminum, brass, copper, lead, other metal, electrical wiring, cable (cut in 3 foot or less sections)
Treated & Untreated Wood/Lumber	Treated & untreated wood/lumber will not be accepted at the landfill.
Concrete	Concrete will not be accepted at the landfill.
Construction Material	Construction material should be managed and placed in a designated area. Area shall be kept clean of debris and all material removed at the end of the project.
Solid Waste	Separate each category of solid waste to enhance recycling.
Hazardous Material	This project involves demolition, renovation/repair and/or construction activities; therefore, hazardous material (such as paints, solvents, thinners, adhesives, etc) may be used during the execution of this project. The contractor

CATEGORY	CONSTRUCTION DEBRIS DISPOSAL - BASE SANITARY LANDFILL EXAMPLE/GENERAL INFORMATION FOR DEPOSIT IN THE LANDFILL
	will be required to appropriately manage the hazardous material and provide secondary containment.
Solid Waste Report	All solid waste generated and recycled will be weighed. Contractor will report the amount of solid wasted disposed and recycled at the end of the project to EMD's Solid Waste Manager or the Pollution Prevention Manager via the OICC. Tonnage information for all materials delivered to the Base Landfill is available at the Landfill Office. Submit a written request to the Landfill Manager, specifying the desired information.
Recycling of Construction Debris	Recyclable material (ex. Scrap metal/aluminum/brass/copper/lead, and other metal) may be recycled through Defense Utilization Maintenance Office) DRMO using a 1348-1a with the following information (Proceeds for the sale of recyclable material are to go to the Qualified Recycling financial account - 17F3875 27RM 00767001 0 000027 3c 000000 06700198004). For additional information contact the Base Recycling Coordinator 910-451-4214.
Electrical Equipment	Before demolition or removal of electrical equipment from the Base - Contractor shall contact Base High Voltage Shop Supervisor at (910) 451-2790, to allow for first right of refusal of electrical equipment such as: ATS, transformers, and generators. Electrical equipment will not be accepted at landfill.

3.5.3 Disposal Off-Base

a. Provide 24-hour advance written notice to the Contracting Office of Contractor's intention to dispose of off base.

b. Disposal at sites or landfills not holding a valid State of North Carolina permit is specifically prohibited. The prohibition also applies to sites where a permit may have been applied for but not yet obtained.

c. Off-base disposal of construction debris outside the parameters of this paragraph at site without State permits and/or not in accordance with regulatory requirements shall require the Contractor at his own expense to remove, transport and relocate the debris to a State approved site. The Contractor shall also be required to pay any fines, penalties, or fees related to the illegal disposal of construction debris

3.6 CONTROL AND DISPOSAL OF HAZARDOUS WASTE

3.6.1 Hazardous Waste Generation

Handle generated hazardous waste in accordance with 40 CFR 262.

3.6.2 Hazardous Waste Disposal

Dispose of hazardous waste in accordance with Federal, State, and local regulations, especially 40 CFR 263, 40 CFR 264, and 40 CFR 265. Removal of hazardous waste from Government property shall not occur without prior notification and coordination with the Contracting officer. Transport hazardous waste by a permitted, licensed, or registered hazardous waste transported to a TSD facility. Hazardous waste shall be properly identified, packaged, and labeled in accordance with 49 CFR 172. Provide completed manifest for hazardous waste disposed of off-site to the Contracting Officer within 7 days of disposal. Hazardous waste shall not be brought onto the station.

3.6.3 Hazardous Waste Storage

Store hazardous waste in containers in accordance with 49 CFR 178. Identify hazardous waste in accordance with 40 CFR 261 and 40 CFR 262. Identify hazardous waste generated within the confines of the station by the station's EPA generator identification number.

3.6.4 Spills of Oil and Hazardous Materials

Take precautions to prevent spills of oil and hazardous material. In the event of a spill, immediately notify the Contracting Officer. Spill response shall be in accordance with 40 CFR 300 and applicable State regulations.

3.6.5 Lead-Acid Batteries

Dispose of lead-acid batteries that are not damaged or leaking at a State-approved battery recycle or at a permitted or interim status

hazardous waste TSD facility. For lead-acid batteries that are leaking or have cracked casings, dispose of the electrolyte solution using one of the following alternatives:

a. An industrial waste water treatment plant, if available and approved by the Contracting Officer for disposing of lead-acid battery electrolyte.

b. Dispose of the lead-acid battery electrolyte at a permitted or interim status hazardous waste TSD facility.

The management and disposal of waste lead-acid batteries and electrolyte shall comply with requirements for management and disposal of hazardous wastes.

3.6.6 Mercury Control

Prior to starting work, remove thermostats, switches, and other components that contain mercury. Upon removal, place items containing mercury in doubled polyethylene bags, label, and turn over to the Contracting Officer for disposal.

3.6.7 Petroleum Products

Protect against spills and evaporation during fueling and lubrication of equipment and motor vehicles. Dispose of lubricants to be discarded and excess oil.

3.7 DUST CONTROL

Keep dust down at all times, including nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not shake bags of cement, concrete mortar, or plaster unnecessarily.

3.7.1 Abrasive Blasting

3.7.1.1 Blasting Operations

The use of silica sand is prohibited in abrasive blasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other debris in accordance with the requirements specified. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.7.1.2 Disposal Requirements

Collect dust, abrasive, paint, and other debris resulting from abrasive blasting operations and store in 55 gallon drums with watertight lids. Take a representative sample of this material, and test for EP toxicity with respect to lead, chromium, and cadmium content. The sampling and testing shall be performed in accordance with 40 CFR 261. Handle debris resulting from the abrasive blasting operations as a hazardous material, and dispose of in accordance with 40 CFR 262, 40 CFR 263, 40 CFR 264, and

40 CFR 265. Transport hazardous material by a transporter licensed and permitted for transportation of hazardous materials. Dispose of hazardous material in an EPA-approved and permitted facility specifically designated for hazardous waste disposal.

3.8 QUARANTINE FOR IMPORTED FIRE ANT (4/82)

Onslow, Jones, and Cartaret Counties and portions of Duplin and Craven Counties have been declared a generally infested area by the United States Department of Agriculture (USDA) for the imported fire ant. Compliance with the quarantine regulations established by this authority as set forth in USDA Publication 301.81 of 31 December 1992, is required for operations hereunder. Pertinent requirements of the quarantine for materials originating on the Camp Lejeune reservation, the Marine Corps Air Station (Helicopter), New River and the Marine Corps Air Station, Cherry Point, which are to be transported outside Onslow County or adjacent suppression areas, include the following:

a. Certification is required for the following articles and they shall not be moved from the reservation to any point outside Onslow County and adjacent designated areas unless accompanied by a valid inspection certificate issued by an Officer of the Plant Protection and Quarantine Program (PPQ) of the U.S. Department of Agriculture.

   (1) Bulk soil

   (2) Used mechanized soil-moving equipment. (Used mechanized soil-moving equipment is exempt if cleaned of loose noncompacted soil).

   (3) Other products, articles, or means of conveyances, if it is determined by an inspector that they present a hazard of transporting spread of the imported fire ant and the person in possession thereof has been so notified.

b. Authorization for movement of equipment outside the imported fire and regulated area shall be obtained from USDA, Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), Box 28, Goldsboro, North Carolina, 27533-0028, Attn: Mr. William Scroggins or Mr. Frank Best, telephone (919) 735-1941. If Mr. Scroggins or Mr. Best are not available, contact Mr. Jim Kelley at (910) 815-4667, the supervisor's office in Wilmington. Requests for inspection shall be made sufficiently in advance of the date of movement to permit arrangements for the services of authorized inspectors. The equipment shall be prepared and assembled so that it may be readily inspected. Soil on or attached to equipment, supplies, and materials shall be removed by washing with water or such other means as necessary to accomplish complete removal. Resulting spoil shall be wasted as necessary and as directed.

ANNUAL REPORT OF PRODUCTS CONTAINING RECOVERED MATERIALS

Contractor shall submit data annually (By 1 December) for the following products used during the previous fiscal year (1 October - 30 September) as required by 6002 of the Solid Waste Disposal Act as ammended by Resource Conservation and Recovery Act (RCRA):

Contract Number: _____ Fiscal Year: _____

MATERIAL	UNIT	QUANTITY (CRM)	TOTAL QUANTITY
A. Insulation			
1. Loose fill	Ft3		
2. Blanket or batt	Ft2		
3. Board	Ft2		
4. Spray-in-place	m3		
5. Other			
B. Cement and Concrete	yd3		
C. Paper and Paper Products			
1. Copy Paper	Box		
2. Printing/Writing Paper	Box		
3. Corrugated and fiberboard boxes	Box		
4. Folding boxboard and cartons	Box		
5. Stationary, office papers, envelopes, and computer paper	$Amt		
6. Toilet tissue, paper towels, fasial tissue, paper napkins, doilies and industrial wipes	$Amt		
7. Brown papers and coarse papers	Box		
8. Other			

APPENDIX A

MATERIAL	DEFINITION
1. Quantity (CRM)	Quantity used containing recovered materials.
2. Total Quantity	Quantity used containing recovered materials plus quantity used not containing recovered materials.
3. Unit	Ft3 (cubic feet), Ft2 (square feet), m3 (cubic meters), yd3 (cubic yards), box (number of boxes used), $ Amt (dollar value of material used)
4. Loose-Fill Insulation	Includes, but is not limited to..."cellulose fiber, mineral fibers (fiberglass and rock wool), vermiculite, and perlite.
5. Blanket or Batt Insulation	Includes, but is not limited to... "mineral fibers (fiberglass and rock wool)."
6. Board Insulation	This category refers to sheathing, roof decking, and wood panel insulation. It includes, but is not limited to... "cellulose fiber fiberboard, perlite composite board, polyurethane, polyisocyanurate, polystyrene, phenolics, and composites."
7. Spray-in-place Insulation	Includes, but is not limited to... "foam-in-place polyurethane and polyisocyanurate, and spray-on cellulose."
8. Cement or Concrete Containing Recovered Materials, Cement, or Concrete Containing Fly Ash	
9. Copy Paper	This item refers to... "any grade of paper suitable for copying by the xerographic method."
10. Printing & Writing Paper	This item refers to... "paper designed for printing, other than newsprint, such as offset or book paper," and... "paper suitable for pen and ink, pencil, typewriter or printing."

APPENDIX A

MATERIAL	DEFINITION
11. Corrugated & Fiberboard Boxes	Corrugated boxes refer to... "boxes made of corrugated paperboard, which, in turn, is made from a fluted corrugating medium pasted to two flat sheets of paperboard (linerboard)." Fiber or fiberboard boxes refer to... "boxes made from containerboard, either solid fiber or corrugated paperboard (general term); or boxes made from solid paperboard of the same material throughout."
12. Folding Boxes and Cartons	This item refers to... "a paperboard suitable for the manufacture of folding cartons."
13. Stationery, Office Papers, Envelopes, and Manifold Business Forms	This item is considered self-explanatory, however, if questions arise refer to 40 CFR 250.4 for definitions of any of these items.
14. Toilet Tissue, Paper Towels, Facial Tissue, Paper Napkins, Doilies, and Industrial Wipes	This item is considered self-explanatory, however, if questions arise refer to 40 CFR 250.4 for definitions of any of these items.
15. Brown Papers, and Coarse Papers	Brown papers refer to... "papers usually made from unbleached kraft pulp and used for bags, sacks, wrapping paper, and so forth." Coarse papers refer to... "papers used for industrial purposes, as distinguished from those used for cultural or sanitary purposes."
16. Other	Any other type of paper not included in any of the above categories.

APPENDIX A

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
04/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E1971	(2005; R 2011) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings

GREEN SEAL (GS)

GS-37	(2017) Cleaning Products for Industrial and Institutional Use

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014; with Change 4) Navy and Marine Corps Design Procedures
UFC 1-300-08	(2009, with Change 2) Criteria for Transfer and Acceptance of DoD Real Property

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-built drawings are developed and maintained by the Contractor and depict actual conditions, including deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to Contractor submitted Requests for Information; direction from the Contracting Officer; designs which are the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site. These files serve as the basis for the creation of the record drawings.

1.2.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

1.2.3 Final Approved Shop Drawings

The final approved shop drawings are all approved submittals created during the execution of the project. All submittals, regardless of the approving authority, shall be submitted. Include the submittal cover sheet and all relevant attachments for all submittals. Each submittal shall be saved as a

separate file or have its own unique folder if a submittal includes attachments of multiple files or file types. Include a PDF copy of the completed submittal register.

1.3 SOURCE DRAWING FILES

Request the full set of electronic drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.3.1 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan

Warranty Tags

Final Cleaning

Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

As-Built Record of Equipment and Materials

Final Approved Shop Drawings

Construction Contract Specifications

Certification of EPA Designated Items; G

Certification Of USDA Designated Items; G

Interim DD FORM 1354; G

Checklist for DD FORM 1354; G

1.5 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

a. Indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

1.6 WARRANTY MANAGEMENT

1.6.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to each monthly pay estimate.

Assemble approved information in a binder and turn over two (2) copies of the binder to the Government upon submittal of the initial Test & Balance (TAB) Report or no later than ninety (90) days prior to contract completion date (CCD), whichever is sooner. The contents of the binder will be verified onsite for accuracy and completeness of contents by a representative of MCBCL Public Works. Upon site approval of the binder, one copy will be distributed to the PWD representative and one copy will be stored in the O&M cabinet in the mechanical room.

The construction warranty period will begin on the date of project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Include within the warranty management plan , but not limited to, the following:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

c. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

d. As-Built Record of Equipment and Materials list for each warranted equipment, item, feature of construction or system indicating:

(1) Name of item.
(2) Model and serial numbers.
(3) Location where installed.
(4) Name and phone numbers of manufacturers or suppliers.
(5) Names, addresses and telephone numbers of sources of spare parts.
(6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.
(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of all equipment covered by extended warranties.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.6.2 Performance Bond

The Performance Bond must remain effective throughout the construction period .

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.6.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.6.4 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	

Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

PART 2 PRODUCTS

2.1 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items and FAR 52-223-17 Affirmative Procurement of EPA designated items in Service and Construction Contracts.. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

1) The product does not meet appropriate performance standards;
2) The product is not available within a reasonable time frame;
3) The product is not available competitively (from two or more sources);
4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product)."

2.2 CERTIFICATION OF USDA DESIGNATED ITEMS

Submit the Certification of USDA Designated Items as required by FAR 52-223-1 Bio-based Product Certifications and FAR 52.223-2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and

certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current USDA standards for biobased materials content. The following exemptions may apply to the non-procurement of biobased content materials:

1) The product does not meet appropriate performance standards;
2) The product is not available within a reasonable time frame;
3) The product is not available competitively (from two or more sources);
4) The product is only available at an unreasonable price (compared with a comparable bio-based content product)."

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings. At a minimum of 30 days prior to Beneficial Occupancy Date (BOD), certify both sets of as-built drawings as correct, sign, and submit the As-Built Drawings for Contracting Officer approval.

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

a. Use base colors of red, green, and blue. Color code for changes as follows:

   (1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

   (2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

   (3) Additions (Green) - Added items, lettering in notes and leaders.

b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.

c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

f. Wherever a revision is made, also make changes to related section

views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

g. For deletions, cross out all features, data and captions that relate to that revision.

h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

i. Indicate one of the following when attaching a print or sketch to a markup print:

   1) Add an entire drawing to contract drawings

   2) Change the contract drawing to show

   3) Provided for reference only to further detail the initial design.

j. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

j. Modifications (include within change order price the cost to change working as-built markup drawings to reflect modifications) and compliance with FC 1-300-09N procedures.

l. Actual location of anchors, construction and control joints, etc., in concrete.

m. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

n. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 RECORD DRAWINGS

Prepare and provide Record Drawings in accordance with FC 1-300-09N. Provide 2 copies of Record Drawings on two separate CDs or DVDs 30 days after BOD.

3.3 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23 OPERATION AND MAINTENANCE MANUALS DATA. Provide four electronic copies of the Operation and Maintenance Manual files. Submit to the Contracting Officer for approval within 60 calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD. Provide one hard copy and place in cabinet in main mechanical room.

3.4 CLEANUP

Provide final cleaning in accordance with ASTM E1971 and submit two copies of the listing of completed final clean-up items. Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Replace filters of operating equipment and comply with the Indoor Air Quality (IAQ) Management Plan. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.5 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft DD FORM 1354 attached to this section, and submit an accounting of all installed property with Interim DD FORM 1354. Include any additional assets, improvements, and alterations from the Draft DD FORM 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD FORM 1354. Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354. For convenience, a blank fillable PDF DD FORM 1354 may be obtained at the following link:
www.esd.whs.mil/Portals/54/Documents/DD/forms/dd/dd1354.pdf

Submit the completed Checklist for DD FORM 1354 of Installed Building Equipment items. Attach this list to the updated DD FORM 1354.

3.6 FINAL APPROVED SHOP DRAWINGS

Provide 2 copies of Final Approved Shop Drawings on two separate CDs or DVDs within 30 days after BOD.

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA
04/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E1971	(2005; R 2011) Standard Guide for Stewardship for the Cleaning of Commercial and Institutional Buildings

1.2 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

O&M Database ; G

Training Plan ; G

Training Outline ; G

Training Content ; G

SD-11 Closeout Submittals

Training Video Recording ; G

Validation of Training Completion ; G

1.3 OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data for the provided equipment, product, or system, defining the importance of system interactions, troubleshooting, and long-term preventive operation and maintenance. Compile, prepare, and aggregate O&M data to include clarifying and updating the original sequences of operation to as-built conditions. Organize and present information in sufficient detail to clearly explain O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with this section and Section 01 33 00 SUBMITTAL PROCEDURES.

1.3.1 Package Quality

Documents must be fully legible. Operation and Maintenance data must be consistent with the manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions.

1.3.2 Package Content

Provide data package content in accordance with paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES. Comply with the data package requirements specified in the individual technical sections, including the content of the packages and addressing each product, component, and system designated for data package submission, except as follows. Use Data Package 3 for commissioned items without a specified data package requirement in the individual technical sections. Provide a Data Package 3 instead of Data Package 1 or 2, as specified in the individual technical section, for items that are commissioned.

1.3.3 Changes to Submittals

Provide manufacturer-originated changes or revisions to submitted data if a component of an item is so affected subsequent to acceptance of the O&M Data. Submit changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data within 30 calendar days of the notification of this change requirement.

1.3.4 Commissioning Authority Review and Approval

Submit the commissioned systems and equipment submittals to the Government's Commissioning Authority (CxA) to review for completeness and applicability. Obtain validation from the CxA that the systems and equipment provided meet the requirements of the Contract documents and design intent, particularly as they relate to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. The CxA communicates deficiencies to the Contracting Officer. Submit the O&M manuals to the Contracting Officer upon a successful review of the corrections, and with the CxA recommendation for approval and acceptance of these O&M manuals. This work is in addition to the normal review procedures for O&M data.

1.4 OPERATION AND MAINTENANCE MANUAL FILE FORMAT

Assemble data packages into electronic Operation and Maintenance Manuals. Assemble each manual into a composite electronically indexed file using the most current version of Adobe Acrobat or similar software capable of producing PDF file format. Provide compact disks (CD) or data digital versatile disk (DVD) as appropriate, so that each one contains operation, maintenance and record files, project record documents, and training videos. Include a complete electronically linked operation and maintenance directory. Place one hard copy of each in cabinet in main mechanical room.

1.4.1 Organization

Bookmark Product and Drawing Information documents using the current version of CSI Masterformat numbering system, and arrange submittals using the specification sections as a structure. Use CSI Masterformat and UFGS numbers along with descriptive bookmarked titles that explain the content of the information that is being bookmarked.

1.4.2 CD or DVD Label and Disk Holder or Case

Provide the following information on the disk label and disk holder or case:

a. Building Number

b. Project Title

c. Activity and Location

d. Construction Contract Number

e. Prepared For: (Contracting Agency)

f. Prepared By: (Name, title, phone number and email address)

g. Include the disk content on the disk label

h. Date

i. Virus scanning program used

1.5 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

The following are a detailed description of the data package items listed in paragraph SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES.

1.5.1 Operating Instructions

Provide specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.5.1.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for operating conditions. List all residual hazards identified in the Activity Hazard Analysis provided under Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS. Provide recommended safeguards for each identified hazard.

1.5.1.2 Operator Prestart

Provide procedures required to install, set up, and prepare each system for use.

1.5.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.5.1.4 Normal Operations

Provide Control Diagrams with data to explain operation and control of systems and specific equipment. Provide narrative description of Normal Operating Procedures.

1.5.1.5 Emergency Operations

Provide Emergency Procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Provide Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of utility systems including required valve positions, valve locations and

zones or portions of systems controlled.

1.5.1.6 Operator Service Requirements

Provide instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gauge readings.

1.5.1.7 Environmental Conditions

Provide a list of Environmental Conditions (temperature, humidity, and other relevant data) that are best suited for the operation of each product, component or system. Describe conditions under which the item equipment should not be allowed to run.

1.5.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.5.1.9 Additional Requirements for HVAC Control Systems

Provide Data Package 5 and the following for control systems:

a. Narrative description on how to perform and apply functions, features, modes, and other operations, including unoccupied operation, seasonal changeover, manual operation, and alarms. Include detailed technical manual for programming and customizing control loops and algorithms.

b. Full as-built sequence of operations.

c. Copies of checkout tests and calibrations performed by the Contractor (not Cx tests).

d. Full points list. Provide a listing of rooms with the following information for each room:

    (1) Floor

    (2) Room number

    (3) Room name

    (4) Air handler unit ID

    (5) Reference drawing number

    (6) Air terminal unit tag ID

    (7) Heating or cooling valve tag ID

    (8) Minimum cfm

    (9) Maximum cfm

e. Full print out of all schedules and set points after testing and acceptance of the system.

f. Full as-built print out of software program.

g. Marking of system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.5.2 Preventive Maintenance

Provide the following information for preventive and scheduled maintenance to minimize repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.5.2.1 Lubrication Data

Include the following preventive maintenance lubrication data, in addition to instructions for lubrication required under paragraph OPERATOR SERVICE REQUIREMENTS:

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.

c. A Lubrication Schedule showing service interval frequency.

1.5.2.2 Preventive Maintenance Plan, Schedule, and Procedures

Provide manufacturer's schedule for routine preventive maintenance, inspections, condition monitoring (predictive tests) and adjustments required to ensure proper and economical operation and to minimize repairs. Provide instructions stating when the systems should be retested. Provide manufacturer's projection of preventive maintenance work-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft. For periodic calibrations, provide manufacturer's specified frequency and procedures for each separate operation.

a. Define the anticipated time required to perform each of each test (work-hours), test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize repairs.

b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.5.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E1971.

1.5.3 Repair

Provide manufacturer's recommended procedures and instructions for correcting problems and making repairs for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.5.3.1 Troubleshooting Guides and Diagnostic Techniques

Provide step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.5.3.2 Wiring Diagrams and Control Diagrams

Provide point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams, number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation configuration and numbering.

1.5.3.3 Repair Procedures

Provide instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.5.3.4 Removal and Replacement Instructions

Provide step-by-step procedures and a list of required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Use a combination of text and illustrations.

1.5.3.5 Spare Parts and Supply Lists

Provide lists of spare parts and supplies required for repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead-time to obtain.

1.5.3.6 Repair Work-Hours

Provide manufacturer's projection of repair work-hours including requirements by type of craft. Identify, and tabulate separately, repair that requires the equipment manufacturer to complete or to participate.

1.5.4 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.5.4.1 Product Submittal Data

Provide a copy of SD-03 Product Data submittals documented with the

required approval.

1.5.4.2 Certificates

Provide a copy of SD-07 Certificates submittals documented with the required approval.

1.5.4.3 Manufacturer's Instructions

Provide a copy of SD-08 Manufacturer's Instructions submittals documented with the required approval.

1.5.4.4 O&M Submittal Data

Provide a copy of SD-10 Operation and Maintenance Data submittals documented with the required approval.

1.5.4.5 Parts Identification

Provide identification and coverage for the parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing must show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Group the parts shown in the listings by components, assemblies, and subassemblies in accordance with the manufacturer's standard practice. Parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as typically shown in a master parts catalog.

1.5.4.6 Warranty Information

List and explain the various warranties and clearly identify the servicing and technical precautions prescribed by the manufacturers or contract documents in order to keep warranties in force. Include warranty information for primary components of the system. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.5.4.7 Extended Warranty Information

List all warranties for products, equipment, components, and sub-components whose duration exceeds one year. For each warranty listed, indicate the applicable specification section, duration, start date, end date, and the point of contact for warranty fulfillment. Also, list or reference the specific operation and maintenance procedures that must be performed to keep the warranty valid. Provide copies of warranties required by Section 01 78 00 CLOSEOUT SUBMITTALS.

1.5.4.8 Personnel Training Requirements

Provide information available from the manufacturers that is needed for use in training designated personnel to properly operate and maintain the equipment and systems.

1.5.4.9 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components. Provide final set points.

1.5.4.10 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms. Provide final set points.

1.5.4.11 Field Test Reports

Provide a copy of Field Test Reports (SD-06) submittals documented with the required approval.

1.5.4.12 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each Subcontractor who installed the product or equipment, or system. For each item, also provide the name address and telephone number of the manufacturer's representative and service organization that can provide replacements most convenient to the project site. Provide the name, address, and telephone number of the product, equipment, and system manufacturers.

1.6 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Provide the O&M data packages specified in individual technical sections. The information required in each type of data package follows:

1.6.1 Data Package 1

a. Safety precautions and hazards

b. Cleaning recommendations

c. Maintenance and repair procedures

d. Warranty information

e. Extended warranty information

f. Contractor information

g. Spare parts and supply list

1.6.2 Data Package 2

a. Safety precautions and hazards

b. Normal operations

c. Environmental conditions

d. Lubrication data

e. Preventive maintenance plan, schedule, and procedures

f. Cleaning recommendations

g. Maintenance and repair procedures

h. Removal and replacement instructions

i. Spare parts and supply list

j. Parts identification

k. Warranty information

l. Extended warranty information

m. Contractor information

1.6.3 Data Package 3

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Environmental conditions

g. Operating log

h. Lubrication data

i. Preventive maintenance plan, schedule, and procedures

j. Cleaning recommendations

k. Troubleshooting guides and diagnostic techniques

l. Wiring diagrams and control diagrams

m. Maintenance and repair procedures

n. Removal and replacement instructions

o. Spare parts and supply list

p. Product submittal data

q. O&M submittal data

r. Parts identification

s. Warranty information

t. Extended warranty information

u. Testing equipment and special tool information

v. Testing and performance data

w. Contractor information

x. Field test reports

1.6.4 Data Package 4

a. Safety precautions and hazards

b. Operator prestart

c. Startup, shutdown, and post-shutdown procedures

d. Normal operations

e. Emergency operations

f. Operator service requirements

g. Environmental conditions

h. Operating log

i. Lubrication data

j. Preventive maintenance plan, schedule, and procedures

k. Cleaning recommendations

l. Troubleshooting guides and diagnostic techniques

m. Wiring diagrams and control diagrams

n. Repair procedures

o. Removal and replacement instructions

p. Spare parts and supply list

q. Repair work-hours

r. Product submittal data

s. O&M submittal data

t. Parts identification

u. Warranty information

v. Extended warranty information

w. Personnel training requirements

x. Testing equipment and special tool information

y. Testing and performance data

z. Contractor information

aa. Field test reports

1.6.5 Data Package 5

a. Safety precautions and hazards

b. Operator prestart

c. Start-up, shutdown, and post-shutdown procedures

d. Normal operations

e. Environmental conditions

f. Preventive maintenance plan, schedule, and procedures

g. Troubleshooting guides and diagnostic techniques

h. Wiring and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

l. Product submittal data

m. Manufacturer's instructions

n. O&M submittal data

o. Parts identification

p. Testing equipment and special tool information

q. Warranty information

r. Extended warranty information

s. Testing and performance data

t. Contractor information

u. Field test reports

v. Additional requirements for HVAC control systems

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TRAINING

Prior to acceptance of the facility by the Contracting Officer for Beneficial Occupancy, provide comprehensive training for the systems and equipment specified in the technical specifications. The training must be targeted for the Facilities Management Specialist, building maintenance personnel, and applicable building occupants. Instructors must be well-versed in the particular systems that they are presenting. Address aspects of the eOMSI Manual, as submitted in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI). Training must include classroom or field lectures based on the system operating requirements. The location of classroom training requires approval by the Contracting Officer.

3.1.1 Training Plan

Submit a written training plan to the Contracting Officer for approval at least 60 calendar days prior to the scheduled training. Training plan must be approved by the Government's Commisioning Authority (CxA) prior to forwarding to the Contracting Officer. Also, coordinate the training schedule with the Contracting Officer and CxA. Include within the plan the following elements:

a. Equipment included in training

b. Intended audience

c. Location of training

d. Dates of training

e. Objectives

f. Outline of the information to be presented and subjects covered including description

g. Start and finish times and duration of training on each subject

h. Methods (e.g. classroom lecture, video, site walk-through, actual operational demonstrations, written handouts)

i. Instructor names and instructor qualifications for each subject

j. List of texts and other materials to be furnished by the Contractor that are required to support training

k. Description of proposed software to be used for video recording of training sessions.

3.1.2 Training Content

The core of this training must be based on manufacturer's recommendations and the operation and maintenance information. The CxA is responsible for overseeing and approving the content and adequacy of the training. Provide a brief summary of the FACILITY INFORMATION manual, and a more detailed presentation of the PRODUCT AND DRAWING MANUAL, specified in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT

INFORMATION (eOMSI). Spend 95 percent of the instruction time during the presentation on the OPERATION AND MAINTENANCE DATA. Include the following for each system training presentation:

a. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

b. Relevant health and safety issues.

c. Discussion of how the feature or system is environmentally responsive. Advise adjustments and optimizing methods for energy conservation.

d. Design intent.

e. Use of O&M Manual Files.

f. Review of control drawings and schematics.

g. Interactions with other systems.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

3.1.3 Training Outline

Provide the eOMSI Manual files as specified in Section 01 78 24.00 20, FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI), and a written course outline listing the major and minor topics to be discussed by the instructor on each day of the course to each trainee in the course. Provide the course outline 14 calendar days prior to the training.

3.1.4 Training Video Recording

Record classroom training session(s) on video. Provide to the Contracting Officer two copies of the training session(s) in DVD video recording format. Capture within the recording, in video and audio, the instructors' training presentations including question and answer periods with the attendees. The recording camera(s) must be attended by a person during the recording sessions to assure proper size of exhibits and projections during the recording are visible and readable when viewed as training.

3.1.5 Unresolved Questions from Attendees

If, at the end of the training course, there are questions from attendees that remain unresolved, the instructor must send the answers, in writing, to the Contracting Officer for transmittal to the attendees, and the training video must be modified to include the appropriate clarifications.

3.1.6 Validation of Training Completion

Ensure that each attendee at each training session signs a class roster daily to confirm Government participation in the training. At the completion of training, submit a signed validation letter that includes a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and copies of the signed class rosters. Provide two copies of

the validation to the Contracting Officer, and one copy to the Operation and Maintenance Manual Preparer for inclusion into the Manual's documentation.

3.1.7 Quality Control Coordination

Coordinate this training with the CxA in accordance with Section 01 45 00.05 20 DESIGN AND CONSTRUCTION QUALITY CONTROL FOR DESIGN-BUILD.

-- End of Section --

SECTION 01 78 24.00 20

FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI)
03/23

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. DEPARTMENT OF DEFENSE (DOD)

FC 1-300-09N	(2014; with Change 4) Navy and Marine Corps Design Procedures

1.2 DEFINITIONS AND ABBREVIATIONS

1.2.1 eOMSI Manual

Manual (PDF file) provided by the Contractor that includes, but is not limited to, product information, a facility description with photos, and a list of primary facility systems.

1.2.2 Systems

The words "system", "systems", and "equipment", when used in this document refer to as-built systems and equipment.

1.2.3 Computer Assisted Design and Drafting (CADD)

Electronic Computer Assisted Design and Drafting graphic software program that is used to create facility design contract documents and Record Drawings.

1.2.4 KTR

An abbreviation for "Contractor."

1.3 EOMSI MEETINGS

1.3.1

Be prepared to discuss the following during this meeting:

a. eOMSI Manual Development Meetings

b. Processes and methods of gathering eOMSI Manual information during construction.

c. The eOMSI Submittals schedule. Include the eOMSI submittal schedule on the Baseline Construction Schedule.

1.3.2 eOMSI Manual Coordination Meeting

Facilitate a meeting after the Post-Award Kickoff Meeting prior to the

submission of the eOMSI Progress Submittal. Meeting attendance must include the Contractor's eOMSI Manual Preparer, and Quality Control Manager, and the Government's Design Manager (DM), Contracting Officer's Representative, and NAVFAC Public Works (PW) Facilities Management Division (FMD). Include any Mechanical, Electrical, and Fire Protection Sub-Contractors.

The purpose of this meeting is to reach a mutual understanding of the scope of work concerning the contract requirements for eOMSI and coordinate the efforts necessary by both the Government and Contractor to ensure an accurate collection, preparation and timely Government review of eOMSI.

1.3.3 Facility Turnover Meeting

Include eOMSI in NAVFAC Red Zone (NRZ) facility turnover meetings as specified in Section 01 30 00, ADMINISTRATIVE REQUIREMENTS.

1.4 SUBMITTAL SCHEDULING

1.4.1 eOMSI, Progress Submittal

Submit the Progress submittal when construction is approximately 50 percent complete, to the Contracting Officer for approval. Provide eOMSI Manual Files (Bookmarked PDF). Include the elements and portions of system construction completed up to this point.

The purpose of this submittal is to verify progress is in accordance with contract requirements as discussed during the eOMSI Coordination Meeting. Field verify a portion of the eOMSI information in accordance with paragraph FIELD VERIFICATION.

1.4.2 eOMSI, Prefinal Submittal

Submit the 100 percent submittal of the eOMSI Prefinal Submittal to the Contracting Officer for approval within 90 calendar days of the Beneficial Occupancy Date (BOD). This submittal must provide a complete, working document that can be used to operate and maintain the facility. Any portion of the submittal that is incomplete or inaccurate requires the entire submittal to be returned for correction. Any discrepancies discovered during the Government's review of eOMSI Progress submittal must be corrected prior to the Prefinal submission.

The eOMSI Prefinal Submittal must include eOMSI Manual Files (Bookmarked PDF).

1.4.3 eOMSI, Final Submittal

Submit completed eOMSI Manual Files (Bookmarked PDF). The Final submittal is due at BOD. Any discrepancies discovered during the Government's review of the Prefinal eOMSI submittal, including the Field Verification, must be corrected prior to the Final eOMSI submission.

1.5 UNITS OF MEASURE

Provide eOMSI utilizing the English Inch-Pound units of measure

1.6 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL

PROCEDURES:

SD-11 Closeout Submittals

eOMSI, Progress Submittal; G

eOMSI, Prefinal Submittal; G

eOMSI, Final Submittal; G

PART 2 PRODUCTS

2.1 eOMSI FILES FORMAT

Format eOMSI manuals and files in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Include a complete electronically linked operation and maintenance directory. Provide four electronic copies of the eOMSI Manuals to the Contracting Officer for approval.

Scan eOMSI Manuals and Files for viruses, malware, and spyware using a commercially available scanning program that is routinely updated to identify and remove current virus threats. Provide one hard copy of eOMSI Manuals and Files in the cabinet in the main mechanical room.

2.1.1 eOMSI Manual Organization

Organize the eOMSI Manuals into two parts: 1) Product and Drawing Information, and 2) Facility Information. Bookmark the PDF files for easy access to the information.

a. Bookmark Product and Drawing Information documents in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

b. Bookmark Facility Information to at least one level lower than the major system.

2.1.2 eOMSI Manual CD or DVD Disk Label and Disk Holder or Case

Provide disks in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. At a minimum, provide four (4) disks and place one hard copy of all O&M Data in the cabinet in the main mechanical room.

2.2 eOMSI MANUAL

2.2.1 Product and Drawing Information

Provide an organized record of the facility products, materials, equipment, and minimum information necessary to operate the facility. Provide Product and Drawing Information for the systems in the final constructed facility.

2.2.1.1 O&M Data

As a minimum, provide the approved O&M Data, submitted in the technical specification sections, in accordance with paragraph TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

2.2.1.2 Record Drawings

Provide an electronic, PDF copy of the Record Drawings, prepared in accordance with FC 1-300-09N and 01 78 00 CLOSEOUT SUBMITTALS. Bookmark drawings using the sheet title and sheet number.

Include Record Drawings as part of the Red-Zone specified in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS.

2.2.1.3 Utility Record Drawings

Using Record Source Drawings, show and document details of the actual installation of the utility systems; annotate and highlight the eOMSI information. Provide Utility Record Drawings in PDF format. Provide the following drawings at a large enough scale to differentiate designated isolation units from surrounding valves and switches.

a. Utility Schematic Diagrams - Provide a one line schematic diagram for each utility system such as power, water, wastewater, and gas/fuel. Schematic diagram must show from the point where the utility line is connected to the mainline up to the five-foot connection point to the facility. Indicate location or area designation for route of transmission or distribution lines; locations of duct banks, manholes/ handholes or poles; isolation units such as valves and switches; and utility facilities such as pump stations, lift stations, and substations.

b. Enlarged Connection and Cutoff Plans - Provide enlarged floor plans that provide information between the five foot utility connection point and where utilities connect to facility distribution. Enlarge floor plans/ elevations of the rooms where the utility enters the building and indicate on these plans locations of the main interior and exterior connection and cutoff points for the utilities. Also enlarge floor plans / elevations of the rooms where equipment is located. Include enough information to enable someone unfamiliar with the facility to locate the connection and cutoff points. Indicate designations such as room number, panel number, circuit breaker, or valve number, of each utility and equipment connection and cutoff point, and what that connection and cutoff point controls.

2.2.2 Facility Information

Provide the following in Facility Information:

2.2.2.1 General Facility and System Description

Describe the function of the facility. Detail the overall dimensions of the facility, number of floors, foundation type, expected number of occupants, and facility Category Code. List and generally describe all the facility systems and any special building features (for example, HVAC Controls, Sprinkler Systems, Cranes, Elevators, and Generators). Include photographs marked up and labeled to show key operating components and the overall facility appearance.

2.2.2.2 Floor Plans

Provide uncluttered, legible 11 by 17 inches floor plans. Include room numbers, type or function of spaces, and overall facility dimensions on the floor plans. Do not include items such as construction instructions,

references, or frame numbers.

2.2.2.3 Floor Coverings, Wall Surfaces, and Ceiling Surfaces

Provide a table that lists by room number (including hallways and common spaces), the type, and area of finish, manufacturer's product name, identifying number, and color. Include a facility summary of the total area for each type of space and floor, wall, or ceiling finish in the table.

2.2.2.4 Windows

Provide a table that lists by room number (including hallways and common spaces), the type of window, window size, number of each size and type, special features, manufacturer's product name, identifying number, and color. The table must include a facility summary of the total number for each type and size of window.

2.2.2.5 Roofing

Provide the total area of each type of roof surface and system. Provide the name of the roofing product and system; manufacturer's, supplier's, and installer's names, addresses, and phone numbers; manufacturer's product name, identifying number, and color. For each type of roof, provide a recommended inspection, maintenance and repair schedule that details checkpoints, frequencies, and prohibited practices. List roof structural load limits.

2.2.2.6 HVAC Filters

Provide a table that lists the quantity, type, size, and location of each HVAC filter, manufacturer's product name, and identifying number.

2.2.2.7 Plumbing Fixtures

Provide a table that lists by room number, the number and type of plumbing and bathroom plumbing fixtures (for example, sinks, water closets, urinals, showers and drinking fountains).

2.2.2.8 Lighting Fixtures

Provide a table that lists by room number (including hallways and common spaces), the type of lighting fixture, ballast, number of lighting fixtures, type of lamps and number of lamps, and the manufacturer's product name and the identifying number. The table must include a facility summary of the total number of fixtures of each type and number of lamps of each type.

2.2.2.9 Equipment Listing

Provide a table that lists the major equipment shown on the design equipment schedules. Show the item descriptions, locations, model numbers; and the names, addresses, and telephone numbers of the manufacturers, suppliers, contractors, and subcontractors.

2.2.2.10 System Flow Diagrams

Provide a flow diagram indicating system liquid, air or gas flow during normal operations. Integrate the system components into the diagram. A compilation of non-integrated, flow diagrams for the individual system

components are not acceptable.

2.2.2.11 Valve List

Provide a list of all valves associated with the system. Show valve type, identification number, function, location and normal operating position.

2.2.2.12 Riser Diagrams

Provide riser diagrams and settings of equipment.

PART 3 EXECUTION

3.1 FIELD VERIFICATION

Field verify eOMSI Maximo and Warranty Binder information with Contractor and Government personnel. Include the following personnel in this meeting: Contractor's eOMSI Manual and Facility Data Workbook Preparer and Quality Control Manager, and the Government's Contracting Officer's Representative and NAVFAC PW FMD. Request, and provide, an eOMSI Field Verification Meeting no sooner than 14 calendar days after submission of the Progress eOMSI submittal, and another, no sooner than 14 calendar days after submission of the Prefinal eOMSI submittal.

100 percent accuracy of eOMSI Maximo and Warranty Binder information is required for successful field verification.

3.2 eOMSI TRAINING

Provide training on eOMSI Manuals in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

-- End of Section --

SECTION 01 78 30.00 22

GIS DATA DELIVERABLES

5/22

PART 1 GENERAL

1.1 OBJECTIVE

The primary objective of this section is to provide detailed specifications for collection and delivery of geospatial data commonly referred to as Geographic Information System (GIS) data. Additionally, this section shall provide guidance to ensure that all GIS data delivered is compatible and will add value to the Marine Corps Base (MCB) Camp Lejeune Installation Geospatial Information and Services (IGI&S) GEOdatabase.

Failure to comply with the specifications outlined in this document will result in non-acceptance of data deliverables.

1.1.1 Point of Contact for MCB Camp Lejeune

The Points of Contact (POC) for assistance in preparation of GIS deliverables are as follows:

Resident Officer In Charge Of Construction
Construction Manager (CM)
1005 Michael Drive
Camp Lejeune, NC 28547-2521
(910) 451-2581 (Main Number)

Public Works Assigned
GIS Data Manager
1005 Michael Road
Camp Lejeune, NC 28547-2521
(910) 000-0000 ext 0000 TBD
Lejeune_PWD_GIS@usmc.mil

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

GIS Data Deliverables; G

1.3 GOVERNMENT GEOSPATIAL DATA, SCHEMA, AND DOMAINS

Geo-spatial data is based on the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) GEOFidelis Data Model. Because there are recurring business driven modifications and or adaptations within the SDSFIE schema, provide all spatial and non-spatial data in the most current version by the USMC utilized at the time of delivery.

1.3.1 Data Request Package Requirements

Request the existing GIS Data, Schema and Domain Properties by utilizing a Data Request Package (DRP), which is supplied via the government sponsor.

a. The DRP should be submitted prior to the start of data collection efforts and again 4 weeks prior to data delivery to ensure that GIS

data has been created and will be delivered utilizing the most up to date SDSFIE schema.

1.3.1.1 Instruction for submitting a Geospatial DRP to the CM or the Project Manager (PM)

a. Each CM or PM will provide DRP forms upon request from the contractor. Complete the request and include all information as instructed on the data request form.

b. Request only GIS data, schema and domains for feature classes that are relevant to the contract and within the boundary of project area and provide justifications as necessary.

c. Attach the Scope of Work, which is defined by this GIS DATA DELIVERABLES section for each DPR submittal.

d. Return the DRP to the CM or PM for sponsorship and submittal as instructed with required attachments and justifications for submittal.

e. Incomplete forms may delay receipt of the requested GIS data.

f. GIS data deliverables do not supplement or replace as-built drawings.

1.3.2 Data Collection and Utility Locates

a. Utilize the most up to date SDSFIE Schema when delivering GIS Data.

b. Prior to GPS efforts all underground utilities are to be located utilizing a utility locating service in order to obtain and verify accurate feature locations.

c. Actual conditions in the field always supersede drawings. Locate and field verify all features to ensure location is correctly recorded.

d. Data will be created to represent the real world, for example, water, sewer, and transportations systems will be connected. All segments will be created from source to sink in the direction of flow.

e. Research may be required to collect data. Verification of existing data which is located in the Technical Records in the Public Works Department at 1005 Michael Street, MCB Camp Lejeune.

f. Infrastructure data, as identified in paragraph "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" may be collected utilizing Sub-Foot or better GPS data collection methods.

g. Utility data, as identified in paragraph "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" will be collected utilizing Survey Grade GPS data collection methods.

1.3.3 Attribute Data Requirements

a. All attributes will be populated in accordance with paragraph ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES and will be obtained via contract specifications, plans and record drawings.

b. Demolished / Removed Real Property data will be captured, attributed and delivered in the Disposal feature classes which include Disposal

Facility Area, Disposal Facility Line and Disposal Facility Point.

c. Demolished / Removed UTILITY data will be captured, attributed and delivered by creating a new feature class which will consists of adding DEMO to the feature's naming convention for each feature, such as, but not limited to the following examples; DEMO.WastUtilNode_SPump (point), DEMO.Feat_SwRetentionBasinArea,(polygon), and DEMO.WastUtilSegment (polyline)

   1. The Contractor will be responsible for properly delivering demolished features with the current attributes associated with the feature and additionally updating the new contract number, date of demolishment, and optional status.

d. Spatial and non-spatial data may be copied from existing data, with the exception of specific attributes. Potable water wells are an exception to this rule and shall remain in the feature class and attributed as Removed or AIP.

e. Abandoned In Place (AIP) utility lines will be located and updated in the current feature data set and be attributed as AIP as required.

1.3.4 GIS Topology Rules for Geospatial Data

All data must be created using GIS topology rules for polygons, points and lines, such as, but not limited to the following examples:

a. Utility and transportation systems will be created from source to sink.

b. All utilities shall be drawn in the direction of flow with no breaks in polyline except for fittings, manholes and other features nodes within the feature Dataset.

c. All utility or infrastructure system data, which is, but is not limited to, transportation system and electrical, water, thermal distribution, and wastewater collection, etc., will be created using GIS spatial connectivity rules which specify that vertex, edge and endpoints be snapped to features within the system.

d. All polygons will be closed without slivers and be topologically correct.

e. All polylines will be topologically correct, and should be connected to avoid undershoots, overshoots and dangles and will cross only if they share a point in common, at least one of which is not an endpoint.

f. For all Polygons, Polylines and points rules; please reference illustrating topology rules in ArcGIS at www.esri.com.

1.3.5 Global Positioning System (GPS) Data Collection

Utilize field survey GPS data collected by means of non-recreational GPS equipment

a. Only bench marks included in the North Carolina Geodetic Survey Base Station Network are to be used for GPS data collection.

b. Mission planning is essential. Utilize the best Position Dilution of Precision (PDOP) values for data accuracy.

c. Mission planning for GPS collection should be conducted when positional dilution of precision (PDOP) value is 4 or less.

d. Spatial accuracy requirements

1. Survey and Sub-Foot GPS grade data collection requirements are as follows:

i. Sub-Foot requirements:

1) All points shall be within plus or minus 12 inches

2) 95 percent accuracy rate for all points.

ii. Survey Grade requirements:

1) All points shall be within plus or minus 1 centimeter

2) 98 percent accuracy rate for all points

e. Make every effort to capture feature locations without using Offsets. All Offsets will be noted in the Final Report for each feature. Deliver report in PDF format.

1. Resubmittal of data will be required if PDOP planning was not observed per this specification.

1.3.6 Coordinate System Requirements

The data must be collected in the following Spatial Reference / Coordinate System for each feature for all MCB Camp Lejeune and surrounding bases:

1. Transverse Mercator (UTM) Zone 18N

a. GRS 1980 spheroid

b. North American Datum 1983 (NAD83) horizontal datum

c. North American Vertical Datum 1988 (NAVD88) vertical datum.

2. Domain precision of 1000 which will result in a database accuracy of 1/1000 m

1.3.7 Formats and Version Guidelines

All data deliverables shall be presented in the following formats and/or versions.

a. GIS data will be provided in an ArcGIS 10.8 or higher if a higher version is being used by the Government at the time of this project. Verify the ArcGIS version, via the CM or PM at the commencement of this contract.

b. Microsoft Windows 10 operating system, unless otherwise approved by the Government.

c. All reports and maps will be delivered as a hard copy and in a searchable Adobe Portable Document Format (PDF).

1.3.8 GIS Deliverable Submittal Requirements

All GIS Submittals will be submitted to the CM or PM and then analyzed by Government GIS personnel prior to final approval. Failure to comply with the specifications outlined in this document will result in non-acceptance of GIS data deliverables.

a. Prior to any spatial and non-spatial development, provide the Government with a technical approach document, in PDF format, for review and approval. The Technical Approach document will describe in detail the Contractor's technical approach for developing GIS data to include utility locating, collecting, and attributing all GIS data.

b. Provide a GIS deliverable at the end of each phase and at each Beneficial Occupancy Date (BOD) when contracted efforts, studies or construction are delivered in phases.

c. To ensure specifications compliance and quality a preliminary GIS deliverable shall be provided for review when 25 percent of the data has been collected and updated according to this specification.

d. Deliver digital geographic maps, GPS collection files and related data. All working text and documents and personal geodatabase will be included for review in the draft and final delivery of data in PDF format.

e. Do not deliver blank unused schema or feature class data with no attributes. Deliver only data pertinent to the contract that adds value to the Geodatabase per this section.

f. Do not include existing data in the GIS deliverable.

g. Spatial and non-spatial GIS data must be provided in a format that does not require translation or pre/post processing.

h. It is the Contractor's responsibility to perform quality assurance for all data and related materials required in this section prior to submitting product to the Government.

i. The data will be analyzed for discrepancies in subject content, correct format in accordance with this statement of work, and compatibility with the existing SDSFIE Schema as well as all other specifications included in this section.

1.3.9 GIS Deliverable Package Requirements

All reports must be provided in pdf format. Each GIS deliverable must contain the following information and be in the most up to date SDSFIE format utilized by the USMC at the time of delivery.

a. Digital and Paper Maps.

1. All maps of GIS DATA DELIVERABLES will be ANSI C size.

2. Each map will include a project title, contract number, scale, legend, standard symbology, attributes, i.e., building numbers, road names, etc.

3. All utilities will be labeled with direction of flow and segment line size.

4. Provide paper copy and pdf copies of Maps for project.

5. Provide a copy of all red-line construction drawings in pdf format.

6. Communication data will be provided on a separate map.

b. Provide all spatial and non-spatial data for review and acceptance.

c. Provide a report of specific procedures, list GPS equipment, software and versions that were utilized for the GPS data collection and creation of geospatial data.

d. Submit all GPS data files collected in the field.

e. Provide details on any offsets to include justification as to why offsets were utilized and which features and or points offsets were used.

f. Provide the source that was utilized for required attributes, such as redlines drawings and or field notes.

g. Summit DD form 1354, Transfer and Acceptance of DOD Real Property.

h. Provide a coversheet that specifies the CM / PM, contract number, contract title, point of contract for GIS related questions.

i. All geospatial data, pdf reports, spreadsheet, database files, reports, and maps will be submitted on a Digital Versatile Disc (DVD) platform.

j. Failure to comply will result in non - compliance and rejection of data.

1.3.10 Ownership

All digital files, hardcopy products, GPS raw data, source data acquired for this project, and related materials, including that furnished by the Government, will become the property of the Government and will not be issued, posted, distributed, or published by the Contractor. All documentation will be delivered in the final delivery.

Note: No endorsement of software or hardware is implied.

1.4 ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR REAL PROPERTY AND OTHER MISCELLANEOUS FEATURES THAT ARE NOT CONSIDERED A UTILITY

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required. Items in this section that require Survey Grade GPS are property identified in the feature class description.

1.4.1 Feature Dataset CLJN.CL.AccessControl

Locate, GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System

(GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.AccessControlPoint (point) -The location of a feature, manned or unmanned, intended to selectively restrict entrance to or use of a place or other resource.

a) accessControlType - The type of access control. Domain values, i.e., gate, tireShedder, barricade, etc.
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the feature.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) gatePurposeType - Purpose that the gate exists and functions under. Domain values i.e., decorative, insternalSecurity, perimaterSecurity, recreation, residential, safely, vehicleBarrier, other, etc.
h) gateTypeMaterial - The type of material of the gate. Domain values i.e., metal, steel, wood, wroughtiron, etc.
i) isBaseEntryPoint -The Yes / No indicator of whether or not the location is an entry point for the military installation.
j) isCheckpoint - Indicator if location is where officials check vehicle contents or personnel. Yes / No
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) isManned - Yes / No
n) isRangeAccess - Yes / No
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.AccessControlLine (polyline) - The location of a feature, manned or unmanned, intended to selectively restrict entrance to or use of a place or other resource.

a) accessControlTypeThe type of access control. Domain AccessControlType
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber- The contract number associated with the feature.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) gatePurposeType- - Purpose that the gate exists and functions under. Domain values i.e., decorative, insternalSecurity, perimaterSecurity, recreation, residential, safely,

vehicleBarrier, other, etc.

h) gateTypeMaterial - The type of material of the gate. Domain values i.e., metal, steel, wood, wroughtiron, etc.
i) gateUse - The type of a gate (or similar route barrier) based on its intended use.
j) mediald - gpsDataCollected
k) MetadataId - metaID000072
l) isBaseEntryPoint - Yes / No
m) isCheckpoint - Yes / No
n) isManned - Yes / No
o) isRangeAccess - Yes / No
p) operationalStatus- The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.BarricadePoint (point) - The coordinated series of obstacles designed or employed to channel, direct, restrict, delay, or stop the movement of personnel, equipment, or an opposing force and to impose additional losses in personnel, time, and equipment on the opposing force. Barricades can exist naturally, be man-made, or a combination of both.

a) accessControlType - The type of access control. Domain values, i.e., gate, tireShedder, barricade, etc.
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the feature.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) barricadeType -The type of barricade. Domain values i.e., bollard, bollardPipe, pedestrianBarrier, other, etc.
h) barricadeUse - The intended use of the barricade Domain values i.e., pedestrianTraffic, security, vehicularTraffic, etc.
i) gatePurposeType - Purpose that the gate exists and functions under. Domain values i.e., internalSecurity, perimeterSecurity, recreation, residential, safety, vechicleBarrier, etc.
j) gateTypeMaterial - The type of material of the gate. Domain values i.e., metal, steel, wood, wroughtiron, etc.
k) gateUse - The type of a gate (or similar route barrier) based on its intended use.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.BarricadeLine (polyline) - The coordinated series of obstacles designed or employed to channel, direct, restrict, delay, or stop the movement of personnel, equipment, or an opposing force and to impose additional losses in personnel, time, and equipment on the opposing force. Barricades can exist naturally, be man-made, or a combination of both.

a) accessControlType - The type of access control. Domain

values, i.e., gate, tireShedder, barricade, etc.

b) barricadeUse - The intended use of the barricade Domain values i.e., pedestrianTraffic, security, vehicularTraffic, etc.
c) builtDate - The calendar date on which the original construction was completed for a facility.
d) contractNumber - The contract number associated with the feature.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) gatePurposeType - Purpose that the gate exists and functions under. Domain values i.e., internalSecurity,
i) perimeterSecurity, recreation, residential, safety, vechicleBarrier, etc.
j) mediald - gpsDataCollected
k) l) MetadataId - metaID000072
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) gateTypeMaterial - The type of material of the gate. Domain values i.e., metal, steel, wood, wroughtiron, etc.

1.4.2 Feature Dataset CLJN.CL.CivilWorks

Locate, GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.PitOrQuarry (Polygon) - The location where material has been or is being excavated or extracted for use at another location.

a) featureDescription - The narrative describing the feature. (Review current data for description)
b) featureName - The common name of the feature. (Review current data for common name)
c) contractNumber - The contract number associated with the feature.
d) mediald - gpsDataCollected
e) MetadataId -metaID000072
f) isWaterFilled - Yes / No
g) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

1.4.3 Feature Dataset CLJN.CL.HarbourArea

Locate, GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.BoatRampPoint - (Point) - The partially submerged hard surfaced or non-hardsurface structure on a shoreline for launching or retrieving vessels or vehicles.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) isLighted - Yes / No
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.DockOrWharf (Polygon) - The location of a manmade water-land interface structure often used for access to boats, ships, or barges.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) dockType - The kind or type of the dock. Domain values i.e., access ramp, pier, slipway, general, etc.
d) dockUseType - The predominant use. Domain values i.e., fishing, fueling, loading, staging, etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) materialType - The material composition of the feature. Domain values i.e., concrete, steel, wood, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.

CLJN.CL.MarineNavigationAid (Point) - The physical object that serves as an aid to navigation. *Requires Survey Grade GPS.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature.

(Review current data for description)

e) featureName - The common name of the feature. (Review current data for common name)
f) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
g) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
h) isLighted - Yes / No
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) navaidType - Type of the navaid. Domain value i.e., buoyMarkerDangerPoint, buoyMarkerDangerPoint etc.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, closed, abandoned, etc.

1.4.4 Feature Dataset CLJN.CL.RealProperty

Locate, GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

Specific instruction for all Disposal polygons, polylines and points. All demolished or removed property shall be accounted for in the following 3 disposal features. A simple copy and paste with the following exceptions as explains in the disposal area, polyline and point may be permitted with the exception of the directions for attribution for each feature as noted. However, under no circumstance should potable water wells be removed from their original feature class. Potable wells are never deleted from their main feature, all that is required is the water wells are attributed in such a way that indicated if they are abandoned in Place (AIP) or Removed.

CLJN.CL.Disposal_FacilityArea (polygon)- The location of a facility asset in the DoD real property inventory for which a disposal action is being or has been taken to physically demolish, remove, or release the DoD of accountability for and control of the asset.

a) abandonedDate - The date the feature was abandoned. Leave blank if removed.
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the feature demolishment or abandonment.
d) ClassType - Population is contingent only if data is currently available for feature.
e) disposalCompletionDate - The actual calendar date of the disposal or abandonment of the asset.
f) facilityNumber - Asset Identification such as building or structure number.
g) featureDescription -Population is contingent only if data is currently available for feature.
h) featureName (Mandatory) - Feature Name and subtype
i) facilityIdfk - Population is contingent only if data is currently available for feature.
j) operationalStatus - The state of usability of the feature.

Domain values i.e., removed, abandoned, etc.

k) owner - Population is contingent only if data is currently available for feature.
l) removedDate - The date the feature was removed. Leave blank if abandoned.
m) realPropertyJurisdictionType - Population is contingent only if data is currently available for feature.
n) registryIdentifier - Population is contingent only if data is currently available for feature.
o) sourceFeatureClass (Mandatory) - The feature class containing the polygon feature.

CLJN.CL.Disposal_FacilityLine (polyline) - The location of a personal property asset in the DoD real property inventory for which a disposal action is being or has been taken to physically demolish, remove, or release the DoD of accountability for and control of the asset.

a) abandonedDate - The date the feature was abandoned. Leave blank if removed.
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the feature demolishment or abandoned.
d) classType - Population is contingent only if data is currently available for feature.
e) disposalCompletionDate - The actual calendar date of the disposal or abandonment of the asset.
f) facilityNumber - Asset Identification RoadName, fence, utility line, fence gate information, etc.
g) featureDescription - Population is contingent only if data is currently available for feature.
h) featureName (Mandatory) - Feature Name and subtype
i) operationalStatus - The state of usability of the feature. Domain values i.e., removed, abandoned, etc.
j) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
k) removedDate - The date the feature was removed. Leave blank if abandoned.
l) realPropertyJurisdictionType - The type of real property jurisdiction. Domain values i.e., tbd, etc.
m) registryIdentifier - Population is contingent only if data is currently available for feature.
n) sdsId - Population is contingent only if data is currently available for feature.
o) sourceFeatureClass (Mandatory) - The feature class containing the line feature.

CLJN.CL.Disposal_FacilityPoint (point) - The location of a personal property asset in the DoD real property inventory for which a disposal action is being or has been taken to physically demolish, remove, or release the DoD of accountability for and control of the asset.

a) abandonedDate - The date the feature was abandoned. Leave blank if removed.
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the

feature demolishment or abandoned.

d) ClassType - Population is contingent only if data is currently available for feature.
e) disposalCompletionDate - The actual calendar date of the disposal or abandonment of the asset.
f) facilityNumber - Asset Identification such as generator, ows, towers, etc.
g) featureDescription - Population is contingent only if data is currently available for feature.
h) featureName (Mandatory) - Feature Name and subtype
i) facilityIdfk - Population is contingent only if data is currently available for feature.
j) operationalStatus - The state of usability of the feature. Domain values i.e., removed, abandoned, etc.
k) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
l) removedDate - The date the feature was removed. Leave blank if abandoned.
m) realPropertyJurisdictionType - The type of real property jurisdiction. Domain values i.e., tbd, etc.
n) registryIdentifier - Population is contingent only if data is currently available for feature.
o) sdsId - Population is contingent only if data is currently available for feature.
p) sourceFeatureClass (Mandatory) - The feature class containing the point feature.

CLJN.CL.Bridge - Bridge (polygon) - The structure erected over a depression or an obstacle such as a body of water, railroad, etc., to provide a pathway for vehicles, rail services, pedestrians or to carry utility services.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the
c) facilityNumber - Asset number used for visual identification of the facility.
d) contractNumber - The contract number associated with the feature.
e) featureDescription - The narrative describing the feature. Value Base Area or Road Name Crossing
f) featureName - The common name of the feature. Pedestrian, Railroad, Road, other, etc.
g) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
h) heightUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) isFixed - Indicator of whether the bridge cannot be opened for navigation or other purposes. Yes / No
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.Building - Building (polygon) - The roofed and floored facility enclosed by exterior walls and consisting of one or more levels.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature if feature function does not accuracy address the description of building.
e) featureName - The common name of the feature. (Review current data for common name)
f) featureFunction - The purpose(s) of, or intended role(s) served by, the feature. Domain values i.e., Fishing (3), Aircraft Repair (341), Motor Vehicle Repair (343), Utilities (350), Water Treatment (362), Water Distribution (363), Residence (563), Guard (781), Government (811), Recreation (921) etc.
g) floorCount - The number of floors
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.Fence (polyline) - The freestanding structure designed to restrict or prevent movement across a boundary.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - FENCE or GATE.
f) FenceDesignType - The configuration of fabricated fence materials in a particular manner to build a fence. This may or may not include specifications of the post type(s). Domain values i.e., cross, postAndFrame, metalRail, postAndFrame, etc.
g) fenceFabricatedMaterialType - The fabricated material of the fence. Domain values i.e., barbedWire, chainLink, wroughtIron, metalOther, steel, wood, etc.
h) fencePrimaryMaterialType - The fundamental or raw substance of the fence. Domain values i.e., jute, metalOther, steel, wood, wroughtIron, etc.
i) fenceTopType - The fabricated material used as an upper barrier on the fence. Domain values i.e., spiked, electricfiedWire, etc.
j) fenceUseType - The purpose that the fence serves. Domain values, i.e., internalSecurity, perimeterSecurity, recreation, residential, safety, vechicleBarrier, etc.
k) heightAboveSurfaceLevel - The vertical distance measurement in feet.
l) heightUom - The unit of measure for the height measurement. Domain values 0.3048 metres or feet, etc.
m) mediald - gpsDataCollected

n) MetadataId - metaID000072
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.Gate (polyline) - A movable barrier that closes an opening in a fence, wall, or other enclosure or enclosure.

a) accessControlType - The type of access control. Domain values, i.e., gate etc.
b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the feature.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) gateTypeMaterial - The type of material of the gate. Domain values i.e., metal, steel, wood, wroughtiron, etc.
h) gatePurposeType - Purpose that the gate exists and functions under. Domain values i.e., decorative, insternalSecurity, perimaterSecurity, recreation, residential, safely, vehicleBarrier, other, etc.
i) gateTopType - The fabricated material used as an upper barrier on the fence. Domain values i.e., spiked,
j) isBaseEntryPoint - Yes or No
k) isCheckpoint - Yes or No
l) isManned - Yes or No
m) isPortable - Yes or No
n) isRangeAccess - Yes or No
o) mediald - gpsDataCollected
p) metadataId - metaID000072
q) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.RecreationBoundary (polygon) - The area designated for recreational purposes.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) isFormallyDelineated Yes / No
g) isHandicappedAccessible Yes / No
h) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.OpenStorage - Open Storage (polygon) - The non-covered and/or

covered storage areas, paved or otherwise established, for the storage of general supply materials or the receipt, processing, staging and issue of materials.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) mediald - gpsDataCollected
g) MetadataId - metaID000072
h) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.PavementSectionAirfieldArea - Pavement Section Airfield (polygon) - The location of a surface feature that comprises a section of a military airfield area. *Requires Survey Grade GPS.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) airfieldPavementUse - The use of the airfield. Domain values i.e., apron, fueling area, helipad, runway, taxiway, etc.
e) featureDescription - The narrative describing the feature. Values should include Area i.e., MCAS NEW RIVER, HADNOT POINT, RIFLE RANGE, MCOLF CAMP DAVIS, GSRA, HOSPITAL, etc.
f) featureName - The common name of the feature. (Review current data for common name)
g) highestElevation - The elevation from a specified vertical datum to the highest point on a feature.
h) highestElevationUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
i) isLighted - Yes / No
j) isPaved - Yes / No
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
o) runwayClassification - Classification of the runway. Domain values i.e., classA, classB, rotary, olf, etc.

CLJN.CL.PavementSectionParkingArea (polygon) - The area used for parking vehicles not including residential streets and driveways.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the

feature.

c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) isLighted - Yes / No
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
k) pavementSurfaceType - The type of material used to construct the surface of the pavement feature. Domain values i.e., asphalt, gravel, asphaltOverAsphaltConcrete, portlandCementConcrete, etc.
l) vehicleType - The type of vehicle permitted on the pavement section. Domain value i.e., all, gov, mil, pov, etc.

CLJN.CL.PavementSectionRoadway (polygon) - The surface area that comprise a road area, upon which vehicles drive and park.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - FULL Road Name All Capital Letters, i.e., D STREET, SIXTH STREET, FOSTER BOULEVARD, PORTLAND COURT
f) isPaved - Yes / No
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
k) pavementSurfaceType - The type of material used to construct the surface of the pavement feature. Domain values i.e., gravel, asphalt, asphaltOverAsphaltConcrete, portlandCementConcrete, etc.
l) roadSectionType - The type of road asset represented by this section. Domain values i.e., roadway, stagingArea, etc.
m) vehicleType - The type of vehicle permitted on the pavement section. Domain value i.e., all, gov, mil, pov, etc.

CLJN.CL.PavementSection - Pavement Section (polygon) - The portion of a pavement branch that differs in some aspect from other sections such that further segmentation is required to uniquely identify that section.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the

feature.

c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. Value i.e., GENERATOR PAD, TRANSFORER PAD, DUMPSTER PAD, BLEACHER PAD, UTILITY PANEL PAD, etc.
e) FeatureName - Slab.
f) featureName - The common name of the feature. (Review current data for common name)
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.

CLJN.CL.PavementSectionSidewalk (polygon) - The paved pedestrian walkway prepared to facilitate travel on foot. It may or may not be adjacent to a street/road.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) isLighted - Yes / No
g) isPaved - Yes / No
h) materialType - The material composition of the feature. Domain values i.e., asphalt, concrete, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.

CLJN.CL.StructureArea - Structure (polygon) - The facility, other than a building or linear structure, which is constructed on or in the land.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. Values i.e., Picnic Pavilion, Gazebo, Postal Shelter, Buss Stop, Golf Shelter, Vehicle Wash Platform, Outdoor Classroom,
e) featureName - The common name of the feature. Values i.e., CANOPY, PLATFORM, PAVILLION, RAMP, WEIGH STATION, etc.
f) mediald - gpsDataCollected
g) MetadataId - metaID000072

h) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.TowerPoint (point) - The vertical projection, higher than its diameter, generally used for observation, etc.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. I.e., Range, Observation, Cell, etc.
e) featureName - Common name utilized for Range Area name.
f) heightMax - Maximum height of structure in feet.
g) heightUom - The unit of measure for the height measurement. Domain values .3048 metres or feet, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) towerUseType - The primary operational use of the tower. Domain values, i.e., fire, observation, communication, training, etc.

CLJN.CL.TrafficControlLight (point) - A feature used to represent traffic lights.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) heightAboveSurfaceLevel - Maximum height of structure in feet.
g) heightAboveSurfaceLevelUom - The unit of measure for the height measurement. Domain values .3048 metres or feet, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.WallLine - Wall - The linear feature used for separation of facilities, ornamental decoration, or structural reinforcement.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.

d) featureDescription - The narrative describing the feature. Values i.e., BENCH, DUMSPTER ENCLOSURE, UTILITY ENCLOSURE, RETAINING WALL, BLAST PROTECTION, BAFFLE WALL, MECHANICAL YARD, etc.
e) featureName - The common name of the feature. (Review current data for common name)
f) height - The height of the feature in feet.
g) heightUom - The unit of measure for the height measurement. Domain values .3048 metres or feet, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) wallMaterialType - The material from which the majority of the wall is constructed. Domain values i.e., brick, cinderblock, grass, glassBlock, masonry, wood, etc.

1.4.5 Feature Dataset CLJN.CL.Recreation

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.RecreationTrail - Recreation Trail (Polyline) - The path or walkway providing opportunity for physical activities.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature area. Values i.e., HADNOT POINT, FRECH CREEK, WALLAS CREEK, MCAS, etc.
e) featureName - The common name of the feature such as common trail name. Values, i.e., GREENWAY, MCAS, KNOX, etc.
f) Mediald - gpsDataCollected
g) MetadataId - metaID000072
h) meterialType - The material composition of the feature. Domain values i.e., asphalt, concrete, etc.
i) officialLength - The officially reported length of the feature in feet.
j) officialLengthUom - The official length. Domain values i.e. 0.3048 metres, feet, etc.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.Playground - Playground (Polygon) The area designed for children to play outdoors.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the

feature.

c) featureDescription - The narrative describing the feature. (Review current data for description).
d) featureName - The common name of the feature. (Review current data for common name)
e) featureName - The common name of the feature such as common trail name.
f) isHandicappedAccessible - Yes / No
g) MediaId - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
k) isHandicappedAccessible - Yes / No
l) playgroundCategory - Playground categorization by physical location on the installation. Domain values i.e., childDevCenter, generalPurpose, housingArea, school, etc.
m) playgroundMaterial - The primary material that the play pieces are constructed from. Domain values i.e., paintedMetal, plastic, vinylCoatedMetal, wood, etc.
n) recreationFeatureType - The type of recreation feature. Domain values i.e., paintball, playground, obstacleCourse, picnicSite, tennisCourt, volleyballCourt, swimmingPool, etc.
o) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
p) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.

CLJN.CL.RecreationFeatureArea - Recreation Feature Area (Polygon) - The location of an object or other physical asset associated with a recreation site. - Recreation area, i.e., swimming pool, basketball, tennis, baseball, football, and other recreation features.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) facilityNumber - Asset number used for visual identification of the facility.
c) contractNumber - The contract number associated with the feature.
d) featureDescription - The narrative describing the feature.
e) featureName - The common name of the feature if not addressed in RecreationFeatureType field.
f) mediaId - gpsDataCollected
g) MetadataId - metaID000072
h) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
i) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
j) isHandicappedAccessible - Recreation Area has a formal designation. Yes / No
k) isIndoor - Yes or No
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.

n) RecreationFeatureType - The type of recreation feature. Domain values. i.e., athleticCourt, athleticField, basketballCourt, climbingStructure, dugout, exerciseStation, footballField, picnicSite, recreationalFirearmsRange, volleyballCourt, etc.

1.4.6 Feature Dataset CLJN.CL.Transportation

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.Sign - Sign (point) - The structure that conveys directional, warning, or other information.

a) builtDate - The calendar date on which the original construction was completed for a facility.
b) contractNumber - The contract number associated with the feature.
c) mediald - gpsDataCollected
d) MetadataId - metaID000072
e) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
f) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
g) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
h) signAssemblyType - The type of sign assembly material. Domain values i.e., IBeamSteelBreakaway, PedestrialPole, SignalMastArm, signalPole, fire, safety, etc.
i) signText - The text displayed on the sign.
j) signType - The type of sign. Domain values i.e., regulatory, school, warning, etc.
k) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.

CLJN.CL.RoadCenterline - The center of a roadway, as measured from the edge of the navigable road with the paved or unpaved surface. Polylines is to be drawn in direction of flow with no breaks except where naturally occurring such as intersections and crossings.

a) dataSource - The agency that last updated the record.
b) dateUpdated - The date the record was created or last modified.
c) elevationFrom - Elevation value at start of segment.
d) elevationTo - Elevation value at end of segment.
e) featureDescription - The narrative describing the feature.
f) featureName - the common name of the feature.
g) fullStreetName - The combined full street name.
h) isPaved - The yes or no indicator of whether the feature has a paved surface. Domain values i.e., yes, no.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072

k) numLanes - The number of traffic lanes throughout the length of the centerline.
l) oneWayDirection - The one-way road directionality. Domain values i.e. ft, tf, b, etc.
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) owner - The entity that owns the feature. Domain values, i.e., usmc, ncdot, etc.
o) roadClass - The general description of the type of road, based on the US Census MAF/TIGER Feature Classification Codes (MTFCC). Domain values i.e., primary, secondary, local, etc.
p) roadWidth - The width of the feature.
q) roadWidthUom - The width unit of measure in feet
r) Domain: GsipLengthUom (i.e. usSurveyFoot, metre, etc.)
s) speedLimit - The posted speed limit in MPH.
t) verticalDatum - The vertical reference datum for the z location value. Domain values i.e. navd88, etc.
u) verticalEpoch - The time period epoch to which the elevation measurement is referenced. Domain values i.e., opus, etc.

1.4.7 Attrribute Data Collection and GPS Requirements for Utilities

Locate, GPS and collect attribute data as specified for each feature listed with (Survey Grade GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

1.4.8 Feature Dataset CLJN.CL.Telecommunication

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.CommUtilSegment (polyline) - The location of a feature used for destruction in a communication network, particularity a cable for the transmission of a signal.

a) availableStrands - A list of fiber strands that are available.
b) cableCount - The number of copper pairs or fiber strands dedicated at a given location.
c) cableId - The cable identifier. (Review current data for description)
d) cableInstaller - The name of the group responsible for installation of the cable feature.
e) cableInstallType - The type of installation of the cables. Domain values i.e., aeria, directBuried, tunnel, underground, etc.
f) cableInsulation - The material composition of the insulation of the cable. Domain values i.e., pvc, xlpe, etc.
g) cableMaterial - The material composition of the cable. Domain values i.e., fiberOpt, cu, etc.
h) cableRoute - The start and end points of a cable section. (Review current data for description)

i) cableSheathing - The type of sheathing or insulation of the cable. Domain values i.e., bp, cpnm, cj, etc.
j) communicationsSegmentType - The type of communications network segment that this feature represents. Domain values i.e., cCoaxial, cFiberOptic, etc.
k) contractNumber - The contract number associated with the feature.
l) dateInService - The date the utility equipment was put in service.
m) featureDescription - The narrative describing the feature. (Review current data for description)
n) featureName - The common name of the feature. (Review current data for naming convention)
o) numberOfPairs - The number of wire pairs in the cable.
p) numberOfSingleModeStrands - The number of single-mode fiber strands.
q) numberOfStrands -The total number of fiber strands in the cable.
r) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
s) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
t) wireGauge - The gauge of the wire.

CLJN.CL.Feat_CUgEnclosureAccess (point) - The location of a communication access point to the related communication underground enclosure.

a) commUtilityFeatureType - Type of communication feature, i.e., cUGEnclosureAccess
b) contractNumber- The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for naming convention)
f) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., elevated, semiBuried, underground, etc.
g) mediaId - gpsDataCollected
h) MetadataId - metaID000072
i) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., communications.
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS,PPV, Company Name, etc.
l) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., communications, etc.

CLJN.CL.Feat_CPedestal (point) - The location of an above-ground enclosed structure that provides access to buried plant and a place to house utility features.

a) commUtilityFeatureType - Type of communication feature, i.e.,

cPedestal

b) contractNumber- The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for naming convention)
f) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., elevated, semiBuried, underground, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., communications.
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS,PPV, Company Name, etc.

CLJN.CL.CommUtilNode_CAntenna (point) - A device that can transmit or receive radio frequency signals.

a) communicationsNodeType - Type of communication node, i.e., cAntenna
b) contractNumber- The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for naming convention)
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) ownerName - The name of the item owner, i.e., MCB CL, MCCS,PPV, Company Name, etc.

CLJN.CL.Feat_CDuctBank (polyline) - The location of one or more ducts routed in parallel between two nodes.

a) commUtilityFeatureType - Type of communication feature, i.e., cDuctBank, etc.
b) contractNumber- The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) ductDiameterUom - - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) ductMaterial - The material composition of the feature. Domain values i.e., cooper, carbonSteel, etc.
f) featureDescription - The narrative describing the feature.

(Review current data for description)

g) featureName - The common name of the feature. (Review current data for naming convention)
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., communications.
k) NumberOfDucts
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS,PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., communications, etc.

1.4.9 Feature Dataset CLJN.CL.Utilities_Electrical Class

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.AlternativeEnergyArea (polygon) - The apparatus or device used for the production of energy from a renewable resource.

a) alternativeEnergyType - The type of alternative energy that the feature represents. Domain values i.e., photovoltaic, windTurbine, tbd, etc.
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) expansionDistributionNetwork - An indication of the distribution network interconnection an alternative energy feature uses to supply renewable energy. Domain values i.e., partOElectricalNetwork, etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, recreational, tbd, etc.
i) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
j) hasInverter - Yes / No
k) isMetered - Yes / No
l) mediald - gpsDataCollected
m) MetadataId - metaID000072
n) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
o) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

p) panelType - The type of panel present.
q) systemCapacityDc - The system capacity for the DC current produced by the solar photovoltaic array, preferably measured in kilowatts.

CLJN.CL.ElecUtilNode_EFuse (point) - The location of a device used to protect electric distribution devices from dangerously high currents, and reduce risk of severe injury for personnel.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) alternativeEnergyType - The type of alternative energy that the feature represents. Domain values i.e., photovoltaic, windTurbine, tbd, etc.
c) contractNumber - The contract number associated with the feature.
d) dateInService - The date the utility equipment was put in service.
e) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., efuse.
f) facilityNumber - Asset number used for visual identification of the facility.
g) featureDescription - The narrative describing the feature. (Review current data for description)
h) featureName - The common name of the feature. (Review current data for common name)
i) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, recreational, etc.
j) mediald - gpsDataCollected
k) MetadataId - metaID000071
l) numberOfPhases - Number of phases. Domain values i.e., one, two, three, etc.
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

CLJN.CL.ElecUtilNode_EGenerator (point) - The location of an available kinetic power source providing electricity.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eGenerator.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature.

(Review current data for description)

g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) generatorPowerSource - The power source of the generator. Domain values, i.e., gas, natural gas, propane, solarPower, etc.
j) generatorType - The type of electrical generator. Domain values i.e., emergency, primary, standby, etc.
k) isPortable - Yes / No
l) kvaRate - The rating of the complex power that the generator creates.
m) kwRate - The rating of the real power that the generator creates.
n) Manufacturer - The name of the manufacturer of the feature.
o) mediald - gpsDataCollected
p) MetadataId - metaID000072
q) modelNumber - The model, product, catalog, or item number for the feature item.
r) numberOfPhases - Number of phases. Domain values i.e., one, two, three, etc.
s) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
t) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
u) serialNumber - The manufacturer serial or unique identification number for the feature item.
v) voltage - The system voltage applied to the subject item. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.ElecUtilNode_EMeter (point) - The location of a device that measures the amount of electric energy consumed by the power user.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eMeter.
e) energySource - Indicates if the meter is measuring a standard power source or an alternative energy source. Domain values i.e., standardPowerSource, alternativeEnergySource, tbd, etc.
f) facilityNumber - Asset number used for visual identification of the facility.
g) featureDescription - The narrative describing the feature. (Review current data for description)
h) featureName - The common name of the feature. (Review current data for common name)
i) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.

j) isAmi - An indicator of whether or not the meter is an AMI or smart meter. Yes / No
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) meterType - The type of meter. Domain valves i.e., diaphragm, orifice, rotary, other, tbd, etc.
n) meterUse - An indication of the type of service the meter is monitoring. Domain valves eleMeter, generator, loadPoint, commercial, etc.
o) mountingType - The type of mounting for the subject item. Domain valves electrical, pole, pad, transformer, wall, etc.
p) numberOfPhases - Number of phases. Domain values i.e., one, two, three, etc.
q) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
r) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
s) transformerKva - The kva rate for the transformer.
t) voltage - The system voltage applied to the subject item. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.ElecUtilNode_ECircuitBreaker (point) - The location of a circuit breaker, an automatically operated electrical switch designed to protect an electrical circuit from damage caused by excess current from an overload or short circuit.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eCircuitBreaker.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

CLJN.CL.ElecUtilNode_EExteriorLight (point) - The location of a lighting device that is supplied by local distribution systems and is generally the only service for which the electric utility installs, operates and maintains utilization equipment.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eExteriorLight.
e) facilityNumber - Asset number used for visual identification of the facility.
f) exteriorLightType - The type of exterior light. Domain i.e., landscapelight, parkingLotLight, pedestrianLight, recreationFieldLight, securityLight, streetlight, sidewalkLight, etc.
g) featureDescription - The narrative describing the feature. (Review current data for description)
h) featureName - The common name of the feature. (Review current data for common name)
i) feederId - The Feeder Manager identifier assigned to electric feeders and devices that participate in a specific distribution circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) hasSensor - Yes / No
l) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
m) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
n) isSolar - Yes / No
o) lampType - The type of lamp per fixture. Domain i.e., led, hps, mh, etc.
p) mediald - gpsDataCollected
q) MetadataId - metaID000072
r) mountingType - The type of mounting for the subject item. Domain values i.e., pole, pad, transformer, wall, ground, etc.
s) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
t) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
u) voltage - The system voltage applied to the subject item. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.ElecUtilNode_EAirfieldLight (point) - The location of an electrical device used to illuminate runways, taxiways, helipads, aprons, and any other aircraft movement area, as well as to guide ground traffic.

a) airfieldLightType - The type of lighting present on the airfield. Domain value i.e., runwayLight, taxiwayLight, apron, helipadLight, approachLight, etc.
b) circuitId - An operator generated identifier locally used to

reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)

c) contractNumber - The contract number associated with the feature.
d) dateInService - The date the utility equipment was put in service
e) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eAirfieldLight.
f) facilityNumber - Asset number used for visual identification of the facility.
g) featureDescription - The narrative describing the feature. (Review current data for description)
h) featureName - The common name of the feature. (Review current data for common name)
i) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
j) mediald - gpsDataCollected
k) MetadataId - metaID000072
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) voltage - The system voltage applied to the subject item. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.ElecUtilNode_EEnergyStorage - The location of energy storage device or natural system capable of capture of energy produced at one time for use at a later time, within the relative span of a human lifetime.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eEnergyStorage.
e) featureDescription The narrative describing the feature. (Review current data for description)
f) featureName - The narrative describing the feature. (Review current data for description)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
i) ownerName - The name of the item owner, i.e., MCB CL, Company Name, etc.

CLJN.CL.ElecUtilNode_ESubstation (point) - A substation is a part of an

electrical generation, transmission, and distribution system. Substations transform voltage from high to low, or the reverse, or perform any of several other important functions. Between the generating station and consumer, electric power may flow through several substations at different voltage levels.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eSubstation
d) facilityNumber - Asset number used for visual identification of the facility.-
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) numberOfAvailableBays - The number of available bays at the substation.
k) numberOfCircuits - The number of circuits present at the substation.
l) numberOfSpareBreakers - The number of Spare Breakers in the substation.
m) numberOfTransformers - The number of transformers present.
n) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
o) ownerName - The name of the item owner, i.e., MCB CL, Company Name, etc.
p) voltageIn - The line-to-line voltage of the transmission line that is the source for the substation. Domain value i.e., 120V, 480V, 480YTo277V etc.
q) voltageOut - The line-to-line output voltage of the substation. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.Feat_ESubstation (Polygon) - The location of a facility in an electrical system where the voltage is reduced from transmission levels to distribution levels.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalUtilityFeatureType - The type of electrical utility feature. Domain value, i.e., eSubstation.
d) FaciltyNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse

area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.

h) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) networkType - The primary type of utility network to which this feature relates. Domain values i.e., electrical, etc.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

CLJN.CL.ElecUtilNode_EVoltageRegulator (point) - Current Regulators are different that Voltage Regulators and are used on the airfield lighting systems.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., ecurrentRegulator.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) numberOfPhases - Number of phases. Domain values i.e., one, two, three, etc.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

CLJN.CL.ElecUtilNode_ESwitchingStation (point) - A Switching Station is an electrical substation with only one voltage level, whose only function are switching actions.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD

GIS Office)

b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eSwitchingStation.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - Number of Switches.
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediaId- gpsDataCollected
j) MetadataId - metaID000072
k) numberOfSwitches -The number of switches present.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

CLJN.CL.ElecUtilNode_ESwitch (point) - The location of a device throughout distribution feeder circuits to redirect power flows to balance loads or for sectionalizing to allow repair of damaged lines or equipment.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes, i.e., eSwitch.
e) electricalSwitchInstallation - The mounting/installation style of the electrical switch. Domain values buildingMounted, padMounted, poleMounted, electricalPanel, etc.
f) electricalSwitchType - The type or style of electrical switch. Domain values circuitBrkr, disconnect, fuseCutout, gangDisc, hdSaftly, iso, reclosure, etc.
g) facilityNumber - Asset number used for visual identification of the facility.
h) featureDescription - The narrative describing the feature. (Review current data for description)
i) featureName - The common name of the feature. (Review current data for common name)
j) feederId - The Feeder Manager identifier assigned to electric feeders and devices that participate in a specific distribution circuit, utilize (tbd) if unknown.
k) feederId2 - The feeder Manager Identifier assigned if the electric device is supplied by second feeder, utilize. (Data

can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)

l) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
m) mediald - gpsDataCollected
n) MetadataId - metaID000072
o) numberOfPhases - Number of phases. Domain values i.e., one, two, three, etc.
p) numberOfSwitches - The number of switches present, i.e.,
q) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
r) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
s) switchPosition - Code indicating normal position of switch, per phase. Domain value closed, closedOpen, open, openClosed, unknown, tbd, etc.
t) voltage - The system voltage applied to the subject item. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.Feat_EPedestal (point) An aboveground service entrance, allowing maintenance access to the specific utility, usually electric or communications.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) bcontractNumber - The contract number associated with the feature.
c) cdateInService - The date the utility equipment was put in service.
d) electricalUtilityFeatureType - The type of electrical utility feature, i.e., ePedestal
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) featureName - The common name of the feature. (Review current data for common name)
i) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
j) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

ElecUtilNode_ETransformer - Electrical Utility Node - Transformer (point) - The location of an electric distribution or power transformer.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) electricalNodeType - The type of electrical network node that this feature represents. Domain values consist of electrical nodes i.e., eTransformer.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) feederId - The Feeder Manager identifier assigned to electric feeders and devices that participate in a specific distribution circuit, utilize (tbd) if unknown.
i) feederId2 - The feeder Manager Identifier assigned if the electric device is supplied by second feeder, utilize (tbd) if unknown.
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) Manufacture - The name of the manufacturer of the feature.
n) modelNumber - The model, product, catalog, or item number for the feature item.
o) mountingType - The type of mounting for the subject item. Domain value ground, pad, pole, transformer, wall, tbd, etc.
p) numberOfPhases - Number of phases. Domain values i.e., one, two, three, etc.
q) numberOfTransformers - The number of transformers present.
r) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
s) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
t) primaryVoltage - The voltage on the source side of the regulator with the associated units given. Domain value i.e., 120V, 480V, 480YTo277V etc.
u) secondaryVoltage - The voltage on the load side of the regulator with the associated units given. Domain value i.e., 120V, 480V, 480YTo277V etc.
v) totalKva - The total kva rate.
w) transformerType - The type of transformer. Domain values i.e., inverter, isolation, stepDown, stepUp, vault, etc.

CLJN.CL.ElecUtilSegment (polyline) - The location of a linear feature, particularly a cable that transmits, distributes or connects customers to electricity. All polylines shall be drawn in the direction of flow with no breaks except for what is naturally occurring such at nodes,

etc.

a) ElectricalSegmentType - The identifier for Primary or Secondary line segments within an electrical distribution system.
b) cableInsultaion - The material composition of the insulation of the cable. Domain value, i.e., ip, epr, pe, pvc, rubber, xipe, tdb, unknow, etc.
c) cableMaterial - The material composition of the cable. Domain value, i.e., ac, al, copper, fiberOpt, steel, steelGalv, etc.
d) cableSheathing - The type of sheathing or insulation of the cable. Domain value, i.e., shielded, weatherProof, asbestos, cellulose, tapeArmor, tbd, etc.
e) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
f) conductorSize - The size of the conductor.
g) contractNumber - The contract number associated with the feature.
h) dateInService - The date the utility equipment was put in service.
i) facilityNumber - Asset number used for visual identification of the facility.
j) featureDescription - The narrative describing the feature. (Review current data for description)
k) featureName - The common name of the feature. (Review current data for common name)
l) feederId - The Feeder Manager identifier assigned to electric feeders and devices that participate in a specific distribution circuit, utilize (tbd) if unknown.
m) feederId2 - The feeder Manager identifier assigned if the electric device is supplied by second feeder, utilize. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
n) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
o) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
p) mediald - gpsDataCollected
q) MetadataId - metaID000072
r) neutralSize - The size of a single neutral conductor. Domain value i.e., .5, .75, 1, 1.25, 2, 4, etc.
s) numberOfPhases - Number of phases. Value, i.e., 1, 2, 3, 4, etc.
t) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
u) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
v) voltage - The system voltage applied to the subject item. Domain value i.e., 120V, 480V, 480YTo277V etc.

CLJN.CL.Feat_EScadaSensor (point) - The location of a device that is used to remotely measure the status of electrical network components as part of a Supervisory Control and Data Acquisition (SCADA) system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalUtilityFeatureType - The type of electrical utility feature, i.e., eScadaSensor
d) FacilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., electrical.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

CLJN.CL.Feat_EDemarcationPoint (point) - The location where the electrical service provider ownership ends, and the customer ownership begins.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalUtilityFeatureType - The type of electrical utility feature, i.e., eDemarcationPoint.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., electrical.
l) operationalStatus - The state of usability of the feature

i.e., inService, notInService, abandoned, etc.

m) outsideProvider - The name of the outside provider for the Utility Feature. Value, i.e., owner of point may be 3rd party company.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

CLJN.CL.Feat_ESupportStructure (point) - The location of a structural framework that holds electric devices in an elevated position.

a) circuitId - An operator generated identifier locally used to reference a specific electrical circuit. (Data can be found in Geodatabase, i.e., RG2, FC1, CHB, IND, etc. or contact PWD GIS Office)
b) configurationType - The cable mounting configuration on the pole or tower. Domain value, i.e, armless, crossarmEqal, crossarmUnequal, shortArm, vertical, other, tbd, unknown, etc.
c) contractNumber - The contract number associated with the feature.
d) dateInService - The date the utility equipment was put in service.
e) electricalUtilityFeatureType - The type of electrical utility feature i.e., eSupportStructure.
f) facilityNumber - Asset number used for visual identification of the facility.
g) featureDescription - The narrative describing the feature. (Review current data for description)
h) featureName - The common name of the feature. (Review current data for common name)
i) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
j) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
k) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature in feet.
l) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
m) materialType - The material composition of the feature. Domain value, i.e., cement, fiberglass, log, metal, steel, wood, etc.
n) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., electrical.
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) serialNumber - Physical ID on pole that is a unique identifier added to pole on label by contractor/shop.
r) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

CLJN.CL.Feat_ESurfaceStructure - The location of a structural framework that holds electric devices in a position at or near the ground surface.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalStructureType - The type of electrical feature. Domain values i.e., electricalCabinet, handHole, junctionBox, manhole, etc.
d) electricalUtilityFeatureType - The type of electrical utility feature i.e., eSurfaceStructure.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The common name of the feature. (Review current data for common name)
i) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
j) mediaId - gpsDataCollected
k) MetadataId - metaID000072
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc. utilityNetworkSubtype

CLJN.CL.Feat_EAnchorGuy (point) - The location of a wire or set of wires running from the top of the pole to an anchor installed in the ground and consist of wires, appropriate fastenings and the anchor.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalUtilityFeatureType - The type of electrical utility feature, i.e., eAnchorGuy.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., electrical.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

CLJN.CL.Feat_EUgEnclosureAccess (point) - The location of an electrical access point to the related electrical underground enclosure.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) electricalUtilityFeatureType - The type of electrical utility feature i.e., eUgEnclosureAccess.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., electrical.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., electrical, etc.

1.4.10 Feature Dataset CLJN.CL.Utilities_Pol

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.PolUtilNode _OOwsSystem (point) - A filtering device placed in the fuel stream specifically to remove oil and water from the fuel.

a) contractNumber - The contract number associated with the feature.
b) dateInService The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.

d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
j) polNetworkSubType - The subtype of POL network in which this feature participates. Domain values i.e., contaminatedMedia, b5, automotiveDiesal, etc.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

CLJN.CL.PolUtilNode_OValve (point) -The location of a network component used to control flow, pressure, and level within fueling systems.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) depth - The distance, measured vertically downward to the base in inches.
d) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
f) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
g) facilityNumber - Asset number used for visual identification of the facility.
h) featureDescription - The narrative describing the feature. (Review current data for description)
i) featureName - The common name of the feature. (Review current data for common name)
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) polNetworkSubType - The subtype of POL network in which this feature participates. Domain values i.e., jetA, kerosene, marineDiesel, jp5, automotiveDiesel, etc.
o) polNodeType - The type of POL network node that this feature represents i.e., oValve, etc.
p) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
q) valveMaterial - The material composition of the valve. Domain values, i.e., ductileIron, carbonSteel, etc.
r) valveType - The normal status or operating position of the valve. Domain values i.e., check, gate, etc.

CLJN.CL.PolUtilNode_OMeter (point) - The location of a device that measures the volumetric flow rate of fuel passing through the meter.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) isAmi - Description of meter - meter is an AMI or smart meter. Yes / No
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) meterType - The type of meter. Domain valves i.e., diaphragm, orifice, rotary, other, tbd, etc.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, AmeriGas, etc., etc.
m) polNetworkSubType - The subtype of POL network in which this feature participates. Domain values i.e., jetA, kerosene, marineDiesel, jp5, automotiveDiesel, contaminatedMedia, etc.
n) polNodeType - The type of POL network node that this feature represents i.e,. oMeter

CLJN.CL.PolUtilNode_OTank (point) -The location of a container for storage of POL products at atmospheric pressure.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
h) locatedUnderground - Yes / No
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) nominalCapacity - The numeric volume of the feature when filled to its design capacity.
l) nominalCapacityUom - The unit of measure of the like named value. Domain values i.e., usgallon

m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) polNetworkSubType - The subtype of POL network in which this feature participates. Domain values i.e., jetA, kerosene, marineDiesel, jp5, automotiveDiesel, contaminatedMedia, etc.
p) secondaryContainment - Indicates the storage tank has a secondary containment area that contains spills. Domain values i.e., concreteVault, doubleBottom, plasticPanSystem, other, etc.
q) polNodeType - The type of POL network node that this feature represents. Domain values, i.e, (oTank)
r) secondaryContainment - Indicates the storage tank has a secondary containment area that contains spills, i.e., spillPan, etc.
s) storageTankProduct - The product contained in the storage tank. Domain values i.e., automotiveDiesel, bf5, dielectricOil, diesel, ethanol, gasoline, heatingOilUnspecified, jp, marineDiesel, propane, reclaimedFuel, usedCookingOil, usedFuel, usedOil, etc.
t) tankTopHeight - The top of the tank reservoir measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature.
u) tankTopHeightUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.

CLJN.CL.PolUtilNode_ODispenser (point) - The location of a machine at a fueling station that is used to pump fuel into vehicles or Aerospace Ground Equipment (AGE).w

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. Type of dispenser i.e., Marine, Aircraft, Automobile, HeavyEquipment, POV, GOV, etc.
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) mediaId - gpsDataCollected
i) MetadataId - metaID000072
j) networkType - The primary type of utility network to which this feature relates. Domain values i.e., (pol)
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) polNetworkSubType - The subtype of POL network in which this

feature participates. Domain values i.e., jetA, kerosene, marineDiesel, jp5, automotiveDiesel, contaminatedMedia, etc.

n) polNodeType - The type of POL network node that this feature represents i.e., oDispenser

CLJN.CL.PolUtilSegment (polyline) - The location of a linear feature, particularly a pipeline, used for the conveyance of petroleum, oil, and lubricants (POL) product. All polylines shall be drawn in the direction of flow with no breaks except for what is naturally occurring such at nodes, etc.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) depth - The distance, measured vertically downward to the base in inches.
d) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
f) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
g) facilityNumber - Asset number used for visual identification of the facility.
h) featureDescription - The narrative describing the feature. (Review current data for description)
i) featureName - The common name of the feature. (Review current data for common name)
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
l) materialType - The material composition of the feature. Domain values i.e., cooper, carbonSteel, etc.
m) medialD - gpsDataCollected
n) MetadataId - metaID000072
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) polNetworkSubType - The subtype of POL network in which this feature participates. Domain values i.e., jetA, kerosene, marineDiesel, jp5, automotiveDiesel, contaminatedMedia, etc.

1.4.11 Feature Dataset CLJN.CL.Utilities_Sewer

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.Feat_SDemarcationPoint (point) - The location where the

wastewater service provider ownership ends, and the customer ownership begins.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) networkType - The primary type of utility network to which this feature relates. Domain values i.e., wastewater, etc.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) outsideProvider - The name of the outside provider for the Utility Feature. Value, i.e., owner of point may be 3rd party company.
m) owner - The entity that owns the feature. Domain values, i.e., ppv, usmc, usn, leased, federalOther, etc.
n) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates. Domain values i.e., domesticSewage, oilyWaste, industricalWaste, etc.
o) wastewaterNodeType - The type of water utility feature i.e., sDemarcationPoint.

CLJN.CL.WastUtilNode_SMeter (point) - The location of a device or set of devices used to measure the flow of wastewater.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) isAmi - An indicator of whether or not the meter is an AMI or smart meter. Yes / No
h) Manufacturer - The name of the manufacturer of the feature.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) meterType - The type of meter. Domain valves i.e.,

diaphragm, orifice, rotary, other, tbd, etc.

l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates. Domain values i.e., domesticSewage, oilyWaste, industricalWaste, etc.
o) wastewaterNodeType - The type of wastewater network node that this feature represents i.e., smeter.

CLJN.CL.Feat_SScadaSensor (point) - The location of a device that is used to remotely measure the status of wastewater network components as part of a Supervisory Control and Data Acquisition (SCADA) system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., wastewater, etc.
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
l) utilityNetworkSubType - The subtype of wastewater network in which this feature participates. Domain values i.e., domesticSewage, etc.
m) wastewaterUtilityFeatureType - The type of water utility feature i.e., sScadaSensor

CLJN.CL.Feat_SUgEnclosureAccess (point) -The location of a wastewater access point to the related wastewater underground enclosure.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing,

recreational, training, water, etc.

g) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
h) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
i) invertElevation - The elevation of the bottom of the feature in inches.
j) invertElevationUom - The invert elevation. Domain values, i.e., length equal to .0254, inch, etc.
k) numberOfPipes - The number of pipes connecting to the manhole.
l) mediald - gpsDataCollected
m) MetadataId - metaID000072
n) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., wastewater.
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) rimElevation - The elevation at the top of the feature in feet.
r) rimElevationUom - The unit of measure for rim elevation. Domain values i.e. measurement equal to 0.3048 metres, etc.
s) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., wastewater, etc.
t) wastewaterUtilityFeatureType - The type of water utility feature i.e., sUgEnclosureAccess.

CLJN.CL.WastUtilNode_SCleanOut (point) - The location of a wastewater device access point in a lateral used for maintenance purposes.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
g) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) materialType - The material composition of the feature. Domain values i.e., copper, ductileIron, fiber, fiberglassReinforcedPolyester, galvanizedIron, galvanizedSteel, PVC, terracotta, etc.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

n) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
o) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., scleanOut.

CLJN.CL.WastUtilNode_SFitting (point) - The location of a mechanical device on the wastewater system that caps or plugs a single pipe, or connects two or more pipes.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) fittingMaterial - The material of the pipe fitting. Domain values i.e., Domain values i.e., copper, ductileIron, fiber, fiberglassReinforcedPolyester, galvanizedIron, galvanizedSteel, PVC, steel, etc.
i) fittingType - The type of pipe fitting. Domain values, i.e., bend, reducer, tee, plug, etc.
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) mediald - digitized
l) MetadataId - metaID000071
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
p) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., sFitting.

CLJN.CL.WastUtilNode_SSystemValve (point) - The location of a device that regulates, directs, or controls the flow of wastewater.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature.

(Review current data for description)

g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) valveMaterial - The material composition of the valve. Domain values, i.e., ductileIron, carbonSteel, etc.
n) valvePosition - The normal status or operating position of the valve. Domain values i.e., normallyClosed, normallyOpen, other, tbd, unknown.
o) valveType - The normal status or operating position of the valve. Domain values i.e., flowControl, butterfly, check, gate, postIndicator, etc.
p) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
q) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., sSystemValve.

CLJN.CL.WastUtilNode_SReleaseValve (point) - The location of a wastewater device used to purge air from a force main.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) valveMaterial - The material composition of the valve. Domain values, i.e., ductileIron, carbonSteel, etc.
n) valveType - The normal status or operating position of the valve. Domain values i.e., airRelease.
o) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
p) wastewaterNodeType - The type of wastewater network node that

this feature represents. i.e., sReleaseValve.

CLJN.CL.WastUtilNode_SGreaseTrap (point) - The location of a tank which separates grease from water, collects the grease for removal, and allows the water to exit.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediaId - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
k) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
l) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., sGreaseTrap.

CLJN.CL.WastUtilNode_STank (point) - The location of a container for storage of products associated with the wastewater network.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) diameter - Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription- The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
j) hasSecondaryContainment - Yes / No
k) materialType - The material composition of the feature. Domain values i.e., concrete, etc.
l) nominalCapacity - The unit total numeric capacity in gallons.

m) nominalCapacityUom - The unit of measure of the like named value i.e., usGallon
n) mediald - gpsDataCollected
o) MetadataId - metaID000072
p) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
q) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc
r) storageTankProduct - The product contained in the storage tank. Domain values i.e., oilyWastewater, rawWater, wasteFuel.
s) volume - The volumetric capacity of the feature
t) volumeUom - The unit of measure of the like named value i.e., usGallon
u) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, oilyWaste, etc.
v) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e.,stank.
w) width - The dimension of a feature in feet.
x) widthUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.

CLJN.CL.WastUtilNode_SOilWateSeparator (point) - The location of a device or structure placed in the wastewater stream to separate water from oil products.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) nominalCapacity - The unit total numeric capacity in gallons.
j) nominalCapacityUom - The unit of measure of the like named value i.e., usGallon
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, oilyWaste, etc.
n) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., sOilWaterSeparator.

CLJN.CL.WastUtilNode_SPump (point) - The location of a piece of wastewater equipment that adds energy to a fluid being conveyed through

a pipe or other closed conduit.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) isMainPump - Yes / No
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
l) pumpType - Type of pump. Domain values i.e., liftstation, booster, submersible, grinder, etc.
m) ratedFlow - The common rate of flow of each pump.
n) ratedFlowUom - The rate of flow for each pump. Domain value i.e., galMin
o) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
p) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., sPump.

CLJN.CL.Feat_SPumpStation (polygon) - The location of a facility that collects and discharges wastewater via pumps.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature.
e) featureDescription - The narrative describing the feature. (Review current data for description)
f) featureName - The common name of the feature. (Review current data for common name)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) hasGeneratorBackup - Yes / No
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) isMainPump - Yes / No
l) nominalCapacity - The station total capacity in gallons.
m) nominalCapacityUom - The unit of measure of the like named value i.e., usGallon
n) numberOfPumps - The number of pumps in the feature.
o) operationalStatus - The state of usability of the feature

i.e., inService, notInService, abandoned, etc.

p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) pumpStationType - Type of pumping station. Domain value i.e., pumpingStation, ejectorStation, liftStation, etc.
r) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
s) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., sPumpStation.

CLJN.CL.Feat_SSepticTankPoint (point) - The location of a small-scale anaerobic digester and leach field designed to treat wastewater from an individual facility, and is not connected to the wastewater collection system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) materialType - The material composition of the feature. Domain values i.e., plastic, concrete, fiberglass, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., wastewater.
k) nominalCapacity - The unit total numeric capacity in gallons.
l) nominalCapacityUom - The unit of measure of the like named value i.e., usGallon
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) secondaryContainment - Indicates the storage tank has a secondary containment area that contains spills. Domain values i.e., concreteVault, doubleBottom, plasticPanSystem, other, etc.
o) septicTankType - The type of septic tank. Domain values, i.e., mound, septicTank, etc.
p) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., domesticSewage, etc.
q) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
r) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, oilyWaste, etc.
s) wastewaterNodeType - The type of wastewater network node that this feature represents. i.e., tbd

CLJN.CL.WastUtilSegment (polyline) - The location of a feature used for

the conveyance of wastewater. All polylines shall be drawn in the direction of flow with no breaks except for what is naturally occurring such at nodes, etc.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) materialType - The material composition of the feature. Domain values i.e., asbestosCement, pvc, etc.
j) invertElevationDownstream - Numeric number of the elevation downstream invert in inches.
k) invertElevationDownstreamUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, etc.
l) invertElevationUpstream - Numeric number of the elevation upstream invert in inches.
m) invertElevationUpstreamUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, etc.
n) isLined - Yes / No
o) mediald - gpsDataCollected
p) MetadataId - metaID000072
q) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
r) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
s) pipeType - The type of pipe used. Domain values i.e., box, circular, pipArch, tbd, etc.
t) slope - The slope of the bottom of the subject item expressed as a percentage.
u) wastewaterNetworkSubType - The subtype of wastewater network in which this feature participates, i.e., domesticSewage, etc.
v) wastewaterSegmentType - The type of wastewater network segment that this feature represents. Domain values i.e., sForceMain, sGravityMain, sLateralLine, sPressurizedServiceLine, etc.

1.4.12 Feature Dataset CLJN.CL.Utilities_Stormwater

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.StormUtilNode_SwInlet (point) - The location where stormwater is collected and received into the utility system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. Values i.e., CATCHBASIN, ENDWALL, HEADWALL, INLET, ETC.
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) inletCoverType - The type of inlet cover. Domain values i.e., Domain values i.e., concrete, metalGate, etc.
h) inletDiameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.5, 1, 4, etc.
i) inletDiameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
j) inletOpeningSize - The size of the inlet opening in inches.
k) inletOpeningSizeUom - The unit of measure for the inlet opening size. Domain values, i.e., 0.0254 metres, inches etc.
l) invertElevation - The elevation of the bottom of the feature in inches.
m) invertElevationUom - The invert elevation. Domain values, i.e., length equal to .0254, inch, etc.
n) materialType - The material composition of the feature. Domain values i.e., concrete, steel, pvc, etc.
o) mediald - gpsDataCollected
p) MetadataId - metaID000072
q) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
r) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
s) rimElevation - The elevation at the top of the feature in feet.
t) rimElevationUom - The unit of measure for rim elevation. Domain values i.e. measurement equal to 0.3048 metres, etc.
u) stormwaterInletType - The type of stormwater inlet feature. Domain values i.e., catch basin, curbinlet, grateInlet, weirInlet, etc.
v) stormwaterNodeType - The type of stormwater network node that this feature represents. Domain values i.e., swCatchBasin, swCleanout, swDownspout, swInlet, swInfall, etc.

CLJN.CL.Feat_SwUgEnclosureAccess (point) - The location of a Stormwater access point to the related Stormwater underground enclosure.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameterUom- The diameter unit of measure. Domain values,

i.e., 0.0254 metres, inches etc.

e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. Values i.e., swManhole, etc.
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) invertElevation - The elevation of the bottom of the feature in inches.
j) invertElevationUom - The invert elevation. Domain values, i.e., length equal to .0254, inch, etc.
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) networkType - The type of stormwater network node that this feature represents. Domain values i.e., stormwater.
n) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
o) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
p) rimElevation - The elevation at the top of the feature in feet.
q) rimElevationUom - The unit of measure for rim elevation. Domain values i.e. measurement equal to 0.3048 metres, etc.
r) stormwaterUtilityFeatureType - The type of stormwater utility feature, i.e., swUgEnclosureAccess
s) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., stormwater, etc.

CLJN.CL.StormUtilSeg (polyline) - The location of a feature used for the conveyance of stormwater. For example, a pipeline, culvert, or ditch. All polylines shall be drawn in the direction of flow with no breaks except for what is naturally occurring such at nodes, etc.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The narrative describing the feature. (Review current data for description)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) invertElevation - The elevation of the bottom of the feature in inches.
j) invertElevationUom - The invert elevation. Domain values, i.e., length equal to .0254, inch, etc.

k) invertElevationDownstream - Numeric number of the elevation downstream invert in inches.
l) invertElevationDownstreamUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, etc.
m) invertElevationUpstream - Numeric number of the elevation upstream invert in inches.
n) invertElevationUpstreamUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, etc.
o) mediald - gpsDataCollected
p) MetadataId - metaID000072
q) openDrainSurface - The surface material of the drain, typically at the bottom of the structure.
r) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
s) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
t) percentSlope - The slope of the bottom of the subject item expressed as a percentage.
u) pipeType - The type of pipe used. Domain values i.e., box, circular, pipArch, tbd, etc.
v) stormwaterSegmentType - The type of stormwater network segment that this feature represents. Domain values i.e., swCulvert, swForceMain, swGravityMain, swLateralLine, swOpenDrain, swSwale, swTrenchDrain, tbd.

CLJN.CL.StormUtilNode_SwOilWateSepa (point) - The location of a device or structure placed in the stormwater stream to separate water from oil products.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service degradationIndex
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
h) isCovered - Yes / No
i) nominalCapacity - The numeric volume of the feature when filled to its design capacity.
j) nominalCapacityUom - The unit of measure of the like named value. Domain values i.e., usgallon
k) operationalStatus - The state of usability of the feature i.e., inService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) stormwaterNodeType - The type of stormwater network node that this feature represents. Domain values i.e., swCatchBasin, swCleanout, swDownspout, swInlet, swInfall, etc.

CLJN.CL.Feat_SwRetentionBasinArea (polygon) - The location of a human-created area installed to improve water quality by permanently storing runoff.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) networkType - The type of stormwater network node that this feature represents. Domain values i.e., stormwater.
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
l) stormwaterUtilityFeatureType - The type of stormwater utility feature, i.e. swRetentionBasinArea
m) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., stormwater, etc.

1.4.13 Feature Dataset CLJN.CL.Utilities_Thermal

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.TherUtilNode_TPump (point) - The location of a facility that operates to maintain flow at adequate pressure for the thermal system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.

g) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
h) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
i) pumpElevation - The elevation of the pump feature in feet.
j) pumpElevationUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
k) pumpType - The type of pump.
l) ratedFlow - The numeric flow rating of the pump.
m) ratedFlowUom - The rate of flow for each pump. Domain value i.e., galMin
n) thermalNodeType - The type of thermal network node that this feature represents, tPump.

CLJN.CL.TherUtilNode_TProdStruc (point) - The location of a facility which produce steam, high-temperature water, low-temperature water, dual-temperature water or chilled water.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) heightAboveSurfaceLevel - The vertical distance measured from the lowest point of the base of the feature at ground or water level to the tallest point of the feature in feet.
h) heightAboveSurfaceLevelUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) nominalCapacity - The numeric volume of the feature when filled to its design capacity
l) nominalCapacityUom - The unit of measure for nominal capacity. Domain value i.e., tons, btu, etc.
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) thermalNetworkSubType - The subtype of thermal network in which this feature participates. Domain values i.e., steamSupply, otherSupply, geothermalSupply (well), highTemperatureHotWaterSupply, etc.
p) thermalNodeType - The type of thermal network node that this feature represents, tProductionStructure.
q) thermalProdStrucType - The type of production structure based upon various classifications including methods of transferring heat, piping arrangement, pumping arrangement, or the relative temperature of transferred media. Examples include Boilers, Chillers, Cooling Towers, Heat Pumps, Single/Double pipe systems, Low/Medium/High Temperatures

systems, etc.

r) volume - The volumetric capacity of the feature
s) volumeUom - Rate of flow in tons, btu, etc.

CLJN.CL.TherUtilNode_TCondCollector (point) - The location of a thermal related well or a tank that collects condensation.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
h) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
i) thermalNetworkSubType - The subtype of thermal network in which this feature participates. Domain values i.e., chilledWaterReturn, dualTemperatureWaterSupply, geothermalReturn, highTemperatureHotWaterSupply, lowTemperatureHotWaterSupply, steamSupply, etc.
j) thermalNodeType - The type of thermal network node that this feature represents, tCondCollector.

CLJN.CL.TherUtilNode_TSystemValve (point) - The location of a device that regulates, directs, or controls the flow of steam or water.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
h) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
i) thermalNetworkSubType - The subtype of thermal network in which this feature participates. Domain values i.e., chilledWaterReturn, dualTemperatureWaterSupply, geothermalReturn, highTemperatureHotWaterSupply, lowTemperatureHotWaterSupply, steamSupply, etc.

j) thermalNodeType - The type of thermal network node that this feature represents, tSystemValve
k) valveMaterial - The material composition of the valve. Domain values i.e., steel, etc.
l) valvePosition - The normal status or operating position of the valve. Domain value i.e., normallyClose, normallyOpen, other, tbd, unknown.
m) valveType - The normal status or operating position of the valve. Domain values i.e., reliefValve, flowControl, gate, pressureRegulator, pressureReducing, etc.

CLJN.CL.Feat_TUgEnclosureAccess (point) - The location of a thermal access point to the related thermal underground enclosure.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
h) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
i) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
j) networkType - The primary type of utility network to which this feature relates. Domain values i.e., thermal.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) thermalUtilityFeatureType - The type of thermal utility feature tUgEnclosureAccess.
n) thermalNetworkSubType - The subtype of thermal network in which this feature participates. Domain values i.e., steamSupply, otherSupply, geothermalSupply, highTemperatureHotWaterSupply, etc.

ThermalUtilitySegment (polyline) - The location of a feature used for the conveyance of steam, high-temperature water, low-temperature water, or chilled water. All polylines shall be drawn in the direction of flow with no breaks except for what is naturally occurring such at nodes, etc.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.

c) depth - The distance, measured vertically downward to the base in inches.
d) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
f) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
g) facilityNumber - Asset number used for visual identification of the facility.
h) featureDescription - The narrative describing the feature. (Review current data for description)
i) featureName - The common name of the feature. (Review current data for common name)
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
n) materialType - Type of segment material. Domain values i.e., steel, castiron, etc.
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) pipeType - The type of pipe used. Domain values i.e., box, circular, pipArch, tbd, etc.
r) thermalNetworkSubType - The subtype of thermal network in which this feature participates. Domain values i.e., steamSupply, otherSupply, geothermalSupply, highTemperatureHotWaterSupply, etc.
s) thermalSegmentType - The type of termal network segment that this feature represents. Domain values i.e., tMainLine, tService Line.

1.4.14 Feature Dataset CLJN.CL.Utilities_Water

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.WateUtilNode_WSystemValve (point) - The location of a device that regulates, directs, or controls the flow of water.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) depth - The distance, measured vertically downward to the base in inches.

d) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
f) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
g) facilityNumber - Asset number used for visual identification of the facility.
h) featureDescription - Utilize CLJN.CL.Feat_WUtilityArea to use Service Area Values i.e., Stone Bay, Onslow Beach, Handnot Point, etc.
i) featureName - The common name of the feature. (Review current data for common name)
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) turnDirectionToClose - The turn direction to close the valve. Domain values i.e., leftToClose, rightToClose, other, na, tbd, unknown, etc.
p) valveMaterial - The material composition of the valve. Domain values i.e., ductileIron, steel, pvc, etc.
q) valvePosition - The normal status or operating position of the valve. Domain value i.e., normallyClose, normallyOpen, other, tbd, unknown.
r) valveType - The subtype of water network in which this feature participates. Domain values i.e., ball, gate, postIndicator, waterServiceValve, postIndicator, fireHydrantValve, etc.
s) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater, etc.
t) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wAirGap, wControlValve, wFireHydrant, wFitting, wFlushingStation, wHydrant, wMeter, etc.

CLJN.CL.WateUtilNode_WReliefValve (point) - The location of a water related device designed to release when the set pressure is exceeded.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) depth - The distance, measured vertically downward to the base in inches.
d) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 1.75, 2, etc.
f) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.

g) facilityNumber - Asset number used for visual identification of the facility.
h) featureDescription - The common name of the feature. (Review current data for common name)
i) featureName - The common name of the feature. (Review current data for common name)
j) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
n) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
o) valveMaterial - The material composition of the valve. Domain values i.e., steel, pvc, etc.
p) valveType - The subtype of water network in which this feature participates. Domain values i.e., wReliefValve.
q) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
r) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wReliefValve

CLJN.CL.WateUtilNode_WPressReduStation (point) - The location of a feature which reduces the pressure from line pressure to the desired operating pressure and can switch from low to high pressure for flushing.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) featureDescription - The common name of the feature. (Review current data for common name)
d) featureName - The common name of the feature. (Review current data for common name)
e) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
f) mediald - gpsDataCollected
g) MetadataId - metaID000072
h) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
i) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
j) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
k) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wPressureReducingStation.

CLJN.CL.WateUtilNode_WBackPrevDevice (point) - The location of a

feature that is used to protect water supplies from contamination or pollution.

a) bfpType - Backflow prevention device type. Domain values i.e., ag, avb, dcva, pvb, rpz, spvb, etc.
b) contractNumber - The contract number associated with the feature.
c) dateInService - The date the utility equipment was put in service.
d) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.75, 2, etc.
e) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
f) featureDescription - The common name of the feature. (Review current data for common name)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) mediaId - gpsDataCollected
j) MetadataId - metaID000072
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
m) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
n) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wBackflowPreventionDevice.

CLJN.CL.WateUtilNode_WMeter (point) - The location of a device used to measure the quantity and/or rate of water flowing through a pipe, which may be the amount of water used by the customer.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The common name of the feature. (Review current data for common name)
g) featureName - The common name of the feature. (Review current data for common name)
h) fittingType - The type of pipe fitting. Domain values i.e., bend, tap, cap, other, tbd, etc.
i) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
j) isAmi - The yes or no indicator of whether or not the meter

is an AMI or smart meter.

k) mediald - gpsDataCollected
l) MetadataId - metaID000072
m) meterType - The type of meter. Domain values i.e., turbine, rotary, etc.
n) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
o) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
p) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
q) waterNodeType - The type of water network node that this feature represents, wMeter.

CLJN.CL.WateUtilNode_WHydrant (point) - Hydrants not exclusively used for firefighting. Secondary uses are flushing main lines and laterals, filling tank trucks, and providing a temporary water source for construction jobs.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The common name of the feature. (Review current data for common name)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) HydrantPurpose - The purpose of the Hydrant. Values i.e., fireHydant, flushedFDC, YardHydrant, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
l) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
m) waterNodeType - The type of water network node that this feature represents. Domain values i.e., whHydrant.

CLJN.CL.WateUtilNode_WFireHydrant (point) a valve connection on a water supply system having one or more outlets and that is used in firefighting to supply hose and fire department pumpers with water.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.

c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.5, 1.75, 2, etc.
d) diameter1 - The diameter of the outlet.
e) diameter2 - The diameter of the outlet.
f) diameter3 - The diameter of the outlet.
g) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
h) facilityNumber - Asset number used for visual identification of the facility.
i) featureDescription - The common name of the feature. (Review current data for common name)
j) featureName - The common name of the feature. (Review current data for common name)
k) fireConnectionType - The yes or no indicator of whether or not the fire hydrant is a fire protection connection. Yes or No
l) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
m) hydrantNumber - The equipment number as designated by the fire department that is primarily responsible for the fire hydrants operation and maintenance.
n) inletDiameter - The diameter of the inlet.
o) inletDiameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
p) mediald - gpsDataCollected
q) MetadataId - metaID000072
r) isFireConnection - The yes or no indicator of whether or not the fire hydrant is a fire protection connection. Yes or No
s) outletDiameter - The diameter of the outlet.
t) outletDiameter1 - The diameter of the outlet.
u) outletDiameter2 - The diameter of the outlet.
v) outletDiameter3 - The diameter of the outlet.
w) outletDiameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
x) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
y) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
z) waterNodeType - The type of water network node that this feature represents, wFireHydrant.

CLJN.CL.WateUtilNode_WFitting (point) - The location of a mechanical device that connects two or more pipes, or caps or plugs a single pipe, on the water system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, 1, 1.25, 1.5, 1.75, 2, etc.
d) diameter1 - The diameter of the outlet.
e) diameter2 - The diameter of the outlet.
f) diameter3 - The diameter of the outlet.
g) diameter4 - The diameter of the outlet.
h) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.

i) facilityNumber - Asset number used for visual identification of the facility.
j) featureDescription - The common name of the feature. (Review current data for common name)
k) featureName - The common name of the feature. (Review current data for common name)
l) fittingType - The type of pipe fitting. Domain values i.e., bend, cap, tee, etc.
m) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
n) mediald - digitized
o) MetadataId - metaID000071
p) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
q) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
r) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wfitting.
s) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.

CLJN.CL.WateUtilNode_WPump (point) - The location of a water related piece of equipment that adds energy to a fluid, such as water, being conveyed through a pipe or other closed conduit.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The common name of the feature. (Review current data for common name)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) mediald - gpsDataCollected
h) MetadataId - metaID000072
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
j) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
k) pumpType - Type of pump. Domain values i.e., booster, submersible, etc.
l) ratedFlow - The common rate of flow of each pump.
m) ratedFlowUom - The rate of flow for each pump. Domain value i.e., galMin
n) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wpump.
o) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.

CLJN.CL.WateUtilNode_WStorageStructure (point) - The location of a facility that store large volumes of water.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Elevation - The elevation from a specified vertical datum to the highest point on a feature.
d) elevationUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The common name of the feature. (Review current data for common name)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
j) groundElevation - The elevation of the ground at the location of the item in feet.
k) invertElevation - The elevation of the bottom of the feature in feet.
l) mediald - gpsDataCollected
m) MetadataId - metaID000072
n) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
o) overflowElevation - The elevation of the overflow device (i.e., pipe invert).
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) secondaryContainment - Indicates the storage tank has a secondary containment area that contains spills. Domain values i.e., concreteVault, doubleBottom, plasticPanSystem, other, etc.
r) storageTankProduct - The product contained in the storage tank.
s) storageTankType - The primary type of storage tank.
t) topElevation - The elevation at the top of the feature.
u) topElevationUom The unit of measure Domain values i.e. 0.3048 metres, feet, etc.
v) volume - The volumetric capacity of the feature in usgallons.
w) volumeUom - Unit of measure in usgallons
x) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
y) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wstorageStructure.
z) width - The dimension of a feature in feet.
aa) widthUom - The unit of measure Domain values i.e. 0.3048 metres, feet, etc.

CLJN.CL.Feat_WUgEnclosureAccess (point) - The location of a water access point to the related water underground enclosure.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.5, 1.75, 2, etc.
d) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) facilityNumber - Asset number used for visual identification of the facility.
f) featureDescription - The common name of the feature. (Review current data for common name)
g) featureName - The common name of the feature. (Review current data for common name)
h) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
i) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
j) lidDiameter - Diameter of the lid or cover that allows access to the manhole.
k) lidDiameterUom - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 2, etc.
l) lidMaterial - Material type of the manhole access lid or cover.
m) mediald - gpsDataCollected
n) MetadataId - metaID000072
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
r) waterUtilityFeatureType - The type of water utility feature i.e., wUgEnclosureAccess.

WateUtilNode_WSource(point) - A source of water intake to the water system including reservoirs, natural water bodies, wells, and/or feeds from external water networks. Do not delete potable from any feature class, please attribute as removed or AIP.

a) abandonedDate - The date the feature was abandoned - see feature name to add contract number for abandoned.
b) contractNumber - The contract number associated with the original construction of this feature.
c) dateInService - The date the utility equipment was put in service.
d) facilityNumber - Asset number used for visual identification of the facility.
e) featureDescription - The common name of the feature. (Review current data for common name)

f) featureName - The common name of the feature. Until such a time that the well is abandoned or removed. (Add contract number associated with removal or abandonment of water well)
g) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
k) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
l) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
m) removedDate - Enter Remove date; however, do not delete water well from well feature class. (Attribute contract number to remove well in featureName)
n) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.
o) waterNodeType - The type of water network node that this feature represents. Domain values i.e., wSource.
p) waterSourceType - Source of water, well.

CLJN.CL.Feat_WScadaSensor (point) - The location of a device that is used to remotely measure the status of water network components as part of a Supervisory Control and Data Acquisition (SCADA) system.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The common name of the feature. (Review current data for common name)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities,
g) familyHousing, recreational, training, water, etc.
h) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
i) mediald - gpsDataCollected
j) MetadataId - metaID000072
k) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., water.
l) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., water, etc.
o) waterUtilityFeatureType - The type of water utility feature

is wScadaSensor.

CLJN.CL.Feat_WDemarcationPoint (point) - The location where the water service provider ownership ends, and the customer ownership begins.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The common name of the feature. (Review current data for common name)
e) featureName - The common name of the feature. (Review current data for common name)
f) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
g) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.
h) mediald - gpsDataCollected
i) MetadataId - metaID000072
j) networkType - The primary type of utility network to which this feature relates. Domain values, i.e., water.
k) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.
l) outsideProvider - The name of the outside provider for the Utility Feature.
m) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
n) utilityNetworkSubtype - The primary subtype of utility to which this feature relates. Domain values i.e., water, etc.
o) waterUtilityFeatureType - The type of water utility feature is wDemarcationPoint.

CLJN.CL.WaterUtilitySegment (polyline) - The location of a feature used for the conveyance of water.

a) contractNumber - The contract number associated with the feature.
b) dateInService - The date the utility equipment was put in service.
c) depth - The distance, measured vertically downward to the base in inches.
d) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
e) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.5, 1.75, 2, etc.
f) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
g) elevation - The elevation at the top of the feature.
h) elevationUom - The elevation unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
i) facilityNumber - Asset number used for visual identification of the facility.
j) featureDescription - The narrative describing the feature.

(Review current data for description)

k) featureName - The common name of the feature. (Review current data for common name)

l) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.

m) groundConfiguration - The configuration of the asset in relationship to the ground. Domain values i.e., aboveground, elevated, semiBuried, underground, etc.

n) invertElevationDownstream - Numeric number of the elevation downstream invert in inches.

o) invertElevationDownstreamUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, etc.

p) invertElevationUpstream - Numeric number of the elevation upstream invert in inches.

q) invertElevationUpstreamUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, etc.

r) lateralSegmentType - The type of lateral water network segment that this feature represents. Domain values i.e., wDomesticLateral, wFireProtectionLateral, wHydrantLateral, wInlineStorageLateral, wIrrigationLateral, wTransportPipeLateral, etc.

s) materialType - The material composition of the feature. Domain values i.e., pvc, tbd, etc.

t) mediald - gpsDataCollected

u) MetadataId - metaID000072

v) operationalStatus - The state of usability of the feature i.e., inService, notInService, abandoned, etc.

w) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.

x) waterNetworkSubType - The subtype of water network in which this feature participates. Domain values i.e., fireProtectionWater, nonPotableWater, potableWater, rawWater, saltWater.

y) waterSegmentType - The type of wastewater network segment that this feature represents. Domain values i.e., wDistributionMain, wGravityMain, wLateral, wTransmissionMain

1.4.15 Feature Dataset CLJN.CL.Wells

Locate, GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) Data Collection". Attribute fields may be associated with Domains, which are utilized to constrain the values allowed in a particular field, attribute table or feature class. Domains must be utilized when populating the feature where required.

CLJN.CL.WellPoint - (point) - The man-made vertical excavation penetrating the surface of the Earth used collect environmental samples or monitor fluid or gas characteristics, inject fluids, gases or thermal energy into the subsurface, or extract contamination or other impurities from the subsurface. *(Potable Water Wells used for water distribution are not to be deleted from the this feature class, if they are demolished or AIP, the contract number utilize to make any changes should be attributed in featureName and the operation status should be changed to removed)*

a) abandonedDate - The date the feature was abandoned - see

feature name to add contract number for abandoned.

b) builtDate - The calendar date on which the original construction was completed for a facility.
c) contractNumber - The contract number associated with the original construction of this feature.
d) depth - The distance, measured vertically downward to the base in inches.
e) depthUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
f) Diameter - The diameter of the feature in inches. Domain value i.e., .5, .75, 1, 1.25, 1.5, 2, 3, etc.
g) diameterUom - The diameter unit of measure. Domain values, i.e., 0.0254 metres, inches etc.
h) facilityNumber - Asset number used for visual identification of the facility.
i) featureDescription - Utilize CLJN.CL.Feat_WUtilityArea to use Service Area Values i.e., Stone Bay, Onslow Beach, Handnot Point, etc.
j) featureName - The common name of the feature. Until such a time that the well is abandoned or removed. (Add contract number associated with removal or abandonment of water well)
k) functionalArea - The principle activity within a landuse area. Domain values i.e., utilities, familyHousing, recreational, training, water, etc.
l) locationAccuracy - The location accuracy for the data that was collected and verified i.e., Survey Grade GPS
m) mediald - gpsDataCollected
n) MetadataId - metaID000072
o) operationalStatus - The state of usability of the feature i.e., inService, notInService, removed, etc.
p) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company Name, etc.
q) removedDate - Enter Remove date; however, do not delete water well from well feature class. *(Attribute contract number to remove well in featureName)*
r) wellCapacity- The total capacity in gallons.
s) wellCapacityUom - The unit of measure of the like named value i.e., usGallon
t) wellPurposeType - The purpose of the well. Domain values extraction.
u) wellResourceType - The resource type which is being extracted, i.e. waterNonPotable.

1.4.16 Feature Dataset CLJN.CL.CadFloorPlan

All new and renovated buildings or structures shall be required to have a linear representation, "clean floor plan", for each floor. A polyline for each level will include exterior and interior walls, doors and windows, exits and stairwells, etc. No nonpermanent fixtures, such as furniture, shall be included. Please note the dataset/feature name may change, however, the attribution requirements will remain the same.

CLJN.CL.CadFloorPlan (polyline) A linear representation of the floor plan representing the outer and inner walls, doors and windows of a building or structure that has been exported into a GIS Feature. (Note - Naming convention may change in the future)

This feature will present all levels, entry, exits, windows,

stairwells. No none permanent fixtures, such as furniture should be included.

a) contractNumber - The contract number associated with the feature.
b) builtDate - The date the utility equipment was put in service.
c) facilityNumber - Asset number used for visual identification of the facility.
d) featureDescription - The narrative describing the feature. (Review current data for description)
e) featureName - The narrative describing the feature. (Review current data for description)
f) florid - Floor Level
g) mediald - digitized
h) MetadataId - metaID000071
i) operationalStatus - The state of usability of the feature i.e., inService, notInService, removed, etc.
j) ownerName - The name of the item owner, i.e., MCB CL, MCCS, PPV, Company

1.4.17 Non-Compliance

Failure to follow the specification outlined in this document will result in non-acceptance of data deliverable.

Note: Geospatial data delivery does not replace record drawing requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 02 41 00

DEMOLITION
05/10, CHG 2: 02/19

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145	(1991; R 2012) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
AASHTO T 180	(2017) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6	(2006) Safety & Health Program Requirements for Demolition Operations - American National Standard for Construction and Demolition Operations

CARPET AND RUG INSTITUTE (CRI)

CRI 104	(2015) Carpet Installation Standard for Commercial Carpet
CRI 105	(2015) Carpet Installation Standard for Residential Carpet

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61	National Emission Standards for Hazardous Air Pollutants

1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Demolition

Demolition is the process of wrecking or taking out any load-supporting

structural member of a facility together with any related handling and disposal operations.

1.2.1.2 Deconstruction

Deconstruction is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials.

1.2.1.3 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

1.2.2 Demolition Plan

Prepare a Demolition Plan and submit proposed demolition, and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be removed, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed. Append tracking forms for all removed materials indicating type, quantities, condition, destination, and end use. Coordinate with Waste Management Plan. Include statements affirming Contractor inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the work. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Structural PE prior to work beginning.

1.2.3 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. Remove rubbish and debris from the station daily; do not allow accumulations inside or outside the buildings. The work includes demolition,, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements and/or pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement,

or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Trees

Protect trees within the project site which might be damaged during demolition or deconstruction, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations.

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00.05 20 CONSTRUCTION SUBMITTAL PROCEDURES and 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G

Deconstruction Plan; G

Existing Conditions

SD-07 Certificates

Notification; G

SD-11 Closeout Submittals

Receipts

1.6 QUALITY ASSURANCE

Submit timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.6.1 Dust and Debris Control

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to aircraft.

1.7 PROTECTION

1.7.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind, jet or prop blast. Notify the Contracting Officer prior to beginning such work.

1.7.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without

sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.8 FOREIGN OBJECT DAMAGE (FOD)

Aircraft and aircraft engines are subject to FOD from debris and waste material lying on airfield pavements. Remove all such materials that may appear on operational aircraft pavements due to the Contractor's operations. If necessary, the Contracting Officer may require the Contractor to install a temporary barricade at the Contractor's expense to control the spread of FOD potential debris. The barricade shall include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.10 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures.

b. Fill material shall conform to the definition of satisfactory soil material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

c. Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

Soil classification	AASHTO M 145
Moisture-density relations	AASHTO T 180, Method B or D

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.1.1 Structures

a. Remove existing structures indicated to be removed to grade. Interior walls, other than retaining walls and partitions, shall be removed completely. Break up basement slabs to permit drainage. Remove sidewalks, curbs, gutters and street light bases as indicated.

b. Demolish structures in a systematic manner from the top of the structure to the ground. Complete demolition work above each tier or floor before the supporting members on the lower level are disturbed. Demolish concrete and masonry walls in small sections. Remove structural framing members and lower to ground by means of derricks, platforms hoists, or other suitable methods as approved by the Contracting Officer.

c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

d. Building, or the remaining portions thereof, not exceeding 80 feet in height may be demolished by the mechanical method of demolition.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities , as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location on the station in accordance with

instructions of the Contracting Officer.

3.1.3 Chain Link Fencing

Remove chain link fencing, gates and other related salvaged items scheduled for removal and transport to designated areas. Remove gates as whole units. Cut chain link fabric to 25 foot lengths and store in rolls off the ground.

3.1.4 Paving and Slabs

Sawcut concrete and asphaltic concrete paving and slabs including aggregate base as indicated. Provide neat sawcuts at limits of pavement removal as indicated. Pavement and slabs not to be used in this project shall be removed from the Installation at Contractor's expense.

3.1.5 Roofing

Remove existing roof system and associated components in their entirety down to existing roof deck where indicated in PART 3. Sequence work to minimize building exposure between demolition or deconstruction and new roof materials installation.

3.1.5.1 Temporary Roofing

Install temporary roofing and flashing as necessary to maintain a watertight condition throughout the course of the work. Remove temporary work prior to installation of permanent roof system materials unless approved otherwise by the Contracting Officer. The existing deck and support structure is deteriorated where indicated, such that ability to support foot traffic and construction loads is unknown. Make provisions for worker safety during demolition, deconstruction, and installation of new materials as described in paragraphs entitled "Statements" and "Regulatory and Safety Requirements."

3.1.5.2 Reroofing

When removing the existing roofing system from the roof deck, remove only as much roofing as can be recovered by the end of the work day, unless approved otherwise by the Contracting Officer. Do not attempt to open the roof covering system in threatening weather. Reseal all openings prior to suspension of work the same day.

3.1.6 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain, to removed materials being salvaged. Where new masonry adjoins existing, the new work shall abut or tie into the existing construction as specified for the new work. Provide square, straight edges and corners where existing masonry adjoins new work and other locations. Masonry removed in pieces shall be crushed for use as aggregate.

3.1.7 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be

concealed, grind smooth or saw cut entirely through the concrete.

3.1.8 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Flame-cutting torches are permitted when other methods of dismantling are not practical. Transport steel joists and girders as whole units and not dismantled. Transport structural steel shapes to a designated recycling facility, stacked according to size, type of member and length, and stored off the ground, protected from the weather.

3.1.9 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.10 Carpentry

Salvage for recycle lumber, millwork items, and finished boards, and sort by type and size.

3.1.11 Carpet

Remove existing carpet for reclamation in accordance with manufacturer recommendations and as follows. Remove used carpet in large pieces, roll tightly, and pack neatly in a container. Remove adhesive according to recommendations of the Carpet and Rug Institute (CRI). Adhesive removal solvents shall comply with CRI 104/CRI 105. Recycle removed carpet cushion.

3.1.12 Acoustic Ceiling Tile

Remove, neatly stack, and recycle acoustic ceiling tiles. Recycling may be available with manufacturer. Otherwise, priority shall be given to a local recycling organization. Recycling is not required if the tiles contain or may have been exposed to asbestos material.

3.1.13 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include:

a. Concrete and Masonry: Completely fill holes and depressions, caused by

previous physical damage or left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

b. Where existing partitions have been removed leaving damaged or missing resilient tile flooring, patch to match the existing floor tile.

c. Patch acoustic lay-in ceiling where partitions have been removed. The transition between the different ceiling heights shall be effected by continuing the higher ceiling level over to the first runner on the lower ceiling and closing the vertical opening with a painted sheet metal strip.

3.1.14 Air Conditioning Equipment

Remove air conditioning, refrigeration, and other equipment containing refrigerants without releasing chlorofluorocarbon refrigerants to the atmosphere in accordance with the Clean Air Act Amendment of 1990. Recover all refrigerants prior to removing air conditioning, refrigeration, and other equipment containing refrigerants and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)." Turn in salvaged Class I ODS refrigerants as specified in paragraph, "Salvaged Materials and Equipment."

3.1.15 Cylinders and Canisters

Remove all fire suppression system cylinders and canisters and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)."

3.1.16 Locksets on Swinging Doors

Remove all locksets from all swinging doors indicated to be removed and disposed of. Deliver the locksets and related items to a designated location for receipt by the Contracting Officer after removal.

3.1.17 Mechanical Equipment and Fixtures

Government has right of first refusal for all existing mechanical equipment and fixtures. Document in Demolition Plan list of equipment to be salvaged and returned to the Government.

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated storage area as directed by the Contracting Officer. Do not remove equipment until approved. Do not offer low-efficiency equipment for reuse; provide to recycling service for disassembly and recycling of parts.

3.1.17.1 Preparation for Storage

Remove water, dirt, dust, and foreign matter from units; tanks, piping and fixtures shall be drained; interiors, if previously used to store flammable, explosive, or other dangerous liquids, shall be steam cleaned. Seal openings with caps, plates, or plugs. Secure motors attached by

flexible connections to the unit. Change lubricating systems with the proper oil or grease.

3.1.17.2 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve shall be attached to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.17.3 Ducts

Classify removed duct work as scrap metal.

3.1.17.4 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify non-porcelain broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor. Salvage and crush porcelain plumbing fixtures unsuitable for reuse.

3.1.18 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.18.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.18.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.18.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.18.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.1.19 Elevators and Hoists

Remove elevators, hoists, and similar conveying equipment and salvage as whole units, to the most practical extent. Remove and prepare items for salvage without damage to any of the various parts. Salvage and store rails for structural steel with the equipment as an integral part of the unit.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Salvaged Materials and Equipment

Remove materials and equipment that are listed in the Demolition Plan to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site , as directed within 30 miles of the work site.

a. Salvage items and material to the maximum extent possible.

b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. Coordinate the salvaged materials with

tracking requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture salvaged materials in the diversion calculations for the project.

c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers.

The Government will remove and capture Class I ODS refrigerants. To view the web site for ODS, link to: https://www.osd.mil/denix/Public/News/DLA/ODS/sect1.html

3.3.3 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material in a properly permitted sanitary landfill area located off the site.

3.4 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

SECTION 23 03 00.00 20

BASIC MECHANICAL MATERIALS AND METHODS
08/24 MCBCL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus

INTERNATIONAL CODE COUNCIL (ICC)

ICC IFGC	(2024) International Fuel Gas Code
ICC IMC	(2024) International Mechanical Code
ICC IPC	(2024) International Plumbing Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA MG 1	(2021) Motors and Generators
NEMA MG 10	(2017) Energy Management Guide for Selection and Use of Fixed Frequency Medium AC Squirrel-Cage Polyphase Induction Motors
NEMA MG 11	(1977; R 2012) Energy Management Guide for Selection and Use of Single Phase Motors

1.2 SUBMITTALS

Government approval is required for all submittals.

1.3 RELATED REQUIREMENTS

This section applies to all sections of Divisions: 21, FIRE SUPPRESSION; 22, PLUMBING; and 23, HEATING, VENTILATING, AND AIR CONDITIONING of this project specification, unless specified otherwise in the individual section.

1.4 QUALITY ASSURANCE

1.4.1 Material and Equipment Qualifications

Provide materials and equipment that are standard products of manufacturers regularly engaged in the manufacture of such products, which are of a similar material, design and workmanship. Standard products must have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use must include applications of equipment and

materials under similar circumstances and of similar size. The product must have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.4.2 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

1.4.3 Service Support

The equipment items must be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations must be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.4.4 Manufacturer's Nameplate

For each item of equipment, provide a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.4.5 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "must" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Contracting Officer.

1.4.5.1 Definitions

For the International Code Council (ICC) Codes referenced in the contract documents, advisory provisions must be considered mandatory, the word "should" is interpreted as "must." Reference to the "code official" must be interpreted to mean the "Contracting Officer." For Navy owned property, references to the "owner" must be interpreted to mean the "Contracting Officer." For leased facilities, references to the "owner" must be interpreted to mean the "lessor." References to the "permit holder" must be interpreted to mean the "Contractor."

1.4.5.2 Administrative Interpretations

For ICC Codes referenced in the contract documents, the provisions of Chapter 1, "Administrator," do not apply. These administrative requirements are covered by the applicable Federal Acquisition Regulations (FAR) included in this contract and by the authority granted to the Officer in Charge of Construction to administer the construction of this project. References in the ICC Codes to sections of Chapter 1, must be applied appropriately by the Contracting Officer as authorized by his administrative cognizance and the FAR.

1.5 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

1.6 ELECTRICAL REQUIREMENTS

Furnish motors, controllers, disconnects and contactors with their respective pieces of equipment. Motors, controllers, disconnects and contactors must conform to and have electrical connections provided under Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Furnish internal wiring for components of packaged equipment as an integral part of the equipment. Controllers and contactors shall have a maximum of 120 volt control circuits, and must have auxiliary contacts for use with the controls furnished. When motors and equipment furnished are larger than sizes indicated, the cost of additional electrical service and related work must be included under the section that specified that motor or equipment. Power wiring and conduit for field installed equipment must be provided under and conform to the requirements of Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

1.6.1 Motor Voltage

Provide motors rated for the voltage supplied. Motors shall be suitable for use at 90% to 110% of the nominal supplied voltage and shall have a service factor of at least 1.1 at that nominal supplied voltage. Motors indicated to be "Usable at 208 Volts" or "Usable at 200 Volts" are not permitted to be utilized on electrical systems with a nominal supplied voltage of 208 volts.

1.6.2 Single Phase Motor Efficiency

Unless otherwise specified, single-phase fractional-horsepower alternating-current motors must be high efficiency types corresponding to the applications listed in NEMA MG 11.

1.6.3 Poly Phase Motor Efficiency

Unless other specified polyphase squirrel-cage induction motors must be premium efficiency with continuous ratings that meet or exceed energy efficient ratings in accordance with Table 12-12 of NEMA MG 1 and corresponding to the applications listed in NEMA MG 10

1.6.4 Three-Phase Motor Protection

Provide controllers for motors rated three horsepower and larger with electronic phase-voltage monitors designed to protect motors from phase-loss, undervoltage, and overvoltage. Provide protection for motors from immediate restart by a time adjustable restart relay.

1.7 INSTRUCTION TO GOVERNMENT PERSONNEL

When specified in other sections, furnish the services of competent instructors to give full instruction to the designated Government personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of the specified equipment or system. Instructors must be thoroughly familiar with all parts of the installation

and must be trained in operating theory as well as practical operation and maintenance work.

Instruction must be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. The number of man-days (8 hours per day) of instruction furnished must be as specified in the individual section. When more than 4 man-days of instruction are specified, use approximately half of the time for classroom instruction. Use other time for instruction with the equipment or system.

When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instruction to acquaint the operating personnel with the changes or modifications.

1.8 ACCESSIBILITY

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install concealed valves, expansion joints, controls, dampers, and equipment requiring access, in locations freely accessible through access doors.

1.9 EQUIPMENT INVENTORY UPDATE

Submit information for each piece of equipment removed and supplied for use of Camp Lejeune to update the Maximo equipment inventory. For the purposes of this paragraph, inventoried equipment is defined as equipment listed on the Maximo Equipment Inventory Update form.

1.9.1 Requirements

The contractor shall prepare and submit one Maximo Equipment Inventory Update form for each individual item of inventoried equipment that is demolished, removed, replaced, or installed. (ex: three new condensing units would require the submission of three Equipment Inventory Update forms. The replacement of two existing air handling units with two new air handling units would require the submission of two Equipment Inventory Update forms). The contractor shall prepare and submit a VAV/TAB Room Number List for each VAV/Tab model installed in a single building. Only one Maximo Equipment Inventory Update form is required for each model of VAV or TAB in a single building.

1.9.1.1 Demolition of all equipment in a structure or facility

When all the inventoried equipment in a building or structure is demolished or removed, and not replaced, an Equipment Inventory Update form is not required.

1.9.2 Standards

The contractor shall provide accurate, complete, and legible information on all required forms. All required forms shall be completed and delivered to the Contracting Officer on or before the Beneficial Occupancy Date. All information on Equipment Inventory Update forms shall be obtained by visual inspection of equipment data plate(s).

1.9.3 Form Preparation

Each required Maximo Equipment Inventory Update form shall contain the

following information:

(1) The name and telephone number of an individual who can be contacted for clarification or additional information pertaining to the data on the form.

(2) The date of data collection

(3) The building or structure identification number and the specific location of the equipment within the structure (ex: 3d deck mech room)

(4) A check adjacent to the description of the new or replacement item, and a check adjacent to the supplemental description if applicable (ex: circulating pump and HVAC or steam)

(5) The Maximo number or serial number of the demolished or removed item, if applicable

(6) All applicable data from the equipment data plate

Each Room Number List form shall contain the following information:

(1) The name and telephone number of the individual providing the information

(2) The date the form was completed

(3) The building or structure identification number

(4) A check in the box adjacent to each applicable room number

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 Manufacturer's Recommendations

All material and equipment shall be installed in accordance with the manufacturer's recommendations for the intended purpose. Use the more stringent methods when manufacturer's recommendations, and plan & specification requirements differ. The contractor shall notify the government of any conflicts between manufacturer's recommendations and plans & specification requirements.

3.2 International Construction Codes

All material, equipment and installation shall be in accordance with the ICC IFGC, ICC IPC, and ICC IMC unless noted otherwise on the drawings and/or specifications. The contractor shall notify the government of any conflicts between ICC code requirements and contract requirements.

3.3 PAINTING OF NEW EQUIPMENT

New equipment painting must be factory applied or shop applied, and must be as specified herein, and provided under each individual section.

3.3.1 Factory Painting Systems

Manufacturer's standard factory painting systems may be provided subject to certification that the factory painting system applied will withstand 125 hours in a salt-spray fog test, except that equipment located outdoors must withstand 500 hours in a salt-spray fog test. Salt-spray fog test must be in accordance with ASTM B117, and for that test the acceptance criteria must be as follows: immediately after completion of the test, the paint must show no signs of blistering, wrinkling, or cracking, and no loss of adhesion; and the specimen must show no signs of rust creepage beyond 0.125 inch on either side of the scratch mark.

The film thickness of the factory painting system applied on the equipment must not be less than the film thickness used on the test specimen. If manufacturer's standard factory painting system is being proposed for use on surfaces subject to temperatures above 120 degrees F, the factory painting system must be designed for the temperature service.

3.3.2 Shop Painting Systems for Metal Surfaces

Clean, pretreat, prime and paint metal surfaces; except aluminum surfaces need not be painted. Apply coatings to clean dry surfaces. Clean the surfaces to remove dust, dirt, rust, oil and grease by wire brushing and solvent degreasing prior to application of paint, except metal surfaces subject to temperatures in excess of 120 degrees F must be cleaned to bare metal.

Where more than one coat of paint is specified, apply the second coat after the preceding coat is thoroughly dry. Lightly sand damaged painting and retouch before applying the succeeding coat. Color of finish coat must be aluminum or light gray.

a. Temperatures Less Than 120 Degrees F: Immediately after cleaning, the metal surfaces subject to temperatures less than 120 degrees F must receive one coat of pretreatment primer applied to a minimum dry film thickness of 0.3 mil, one coat of primer applied to a minimum dry film thickness of 1 mil; and two coats of enamel applied to a minimum dry film thickness of 1 mil per coat.

b. Temperatures Between 120 and 400 Degrees F: Metal surfaces subject to temperatures between 120 and 400 degrees F must receive two coats of 400 degrees F heat-resisting enamel applied to a total minimum

thickness of 2 mils.

c. Temperatures Greater Than 400 Degrees F: Metal surfaces subject to temperatures greater than 400 degrees F must receive two coats of 600 degrees F heat-resisting paint applied to a total minimum dry film thickness of 2 mils.

MAXIMO EQUIPMENT INVENTORY UPDATE

Employee: _____ Phone: _____ Date: ____/____/____

Bldg: _____ Specific Location: _____

__ AC, Computer Room
__ AC, Package
__ AC, Package Terminal
__ Assembly, Trap line
__ Backflow Preventer
__ Boiler
__ Chiller, Air Cooled Recip
__ Chiller, Air Cooled Screw
__ Chiller, Air Cooled Scroll
__ Chiller, Water Cooled Recip
__ Chiller, Water Cooled Screw
__ Compressor, Control Air
__ Compressor, Industrial Air
__ Dryer, Refrigerated Air
__ Exchanger, Heat
__ Evaporator, Freezer
__ Evaporator, Refrigerator
__ Fan, Exhaust
__ Generator
__ Heater, Space
__ Heater, Unit
__ Heat Pump, Geo-Thermal
__ Heat Pump, Indoor Unit
__ Heat Pump, Outdoor Unit
__ Heat Pump, Package
__ Heat Pump, Package Terminal
__ Pump, Circulating, Chilled Water
__ Pump, Circulating, Domestic Water
__ Pump, Circulating, Dual Temp Water
__ Pump, Circulating, Heating Water
__ Pump, Condensate
__ Pump, Sump
__ Regulator, Temperature
__ Tank, Hot Water Storage
__ Tower, Cooling
__ Unit, Air Handling
__ Unit, AC Condensing
__ Unit, Freezer Condensing
__ Unit, Refrigerator Condensing
__ Unit, Fan Coil
__ Unit, TAB (Attach Room No. List)
__ Unit, VAV (Attach Room No. List)
__ Valve, Pressure Reducing
__ Valve, Steam Pilot
__ Water Heater

Demolished/Removed Equipment

Maximo no: _____ or Ser no: _____

New Equipment

Manufacturer: _____

Model no: _____

Ser no: _____

Type: __Elec __Oil __LP Gas __Nat Gas __Steam __Water __Air

Motor Data: HP____ Volts____ Phase____ RLA_____ RPM____ Frame____

Tons____ No. of Motors____ no. of Belts____ Belt size(s)____ CFM____

KW____ Refrig type_____ Refrig Qty_____ Filter Size(s)_____

-- End of Section --

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

07/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)

AMCA 203	(1990; R 2011) Field Performance Measurements of Fan Systems

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 62.1	(2010) Ventilation for Acceptable Indoor Air Quality

ASSOCIATED AIR BALANCE COUNCIL (AABC)

AABC MN-1	(2002; 6th ed) National Standards for Total System Balance
AABC MN-4	(1996) Test and Balance Procedures

NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB)

NEBB MASV	(2006) Procedural Standards for Measurements and Assessment of Sound and Vibration
NEBB PROCEDURAL STANDARDS	(2015) Procedural Standards for TAB (Testing, Adjusting and Balancing) Environmental Systems

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1780	(2002) HVAC Systems - Testing, Adjusting and Balancing, 3rd Edition
SMACNA 1858	(2004) HVAC Sound And Vibration Manual - First Edition

1.2 DEFINITIONS

a. AABC: Associated Air Balance Council.

b. COTR: Contracting Officer's Technical Representative.

c. DALT: Duct air leakage test

d. DALT'd: Duct air leakage tested

e. HVAC: Heating, ventilating, and air conditioning; or heating, ventilating, and cooling.

f. NEBB: National Environmental Balancing Bureau

g. Out-of-tolerance data: Pertains only to field acceptance testing of Final DALT or TAB report. When applied to DALT work, this phase means "a leakage rate measured during DALT field acceptance testing which exceeds the leakage rate allowed by Appendix C REQUIREMENTS FOR DUCT AIR LEAK TESTING." When applied to TAB work this phase means "a measurement taken during TAB field acceptance testing which does not fall within the range of plus 5 to minus 5 percent of the design for a specific parameter."

h. Season of maximum heating load: The time of year when the outdoor temperature at the project site remains below 45 degrees Fahrenheit, throughout the period of TAB data recording.

i. Season of maximum cooling load: The time of year when the outdoor temperature at the project site remains above 85 degrees Fahrenheit dry bulb and 76 degress Fahrenheit wet bulb of the project site's summer outdoor design temperature, throughtout the period of TAB data recording. The season of maximum cooling load shall fall within June, July, August, or September.

j. Season 1, Season 2: Depending upon when the project HVAC is completed and ready for TAB, Season 1 is defined, thereby defining Season 2. Season 1 could be the season of maximum heating load, or the season of maximum cooling load.

k. Sound measurements terminology: Defined in AABC MN-1, NEBB MASV, or SMACNA 1858 (TABB).

l. TAB: Testing, adjusting, and balancing (of HVAC systems).

m. TAB'd: HVAC Testing/Adjusting/Balancing procedures performed.

n. TAB Agency: TAB Firm

o. TAB team field leader: TAB team field leader

p. TAB team supervisor: TAB team engineer, TAB specialist.

q. TAB team technicians: TAB team assistants.

r. TABB: Testing Adjusting and Balancing Bureau.

1.2.1 Similar Terms

In some instances, terminology differs between the Contract and the TAB Standard primarily because the intent of this Section is to use the industry standards specified, along with additional requirements listed herein to produce optimal results.

The following table of similar terms is provided for clarification only.

Contract requirements take precedent over the corresponding AABC, NEBB, or TABB requirements where differences exist.

SIMILAR TERMS			
Contract Term	AABC Term	NEBB Term	TABB Term
TAB Standard	National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems	Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems	International Standards for Environmental Systems Balance
TAB Specialist	TAB Engineer	TAB Supervisor	TAB Supervisor
Systems Readiness Check	Construction Phase Inspection	Field Readiness Check & Preliminary Field Procedures	Field Readiness Check & Prelim. Field Procedures

1.3 WORK DESCRIPTION

The work includes testing, adjusting, and balancing (TAB) of new heating, ventilating, and cooling (HVAC) air and water distribution systems including equipment and performance data, ducts, and piping which are located within, on, under, between, and adjacent to buildings, including records of existing conditions.

Perform TAB in accordance with the requirements of the TAB procedural standard recommended by the TAB trade association that approved the TAB Firm's qualifications. Comply with requirements of AABC MN-1, NEBB PROCEDURAL STANDARDS, or SMACNA 1780 (TABB) as supplemented and modified by this specification section. All recommendations and suggested practices contained in the TAB procedural standards are considered mandatory.

Conduct TAB of the indicated existing systems and equipment and submit the specified TAB reports for approval. Conduct TAB work in accordance with the requirements of this section.

1.3.1 Air Distribution Systems

Test, adjust, and balance system (TAB) in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to exterior of air distribution systems as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

1.3.2 Water Distribution Systems

TAB system in compliance with this section. Obtain Contracting Officer's written approval before applying insulation to water distribution systems as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS. At Contractor's option and with Contracting Officer's written approval, the piping systems may be insulated before systems are TAB'd.

Terminate piping insulation immediately adjacent to each flow control valve, automatic control valve, or device. Seal the ends of pipe insulation and the space between ends of pipe insulation and piping, with waterproof vapor barrier coating.

After completion of work under this section, insulate the flow control valves and devices as specified under Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

1.3.3 TAB SCHEMATIC DRAWINGS

Show the following information on TAB Schematic Drawings:

1. A unique number or mark for each piece of equipment or terminal.

2. Air quantities and temperatures in DOAS unit schedules.

3. Water quantities and temperatures in thermal energy transfer equipment schedules.

4. Water flow measurement fittings and balancing fittings.

Submit three copies of the TAB Schematic Drawings and Report Forms to the Contracting Officer, no later than 21 days prior to the start of TAB field measurements.

1.3.4 Related Requirements

Section 23 73 33 HEATING, VENTILATING, AND COOLING SYSTEM applies to work specified in this section.

Specific requirements relating to Reliability Centered Maintenance (RCM) principals and Predictive Testing and Inspection (PTI), by the construction contractor to detect latent manufacturing and installation defects must be followed as part of the Contractor's Quality Control program. Refer to the paragraph titled "Sustainability" for detailed requirements.

Requirements for price breakdown of HVAC TAB work are specified in Section 01 20 00 PRICE AND PAYMENT PROCEDURES.

Requirements for construction scheduling related to HVAC TAB work are specified in Section 01 32 16.00 20 SMALL PROJECT CONSTRUCTION PROGRESS SCHEDULES.

1.4 SUBMITTALS

All submitted documentation must be typed, neat and organized unless otherwise noted. All reports must have a waterproof front and back cover, a title page, a certification page, sequentially numbered pages throughout, and a table of contents. Tables, lists, and diagrams must be titled. Generate and submit for approval the following documentation:

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES to:

ROICC, Jacksonville, North Carolina Area, 1005 Michael Road, Camp Lejeune, NC 28542-2521

SD-01 Preconstruction Submittals

Records Of Existing Conditions

Independent TAB Agency and Personnel Qualifications;G

TAB Design Review Report;G

Pre-Field TAB Engineering Report

TAB Work Execution Schedule

SD-02 Shop Drawings;G

TAB Schematic Drawings and Report Forms;

SD-03 Product Data

Equipment and Performance Data;G

SD-06 Test Reports;G

Final TAB Report for Proportional Balancing;G

Pre-Final TAB For Proportional Balancing Report; G

SD-07 Certificates

Independent TAB agency and personnel qualifications;

1.4.1 Design Review Report

Submit typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the duct leakage testing work and the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. State that no deficiencies are evident if that is the case.

1.4.2 Pre-Field TAB Engineering Report

Submit report containing the following information:

a. Step-by-step TAB procedure:

(1) Strategy: Describe the method of approach to the TAB field work from start to finish. Include in this description a complete methodology for accomplishing each seasonal TAB field work session.

(2) Air System Diagrams: Use the contract drawings and duct fabrication drawings if available to provide air system diagrams in the report showing the location of all terminal outlet supply, return, exhaust and transfer registers, grilles and diffusers. Use a key numbering system on the diagrams which identifies each outlet contained in the outlet airflow report sheets. Show intended locations of all traverses and static pressure readings.

(3) Procedural steps: Delineate fully the intended procedural steps to be taken by the TAB field team to accomplish the required TAB work of each air distribution system and each water distribution system. Include intended procedural steps for TAB work for subsystems and system components.

b. Pre-field data: Submit AABC or NEBB or SMACNA 1780 data report forms with the following pre-field information filled in:

(1) Design data obtained from system drawings, specifications, and approved submittals.

(2) Notations detailing additional data to be obtained from the contract site by the TAB field team.

(3) Designate the actual data to be measured in the TAB field work.

(4) Provide a list of the types of instruments, and the measuring range of each, which are anticipated to be used for measuring in the TAB field work. By means of a keying scheme, specify on each TAB data report form submitted, which instruments will be used for measuring each item of TAB data. If the selection of which instrument to use, is to be made in the field, specify from which instruments the choice will be made. Place the instrument key number in the blank space where the measured data would be entered.

c. Prerequisite HVAC work checkout list: Provide a list of inspections and work items which are to be completed by the Contractor. This list must be acted upon and completed by the Contractor and then submitted and approved by the Contracting Officer prior to the TAB team coming to the contract site.

At a minimum, a list of the applicable inspections and work items listed in the NEBB PROCEDURAL STANDARDS, Section III, "Preliminary TAB Procedures" under paragraphs titled, "Air Distribution System Inspection" and "Hydronic Distribution System Inspection" must be provided for each separate system to be TAB'd.

1.4.3 Work Execution Schedule

Submit a detailed schedule indicating the anticipated calendar date for each submittal and each portion of work required under this section. For each work entry, indicate the support personnel (such as controls provider, HVAC mechanic, etc.) that are needed to accomplish the work. Arrange schedule entries chronologically.

1.4.4 TAB Reports

Submit TAB Report for Proportional Balancing, Season 1, and Season 2 in the following manner:

a. Procedure Summary: Submit a copy of the approved TAB Procedures Summary. When applicable, provide notations describing how actual field procedures differed from the procedures listed.

b. Report format: Submit the completed data forms approved in the pre-field TAB Engineering Report completed by TAB field team, reviewed, approved and signed by the TAB supervisor. Bind the report

with a waterproof front and back cover. Include a table of contents identifying by page number the location of each report. Report forms and report data shall be typewritten for final TAB Report. Handwritten report forms or report data are acceptable for pre-final TAB Report.

c. Temperatures: On each TAB report form reporting TAB work accomplished on HVAC thermal energy transfer equipment, include the indoor and outdoor dry bulb temperature range and indoor and outdoor wet bulb temperature range within which the TAB data was recorded.

d. Air System Diagrams: Provided updated diagrams with final installed locations of all terminals and devices, any numbering changes, and actual test locations.

e. Air Static Pressure Profiles: Report static pressure profiles for air duct systems including: all new rooftop units. Report static pressure data for all supply, return, relief, exhaust and outside air ducts for the systems listed. The static pressure report data shall include, in addition to AABC or NEBB or TABB required data, the following:

(1) Report supply fan inlet and discharge static pressures.

(2) Report static pressure drop across DX coils, hot water coils, electric resistance heating coils and heat reclaim devices installed in unit cabinetry or the system ductwork.

(3) Report static pressure drop across outside air, return air air automatic control dampers, both proportional and two-position, installed in unit cabinetry.

(4) Report static pressure drop across air filters, acoustic silencers, moisture eliminators, air flow straighteners, air flow measuring stations or other pressure drop producing specialty items installed in unit cabinetry, or in the system ductwork. Examples of these specialty items are smoke detectors, white sound generators, RF shielding, wave guides, security bars, blast valves, small pipes passing through ductwork, and duct mounted humidifiers.

Do not report static pressure drop across duct fittings provided for the sole purpose of conveying air, such as elbows, transitions, offsets, plenums, manual dampers, and branch takes-offs.

(5) Report static pressure drop across outside air and relief/exhaust air louvers.

f. Duct Transverses: Report duct traverses for main supply and return air ducts. This shall include all ducts, including those which lack 7 1/2 duct diameters upstream and 2 1/2 duct diameters downstream of straight duct unobstructed by duct fittings/offsets/elbows. The TAB Agency shall evaluate and report findings on the duct traverses taken. Evaluate the suitability of the duct traverse measurement based on satisfying the qualifications for a pitot traverse plane as defined by AMCA 203, "Field Measurements", Section 8, paragraph 8.3, "Location of Traverse Plane".

g. Instruments: List the types of instruments actually used to measure the tab data. Include in the listing each instrument's unique identification number, calibration date, and calibration expiration date.

   Instrumentation, used for taking wet bulb temperature readings shall provide accuracy of plus or minus 5 percent at the measured face velocities. Submit instrument manufacturer's literature to document instrument accuracy performance is in compliance with that specified.

h. Certification: Include the type name of the TAB supervisor and the dated signature of the TAB supervisor.

i. Performance Curves: The TAB Supervisor shall include, in the TAB Reports, factory pump curves and fan curves for pumps and fans TAB'd on the job.

j. Calibration Curves: The TAB Supervisor shall include, in the TAB Reports, a factory calibration curve for installed flow control balancing valves, flow venturi's and flow orifices TAB'd on the job.

k. Report flow rates through and pressure drops across all contract applicable hydronic components such as: balancing valves, coils, and flow measuring devices.

1.5 QUALITY ASSURANCE

1.5.1 Independent TAB Agency and Personnel Qualifications

To secure approval for the proposed agency, submit information certifying that the TAB agency is a first tier subcontractor who is not affiliated with any other company participating in work on this contract, including design, furnishing equipment, construction, or commissioning. Further, submit the following, for the agency, to Contracting Officer for approval:

a. Independent AABC or NEBB or TABB TAB agency:

   TAB agency: AABC registration number and expiration date of current certification; or NEBB certification number and expiration date of current certification; or TABB certification number and expiration date of current certification.

   TAB team supervisor: Name and copy of AABC or NEBB or TABB TAB supervisor certificate and expiration date of current certification.

   TAB team field leader: Name and documented evidence that the team field leader has satisfactorily performed full-time supervision of TAB work in the field for not less than 3 years immediately preceding this contract's bid opening date.

   TAB team field technicians: Names and documented evidence that each field technician has satisfactorily assisted a TAB team field leader in performance of TAB work in the field for not less than one year immediately preceding this contract's bid opening date.

   Current certificates: Registrations and certifications are current, and valid for the duration of this contract. Renew Certifications which expire prior to completion of the TAB work, in a timely

manner so that there is no lapse in registration or certification. TAB agency or TAB team personnel without a current registration or current certification are not to perform TAB work on this contract.

b. TAB Team Members: TAB team approved to accomplish work on this contract are full-time employees of the TAB agency. No other personnel is allowed to do TAB work on this contract.

c. Replacement of TAB team members: Replacement of members may occur if each new member complies with the applicable personnel qualifications and each is approved by the Contracting Officer.

1.5.1.1 TAB Standard

Perform TAB in accordance with the requirements of the standard under which the TAB Firm's qualifications are approved, i.e., AABC MN-1, NEBB PROCEDURAL STANDARDS, or SMACNA 1780 unless otherwise specified herein. All recommendations and suggested practices contained in the TAB Standard are considered mandatory. Use the provisions of the TAB Standard, including checklists, report forms, etc., as nearly as practical, to satisfy the Contract requirements. Use the TAB Standard for all aspects of TAB, including qualifications for the TAB Firm and Specialist and calibration of TAB instruments. Where the instrument manufacturer calibration recommendations are more stringent than those listed in the TAB Standard, adhere to the manufacturer's recommendations.

All quality assurance provisions of the TAB Standard such as performance guarantees are part of this contract. For systems or system components not covered in the TAB Standard, TAB procedures must be developed by the TAB Specialist. Where new procedures, requirements, etc., applicable to the Contract requirements have been published or adopted by the body responsible for the TAB Standard used (AABC, NEBB, or TABB), the requirements and recommendations contained in these procedures and requirements are considered mandatory, including the latest requirements of ASHRAE 62.1.

1.5.1.2 Qualifications

a. Tab Firm

The TAB Firm must be either a member of AABC or certified by the NEBB or the TABB and certified in all categories and functions where measurements or performance are specified on the plans and specifications, including TAB of environmental systems the performance of clean rooms and clean air devices and the measuring of sound and vibration in environmental systems.

Certification must be maintained for the entire duration of duties specified herein. If, for any reason, the firm loses subject certification during this period, the Contractor must immediately notify the Contracting Officer and submit another TAB Firm for approval. Any firm that has been the subject of disciplinary action by either the AABC, the NEBB, or the TABB within the five years preceding Contract Award is not be eligible to perform any duties related to the HVAC systems, including TAB. All work specified in this Section and in other related Sections to be performed by the TAB Firm will be considered invalid if the TAB Firm loses its certification prior to Contract completion and must

be performed by an approved successor.

These TAB services are to assist the prime Contractor in performing the quality oversight for which it is responsible. The TAB Firm must be a prime subcontractor of the Contractor and be financially and corporately independent of the mechanical subcontractor, reporting directly to and paid by the Contractor.

b. TAB Specialist

The TAB Specialist must be either a member of AABC,an experienced technician of the Firm certified by the NEBB, or a Supervisor certified by the TABB. The certification must be maintained for the entire duration of duties specified herein. If, for any reason, the Specialist loses subject certification during this period, immediately notify the Contracting Officer and submit another TAB Specialist for approval. Any individual that has been the subject of disciplinary action by either the AABC, the NEBB, or the TABB within the five years preceding Contract Award is not eligible to perform any duties related to the HVAC systems, including TAB. All work specified in this Section and in other related Sections performed by the TAB Specialist will be considered invalid if the TAB Specialist loses its certification prior to Contract completion and must be performed by the approved successor.

c. TAB Related HVAC Submittals

The TAB Specialist must prepare a list of the submittals from the Contract Submittal Register that relate to the successful accomplishment of all HVAC TAB. Accompany the submittals identified on this list with a letter of approval signed and dated by the TAB Specialist when submitted to the Government. Ensure that the location and details of ports, terminals, connections, etc., necessary to perform TAB are identified on the submittals.

1.5.2 Responsibilities

The Contractor is responsible for ensuring compliance with all requirements of this specification section. However, the following delineation of specific work items is provided to facilitate and coordinate execution of the various work efforts by personnel from separate organizations.

1.5.2.1 Contractor

a. TAB personnel: Ensure that the TAB work is accomplished by a group meeting the requirements specified in paragraph entitled "TAB Personnel Qualification Requirements."

b. HVAC documentation: Provide pertinent contract documentation to the TAB firm, to include the following: the contract drawings and specifications, copies of the approved submittal data for all HVAC equipment, air distribution devices, and air/water measuring/balancing devices; the construction work schedule; and other applicable documents requested by TAB firm. Provide the TAB Firm copies of contract revisions and modifications as they occur.

c. Schedules: Ensure the requirements specified under the paragraph "TAB Schedule" are met.

d. Pre-TAB meetings: Arrange and conduct the Pre-TAB meetings. Ensure that a representative is present for the sheet metal contractor, the mechanical contractor, the electrical contractor, and the automatic temperature controls contractor.

e. Coordinate Support: Provide and coordinate support personnel required by the TAB Firm in order to accomplish the TAB field work. Support personnel may include factory representatives, HVAC controls installer, HVAC equipment mechanics, sheet metal workers, pipe fitters, and insulators. Ensure support personnel are present at the work site at the times required.

f. Correct Deficiencies: Ensure the notifications of Construction Deficiencies are provided as specified herein. Refer to paragraph entitled "Construction Deficiencies." Correct each deficiency as soon as practical with the Contracting Officer, and submit revised schedules and other required documentation.

g. Prior to the TAB field team's arrival, ensure completion of the applicable inspections and work items listed in the TAB team supervisor's pre-field engineering report. Do not allow the TAB team to commence TAB field work until all of the following are completed.

(1) HVAC system installations are fully complete.

(2) HVAC prerequisite checkout work lists specified in the paragraph "Pre-Field TAB Engineering Report" are completed, submitted, and approved. At a minimum, complete check out and debugging of HVAC equipment, ducts, and controls prior to the TAB engineer arriving at the project site to begin the TAB work. Debugging includes searching for and eliminating malfunctioning elements in the HVAC system installations, and verifying all adjustable devices are functioning as designed. Ensure that the TAB Agency gets a copy of the approved prerequisite HVAC work checklist.

(3) Provide new throwaway HVAC filters and/or clean washable HVAC filters within seven days before both Season 1 and Season 2 TAB field work.

(4) All fan belts on equipment involved in the TAB field work shall be checked, adjusted, and replaced as necessary to bring within the manufacturer's recommended tolerances within seven days before both Season 1 and Season 2 TAB field work.

(5) If Season 2 TAB field work is out of compliance, the Contractor shall be responsible for inspecting and cleaning all strainers, hot water, and chilled water coils as necessary, after which Season 2 TAB field work shall be repeated as necessary to prove compliance.

i. Advance notice: Furnish to the Contracting Officer with advance written notice for the commencement of the TAB field work.

1.5.2.2 TAB Agency

Provide the services of a TAB team which complies with the requirements of paragraph entitled "Independent TAB Agency Personnel Qualifications". The work to be performed by the TAB agency is limited to testing, adjusting,

and balancing of HVAC air and water systems to satisfy the requirements of this specification section.

1.5.2.3 TAB Team Specialist

a. Overall management: Supervise and manage the overall TAB team work effort, including preliminary and technical TAB procedures and TAB team field work.

b. Schedule: Ensure the requirements specified under the paragraph "TAB Schedule" are met.

c. Submittals: Provide the submittals specified herein.

d. Pre-TAB meeting: Attend meeting with Contractor. Ensure TAB personnel that will be involved in the TAB work under this contract attend the meeting.

e. Design review report: Submit typed report describing omissions and deficiencies in the HVAC system's design that would preclude the TAB team from accomplishing the TAB work requirements of this section. Provide a complete explanation including supporting documentation detailing the design deficiency. State that no deficiencies are evident if that is the case.

f. Support required: Specify the technical support personnel required from the Contractor other than the TAB agency; such as factory representatives for temperature controls or for complex equipment. Inform the Contractor in writing of the support personnel needed and when they are needed. Furnish the notice as soon as the need is anticipated, either with the design review report, or the pre-field engineering report, the during the TAB field work.

g. Ensure all inspections and verifications for the Pre-Final Pre-TAB Checklists are completely and successfully conducted before TAB field work is performed.

h. Pre-field engineering report: Utilizing the following HVAC-related documentation; contract drawings and specifications, approved submittal data for equipment, up-to-date revisions and change orders; prepare this report.

i. Prerequisite HVAC work checklist: Ensure the Contractor gets a copy of this checklist at the same time as the pre-field engineering report is submitted.

j. Technical Assistance for TAB Work: Provide immediate technical assistance to the TAB field team for the TAB work.

   (1) TAB field visit: Near the end of the TAB field work effort, visit the contract site to inspect the HVAC installation and the progress of the TAB field work. Review the TAB final report data and certify the TAB final report.

k. Certified TAB report: Certify the TAB report. This certification includes the following work:

   (1) Review: Review the TAB field data report. From this field report, prepare the certified TAB report.

(2) Verification: Verify adherence, by the TAB field team, to the TAB plan prescribed by the pre-field engineering report and verify adherence to the procedures specified in this section.

l. Design/Construction deficiencies: Within 3 working days after the TAB Agency has encountered any design or construction deficiencies, the TAB Supervisor must submit written notification directly to the Contracting Officer, with a separate copy to the Contractor, of all such deficiencies. Provide in this submittal a complete explanation, including supporting documentation, detailing deficiencies. Where deficiencies are encountered that are believed to adversely impact successful completion of TAB, the TAB Agency must issue notice and request direction in the notification submittal.

1.5.2.4 TAB Team Field Leader

a. Field manager: Manage, in the field, the accomplishment of the work specified in Part 3, "Execution."

b. Full time: Be present at the contract site when TAB field work is being performed by the TAB team; ensure day-to-day TAB team work accomplishments are in compliance with this section.

c. Prerequisite HVAC work: Do not bring the TAB team to the contract site until a copy of the prerequisite HVAC Checklist, with all work items certified by the Contractor to be working as designed, reaches the office of the TAB Agency.

1.6 TAB SUBMITTAL AND WORK SCHEDULE

1.6.1 Pre-Construction Submittals

Within 60 calendar days after date of contract award, submit the following:

Independent TAB Agency and Personnel Qualifications and Certificates

TAB Design Review Report

Pre-Field TAB Engineering Report

TAB Work Execution Schedule

1.6.2 Pre-TAB Meeting

A minimum 30 calendar days prior to the start of TAB field work.

1.6.3 Pre-TAB Preliminary Notification

A minimum of 7 calendar days prior to the start of TAB notify the Contracting Officer in writing of the start of TAB.

1.6.4 HVAC Work Check Out List

Complete HVAC Work Check Out List for proportional balancing and Season 1 thermal performance prior to start of TAB work.

1.6.5 TAB Field Work

Tab Field Work for proportional balancing shall be completed a minimum of 90 calendar days prior to CCD.

1.6.6 Submit Pre-Final TAB for Proportional Balancing Report

Within seven working days after completion of TAB field work.

1.6.7 TAB Field Acceptance Testing for Proportional Balancing

Upon approval of the Pre-Final TAB Report, schedule the TAB work field check with the Contracting Officer. TAB for proportional balancing shall be approved prior to BOD.

1.6.8 Submit Final TAB Report for Proportional Balancing

Within 15 calendar days after completion of successful TAB Work Field Check.

1.6.9 Seasonal 1 Thermal Performance TAB Work

Normally, Season 1 thermal performance TAB work will be accomplished during TAB for proportional balancing. If it cannot be performed concurrently due to weather; the TAB for Season 1 will follow the same sequence as TAB for proportionally balanced. TAB for Season 1 shall be complete and TAB Field Acceptance Testing approved prior to BOD.

1.6.10 Pre-Season 2 TAB Preliminary Notification

A minimum of 7 calendar days prior to the start of TAB notify the Contracting Officer in writing of the start of TAB.

1.6.11 HVAC Work Check Out List

Complete HVAC Work Check Out List for Season 2 thermal performance prior to start of TAB work.

1.6.12 TAB Field Work for Proportional Balancing

TAB Field Work for proportional balancing shall be completed within 240 calendar days after commencement of the Season 1 TAB field work and when the ambient temperature is within Season 2 limits.

1.6.13 Submit Pre-Final TAB for Season 2 Report

Within seven working days after completion of TAB field work.

1.6.14 TAB Field Acceptance Testing for Season 2

Upon approval of the Pre-Final TAB Report, schedule the TAB work field check with the Contracting Officer. TAB for proportional balancing shall be approved prior to BOD.

1.6.15 Submit Final TAB Report for Proportional Balancing

Within 15 calendar days after completion of successful TAB Work Field Check.

1.6.16 Maximum Cooling Thermal Performance

Season of maximum cooling thermal performance shall be conducted in June - September.

1.7 WARRANTY

Furnish workmanship and performance warranty for the TAB system work performed for a period not less than 1 years from the date of Government acceptance of the work; issued directly to the Government. Include provisions that if within the warranty period the system shows evidence of major performance deterioration, or is significantly out of tolerance, resulting from defective TAB workmanship, the corrective repair or replacement of the defective materials and correction of the defective workmanship is the responsibility of the TAB firm. Perform corrective action that becomes necessary because of defective materials and workmanship while system TAB is under warranty 7 days after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within the specified period of time constitutes grounds for having the corrective action and repairs performed by others and the cost billed to the TAB firm. The Contractor must also provide a 1 year contractor installation warranty.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 WORK DESCRIPTIONS OF PARTICIPANTS

Comply with requirements of this section as specified in Appendix A WORK DESCRIPTIONS OF PARTICIPANTS.

3.2 PRE-TAB MEETING

Meet with the Contracting Officer's technical representative (COTR) to develop a mutual understanding relative to the details of the TAB work requirements. Ensure that the TAB supervisor is present at this meeting. Requirements to be discussed include required submittals, work schedule, and field quality control.

3.3 TAB PROCEDURES

3.3.1 TAB Field Work

Test, adjust, and balance the HVAC systems until measured flow rates (air and water flow) are within plus or minus 5 percent of the design flow rates as specified or indicated on the contract documents. Provide a proportional balance of air and water flow. Outside air to exhaust air flow ratio shall be balanced to -0/+5% of design.

That is, comply with the the requirements of AABC MN-1 and AABC MN-4, NEBB PROCEDURAL STANDARDS, NEBB MASV, or SMACNA 1780 (TABB) and SMACNA 1858 (TABB),except as supplemented and modified by this section.

Provide instruments and consumables required to accomplish the TAB work. Calibrate and maintain instruments in accordance with manufacturer's written procedures.

Test, adjust, and balance the HVAC systems until measured flow rates (air and water flow) are within plus or minus 5 percent of the design flow rates as specified or indicated on the contract documents. Conduct TAB work, including measurement accuracy, and sound measurement work in conformance with the AABC MN-1 and AABC MN-4, or NEBB TABES and NEBB MASV, or SMACNA 1780 (used by TABB) and SMACNA 1858 sound measurement procedures, except as supplemented and modified by this section. The only water flow and air flow reporting which can be deferred until the Season 2 is that data which would be affected in terms of accuracy due to outside ambient conditions.

3.3.2 Preliminary Procedures

Use the approved pre-field engineering report as instructions and procedures for accomplishing TAB field work. TAB engineer is to locate, in the field, test ports required for testing. It is the responsibility of the sheet metal contractor to provide and install test ports as required by the TAB engineer.

3.3.3 TAB Air Distribution Systems

3.3.3.1 Units With Coils

Report heating and cooling performance capacity tests for hot water, DX coils for the purpose of verifying that the coils meet the indicated design capacity. Submit the following data and calculations with the coil test reports:

a. For air handlers with capacities greater than 7.5 tons (90,000 Btu) cooling, such as factory manufactured units, central built-up units and rooftop units, conduct capacity tests in accordance with AABC MN-4, procedure 3.5, "Coil Capacity Testing."

   Do not determine entering and leaving wet and dry bulb temperatures by single point measurement, but by the average of multiple readings in compliance with paragraph 3.5-5, "Procedures", (in subparagraph d.) of AABC MN-4, Procedure 3.5, "Coil Capacity Testing."

   Submit part-load coil performance data from the coil manufacturer converting test conditions to design conditions; use the data for the purpose of verifying that the coils meet the indicated design capacity in compliance with AABC MN-4, Procedure 3.5, "Coil Capacity Testing," paragraph 3.5.7, "Actual Capacity Vs. Design Capacity" (in subparagraph c.).

b. For units with capacities of 7.5 tons (90,000 Btu) or less, such as fan coil units, duct mounted reheat coils associated with VAV terminal units, and unitary units, such as through-the-wall heat pumps:

   Determine the apparent coil capacity by calculations using single point measurement of entering and leaving wet and dry bulb temperatures; submit the calculations with the coil reports.

3.3.3.2 Rooftop Air Conditioning

Rooftop air conditioning systems including fans, coils, ducts, plenums, and air distribution devices for supply air, return air, and outside air.

For refrigeration compressors/condensers/condensing units/evaporators, report data as required by NEBB, AABC, and TABB standard procedures, including refrigeration operational data.

3.3.4 TAB Water Distribution Systems

3.3.4.1 Heating Hot Water

Heating hot water systems including coils, system balancing valves and flow measuring devices.

3.3.5 TAB Work on Performance Tests Without Seasonal Limitations

3.3.5.1 Performance Tests

In addition to the TAB proportionate balancing work on the air distribution systems and the water distribution systems, accomplish TAB work on the HVAC systems which directly transfer thermal energy. TAB the operational performance of the heating systems and cooling systems.

3.3.5.2 Ambient Temperatures

On each tab report form used for recording data, record the outdoor and indoor ambient dry bulb temperature range and the outdoor and indoor ambient wet bulb temperature range within which the report form's data was recorded. Record these temperatures at beginning and at the end of data taking.

3.3.6 TAB Work on Performance Tests With Seasonal Limitations

3.3.6.1 Performance Tests

Accomplish proportionate balancing TAB work on the air distribution systems and water distribution systems, in other words, accomplish adjusting and balancing of the air flows and water flows, any time during the duration of this contract, subject to the limitations specified elsewhere in this section.

In addition to the TAB proportional balancing work on the air distribution systems and the water distribution systems, accomplish TAB work on the HVAC systems which directly transfer thermal energy within the seasons of maximum heating load and maximum cooling load.

3.3.6.2 Season Of Maximum Load

Visit the contract site for at least two TAB work sessions for TAB field measurements. Visit the contract site during the season of maximum heating load and visit the contract site during the season of maximum cooling load, the goal being to TAB the operational performance of the heating systems and cooling systems under their respective maximum outdoor environment-caused loading. During the seasonal limitations, TAB the operational performance of the heating systems and cooling systems.

3.3.6.3 Ambient Temperatures

On each tab report form used for recording data, record the outdoor and indoor ambient dry bulb temperature range and the outdoor and indoor ambient wet bulb temperature range within which the report form's data was recorded. Record these temperatures at beginning and at the end of data

taking.

3.3.7 Workmanship

Conduct TAB work on the HVAC systems until measured flow rates are within specified tolerance. This TAB work includes adjustment of balancing valves, balancing dampers, and sheaves. Further, this TAB work includes changing out fan sheaves and pump impellers if required to obtain air and water flow rates specified or indicated. The Contractor is responsible for cleaning strainers and coils (interior and exterior as necessary) if required to obtain air and water flow rates specified or indicated. If, with these adjustments and equipment changes, the specified or indicated design flow rates cannot be attained, contact the Contracting Officer for direction.

3.3.8 Deficiencies

Strive to meet the intent of this section to maximize the performance of the equipment as designed and installed. However, if deficiencies in equipment design or installation prevent TAB work from being accomplished within the range of design values specified in the paragraph entitled "Workmanship," provide written notice as soon as possible to the Contractor and the Contracting Officer describing the deficiency and recommended correction.

Responsibility for correction of installation deficiencies is the Contractor's. If a deficiency is in equipment design, call the TAB team supervisor for technical assistance. Responsibility for reporting design deficiencies to Contractor is the TAB team supervisor's.

3.3.9 TAB Reports

After completion of the TAB field work, prepare the Pre-FinalTAB Report for TAB supervisor's review and certification, using the reporting forms approved in the pre-field engineering report. Data required by those approved data report forms is to be furnished by the TAB team. Except as approved otherwise in writing by the Contracting Officer, the TAB work and thereby the TAB report is considered incomplete until the TAB work is accomplished to within the accuracy range specified in the paragraph entitled "Workmanship."

3.3.10 Quality Assurance - COTR TAB Field Acceptance Testing

3.3.10.1 TAB Field Acceptance Testing

During the field acceptance testing, verify, in the presence of the COTR, random selections of data (water, air quantities, air motion,) recorded in the TAB Report. Points and areas for field acceptance testing are to be selected by the COTR. Measurement and test procedures are the same as approved for TAB work for the TAB Report.

Field acceptance testing includes verification of TAB Report data recorded for the following equipment groups:

Group 1: All air handling units (rooftop and central stations).

Group 5: All of the supply fans.

If any of the acceptance testing measurements for a given equipment group

is found not to fall within the range of plus 5 to minus 5 percent of the Design Value, terminate data verification for all affected data for that group. The affected data for the given group will be disapproved. Make the necessary corrections and prepare a revised TAB Report. Reschedule acceptance testing of the revised report data with the COTR.
Further, if any data on the TAB Report for a given field acceptance test group is out-of-tolerance, then field test data for one additional field test group as specified herein. Continue this increase field test work until out-of-tolerance data ceases to to be found. This additional field testing is up and above the original 25 percent of the of reported data entries to be field tested.

If there are no more similar field test groups from which to choose, additional field testing from another, but different, type of field testing group must be tested.

3.3.10.2 Prerequisite for Approval

Compliance with the field acceptance testing requirements of this section is a prerequisite for the final Contracting Officer approval of the TAB Report submitted.

3.3.11 Final TAB Report

After acceptance of the TAB Field Acceptance testing, submit a Final TAB Report including all adjustments/revisions made. The Final Report shall be neat, legible and type written.

3.4 MARKING OF SETTINGS

Upon the final TAB work approval, permanently mark the settings of HVAC adjustment devices including valves, gauges, splitters, and dampers so that adjustment can be restored if disturbed at any time. Provide permanent markings clearly indicating the settings on the adjustment devices which result in the data reported on the submitted TAB report.

3.5 MARKING OF TEST PORTS

The TAB team is to permanently and legibly mark and identify the location points of the duct test ports. If the ducts have exterior insulation, make these markings on the exterior side of the duct insulation. Show the location of test ports on the as-built mechanical drawings with dimensions given where the test port is covered by exterior insulation.

-- End of Section --

SECTION 23 09 00

INSTRUMENTATION AND CONTROL FOR HVAC
02/25 MCBCL

PART 1 GENERAL

1.1 SUMMARY

Provide a complete Direct Digital Control (DDC) system, except for the Front End, suitable for the control of the heating, ventilating and air conditioning (HVAC) and other building-level systems as indicated and shown and in accordance with Section 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS, and other referenced Sections.

1.1.1 BACnet Direct Digital Control Systems for HVAC Description:

a. Remove existing and merge new BACnet DDC with existing non-BACnet DDC system(s) including associated equipment and accessories. Existing DDC system is manufactured by n/a.

b. All new devices are accessible using a Web browser interface and communicate using ASHRAE 135 BACnet communications without the use of gateways, unless gateways are shown on the design drawings and specifically requested by the Government. Where gateways are allowed, they must support ASHRAE 135, including all object properties and read-write services shown on Government approved interoperability schedules. Manufacturer's products, including design, materials, fabrication, assembly, inspection, and testing shall be in accordance with ASHRAE 135, ASME B31.1, and NFPA 70, except where indicated otherwise.

1.1.2 System Requirements

Provide systems meeting the requirements this Section and other Sections referenced by this Section, and which have the following characteristics:

a. The system implements the control sequences of operation shown in the Contract Drawings using DDC hardware to control mechanical and electrical equipment.

b. The system meet the requirements of this specification as a stand-alone system and does not require connection to any other system.

c. Control sequences reside in DDC hardware in the building. The building control network is not dependent upon connection to a Utility Monitoring and Control System (UMCS) Front End or to any other system for performance of control sequences. To the greatest extent practical, the hardware performs control sequences without reliance on the building network.

d. The hardware is installed such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.

e. All necessary documentation, configuration information, programming tools, programs, drivers, and other software are licensed to and

otherwise remain with the Government such that the Government or their agents are able to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor, Vendor or Manufacturer.

f. Sufficient documentation and data, including rights to documentation and data, are provided such that the Government or their agents can execute work to perform repair, replacement, upgrades, and expansions of the system without subsequent or future dependence on the Contractor, Vendor or Manufacturer.

g. Hardware is installed and configured such that the Government or their agents are able to perform repair, replacement, and upgrades of individual hardware without further interaction with the Contractor, Vendor or Manufacturer.

1.1.3 Verification of Dimensions

After becoming familiar with all details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.1.4 Drawings

The Government will not indicate all offsets, fittings, and accessories that may be required on the drawings. Carefully investigate the mechanical, electrical, and finish conditions that could affect the work to be performed, arrange such work accordingly, and provide all work necessary to meet such conditions.

1.2 RELATED SECTIONS

Related work specified elsewhere:

a. Section 23 09 23.02 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS

b. Section 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

c. Section 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 135	(2024; INT 1-3 2025; Errata 1 2025; INT 4-6 2025; Addenda CU 2025) BACnet—A Data Communication Protocol for Building Automation and Control Networks
ASHRAE 135.1	(2023) Method of Test for Conformance to BACnet

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B31.1	(2024) Power Piping

ASTM INTERNATIONAL (ASTM)

ASTM B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus

CONSUMER ELECTRONICS ASSOCIATION (CEA)

CEA-709.1-D	(2014) Control Network Protocol Specification

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41.1	(2002; R 2008) Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.41.2	(2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.45	(2002; R 2008) Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code

UL SOLUTIONS (UL)

UL 506	(2017; Reprint Jan 2022) UL Standard for Safety Specialty Transformers
UL 508A	(2018; Reprint Jul 2022) UL Standard for Safety Industrial Control Panels
UL 1449	(2021; Reprint Dec 2022) UL Standard for Safety Surge Protective Devices

1.4 DEFINITIONS

The following list of definitions includes terms used in Sections referenced by this Section and are included here for completeness.The definitions contained in this Section may disagree with how terms are defined or used in other documents, including documents referenced by this Section. The definitions included here are the authoritative definitions for this Section and all Sections referenced by this Section.

1.4.1 BACnet

Building Automation and Control Network; the common name for the communication standard ASHRAE 135. The standard defines methods and protocol for cooperating building automation devices to communicate over a

variety of LAN technologies.

1.4.2 BACnet/IP

An extension of BACnet, Annex J, defines this mechanism using a reserved UDP socket to transmit BACnet messages over IP networks. A BACnet/IP network is a collection of one or more IP subnetworks that share the same BACnet network number. See also "BACnet Broadcast Management Device".

1.4.3 BACnet Internetwork

Two or more BACnet networks, possibly using different LAN technologies, connected with routers. In a BACnet internetwork, there exists only one message path between devices.

1.4.4 BACnet Network

One or more BACnet segments that have the same network address and are interconnected by bridges at the physical and data link layers.

1.4.5 BACnet Segment

One or more physical segments of BACnet devices on a BACnet network, connected at the physical layer by repeaters.

1.4.6 BBMD

BACnet Broadcast Management Device (BBMD). A communications device, typically combined with a BACnet router. A BBMD forwards BACnet broadcast messages to BACnet/IP devices and other BBMDs connected to the same BACnet/IP network. Every IP subnetwork that is part of a BACnet/IP network must have only one BBMD. See also "BACnet/IP".

1.4.7 BAS

Building Automation Systems, including DDC (Direct Digital Controls) used for facility automation and energy management.

1.4.8 BAS Owner

The regional or local user responsible for managing all aspects of the BAS operation, including: network connections, workstation management, technical support, control parameters, and daily operation. The BAS Owner for this project is Camp Lejeune FRCS Cyber Operation Group. Point of contact:

Public Works Division/FRCS Cyber Ops
1110 Ash Street
MCB Camp Lejeune, NC 28547
(910) 450-6891

1.4.9 BIBBs

BACnet Interoperability Building Blocks. A collection of BACnet services used to describe supported tasks. BIBBs are often described in terms of "A" (client) and "B" (server) devices. The "A" device uses data provided by the "B" device, or requests an action from the "B" device.

1.4.10 BI

BACnet International, formerly two organizations: the BACnet Manufacturers Association (BMA) and the BACnet Interest Group - North America (BIG-NA).

1.4.11 BI/BTL

BACnet International/BACnet Testing Laboratories (Formerly BMA/BTL). The organization responsible for testing products for compliance with the BACnet standard, operated under the direction of BACnet International.

1.4.12 Bridge

Network hardware that connects two or more network (or BACnet internetwork) segments at the physical and data link layers. A bridge may also filter messages.

1.4.13 Broadcast

A message sent to all devices on a network segment.

1.4.14 Device

Any control system component, usually a digital controller, that contains a BACnet Device Object and uses BACnet to communicate with other devices. See also "Digital Controller".

1.4.15 Device Object

Every BACnet device requires one Device Object, whose properties represent the network visible properties of that device. Every Device Object requires a unique Object Identifier number on the BACnet internetwork. This number is often referred to as the device instance.

1.4.16 Device Profile

A collection of BIBBs determining minimum BACnet capabilities of a device, defined in ASHRAE Standard 135-2004, Annex L. Standard device profiles include BACnet Operator Workstations (B-OWS), BACnet Building Controllers (B-BC), BACnet Advanced Application Controllers (B-AAC), BACnet Application Specific Controllers (B-ASC), BACnet Smart Actuator (B-SA), and BACnet Smart Sensor (B-SS). Each device used in new construction is required to have a PICS statement listing BIBBs supported.

1.4.17 Digital Controller

An electronic controller, usually with internal programming logic and digital and analog input/output capability, which performs control functions. In most cases, synonymous with a BACnet device described in this specification. See also "Device".

1.4.17.1 Terminal Device Controllers

Terminal device controllers typically are controllers with less control features, may have integrated actuators, and may be mounted directly on equipment (with enclosures).

1.4.17.2 Field Controllers

Field controllers typically have a greater capability for input/output and customization, do not have integral actuators, are mounted in an enclosure not on the equipment and are used for equipment such as VAV air handlers.

1.4.17.3 Plant Controllers

Plant controllers are typically used to control various equipment in mechanical rooms such as pumps, heat exchangers, and chillers.

1.4.17.4 Supervisory Building Controller (SBC)

The Supervisory Building Controller is used to coordinate all equipment in a building, input scheduling, and is used as a connection point for transferring configuration files to the other controllers. The SBC shall communicate with other controllers and equipment through a BACnet MS/TP bus. Depending on approvals and capabilities, the SBC may be used as a point of connection between the Camp Lejeune EMCS network (IP) and the building level control network (BACnet MS/TP).

1.4.18 Direct Digital Control (DDC)

Digital controllers performing control logic. Usually the controller directly senses physical values, makes control decisions with internal programs, and outputs control signals to directly operate switches, valves, dampers, and motor controllers.

1.4.19 DDC System

A network of digital controllers, communication architecture, and user interfaces. A DDC system may include programming, sensors, actuators, switches, relays, factory controls, operator workstations, and various other devices, components, and attributes.

1.4.20 Energy Management & Control System (EMCS)

The EMCS at Camp Lejeune is an enterprise system that actively receives energy and building condition information from multiple sources and provides load shedding, electric metering, alarming, trending, scheduling, set point adjustment and device status of all supervisory building controllers for maintenance personnel. The EMCS receives real time electrical utility pricing data and automatically manages to Camp Lejeune's energy target. The existing EMCS consists of Niagara FX N4 supervisor (JCI FX web supervisor).

1.4.21 Ethernet

A family of local-area-network technologies providing high-speed networking features over various media.

1.4.22 Firmware

Software programmed into read only memory (ROM), flash memory, electrically erasable programmable read only memory (EEPROM), or erasable programmable read only memory (EPROM) chips.

1.4.23 Gateway

Communication hardware and software connecting two or more different protocols, similar to human language translators. The Gateway translates one protocol into equivalent concepts for the other protocol. In BACnet applications, a Gateway has BACnet on one side and non-BACnet protocols on the other side.

1.4.24 Global ID

An identification number assigned to each Supervisory Building Controller. The Global ID includes assigned MSTP Trunk Instance Numbers and a range of BACnet Instance Numbers to be used for the Field Controllers. The Global ID is assigned by the BAS Owner.

1.4.25 Half Router

A device that participates as one partner in a BACnet point-to-point (PTP) connection. Two half-routers in an active PTP connection combine to form a single router.

1.4.26 Hub

A common connection point for devices on a network.

1.4.27 Internet Protocol (IP, TCP/IP, UDP/IP)

A communication method, the most common use is the World Wide Web. At the lowest level, it is based on Internet Protocol (IP), a method for conveying and routing packets of information over various LAN media. Two common protocols using IP are User Datagram Protocol (UDP) and Transmission Control Protocol (TCP). UDP conveys information to well-known "sockets" without confirmation of receipt. TCP establishes "sessions", which have end-to-end confirmation and guaranteed sequence of delivery.

1.4.28 Input/Output (I/O)

Physical inputs and outputs to and from a device, although the term sometimes describes software, or "virtual" I/O. See also "Points".

1.4.29 I/O Expansion Unit

An I/O expansion unit provides additional point capacity to a digital controller.

1.4.30 IP subnet

Internet protocol (IP) identifies individual devices with a 32-bit number divided into four groups from 0 to 255. Devices are often grouped and share some portion of this number. For example, one device has IP address 209.185.47.68 and another device has IP address 209.185.47.82. These two devices share Class C subnet 209.185.47.00

1.4.31 ISSM

Information Systems Security Manager

1.4.32 Local-Area Network (LAN)

A communication network that spans a limited geographic area and uses the same basic communication technology throughout.

1.4.33 LonTalk

CEA-709.1-D. A communication protocol developed by Echelon Corp. LonTalk is not permitted.

1.4.34 MAC Address

Media Access Control address. The physical node address that identifies a device on a Local Area Network.

1.4.35 Master-Slave/Token-Passing (MS/TP)

One of the LAN options for BACnet. MSTP uses twisted-pair wiring for relatively low speed and low cost communication (up to 4,000 ft at 76.8K bps).

1.4.36 Native BACnet Device

A device that uses BACnet as its primary, if not only, method of communication with other BACnet devices without intermediary gateways. A system that uses native BACnet devices at all levels is a native BACnet system.

1.4.37 Network

Communication technology for data communications. BACnet approved network types are BACnet over Internet Protocol (IP), Point to Point (PTP) Ethernet, MS/TP, and LonTalk®. In general, networks within the building, all controllers and equipment will be BACnet MS/TP, unless noted otherwise.

1.4.38 Network Number

A site-specific number assigned to each network segment to identify for routing. This network number must be unique throughout the BACnet internetwork.

1.4.39 Object

The concept of organizing BACnet information into standard components with various associated properties. Examples include analog input objects and binary output objects.

1.4.40 Object Identifier

An object property used to identify the object, including object type and instance. Object Identifiers must be unique within a device.

1.4.41 Object Properties

Attributes of an object. Examples include present value and high limit properties of an analog input object. Properties are defined in ASHRAE 135; some are optional and some are required. Objects are controlled by reading from and writing to object properties.

1.4.42 Peer-to-Peer

Peer-to-peer refers to devices where any device can initiate and respond to communication with other devices. Peer-to-Peer configurations must be reviewed and approved by Camp Lejeune Public Works Department.

1.4.43 Performance Verification Test (PVT)

The procedure for determining if the installed BAS meets design criteria prior to final acceptance. The PVT is performed after installation, testing, and balancing of mechanical systems. The PVT is performed by the Contractor.

1.4.44 PID

Proportional, integral, and derivative control; three parameters used to control modulating equipment to maintain a setpoint. Derivative control is often not required for HVAC systems (leaving "PI" control).

1.4.45 PICS

Protocol Implementation Conformance Statement (PICS), describing the BACnet capabilities of a device. See BACnet, Annex A for the standard format and content of a PICS statement.

1.4.46 Points

Physical and virtual inputs and outputs. See also "Input/Output".

1.4.47 PTP

Point-to-Point protocol connects individual BACnet devices or networks using serial connections like modem-to-modem links.

1.4.48 Repeater

A network component that connects two or more physical segments at the physical layer.

1.4.49 Router

A BACnet router is a component that joins together two or more networks using different LAN technologies. Examples include joining a BACnet Ethernet LAN to a BACnet MS/TP LAN. If a router is connected directly to the MCEN, it must be listed on the approved DIACAP equipment list and must be Marine Corps DADMS listed and approved.

1.4.50 Stand-Alone Control

Refers to devices performing equipment-specific and small system control without communication to other devices or computers for physical I/O, excluding outside air and other common shared conditions. Devices are located near controlled equipment, with physical input and output points limited to 64 or less per device, except for complex individual equipment or systems. Failure of any single device or communications will not cause other network devices to fail. Internal time clocks and onboard scheduling are required to allow for stand-alone control if not connected to a Supervisory Building Controller. BACnet "Smart" actuators (B-SA profile) and sensors (B-SS profile) communicating on a network with a parent device

are exempt from stand-alone requirements. Provide stand-alone control routines to provide for energy saving sequences such as free cooling. Provide stand-alone control routines that operate without connection to the BACnet/IP and MS/TP networks during a loss of communication.

1.4.51 Supervisory Building Controller

Supervisory Controller that is the main interface for the building control system.

1.4.52 TAB

Testing, adjusting, and balancing (of HVAC systems).

1.5 ADMINISTRATIVE REQUIREMENTS

1.5.1 FRCS Required Training

It is the contractor's sole responsibility to ensure any contractor personnel or subcontractor who will be performing any work pertaining to any new or existing SBC:

a. Attend mandatory FRCS provided training at the frequency prescribed by FRCS.

b. Maintain valid credentials throughout the duration of the project.

FRCS training is typically conducted every two weeks at a location designated by FRCS. Contact the BAS Owner to schedule training and to obtain login credentials. The contractor shall bear the sole responsibility for any delays or mobilizations that may occur should the contractor or subcontractor fail to fulfil the qualifications required to maintain valid credentials. FRCS will not provide unscheduled training under any circumstances. Temporary credentials will not be provided.

1.5.2 DDC Pre-Installation Meeting

Prior to starting the installation, meet with the Contracting Officer's Technical Representative (COTR) and the BAS owner to develop a mutual understanding relative to the details of the DDC system requirements. Requirements to be discussed include, but not limited to, required submittals, work schedule, field quality control, BAS Supervisory controller configuration requirements, and project DDC Specification requirements. Ensure that a representative from the controls contractor and the controls contractor's installation team or subcontractor is present. Contractor shall provide minimum fifteen days notice to COTR when scheduling pre-installation meeting.

1.5.3 Pre-PVT Meeting

A Pre-PVT meeting to review the Pre-PVT Checklist is required to coordinate all aspects of the PVT and shall include the Contractor's QA representative, the Contractor's PVT administrator, the Contracting Officer's representative, and the BAS Owner.

1.5.4 Overhead Inspection by BAS Owner

Prior to closing in any ceiling that contains any DDC component above it, meet with the COTR and the BAS Owner for a site inspection. Mutiple

overhead inspections may be required based on construction schedule. Provide minimum 14 days notice to COTR when scheduling each overhead inspection.

1.5.5 Final Inspection by BAS Owner

After receiving approval of the Controls System Operators Manual, meet with the COTR and the BAS Owner for a final site inspection. Provide minimum 14 days notice to COTR when scheduling the final inspection.

1.5.6 Project Sequence

The control system work for this project shall proceed in the following order:

a. Preparatory meeting for controls work.

b. Submit and receive approval on the Shop Drawings, Product Data, and Certificates specified under the paragraph SUBMITTALS.

c. DDC Pre-Installation Meeting.

d. Submit and receive approval for PVT Plan.

e. Pre-PVT Meeting.

f. Perform the control system installation work, including all field check-outs and tuning.

g. Overhead Inspection by BAS Owner.

h. Provide support to TAB personnel as specified under the paragraph TEST AND BALANCE SUPPORT.

i. Perform final tuning of all PID loops after TAB field acceptance testing is complete.

j. Perform the PVT.

k. Submit and receive approval for the PVT Report.

l. Submit and receive approval for As-Built Control Drawings.

m. Submit and receive approval of the Controls System Operators Manual specified under the paragraph CONTROLS SYSTEM OPERATORS MANUALS.

n. Final inspection by BAS Owner.

o. Submit and receive approval for Trends.

p. PVT Report Field Acceptance Test.

q. Submit and receive approval on the Training Documentation specified under the paragraph INSTRUCTION TO GOVERNMENT PERSONNEL and VFD Service Support. Submit at least 30 days before training.

r. Deliver the final Controls System Operators Manuals and VFD Service Manuals.

s. Conduct the Phase I Training and VFD on-site/hands-on training.

t. Conduct the Phase II Training.

u. Submit and receive approval of Closeout Submittals.

1.6 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Control System Drawings Title Sheet; G

List Of I/O Points; G

Control System Components List; G

Control System Schematics; G

Hvac Equipment Control Ladder Diagrams; G

Sequence Of Operations; G

Component Wiring Diagrams; G

Terminal Strip Diagrams; G

Bacnet Communication Architecture Schematic (Network Riser); G

Control Panel Layout; G

SD-06 Test Reports

Existing Conditions Report; G

Control Contractor's Performance Verification Testing Plan; G

Equipment Supplier's Performance Verification Testing Plan; G

Performance Verification Testing Report; G

Trends; G

Bus Waveform Report; G

SD-07 Certificates

Contractor's Qualifications; G

Contractor's Training Certifications; G

SD-10 Operation and Maintenance Data

Comply with requirements for data packages in Section 01 78 23 OPERATION AND MAINTENANCE DATA and in Section 01 78 24.00 20

FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI), except as supplemented and modified in this specification.

Controls System Operators Manuals; G, Data Package 4

SD-11 Closeout Submittals

Training Documentation; G

Warranty Information; G

1.7 QUALITY ASSURANCE

1.7.1 Standard Products

Provide material and equipment that are standard manufacturer's products currently in production and supported by a local service organization.

1.7.2 Finish of New Equipment

New equipment finishing shall be factory provided. Manufacturer's standard factory finishing shall be proven to withstand 125 hours in a salt-spray fog test. Equipment located outdoors shall be proven to withstand 500 hours in a salt-spray fog test.

Salt-spray fog test shall be according to ASTM B117, with acceptance criteria as follows: immediately after completion of the test, the finish shall show no signs of degradation or loss of adhesion beyond 0.125 inch on either side of the scratch mark.

1.7.3 Verification of Dimensions

The contractor shall verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing work.

1.7.4 Modification of References

The advisory provisions in ASME B31.1, NFPA 70 and the manufacturer's recommendations are mandatory. Substitute "shall" for "should" wherever it appears and interpret all references to the "authority having jurisdiction" and "owner" to mean the Contracting Officer.

1.7.5 Subcontractor Special Requirements

Perform all work in this section in accordance with the paragraph SUBCONTRACTOR SPECIAL REQUIREMENTS in Section 01 30 00 ADMINISTRATIVE REQUIREMENTS. The paragraph specifies that all contract requirements of this section shall be accomplished directly by a first tier subcontractor. No work required shall be accomplished by a second tier subcontractor.

1.7.6 Contractor's Qualifications

Submit documentation certifying the controls Contractor performing the work has completed at least three DDC systems installations of a similar design to this project, and programmed similar sequences of operation for at least two years. Personnel performing the installation, programming, checkout, commissioning and training shall, at a minimum, have obtained all Contractor's Training Certifications required by the manufacturer for the tasks they are performing. Tasks include any activity required to

execute and complete the contracted work. Certifications for each person shall be submitted prior to the beginning of the contracted work. Certifications shall be made available at any time upon the request from Camp Lejeune.

1.8 DELIVERY, STORAGE, AND HANDLING

Store and protect products from the weather, humidity, and temperature variations, dirt and dust, and other contaminants, within the storage condition limits published by the equipment manufacturer, and as approved by the Contracting Officer. Replace damaged or defective items.

PART 2 PRODUCTS

Provide products meeting the requirements of Section 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS for BACnet, other referenced Sections, and this Section.

2.1 DDC SYSTEM

a. Provide a networked DDC system for stand-alone control in compliance with the latest revision of the ASHRAE 135. Include all programming, objects, and services required to meet the sequence of control. Provide BACnet MS/TP communications between the DDC system and native BACnet devices furnished with HVAC equipment and plant equipment including boilers, chillers, and variable frequency drives. Devices provided shall be certified in the BACnet Testing Laboratories (BTL) Product Listing and in accordance with ASHRAE 135.1 Method of Test for Conformance to BACnet. Controls provided integral to equipment shall be part of the DDC system and shall fully comply with this specification. Coordinate integration of integral controls into the system as a whole. BACnet over IP is not permitted within the DDC system.

b. Assist the Government in interfacing the new DDC system with the site's existing server and operator workstation and software. Create graphics, scheduling, alarming, and trending.

2.2 GENERAL PRODUCT REQUIREMENTS

Units of the same type of equipment must be products of a single manufacturer. Each major component of equipment must have the manufacturer's name and address, and the model and serial number in a conspicuous place. Materials and equipment must be standard products of a manufacturer regularly engaged in the manufacturing of these and similar products. The standard products must have been in a satisfactory commercial or industrial use for two years prior to use on this project. The two year use must include applications of equipment and materials under similar circumstances and of similar size. DDC Hardware not meeting the two-year field service requirement is acceptable provided it has been successfully used by the Contractor in a minimum of two previous projects. The equipment items must be supported by a service organization. Items of the same type and purpose must be identical, including equipment, assemblies, parts and components.

2.3 OPERATION ENVIRONMENT

Provide continuous protection of components from the following conditions:

a. Pressure: Pressure conditions normally encountered in the installed location.

b. Vibration: Vibration conditions normally encountered in the installed location.

c. Temperature:

(1) Products installed indoors: Ambient temperatures in the range of 32 to 112 degrees F and temperature conditions outside this range normally encountered at the installed location.

(2) Products installed outdoors or in unconditioned indoor spaces: Ambient temperatures in the range of -35 to +151 degrees F and temperature conditions outside this range normally encountered at the installed location.

d. Humidity: 10 to 95 percent relative humidity, noncondensing and humidity conditions outside this range normally encountered at the installed location.

2.4 WIRELESS CAPABILITY

Wireless networking is not authorized for this project as a default. Do not use any wireless communication unless approved by the ISSM which is done on a case-by-case basis. Any device with wireless communication capability is considered to be using wireless communication, regardless of whether or not the device is actively communicating wirelessly, except when wireless communication has been physically permanently disabled (such as through the removal of the wireless transceiver).

Wireless connections must follow all DoD, USN, and USMC requirements and be approved by the PWD ISSM.

2.4.1 Wireless IP Communications

Do not install wireless IP networks, including:

a. Wireless access points

b. Ad-hoc wireless networks

c. WiFi Direct communication

2.4.2 Non-IP Wireless Communication

Non-IP Wireless networking is not authorized for this project.

2.5 ELECTRICAL POWER AND CONTROL WIRING

2.5.1 Transformers

Transformers shall conform to UL 506. For control power other than terminal level equipment, provide a fuse or circuit breaker on the secondary side of each transformer.

2.5.2 Surge and Transient Protection

Provide each control cabinet with surge and transient power protection. Surge protection is not required for small terminal unit controllers such as VAV controllers. Surge and transient protection shall consist of the following devices, installed externally to the controllers.

2.5.2.1 Power-Line Surge Protection

Provide surge suppressors on the incoming power at each direct digital controller or grouped terminal controllers and shall be installed externally to the device or devices being protected. Surge suppressors shall be rated in accordance with UL 1449, have a fault indicating light, and conform to the following:

a. The device shall be a transient voltage surge suppressor, hard-wire type individual equipment protector for 120 VAC/1 phase/2 wire plus ground.

b. The device shall react within 5 nanoseconds and automatically reset.

c. The voltage protection threshold, line to neutral, shall be no more than 211 volts.

d. The device shall have an independent secondary stage equal to or greater than the primary stage joule rating.

e. The primary suppression system components shall be pure silicon avalanche diodes.

f. The secondary suppression system components shall be silicon avalanche diodes or metal oxide varistors.

g. The device shall have an indication light to indicate the protection components are functioning.

h. All system functions of the transient suppression system shall be individually fused and not short circuit the AC power line at any time.

i. The device shall have an EMI/RFI noise filter with a minimum attenuation of 13 dB at 10 kHz to 300 MHz.

j. The device shall comply with IEEE C62.41.1 and IEEE C62.41.2, Class "B" requirements and be tested according to IEEE C62.45.

k. The device shall be capable of operating between minus 20 degrees F and plus 122 degrees F.

2.5.2.2 Communication Line Surge Protection

Provide surge and transient protection for all DDC controllers and all DDC network related devices connected to phone lines, network communication lines, lines from exterior equipment, and lines from other buildings including mechanical buildings in accordance with the following:

a. The device shall provide continuous, non-interrupting protection.

b. The protection shall react within 5 nanoseconds using only solid-state silicon avalanche technology.

c. The device shall be installed at the distance recommended by its manufacturer.

d. Include the location of the surge and transient protection devices on the control drawing network riser.

e. The device shall be located in an enclosure.

f. Surge and transient protection devices must be located at the point where the communication line exists the building and at the exterior equipment location.

2.5.3 Wiring

Provide complete electrical wiring for the DDC System, including wiring to transformer primaries. Run all control wiring in rigid or flexible conduit, metallic tubing, or covered metal raceways, unless noted otherwise. Control circuit wiring shall not run in the same conduit as power wiring over 100 volts. Circuits operating at more than 100 volts shall be in accordance with Section 26 20 00, INTERIOR DISTRIBUTION SYSTEM. Run all circuits over 100 volts in conduit, metallic tubing, covered metal raceways, or armored cable. Follow cable manufacturer's recommendations or requirements based on the cable usage, such as outdoors and/or underground.

2.5.3.1 Power Wiring

The following requirements are for field-installed wiring:

a. Wiring for 24 V circuits shall be insulated copper 18 AWG minimum and rated for 300 VAC service.

b. Wiring for 120 V circuits shall be insulated copper 12 AWG minimum and rated for 600 VAC service.

2.5.3.2 Analog Signal Wiring and Binary Wiring

Provide in accordance with control manufacturer's recommendations and the following: Field-installed analog signal wiring shall be 18 AWG single or multiple twisted pair. Each cable shall be 100 percent shielded and have a drain wire. Each wire shall have insulation rated for 300 VAC service. Cables shall have an overall aluminum-polyester or tinned-copper cable-shield tape. All binary input and output wiring shall be 18 AWG.

2.5.3.3 MS/TP Communication Bus

a. Provide system manufacturer's recommended or preferred cabling.

b. Follow cable manufacturer's recommendations or requirements based on the cable usage, such as outdoors and/or underground.

c. Splices in communication cable are not allowed. Segments of communication cable between field devices shall be solid lengths with no splices.

2.5.3.4 Conduit

Except for flexible conduit, all conduit for controls less than 100 volts

shall be colored blue. All conduit to be blue must be pre-tinted by the manufacturer. Painting or wrapping of conduit is not permitted. Junction box cover plates, cable/wire trough covers, etc., for controls shall be blue. Fittings and boxes do not need to be blue. The requirement for blue colored conduit may be waived for designated exposed areas at the discretion of BAS Owner and Public Works Department.

PART 3 EXECUTION

3.1 DESIGN REQUIREMENTS

3.1.1 Control System Drawings Title Sheet

Provide a title sheet for the control system drawing set. Include the project title, project location, contract number, the controls contractor preparing the drawings, an index of the control drawings in the set, and a legend of the symbols and abbreviations used throughout the control system drawings. The Title Block of each drawing must include the Drawing revision, i.e. Submittal, Revision 1, Revision 2, As-Built, etc., including the date.

3.1.2 List of I/O Points

Also known as a Point Schedule, provide for each input and output point physically connected to a digital controller: point name, point description, point type (Analog Output (AO), Analog Input (AI), Binary Output (BO), Binary Input (BI)), point sensor range, point actuator range, point address, BACnet object, associated BIBBS (where applicable), and point connection terminal number and cable type (18/2, 18/3, etc). Typical schedules for multiple identical equipment are allowed unless otherwise requested in design or contract criteria. All points shall adhere to the Camp Lejeune Standard naming conventions.

3.1.3 Control System Components List

Provide a complete list of control system components installed on this project. Include for each controller and device: control system schematic name, control system schematic designation, device description, manufacturer, model, part number, firmware version, serial number, physical location (e.g. Building 4, room 112 overhead), and power requirements (i.e. AC/DC voltage and power draw). For sensors, include point name, sensor range, and operating limits. For valves, include body style, Cv, design flow rate, pressure drop, valve characteristic (linear or equal percentage), and pipe connection size. For actuators, include point name, spring or non-spring return, modulating or two-position action, normal (power fail) position, nominal control signal operating range (0-10 volts DC or 4-20 milliamps), and operating limits.

3.1.4 Control System Schematics

Provide control system schematics. Typical schematics for multiple identical equipment are allowed unless otherwise requested in design or contract criteria. Include the following:

a. Location of each input and output device. Specify room number for remote devices.

b. Flow diagram for each piece of HVAC equipment.

c. Name or symbol for each control system component, such as V-1 for a valve.

d. Setpoints, with differential or proportional band values.

e. Written sequence of operation for the HVAC equipment.

f. Valve and Damper Schedules, with normal (power fail) position.

g. Control cabinet general layout, include all devices, point count, cable type (18/2, 18/3, etc), 24VAC VA power requirement for all devices including those powered from the cabinet.

3.1.5 HVAC Equipment Control Ladder Diagrams

Provide HVAC equipment control ladder diagrams. Indicate required electrical interlocks. Ladder diagram schematics shall include 120 VAC and low voltage devices in each panel. Ladder diagram schematics shall also include all field devices (sensors, relays, actuators, etc.) and any connection point to controlled equipment or devices.

3.1.6 Sequence of Operations

Provide HVAC control system sequence of operation and control logic diagrams in the same format as the Contract Drawings. Within these drawings, refer to devices by their unique identifiers. Submit sequences of operation and control logic diagrams for each HVAC system

3.1.7 Component Wiring Diagrams

Provide a wiring diagram for each type of input device and output device. Indicate how each device is wired and powered; showing typical connections at the digital controller and power supply. Show for all field connected devices such as control relays, motor starters, actuators, sensors, and transmitters.

3.1.8 Terminal Strip Diagrams

Provide a diagram of each terminal strip. Indicate the terminal strip location, termination numbers, and associated point names.

3.1.9 BACnet Communication Architecture Schematic (Network Riser)

Provide a schematic showing the project's entire BACnet communication network complete with wire sizes, including Internet Protocol (IP), Media Access Control (MAC), BACnet network, Device ID, field bus address, BBMDs, any devices using BACnet FDR, and Firmware version / Operating System, LAN devices including routers and bridges, gateways, controllers, workstations, and field interface devices. Show connection to existing networks and include the existing network in the riser diagram. Include all external network capabilities. Include surge protection device at all locations on the riser when the field controller communication trunk is leaving or entering a building and at all external equipment (such as chillers).

3.1.10 Control Panel Layout

Provide a detailed panel layout for each control panel, relay panel, etc. The layout shall include all components to be installed in the panel

including controllers, terminal strips, transformers, wireway, etc.

3.2 DEMOLITION

Remove and/or demolish all existing controls, cabling, conductors, conduit, controllers, power circuits and cabinets that are no longer needed after new work is installed. Contractor shall inform government prior to start of demolition and shall give the government the option to salvage any existing equipment. Contractor shall remove all unused existing conduit and shall not reuse any existing conduit. Any existing systems to remain, must remain functional and operate properly after all demolition is complete.

3.3 EXISTING CONDITIONS

3.3.1 Existing Conditions Survey

Perform a field survey, including testing and inspection of the equipment to be controlled and submit an Existing Conditions Report documenting the current status and its impact on the Contractor's ability to meet this specification. For those items considered nonfunctional, document the deficiency in the report including explanation of the deficiencies and estimated costs to correct the deficiencies. As part of the report, define the scheduled need date for connection to existing equipment. Make written requests and obtain Government approval prior to disconnecting any controls and obtaining equipment downtime.

3.3.2 Existing Equipment Downtime

Make written requests and obtain Government approval prior to disconnecting any controls and obtaining equipment downtime.

3.3.3 Existing Control System Devices

Inspect, calibrate, and adjust as necessary to place in proper working order all existing devices which are to be reused.

3.4 INSTALLATION

Fully install and test the control system in accordance Section 23 09 13 INSTRUMENTATION AND CONTROL DEVICES FOR HVAC, Section 23 09 23.02 BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS for BACnet or Niagara BACnet systems, and this Section.

Perform the installation under the supervision of competent technicians regularly employed in the installation of DDC systems. All material and equipment shall be installed in accordance with the manufacturer's recommendations for the intended purpose and NFPA 70. Maintain a copy of the manufacture's recommendations on the Contruction Site. Use the more stringent methods when manufacturer's recommendations, and plans & specification requirements differ. Use the "Preferred" method when alternative methods are given. The word "should" will be considered to mean "shall". Bring any conflicts between manufacturer's recommendations and plans and specification requirements to the Government's attention. All equipment shall be installed level and plumb.

3.4.1 Wiring Criteria

a. Run circuits operating at more than 100 volts in rigid or flexible

conduit, metallic tubing, covered metal raceways, or armored cable.

b. Run all control wiring in blue rigid or flexible conduit, blue metallic tubing, or covered metal raceways, unless noted otherwise. All control wiring located inside mechanical rooms shall be in conduit or metallic tubing. All conduit and junction box covers, cable/wire trough covers, etc., shall be blue in color.

c. Do not run binary control circuit wiring in the same conduit as power wiring over 100 volts. Where analog signal wiring requires conduit, do not run in the same conduit with AC power circuits or control circuits operating at more than 100 volts.

d. Provide circuit and wiring protection required by NFPA 70.

e. Minimum conduit size is 3/4-inch. Maximum conduit fill is 40% or the cable manufacturer's recommended amount, whichever is less. Provide insulated throat at all conduit terminations to protect wiring from burrs. Support conduit by pipe straps, wall brackets, threaded rod conduit hangers, or ceiling trapeze. Plastic cable ties are not acceptable. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Do not exceed one-fourth proof test load for load applied to fasteners. Provide vibration resistant and shock-resistant fasteners attached to concrete ceiling. The use of masonry screws to support conduit is not permitted.

f. Do not bury aluminum-sheathed cable or aluminum conduit in concrete.

g. Input/output identification: Permanently label each field-installed wire, cable, and pneumatic tube at each end with descriptive text using a commercial wire marking system, minimum 9 point font. Labels shall fully encircle the wire, cable, or tube. The single line text shall run parallel to the wire, cable, or tube and shall be repeated so as to be viewable without twirling or twisting the wire. Locate the markers within 2 inches of each termination. Label shall include type of network and destination of cable (ex. BACnet/AHU-1). Match the names and I/O number to the project's point list. Similarly label all power wiring serving control devices, including the word "power" and panel board and circuit number, or transformer location in the label. Number each pneumatic tube every six feet. Label all terminal blocks with alpha/numeric labels. All wiring and the methods shall be in accordance with UL 508A.

h. Permanently display controller wiring diagram for each controller on the inside of the control cabinet door. Diagram shall be neatly lettered and taped or adhered with sticky back label.

i. Conduit identification: All conduits shall be labeled within 36 inches from terminations, boxes, bends or wall penetrations. Labels shall be 3/8 inches bold black lettering on white background and indicate what system the conduit contains. Apply labels every 10 feet of line of sight or a distance agreed upon by Camp Lejeune Public Works Department. Provide label for each side of a wall pentration by the conduit. The agreed upon distance shall be for a single building or project only. Label shall be visible and legible, while standing on

the floor, from up to three sides with a minimum dimension of 1.9 inches x 4 inches. Conduit that includes power circuits shall be labeled with source panel and circuit, and destination cabinet or equipment. When MSTP is installed within conduit, label conduit with trunk number and to and from device (ie. MSTP-01 From VAV 1-1 to VAV 1-2).

Provide a label at each control panel on the 120 VAC conduit. The label shall contain the source panel and circuit identifier.

Label Example: SF-C, SF-S, SF-O (3 cables, Supply Fan Command, Supply Fan Status, Supply Fan Output).

Label Example: ZN-T/ZN-H/ZN-Q (1 cable, Zone Temperature, Zone Humidity, Zone Quality).

j. Each terminal device shall have its own terminal conduit run. Device boxes or devices or panels shall not be used as "pass thru" for wiring.

k. Conduit to equipment and devices shall be run tight to walls, and ceilings. Avoid conduit on the floor, i.e. conduit shall not block access to or past equipment. Flex conduit is to be used only when EMT or rigid conduit is not able to satisfy the application such as a transition to a sensor or equipment. Flex conduit shall be limited to a maximum length of 3 ft.

l. For controller power, provide new 120 VAC circuits, with ground if not defined on the electrical drawings. Provide each circuit with a dedicated breaker, and run wiring in its own conduit, separate from any control wiring. Connect the controller's ground wire to the electrical panel ground; conduit grounds are not acceptable. Include a label on the 120 VAC circuit conduit at each control panel. The label is to include the source panel and circuit identification. The label size shall be a minimum of 1.9 inches by 4 inches, 3/8 inch black lettering on white background.

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

n. Surge Protection: Install surge protection according to manufacturer's instructions. Multiple controllers fed from a common power supply may be protected by a common surge protector, properly sized for the total connected devices.

o. All terminations in panels shall be made at a terminal block if not connected directly to a panel device, ie Field Controller, Supervisory Controller, relays, transmitters, etc. No wire nuts are allowed in panels, VAV boxes, control panels, relay panels, raceways, or any other type of enclosure shall follow this requirement. High and low voltage wires must not land on the same terminal block unless they are separated and of a different color and/or clearly identified.

p. Grounding: Ground controllers and cabinets to a good earth ground as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Conduit grounding is not acceptable; all grounding shall have a direct path to

the building earth ground. Ground sensor drain wire shields at the controller end.

q. The Contractor shall be responsible for correcting all associated MS/TP and SA bus wiring, auxiliary bus wiring, termination, end of line, and ground loop problems.

r. Run wiring in panel enclosures in covered wire track.

s. Control cabinets, wiring boxes, cable/wiring troughs, panel enclosures, etc., must be clean of all debris, metal shavings, etc.

t. Low voltage cable must not be supported directly from "all thread" rod. If cabling/wiring is permitted to be run without conduit/raceway it must be supported using a retaining device such as a bridle ring or J hook, and where appropriate connected to the all thread rod using a standoff device. Openly installed cabling/wiring must be approved by Camp Lejeune Public Works Department.

u. For serviceability, allow a minimum of 2 inches of exposed wire or cable from any termination point, i.e. between wireway and field controller terminations.

v. Wireway inside panels and junction boxes shall be maximum 40% filled.

3.4.2 Accessibility

Install all equipment so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install digital controllers, data ports, and concealed actuators, valves, dampers, air flow stations and like equipment in locations freely accessible through access doors. Install power surge protection such that it is replaceable without removing other components.

3.4.3 Component Identification Labeling

Using an electronic hand-held label maker with white tape and bold black block lettering, provide an identification label on the exterior of each new control panel, control device, actuator, and sensor. Also provide labels on the exterior of each new control actuator indicating the (full) open and (full) closed positions. For labels located outdoors, use exterior grade label tape, and provide labels on both the inside and outside of the panel door or device cover. Acceptable alternatives are white plastic labels with engraved bold black block lettering permanently attached to the control panel, control device, actuator, and sensor. Have the labels and wording approved by the BAS Owner prior to installation. Devices with field adjustable setpoints, such as Air Filter Status, Duct Pressure Safety Limit, etc., must have the field adjusted setpoint and date included on the label. Components mounted above a ceiling or service hatch must also have the component identification visible from below. Examples: "A VAV controller, exhaust fan relay, Differential Pressure Transmitter, etc., identification would be included on the ceiling grid, or service hatch, in the area of the controller or field device." Supervisory Controller: Provide a removable label (not permanent marker) with the Global ID(s), IP Address and all login credentials. Niagara JACE should include login credentials for both the Station and Platform.

3.4.4 Network Communication Lines

Network connections by the Government are required for each new supervisory controller back to the telecom room. Provide the Contracting Officer at least 120 days advance notice of need. Provide one inch conduit and two(2) green Cat 6 cables from the point of connection of the BAS to the point of connection to the MCEN (most likely in the telephone equipment room). The conduit for these runs MCEN homeruns shall be the only controls conduit that is not blue in color. For each run, provide an additional 20 feet of extra cable, coiled up in the telecom closet. Cables must be terminated and tested.

3.4.5 Dielectric Isolation

Provide dielectric isolation where dissimilar metals are used for connection and support. Install control system in a matter that provides clearance for control system maintenance by maintaining access space required to calibrate, remove, repair, or replace control system devices. Install control system such that it does not interfere with the clearance requirements for mechanical and electrical system maintenance.

3.4.6 Penetrations in Building Exterior

Make all penetrations through and mounting holes in the building exterior watertight.

3.5 TEST AND BALANCE SUPPORT

The controls contractor shall coordinate with and provide on-site support to the test and balance (TAB) personnel specified under Section 23 05 93 TESTING, ADJUSTING AND BALANCING or Section 23 05 92 TESTING, ADJUSTING, BALANCING SMALL HEATING/VENTILATING/COOLING SYSTEMS. This support shall include:

a. On-site operation and manipulation of control systems during the testing and balancing.

b. Control setpoint adjustments for balancing all relevant mechanical systems, including VAV boxes.

c. Tuning control loops and sensors with setpoints and adjustments determined by TAB personnel.

3.6 INTERFACE WITH EXISTING EMCS

Provide 16 hours of assistance to the Government with interfacing the BAS to the Base wide EMCS. The Government will make the final connection of the BAS to the MCEN. This 16 hours does not include completion or corrections to the installed BAS as defined in the contract documents. This 16 hours is for assisting the interface and for making revisions to the BAS that may be needed outside of the contract requirements. Approved As-Build control drawings must be available for the EMCS operator performing the interacing. Graphics shall be created prior to interface with existing EMCS.

3.7 CONTROLS SYSTEM OPERATORS MANUALS

Provide four electronic and printed copies of a Controls System Operators Manual. Manual copies must be placed in the following locations:

a. Submitted to the ROICC.

b. On the submitted and approved notebook computer.

c. In the storage cabinet.

d. Delievered to the BAS Owner.

The manual shall be specific to the project, written to actual project conditions, and provide a complete and concise depiction of the installed work. Provide information in detail to clearly explain all operation requirements for the control system.

Provide with each manual: CDs of the project's control system drawings, control programs, data bases, graphics, and all items listed below. Include gateway back-up data and configuration tools where applicable. Provide CDs in jewel case with printed and dated project-specific labels on both the CD and the case. For text and drawings, use Adobe Acrobat or MS Office file types. When approved by the Government, AutoCAD and Visio files are allowed. Give files descriptive English names and organize in folders.

Provide printed manuals in sturdy 3-ring binders with a title sheet on the outside of each binder indicating the project title, project location, contract number, and the controls contractor name, address, and telephone number. Each binder shall include a table of contents and tabbed dividers, with all material neatly organized. Manuals shall include the following:

a. A copy of the as-built control system (shop) drawings set, with all items specified under the paragraph SUBMITTALS. Indicate all field changes and modifications. As-Built Control Drawings shall be marked "As-Built" on the cover page and in the title block of each page. Revisions must be dated, may be hand or CAD annotated.

b. A copy of the project's mechanical design drawings, including any official modifications and revisions.

c. A copy of the project's approved Product Data submittals provided under the paragraph SUBMITTALS.

d. A copy of the project's approved Equipment Supplier's PVT Plan, Controls Contractor's PVT Plan, and PVT Report.

e. A copy of the project's approved final TAB Report.

f. Printouts of all control system programs, including controller setup pages if used. Include plain-English narratives of application programs, flowcharts, and source code.

g. Printouts of all physical input and output object properties, including tuning values, alarm limits, calibration factors, and set points.

h. A table entitled "AC Power Table" listing the electrical power source for each controller. Include the building electrical panel number, panel location, and circuit breaker number.

i. The DDC manufacturer's hardware and software manuals in both print and

CD format with printed project-specific labels. Include installation and technical manuals for all controller hardware, operator manuals for all controllers, programming manuals for all controllers, operator manuals for all workstation software, installation and technical manuals for the workstation and notebook, and programming manuals for the workstation and notebook software.

j. A list of qualified control system service organizations for the work provided under this contract. Include their addresses and telephone numbers.

k. A written statement entitled "Technical Support" stating the control system manufacturer or authorized representative will provide toll-free telephone technical support at no additional cost to the Government for a minimum of two years from project acceptance, will be furnished by experienced service technicians, and will be available during normal weekday working hours. Include the toll-free technical support telephone number.

l. A written statement entitled "Software Upgrades" stating software and firmware patches and updates will be provided upon request at no additional cost to the Government for a minimum of two years from project acceptance. Include a table of all DDC system software and firmware provided under this contract, listing the original release dates, version numbers, part numbers, and serial numbers.

m. Submit any and all updated field controller files, and BACnet Building Controller data base during the acceptance and warranty periods or as a result of a latent defect. Include in Warranty Information.

3.7.1 Storage Cabinets

In each mechanical room provide a wall-mounted storage cabinet with hinged doors. In addition to the number of manuals specified above, provide an additional copy of the manuals in this mechanical room storage cabinet. Provide cabinets large enough to hold the entire set of Controls System Operators Manuals, and the HVAC operation and maintenance manuals provided under Division 23 Heating, Ventilating, and Air Conditioning. Locate cabinets adjacent to DDC control panels where applicable. Have each cabinet's proposed installation site approved in advance by the Contracting Officer and the BAS Owner. Prominently label each cabinet with the wording "OPERATION AND MAINTENANCE MANUALS." Prominently label each binder with the wording "MECHANICAL ROOM COPY - DO NOT REMOVE."

3.8 PERFORMANCE VERIFICATION TESTING

3.8.1 General

The PVT must demonstrate compliance of the control system work with the contract requirements. The PVT shall be performed by the Controls Contractor and Equipment Suppliers. If the project is phased, provide separate testing for each phase.

3.8.2 PVT and Commissioning

PVT testing is a Government quality assurance function that includes systems trending and field tests. Commissioning is a quality control function that is the Commissioning Team’s responsibility to the extent required by this contract.

3.8.3 PVT of Equipment with Packaged Controls

Controls Contractor and Equipment Supplier(s) must share and coordinate PVT testing responsibilities for equipment provided with on-board factory packaged controls such as boiler controllers, dedicated outside air systems (DOAS’s), and packaged pumping systems.

3.8.3.1 Controls Contractor Responsibilities

The Controls Contractor must provide a PVT Plan separate from Equipment Supplier's Performance Verification Testing Plan and perform PVT testing concurrent with Equipment Suppliers’ testing for equipment provided with on-board factory packaged controls to demonstrate the following:

a. Equipment enabling and disabling.

b. Equipment standard and optional control points necessary to accomplish functionality regardless if specified in contract documents or not.

c. Equipment standard and optional alarms critical to safe operation regardless if specified in contract documents or not.

d. All control points added by Controls Contractor in addition to onboard factory packaged controls regardless if specified in contract documents or not.

3.8.3.2 Equipment Supplier Responsibilities

Each Equipment Supplier must provide PVT Plans separate from Controls Contractor’s Performance Verification Testing Plan and perform PVT testing concurrent with Controls Contractor’s testing for their equipment provided with on-board factory packaged controls to demonstrate the following:

a. Equipment standard and optional control features necessary to accomplish functionality regardless if specified in contract documents or not.

b. Equipment standard and optional operation modes necessary to accomplish functionality regardless if specified in contract documents or not.

c. Equipment standard and optional alarm conditions for safe operation regardless if specified in contract documents or not.

3.8.4 Sensor Accuracy Checks

Include a one-point accuracy check of each sensor in the PVT procedures.

3.8.5 Performance Verification Testing Plan

Submit a detailed PVT Plan of the proposed testing for Government approval. Develop the PVT Plan specifically for the control system and equipment with packaged controls in this contract. The PVT Plan shall be a clear list of test items arranged in a logical sequence. It shall include each and all sequences of all controllers. Include sequence tested, intended test procedure, required assisted personnel (such as the mechanical contractor), the expected response, and the pass/fail criteria for every component tested. Include pass/fail column for test, and space

for comments, signature and date lines for Contractor's PVT administrator and Contractor's QA representative. The PVT plan shall include the prescriptive pre-PVT check list in addition to the Contractor generated controller specific testing sequences. Propose criteria for the trends, i.e., change of state, change of value with the trigger value, time intervals in the PVT Plan submission for approval. Prepare the following PVT plans:

a. Control Contractor's Performance Verification Testing Plan

b. Equipment Supplier's Performance Verification Testing Plan

3.8.6 PVT Sample Size

Test all controllers unless otherwise directed.

3.8.7 Control Contractor's Pre-PVT Checklist

Submit the following as a part of the PVT Plan and the PVT Report. Each item shall include a column for the Contractor's initial/date. This form may be a general form applicable to all controllers and submitted only once in the PVT Plan. Each controller shall have an individual checklist with controller title and identified in the PVT Report.

a. Verify all mechanical installation work is successfully completed and started up by the appropriate personnel.

b. Verify all required control system components, wiring, and accessories are installed.

c. Verify the installed control system architecture matches approved drawings.

d. Verify all control circuits operate at the proper voltage and are free from grounds or faults.

e. Verify all required surge protection is installed.

f. Verify the A/C Power Table specified in the paragraph CONTROLS SYSTEM OPERATORS MANUALS is accurate.

g. Verify all DDC network communications function properly, including uploading and downloading programming changes.

h. Verify each digital controller’s programming is backed up.

i. Verify all wiring, components, and panels are properly labeled.

j. Verify all required points are programmed into devices.

k. Verify all valve and actuator zero and span adjustments are set properly. List each device and span for that device. label device with span setting and adjustment date.

l. Verify all sensor readings are accurate and calibrated. List each sensor, sensor reading, and measured value. Label device with calibrated value and the calibration date.

m. Verify each control valve and actuator goes to normal position upon

loss of power. List each device and normal position.

n. Verify each controller works properly in stand-alone mode by disconnecting the BACnet bus.

3.8.8 Conducting PVT

a. Conduct PVT after approval of the PVT Plan. Notify the Contracting Officer of the planned PVT at least 15 days prior to testing. Provide an estimated time table required to perform the testing. Furnish personnel, equipment, instrumentation, and supplies necessary to perform all aspects of the PVT. Ensure that testing personnel are regularly employed in the testing and calibration of DDC systems. Using the project's as-built control system (shop) drawings, the project's mechanical design drawings, and the approved PVT Plan, conduct the PVT.

b. During testing, identify any items that do not meet the contract requirements and if time permits, conduct immediate repairs and re-test. Otherwise, deficiencies shall be investigated, corrected, and re-tested later. Document each deficiency and corrective action taken.

c. If re-testing is required, follow the procedures for the initial PVT. The Government may require re-testing of any control system components affected by the original failed test.

3.8.9 Controller Capability and Labeling

Test the following for each controller:

a. Memory: Demonstrate that programmed data, parameters, and trend/ alarm history collected during normal operation is not lost during power failure.

b. Direct Connect Interface: Demonstrate the ability to connect directly to each type of digital controller with a portable electronic device like a notebook computer or PDA. Show that maintenance personnel interface tools perform as specified in the manufacturer's technical literature.

c. Stand Alone Ability: Demonstrate controllers provide stable and reliable stand-alone operation using default values for values normally read over the network.

d. Wiring and AC Power: Demonstrate the ability to disconnect any controller safely from its power source using the AC Power Table. Demonstrate the ability to match wiring labels easily with the control drawings. Demonstrate the ability to locate a controller's location using the BACnet Communication Architecture Schematic and floor plans.

e. Nameplates and Tags: Show the nameplates and tags are accurate and permanently attached to control panel doors, devices, sensors, and actuators.

3.8.10 Workstation and Software Operation

For every user workstation or notebook provided:

a. Show points lists agree with naming conventions.

b. Show that graphics are complete.

c. Show the UPS operates as specified.

3.8.11 BACnet Communications and Interoperability Areas

a. Data Presentation: On each BACnet Operator Workstation, demonstrate graphic display capabilities.

b. Reading of Any Property: Demonstrate the ability to read and display any used readable object property of any device on the network.

c. Setpoint and Parameter Modifications: Show the ability to modify all setpoints and tuning parameters in the sequence of control or listed on project schedules. Modifications are made with BACnet messages and write services initiated by an operator using workstation graphics, or by completing a field in a menu with instructional text.

d. Peer-to-Peer Data Exchange: Show all BACnet devices are installed and configured to perform BACnet read/write services directly (without the need for operator or workstation intervention), to implement the project sequence of operation, and to share global data.

e. Alarm and Event Management: Show that alarms/events are installed and prioritized according to the BAS Owner. Demonstrate time delays and other logic is set up to avoid nuisance tripping, e.g., no status alarms during unoccupied times or high supply air during cold morning start-up. Show that operators with sufficient privilege can read and write alarm/event parameters for all standard BACnet event types. Show that operators with sufficient privilege can change routing (BACnet notification classes) for each alarm/event including the destination, priority, day of week, time of day, and the type of transition involved (types of transition include but are not limited to the following: TO-OFF NORMAL and TO-NORMAL).

f. Schedule Lists: Show that schedules are configured for start/stop, mode change, occupant overrides, and night setback as defined in the sequence of operations.

g. Schedule Display and Modification: Show the ability to display any schedule with start and stop times for the calendar year. Show that all calendar entries and schedules are modifiable from any connected workstation by an operator with sufficient privilege.

h. Archival Storage of Data: Show that data archiving is handled by the operator workstation/server, and local trend archiving and display is accomplished with BACnet Trend Log objects.

i. Modification of Trend Log Object Parameters: Show that an operator with sufficient privilege can change the logged data points, sampling rate, and trend duration.

j. Device and Network Management: Show the following capabilities:

(1) Display of Device Status Information

(2) Display of BACnet Object Information

(3) Silencing Devices that are Transmitting Erroneous Data

(4) Time Synchronization

(5) Remote Device Reinitialization

(6) Backup and Restore Device Programming and Master Database(s)

(7) Configuration Management of Half-Routers, Routers and BBMDs

3.8.12 Execution of Sequence of Operation

Demonstrate that the HVAC system operates properly through the complete sequence of operation. Use read/write property services to globally read and modify parameters over the internetwork.

3.8.13 Control Loop Stability and Accuracy

For all control loops tested, give the Government trend graphs of the control variable over time, demonstrating that the control loop responds to a 20 percent sudden change of the control variable set point without excessive overshoot and undershoot. If the process does not allow a 20 percent set point change, use the largest change possible. Show that once the new set point is reached, it is stable and maintained. Control loop trend data shall be in real-time with the time between data points 30 seconds or less.

3.8.14 Performance Verification Testing Report

Upon successful completion of the PVT and prior to the Government taking use and possession of the facility, submit a single PVT Report to the Government. Do not submit the report until all problems are corrected and successfully re-tested. The report shall include the annotated PVT Plan used during the PVT. Where problems were identified, explain each problem and the corrective action taken. Include a written certification that the installation and testing of the control system is complete and meets all of the contract's requirements.

3.8.15 PVT Acceptance Testing

After acceptance of the PVT Report and Trends, demonstrate proper and stable operation of the DDC System. Contractor shall provide minimum fifteen days notice to COTR and BAS Owner when scheduling field acceptance testing. During the field acceptance testing, verify, in the presence of the COTR and BAS owner, random selections of sequences reported in the PVT Report. Equipment, controllers, devices, and sequences for field acceptance testing are to be selected by the COTR. As-built control drawings must be for use and verification at acceptance testing. Field acceptance testing includes verification of the PVT for the following equipment groups:

Group 1: All pumps, chillers, boilers, return fans, computer room units, and air handling units (rooftop and central stations).

Group 2: 50 percent of terminals such as VAV and fan coil units.

Group 3: 100 percent of supply fans, and exhaust fans.

If any of the acceptance testing is found to not operate correctly,

terminate verification for the given group. Make the necessary corrections and prepare a revised PVT Report and Trends. Reschedule acceptance testing of the revised report with the COTR. After successful field acceptance testing, submit the revised controller files and BACnet Building Controller database within 15 calendar days.

3.8.16 Prerequisite for Approval

Compliance with the field acceptance testing requirements of this section is a prerequisite for the final Contracting Officer approval of the PVT Report submitted.

3.9 TRENDS

Trends shall be reported on all points requiring trending as indicated on contract drawings. Trends shall be reported on all central plant equipment and primary air handling unit controllers, and all terminal controllers such as VAV boxes and fan coil units. Include 72 hour trends during which the system is operated continuously. Data from all points must be from a single consecutive 72 hour period without any gaps in time Monday through Friday. Data may not be from Saturday or Sunday unless prior written authorization is obtained from the Contracting Officer.

Unless trending capability exists within the building control system, temporarily install hardware on the building control network to perform trending. Remove the temporary hardware at the completion of all acceptance activities.

Use the building control system Niagara Trend Log Objects to trend all points shown as requiring a trend on the Point Schedule for the entire trending period.

If resubmission is required, all points must be trended. Partial trends will not be accepted.

Additional trends or points shall be provided if requested by Camp Lejeune or a commissioning agent.

Trends shall demonstrate stable operation of the PID loop controls and ability to maintain all temperatures within +/- 1.0 degree F of setpoint. Any alarms that activate during the trending period will result in trend data disapproval regardless of the cause of the alarm.

3.9.1 Trend Report Format

Trend data must be submitted in Microsoft Excel (.xlsx) format. Mutiple workbooks are acceptable, but trend data must be grouped and formatted as follows:

a. Column A on every worksheet must contain the date (MM/DD/YYYY) and time (HH:MM:SS) on every row containing data.

b. For every point, row 1 shall contain the point name (see Attachment 2). Row 2 shall contain the corresponding point name as given on the contract drawings. Row 3 shall contain the unit of measure.

c. All chilled water equipment (e.g. chiller, pumps, etc.) shall be on a single worksheet.

d. All heating hot water equipment (e.g. boilers, pumps, etc.) shall be on a single worksheet.

e. All domestic hot water equipment (e.g. water heater, recirculation pump, etc.) shall be on a single worksheet.

f. All unitary exhaust fans shall be on a single worksheet.

g. Each central piece of equipment (e.g. AHU, DOAS, RTU, etc.) shall be on its own worksheet.

h. Terminal units such as VAV's and Fan Coil Units shall be grouped by the central unit source and shall be on a single worksheet.

i. Packaged terminal air conditioners or heat pumps shall be grouped by floor and shall be on a single worksheet.

j. VRF units shalled be grouped by branch box serving the fan coils and shall be on a single worksheet.

Trend data from the groups described above must be on separate worksheets. Do not mix equipment from the described groups on a single worksheet.

3.10 BUS WAVEFORM REPORT

3.10.1 Bus Waveform Report

Provide printed waveform of the MS/TP bus(es) after all devices are online and operational. Use an oscilloscope to test and record the wave form of each bus segment complete with graphic scale. This waveform is useful in identifying and troubleshooting bus problems such as inappropriate taps, grounds, end of line terminations and poor connections. Identify each waveform graphic with bus segment name/number, location/building, date and time, and instrument used. Include the resistor sizes needed at each Bus End of Line (EOL). Include a list of the EOL devices. Waveform must be field verified by the BAS Owner prior to BOD.

3.10.2 Bus Waveform Field Acceptance Testing

Contractor shall provide minimum fifteen days notice to COTR and BAS Owner when scheduling field verification. During the field acceptance testing, verify, in the presence of the COTR, the bus waveform. If the bus waveform does not match the report, terminate field acceptance testing. Make the necessary corrections and prepare a revised Bus Waveform Report. Reschedule acceptance testing of the revised report data with the COTR.

3.10.3 Prerequisite for Approval

Compliance with the field acceptance testing requirements of this section is a prerequisite for the final Contracting Officer approval of the Bus Waveform Report submitted.

3.11 TRAINING REQUIREMENTS

Provide a qualified instructor (or instructors) with two years minimum field experience with the installation and programming of similar BACnet DDC systems. Orient training to the specific systems installed. Coordinate training times and location with the Contracting Officer and BAS Owner after receiving approval of the training course documentation.

Training shall take place at the job site andor a nearby Government-furnished location. A training day shall occur during normal working hours, last no longer than 8 hours and include a one-hour break for lunch and two additional 15-minute breaks. The project's approved Controls System Operators Manual shall be used as the training text. The Contractor shall ensure the manuals are submitted, approved, and available to hand out to the trainees before the start of training.

3.11.1 Training Documentation

Submit training documentation for review 30 days minimum before training. Documentation shall include an agenda for each training day, objectives, a synopses of each lesson, and the instructor's background and qualifications. The training documentation can be submitted at the same time as the project's Controls System Operators Manual.

3.11.2 Phase I Training - Fundamentals

The Phase I training session shall last one day and be conducted in a classroom environment with complete audio-visual aids provided by the contractor. Provide each trainee a printed 8.5 by 11 inch hard-copy of all visual aids used. Upon completion of the Phase I Training, each trainee should fully understand the project's DDC system fundamentals. Approved As-Built control drawings must be used for training. The training session shall include the following:

a. BACnet fundamentals (objects, services, addressing) and how/where they are used on this project.

b. This project's list of control system components.

c. This project's list of points and objects.

d. This project's device and network communication architecture.

e. This project's sequences of control.

f. Alarm capabilities.

g. Trending capabilities.

h. Troubleshooting communication errors.

i. Troubleshooting hardware errors.

3.11.3 Phase II Training - Operation

Provide Phase II Training shortly after completing Phase I Training. The Phase II training session shall last one day and be conducted at the DDC system workstation, at a notebook computer connected to the DDC system in the field, and at other site locations as necessary. Upon completion of the Phase II Training, each trainee should fully understand the project's DDC system operation. The training session shall include the following:

a. A walk-through tour of the mechanical system and the installed DDC components (components include but are not limited to the following: controllers, valves, dampers, surge protection, switches, thermostats, and sensors).

b. A discussion of the components and functions at each DDC panel.

c. Logging-in and navigating at each operator interface type.

d. Using each operator interface to find, read, and write to specific controllers and objects.

e. Modifying and downloading control program changes.

f. Modifying setpoints.

g. Creating, editing, and viewing trends.

h. Creating, editing, and viewing alarms.

i. Creating, editing, and viewing operating schedules and schedule objects.

j. Backing-up and restoring programming and data bases.

k. Modifying graphic text, backgrounds, dynamic data displays, and links to other graphics.

l. Creating new graphics and adding new dynamic data displays and links.

m. Alarm and Event management.

n. Adding and removing network devices.

-- End of Section --

SECTION 23 09 13

INSTRUMENTATION AND CONTROL DEVICES FOR HVAC
02/25 MCBCL

PART 1 GENERAL

1.1 SUMMARY

This section provides for the instrumentation control system components excluding direct digital controllers, network controllers, gateways, etc. that are necessary for a completely functional automatic control system. When combined with a Direct Digital Control (DDC) system, the Instrumentation and Control Devices covered under this section must be a complete system suitable for the control of the heating, ventilating and air conditioning (HVAC), plumbing, and other building-level systems as specified and indicated.

a. Install hardware to perform the control sequences as specified and indicated and to provide control of the equipment as specified and indicated.

b. Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.

c. Install and configure hardware such that the Government or their agents are able to perform repair, replacement, and upgrades of individual hardware without further interaction with the installing Contractor.

1.1.1 Verification of Dimensions

After becoming familiar with all details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.1.2 Drawings

The Government will not indicate all offsets, fittings, and accessories that may be required on the drawings. Carefully investigate the mechanical, electrical, plumbing, and finish conditions that could affect the work to be performed, arrange such work accordingly, and provide all work necessary to meet such conditions.

1.2 RELATED SECTIONS

Related work specified elsewhere.

Section 01 30 00 ADMINISTRATIVE REQUIREMENTS

Section 23 30 00 HVAC AIR DISTRIBUTION

Section 23 05 15 COMMON PIPING FOR HVAC

Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC

Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC. (AMCA)

AMCA 500-D	(2018) Laboratory Methods of Testing Dampers for Rating

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.5	(2020) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME B16.34	(2021) Valves - Flanged, Threaded and Welding End

ASTM INTERNATIONAL (ASTM)

ASTM A126	(2004; R 2023) Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023; ERTA 1 2024; TIA 24-1; TIA 25-2) National Electrical Code
NFPA 72	(2025; TIA 25-4) National Fire Alarm and Signaling Code
NFPA 90A	(2024) Standard for the Installation of Air Conditioning and Ventilating Systems

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1966	(2020) HVAC Duct Construction Standards Metal and Flexible, 4th Edition

1.4 SUBMITTALS

Submit detailed and annotated manufacturer's data, drawings, and specification sheets for each item listed, that clearly show compliance with the project specifications.

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Sensors And Input Hardware; G

Output Hardware; G

Duct Smoke Detectors; G

Variable Frequency (Motor) Drives; G

SD-06 Test Reports

Vfd Start-Up Test Documentation; G

SD-10 Operation and Maintenance Data

Comply with requirements for data packages in Section 01 78 23 OPERATION AND MAINTENANCE DATA and in Section 01 78 24.00 20 FACILITY ELECTRONIC OPERATION AND MAINTENANCE SUPPORT INFORMATION (eOMSI), except as supplemented and modified in this specification.

Vfd Service Manuals; G, Data Package 4

1.5 QUALITY ASSURANCE

Quality Assurance requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

1.6 DELIVERY, STORAGE, AND HANDLING

Delivery, storage, and handling requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

PART 2 PRODUCTS

2.1 EQUIPMENT

2.1.1 General Requirements

All products used to meet this specification must meet the indicated requirements, but not all products specified here will be required by every project. All products must meet the requirements both Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC and this Section.

2.1.2 Operation Environment Requirements

Unless otherwise specified, provide products rated for continuous operation under the following conditions:

2.1.2.1 Pressure

Pressure conditions normally encountered in the installed location.

2.1.2.2 Vibration

Vibration conditions normally encountered in the installed location.

2.1.2.3 Temperature

a. Products installed indoors: Ambient temperatures in the range of 32 to 112 degrees F and temperature conditions outside this range normally encountered at the installed location.

b. Products installed outdoors or in unconditioned indoor spaces: Ambient temperatures in the range of and temperature conditions outside this range normally encountered at the installed location.

2.1.2.4 Humidity

10 to 95 percent relative humidity, non-condensing and also humidity conditions outside this range normally encountered at the installed location.

2.2 WIRELESS CAPABILITY

Wireless capability requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

2.3 SENSORS AND INPUT HARDWARE

Coordinate sensor types with the BAS Owner to keep them consistent with existing installations.

2.3.1 Field-Installed Temperature Sensors

Where feasible, provide the same sensor type throughout the project. Avoid using transmitters unless absolutely necessary.

2.3.1.1 Thermistors

Precision thermistors may be used in applications below 200 degrees F. Sensor accuracy over the application range shall be 0.36 degree F or less between 32 to 150 degrees F. Stability error of the thermistor over five years shall not exceed 0.25 degrees F cumulative. A/D conversion resolution error shall be kept to 0.1 degrees F. Total error for a thermistor circuit shall not exceed 0.5 degrees F.

2.3.1.2 Resistance Temperature Detectors (RTDs)

Provide RTD sensors with platinum elements compatible with the digital controllers. Encapsulate sensors in epoxy, series 300 stainless steel, anodized aluminum, or copper. Temperature sensor accuracy shall be 0.1 percent (1 ohm) of expected ohms (10k ohms) at 32 degrees F. Temperature sensor stability error over five years shall not exceed 0.25 degrees F cumulative. Direct connection of RTDs to digital controllers without transmitters is preferred. When RTDs are connected directly, lead resistance error shall be less than 0.25 degrees F. The total error for a RTD circuit shall not exceed 0.5 degrees F.

2.3.1.3 Temperature Sensor Details

a. Room Type: Provide the sensing element components within a decorative protective cover suitable for surrounding decor. Provide room temperature sensors with override functionality..

b. Duct Probe Type: Ensure the probe is long enough to properly sense the air stream temperature.

c. Duct Averaging Type: Continuous averaging sensors shall be one foot in length for each 4 square feet of duct cross-sectional area, and a minimum length of 6 feet.

d. Pipe Immersion Type: Provide minimum three-inch immersion. Provide each sensor with a corresponding pipe-mounted sensor well, unless indicated otherwise. Sensor wells shall be stainless steel when used

in steel piping, and brass when used in copper piping. Provide the sensor well with a heat-sensitive transfer agent between the sensor and the well interior.

e. Outside Air Type: Provide the sensing element on the building's north side with a protective weather shade that positions the sensor approximately 3 inches off the wall surface, does not inhibit free air flow across the sensing element, and protects the sensor from snow, ice, and rain.

2.3.2 Supervisory Controller MCEN Network Homerun

All conduits shall be 1 inch inside diameter. No bends in conduit shall exceed 90 degrees. All bends shall be sweeping. Pull boxes shall be installed after every two 90 degree bends, after any number of bends that add up to 180 degrees or greater, or on any straight run exceeding 100 feet. All pull boxes shall be "straight through" (i.e. conduits enter and exit on opposite sides of the pull box.) Pull boxes shall not be substituted for 90 degree bend requirements. All conduits shall have a vinyl bushing installed at termination points, All conduits shall have a ground bushing at the telecommunication distribution area bonded to the telecommunication bonding bus bar. See Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC paragraph Network Communication Lines for additional requirements.

2.3.3 Transmitters

Provide transmitters with 4 to 20 mA or 0 to 10 VDC linear output scaled to the sensed input. Transmitters shall be matched to the respective sensor, factory calibrated, and sealed. Size transmitters for an output near 50 percent of its full-scale range at normal operating conditions. The total transmitter error shall not exceed 0.1 percent at any point across the measured span. Supply voltage shall be 12 to 24 volts AC or DC. Transmitters shall have non-interactive offset and span adjustments. For temperature sensing, transmitter drift shall not exceed 0.03 degrees F a year.

2.3.3.1 Relative Humidity Transmitters

Provide transmitters with an accuracy equal to plus or minus 3 percent from 0 to 90 percent scale, and less than one percent drift per year. Sensing elements shall be the polymer type.

2.3.3.2 Pressure Transmitters

Provide transmitters integral with the pressure transducer. Size transmitters for an output near 50 percent of its full-scale range at normal operating conditions.

2.3.4 Current Transducers

Provide current transducers to monitor motor amperage, unless current switches are shown on design drawings or point tables. Provide a VFD rated current sensor where applicable.

2.3.5 Motor Run Status

Unless otherwise noted, provide current switches to indicate run status of pumps and fans. Sensitivity of the switch on belt and coupler driven

equipment should distinguish between loaded motor and unloaded motor such as a fan with a broken belt. Provide label indicating calibration date affixed to the device.

2.3.6 Pneumatic to Electric Transducers

Pneumatic to electronic transducers shall convert a 0 to 20 psig signal to a proportional 4 to 20 mA or 0 to 10 VDC signal (operator scaleable). Supply voltage shall be 24 VDC. Accuracy and linearity shall be 1.0 percent or better.

2.3.7 Air Quality Sensors

Provide power supply for each sensor.

2.3.7.1 CO2 Sensors

Provide photo-acoustic type CO2 sensors with integral transducers and linear output. The devices shall read CO2 concentrations between 0 and 2000 ppm with full scale accuracy of at least plus or minus 100 ppm.

2.3.7.2 Air Quality Sensors

Provide full spectrum air quality sensors using a hot wire element based on the Taguchi principle. The sensor shall monitor a wide range of gaseous volatile organic components common in indoor air contaminants like paint fumes, solvents, cigarette smoke, and vehicle exhaust. The sensor shall automatically compensate for temperature and humidity, have span and calibration potentiometers, operate on 24 VDC power with output of 0-10 VDC, and have a service rating of 32 to 140 degrees F and 5 to 95 percent relative humidity.

2.3.8 Input Switches

2.3.8.1 Timed Local Overrides

Provide buttons or switches to override the DDC occupancy schedule programming for each major building zone during unoccupied periods, and to return HVAC equipment to the occupied mode. This requirement is waived for zones clearly intended for 24 hour continuous operation.

2.3.8.2 Emergency Shut Down Switches (ATFP)

Anti Terrorism Force Protection emergency shut down switches must be two action to prevent accidental initiation, such as a mushroom push button with a cover. Switches shall have the following attributes:

a. Switches shall not be keyed.

b. Switches shall be blue with a red latching mushroom push button.

c. Switches shall be twist or rotary reset.

2.3.9 Freeze Protection Thermostats

Provide special purpose thermostats with flexible capillary elements 20 feet minimum length for coil face areas up to 40 square feet. Provide longer elements for larger coils at 1-foot of element for every 4 square feet of coil face area, or provide additional thermostats. Provide switch

contacts rated for the respective motor starter's control circuit voltage. Include auxiliary contacts for the switch's status condition. A freezing condition at any 18-inch increment along the sensing element's length shall activate the switch. The thermostat shall be equipped with a manual push-button reset switch so that when tripped, the thermostat requires manual resetting before the HVAC equipment can restart. Provide with factory fabricated mounting rings.

2.3.10 Air Flow Measurement Stations

Air flow measurement stations shall have an array of velocity sensing elements and straightening vanes inside a flanged sheet metal casing. The velocity sensing elements shall be the RTD or thermistor type, traversing the ducted air in at least two directions. The air flow pressure drop across the station shall not exceed 0.08 inch water gage at a velocity of 2,000 fpm. The station shall be suitable for air flows up to 5,000 fpm, and a temperature range of 40 to 120 degrees F. The station's measurement accuracy over the range of 125 to 2,500 fpm shall be plus or minus 3 percent of the measured velocity. Station transmitters shall provide a linear, temperature-compensated 4 to 20 mA or 0 to 10 VDC output. The output shall be capable of being accurately converted to a corresponding air flow rate in cubic feet per minute. Transmitters shall be a 2-wire, loop powered device. The output error of the transmitter shall not exceed 0.5 percent of the measurement.

2.3.11 Air Flow Measurement for Terminal Devices

Air flow measurement for terminal devices such as variable air volume boxes, with or without fan power shall have an array of pressure sensing elements than sense total pressure and static pressure. The flow measurement shall be integral to the device controller and shall be by differential pressure sensor. The air flow shall measure flows down to 300 fpm with an accuracy of 5 percent of reading.

2.3.12 Liquid Flow Meters

Insertion electromagnetic flow meter suitable for measuring electrically conductive liquids in hydronic applications. Provide with grounding ring.

a. Accuracy: ± 1.0% of reading from 2 - 20 ft/s, ± 0.02 ft/s below 2 ft/s.

b. Flow Range: 0.1 ft/s to 20 ft/s (200:1 turndown).

c. Liquid Temperature Range: 15°F to 250°F.

d. Wetted Metal Components: 316 Stainless Steel.

e. Liquid Process Connection: Flange.

f. Display: Display gallons per minute. Must be NEMA 4 rated. Display must be able to be read without openiing any enclosure.

2.3.13 Energy Metering

2.3.13.1 Hot Water Solar Collector Meters

BACnet output or may be a combination of temperature sensors and water flow meter monitored by a DDC controller with the DDC system calculating the BTU transfer. Water flow can be measured by orifice or venturi meter

selected for the anticipated system flow rate. Temperature sensors shall be placed in both the supply to and the return from the solar collector array.

2.3.13.2 Electrical Meters

Provide enhanced power and energy meter with built-in integrator and power supply for the CTs. Meter shall have onboard data logging capability as well as output to SBC via native BACnet MS/TP. Place meter indoors at building Main Distribution Panel (MDP). This meter shall be provided in addition to any other power meters required by Division 26 (Electrical) or Division 33 (Utilities).

Electrical meter shall monitor and trend the following points:

a. Power (3-phase total & per phase): Real (kW), Reactive (kVAR), and Apparent (kVA)

b. Power Factor: 3-phase average & per phase

c. Present Power Demand: Real (kW), Reactive (kVAR), and Apparent (kVA)

d. Peak Power Demand: Real (kW), Reactive (kVAR), and Apparent (kVA)

e. Current: 3-phase average and per phase

f. Voltage: Line-Line and Line-Neutral (3-phase average & per phase)

g. Frequency

h. Accumulated Net Energy: Real (kWh), Reactive (kVARh), and Apparent (kVAh)

i. Accumulated Real Energy by phase (kWh)

2.4 OUTPUT HARDWARE

2.4.1 Control Dampers

Provide factory manufactured aluminum dampers where indicated. Dampers shall be opposed blade for rectangular applications 10-inches and taller, and single blade for round dampers and rectangular dampers shorter than 10-inches. Control dampers shall comply with SMACNA 1966 except as modified or supplemented by this specification. Published damper leakage rates and respective pressure drops shall have been verified by tests in compliance with AMCA 500-D requirements.

Provide damper assembly frames constructed of minimum thickness steel channels with mitered and welded corners. Damper axles shall be 0.5 inches minimum diameter plated steel rods supported in the damper frame by stainless steel or bronze bearings. Blades mounted vertically shall be supported by thrust bearings.

Dampers shall be rated for not less than 2000 fpm air velocity. The pressure drop through each damper when full-open shall not exceed 0.04 inches water gage at 1000 fpm face velocity. Damper assemblies in ductwork shall be constructed to meet SMACNA Seal Class "A" construction requirements.

Provide the damper operating linkages outside of the air stream, including crank arms, connecting rods, and other hardware that transmits motion from the damper actuators to the dampers, shall be adjustable. Additionally, operating linkages shall be designed and constructed to have a 2 to 1 safety factor when loaded with the maximum required damper operating force. Linkages shall be brass, bronze, galvanized steel, or stainless steel.

Provide access doors or panels in hard ceilings and walls for access to all concealed damper operators and damper locking setscrews.

For field-installed control dampers, a single damper section shall have blades no longer than 48 inches and no higher than 72 inches. The maximum damper blade width shall be 12 inches. Larger sized dampers shall be built using a combination of sections.

Frames shall be at least 2 inches wide. Flat blades shall have edges folded for rigidity. Blades shall be provided with compressible gasket seals along the full length of the blades to prevent air leakage when closed.

The damper frames shall be provided with jamb seals to minimize air leakage. Seals shall be suitable for an operating temperature range of minus 40 degrees F to 200 degrees F.

The leakage rate of each damper when full-closed shall be no more than 3 cfm per sq. foot of damper face area at 1.0 inches water gage static pressure.

2.4.2 Control Valves

2.4.2.1 Valve Assembly

Valve bodies shall be designed for 125 psig minimum working pressure or 150 percent of the operating pressure, whichever is greater. Valve stems shall be Type 316 stainless steel. Valve leakage ratings shall be 0.01 percent of rated Cv value. Class 125 copper alloy valve bodies and Class 150 steel or stainless steel valves shall meet the requirements of ASME B16.5. Cast iron valve components shall meet the requirements of ASTM A126 Class B or C.

2.4.2.2 Butterfly Valves

Butterfly valves shall be the threaded lug type suitable for dead-end service and for modulation to the fully-closed position, with stainless steel shafts supported by bearings, non-corrosive discs geometrically interlocked with or bolted to the shaft (no pins), and EPDM seats suitable for temperatures from minus 20 degrees F to plus 250 degrees F. Valves shall have a means of manual operation independent of the actuator.

2.4.2.3 Two-Way Valves

Two-way modulating valves shall have an equal percentage characteristic.

2.4.2.4 Three-Way Valves

Three-way valves shall have an equal percentage characteristic.

2.4.2.5 Valves for Chilled Water, Condenser Water, and Glycol Fluid Service

a. Bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends. Bodies for valves from 2 inches to 3 inches inclusive shall be of brass, bronze, or iron. Bodies for 2 inch valves shall have threaded connections. Bodies for valves from 2-1/2 to 3 inches shall have flanged connections.

b. Internal valve trim shall be brass or bronze, except that valve stems shall be stainless steel.

c. Provide modulating valves sized for 2 psi minimum and 4 psi maximum differential across the valve at the design flow rate.

d. Valves 4 inches and larger shall be butterfly valves, unless indicated otherwise.

2.4.2.6 Valves for Hot Water Service

Valves for hot water service below 250 Degrees F:

a. Bodies for valves 1-1/2 inches and smaller shall be brass or bronze, with threaded or union ends. Bodies for valves from 2 inches to 3 inches inclusive shall be of brass, bronze, or iron. Bodies for 2 inch valves shall have threaded connections. Bodies for valves from 2-1/2 to 3 inches shall have flanged connections.

b. Internal trim (including seats, seat rings, modulation plugs, valve stems, and springs) of valves controlling water above 210 degrees F shall be Type 316 stainless steel.

c. Internal trim for valves controlling water 210 degrees F or less shall be brass or bronze. Valve stems shall be Type 316 stainless steel.

d. Non-metallic parts of hot water control valves shall be suitable for a minimum continuous operating temperature of 250 degrees F or 50 degrees F above the system design temperature, whichever is higher.

e. Provide modulating valves sized for 2 psi minimum and 4 psi maximum differential across the valve at the design flow rate.

f. Valves 4 inches and larger shall be butterfly valves, unless indicated otherwise.

2.4.2.7 Valves for High Temperature Hot Water Service

Valves for hot water service 250 Degrees F and above:

a. Valve bodies shall conform to ASME B16.34 Class 300. Valve and actuator combination shall be normally closed. Bodies shall be carbon steel, globe type with welded ends on valves 1 inch and larger. Valves smaller than 1 inch shall have socket-weld ends. Packing shall be virgin polytetrafluoroethylene (PTFE).

b. Internal valve trim shall be Type 316 stainless steel.

c. Provide modulating valves sized for 2 psi minimum and 4 psi maximum differential across the valve at the design flow rate.

2.4.3 Actuators

Provide direct-drive electric actuators for all control applications, except where indicated otherwise. All actuators shall include a feedback loop for detecting actuator faults. The actuator shall report actual position back to the control system. Binary actuators shall provide open/closed status, at a minimum. Modulating actuators and process shall provide position feedback expressed (directly or through span conversion) as percent open/closed. Actuator status shall be derived from actuator position; however, effect may be used in cases where direct feedback is not practical such as VAV coils and dampers.

Use airflow sensors as a feedback loop for damper actuators. Use differential temperature as a feedback mechanism for VAV coil valve actuation.

2.4.3.1 Electric Actuators

Each actuator shall deliver the torque required for continuous uniform motion and shall have internal end switches to limit the travel, or be capable of withstanding continuous stalling without damage. Actuators shall function properly within 85 to 110 percent of rated line voltage. Provide actuators with hardened steel running shafts and gears of steel or copper alloy. Fiber or reinforced nylon gears may be used for torques less than 16 inch-pounds. Provide two-position actuators of single direction, spring return, or reversing type. Provide modulating actuators capable of stopping at any point in the cycle, and starting in either direction from any point. Actuators shall be equipped with a switch for reversing direction, and a button to disengage the clutch to allow manual adjustments. Provide the actuator with a hand crank for manual adjustments, as applicable. Thermal type actuators may only be used on terminal fan coil units, terminal VAV units, convectors, and unit heaters. Spring return actuators shall be provided on all control dampers and all control valves except terminal fan coil units, terminal VAV units, convectors, and unit heaters; unless indicated otherwise. Each actuator shall have distinct markings indicating the full-open and full-closed position, and the points in-between. Actuators mounted outdoors shall be outdoor rated so that they do not require a weatherproof enclosure.

2.4.4 Output Signal Conversion

2.4.4.1 Electronic-to-Pneumatic Transducers

Electronic to pneumatic transducers shall convert a 4 to 20 mA or 0 to 10 VDC digital controller output signal to a proportional 0 to 20 psig pressure signal (operator scaleable). Accuracy and linearity shall be 1.0 percent or better. Transducers shall have feedback circuit that converts the pneumatic signal to a proportional 4 to 20 mA or 0 to 10 VDC signal.

2.4.5 Output Switches

2.4.5.1 Control Relays

Field installed and DDC panel relays shall be double pole, double throw, UL listed, with contacts rated for the intended application, indicator light, and dust proof enclosure. The indicator light shall be lit when the coil is energized and off when coil is not energized. Relays shall be the socket type, plug into a fixed base, and replaceable without tools or removing wiring. Encapsulated "PAM" type relays may be used for terminal

control applications.

2.5 ELECTRICAL POWER AND CONTROL WIRING

Electrical power and control wiring requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

2.6 FIRE PROTECTION DEVICES

2.6.1 Duct Smoke Detectors

Provide duct smoke detectors in HVAC ducts in accordance with NFPA 72 and NFPA 90A, except as indicated otherwise. Provide UL listed or FM approved detectors, designed specifically for duct installation.

Furnish detectors under Section 28 31 76.00 20 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM and install under this section. Connect new detectors to the building fire alarm panel.

2.7 VARIABLE FREQUENCY (MOTOR) DRIVES

Provide variable frequency drives (VFDs) as indicated. VFDs shall convert 208 or 480 volt (plus or minus 10 percent), three phase, 60 hertz (plus or minus 2Hz), utility grade power to adjustable voltage/frequency, three phase, AC power for stepless motor control from 5 percent to 200 percent of base speed. VFDs shall be UL listed as delivered to the end user. The VFD shall meet the requirements specified in NFPA 70. Each VFD shall also meet the following:

a. The VFD shall use sine coded Pulse Width Modulation (PWM) technology. PWM calculations shall be performed by the VFD microprocessor.

b. The VFD shall be capable of automatic control by a remote signal, by network command, or manually by the VFD control panel.

2.7.1 VFD Quality Assurance

VFDs shall be the manufacturer's current standard production unit with at least 10 identical units successfully operating in the field.

2.7.2 VFD Service Support

a. Warranty: Provide the VFDs with a minimum 24-month full parts and labor warranty. The warranty shall start when the contract's HVAC system is accepted by the Government. Include warranty documentation, dates, and contact information with the VFD on-site service manuals.

b. VFD Service Manuals: Provide the VFDs with all necessary installation, operation, maintenance, troubleshooting, service, and repair manuals in English including related factory technical bulletins. Provide the documents factory bound, in sturdy 3-ring binders, or hard bound covers. Provide a title sheet on the outside of each binder indicating the project title, project location, installing contractor, contract number, and the VFD manufacturer, address, and telephone number. Each binder shall include a table of contents and tabbed dividers, with all material neatly organized. The documentation provided shall be specifically applicable to this

project, shall be annotated to reflect the actual project conditions, and shall provide a complete and concise depiction of the installed work. Provide a storage cabinet on or near the VFD large enough to hold all of the documentation. Have the cabinet's proposed installation site approved in advance by the Contracting Officer. Prominently label the cabinet "VFD OPERATION AND MAINTENANCE MANUALS." Clearly label each manual with the wording "MECHANICAL ROOM COPY - DO NOT REMOVE".

c. Technical Support: Provide the VFDs with manufacturer's technical telephone support in English, readily available during normal working hours, and free of charge for the life of the equipment.

d. Initial Start-Up: Provide the VFDs with factory-trained personnel for the on-site start-up of the HVAC equipment and associated VFD. The personnel shall be competent in the complete start-up, operation, and repair of the particular model VFD installed. The factory start-up representative shall perform the factory's complete recommended start-up procedures and check-out tests on the VFD. Include a copy of the VFD start-up test documentation with the VFD on-site service manuals.

e. Provide the VFDs with on-site/hands-on training for the user and maintenance personnel. Provide a capable and qualified instructor with minimum two years field experience with the operation and maintenance of similar VFDs. The training shall occur during normal working hours and last not less than 2 hours. Coordinate the training time with the Contracting Officer and the end user. The VFD service manuals shall be used during the training. The contractor shall ensure the manuals are on-site before the start of training. The training shall cover all operational aspects of the VFD.

2.7.3 VFD Features

VFDs shall have the following features:

a. A local operator control keypad capable of:

(1) Remote/Local operator selection with password access.

(2) Run/Stop and manual speed commands.

(3) All programming functions.

(4) Scrolling through all display functions.

b. Digital display capable of indicating:

(1) VFD status.

(2) Frequency.

(3) Motor RPM.

(4) Phase current.

(5) Fault diagnostics in descriptive text.

(6) All programmed parameters.

(7) Load power.

c. Standard PI loop controller with input terminal for controlled variable and parameter settings.

d. User interface terminals for remote control of VFD speed, speed feedback, and an isolated form C SPDT relay, which energizes on a drive fault condition.

e. An isolated form C SPDT auxiliary relay which energizes on a run command.

f. A metal NEMA 1 enclosure for indoors, NEMA 4 with heater for outdoors.

g. An adjustable carrier frequency with 16 KHz minimum upper limit.

h. A built in DC buss reactor with 3 percent minimum impedance to protect the VFDs DC buss capacitors and rectifier section diodes.

i. HOA/Bypass Switches

2.7.4 Programmable Parameters

VFDs shall include the following operator programmable parameters:

a. Upper and lower limit frequency.

b. Acceleration and deceleration rate.

c. Variable torque volts per Hertz curve.

d. Starting voltage level.

e. Starting frequency level.

f. Display speed scaling.

g. Enable/disable auto-restart feature.

h. Enable/disable soft stall feature.

i. Motor overload level.

j. Motor stall level.

k. Jump frequency and hysteresis band.

l. PWM carrier frequency.

2.7.5 Protective Features

VFDs shall have the following protective features:

a. An electronic adjustable inverse time current limit with consideration for additional heating of the motor at frequencies below 45Hz, for the protection of the motor.

b. An electronic adjustable soft stall feature, allowing the VFD to

lower the frequency to a point where the motor will not exceed the full-load amperage when an overload condition exists at the requested frequency. The VFD will automatically return to the requested frequency when load conditions permit.

c. A separate electronic stall at 110 percent VFD rated current, and a separate hardware trip at 190 percent current.

d. Ground fault protection that protects the output cables and motor from grounds during both starting and continuous running conditions.

e. The ability to restart after the following faults:

(1) Overcurrent (drive or motor).

(2) Power outage.

(3) Phase loss.

(4) Over voltage/Under voltage.

f. The ability shut down if inadvertently started into a rotating load without damaging the VFD or the motor.

g. The ability to keep a log of a minimum of four previous fault conditions, indicating the fault type and time of occurrence in descriptive text.

h. The ability to sustain 110 percent rated current for 60 seconds.

i. The ability to shutdown safely or protect against and record the following fault conditions:

(1) Over current (and an indication if the over current was during acceleration, deceleration, or running).

(2) Over current internal to the drive.

(3) Motor overload at start-up.

(4) Over voltage from utility power.

(5) Motor running overload.

(6) Over voltage during deceleration.

(7) VFD over heat.

(8) Load end ground fault.

(9) Abnormal parameters or data in VFD EEPROM.

2.7.6 Minimum Operating Conditions

VFDs shall be designed and constructed to operate within the following service conditions:

a. Ambient Temperature Range, 0 to 120 degrees F.

b. Non-condensing relative humidity to 90 percent.

2.7.7 Additional Features

Provide VFDs with the following additional features:

a. BACnet communication interface port.

PART 3 EXECUTION

3.1 INSTALLATION

Perform the installation under the supervision of competent technicians regularly employed in the installation of DDC systems. All material and equipment shall be installed in accordance with the manufacturer's recommendations for the intended purpose and NFPA 70. Maintain a copy of the manufacture's recommendations on the Construction Site. Use the more stringent methods when manufacturer's recommendations, and plans & specification requirements differ. Use the "Preferred" method when alternative methods are given. The word "should" will be considered to mean "shall". Bring any conflicts between manufacturer's recommendations and plans & specification requirements to the Government's attention. All equipment shall be installed level and plumb.

3.1.1 Demolition

Demolition requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.2 Wiring Criteria

Wiring criteria requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.3 Accessibility

Accessibility requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.4 Component Identification Labeling

Component identification labeling requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.5 Digital Controllers

a. Install as stand alone control devices (see definitions in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC).

b. Locate control cabinets at the locations shown on the drawings. If not shown on the drawings, install in the most accessible space, close to the controlled equipment.

c. Controllers must be installed in a manfacturer's required/recommended enclosure for each type of controller.

d. Provide a dedicated analog output to each output device, such as variable frequency driven pump motors, in an alternating arrangement.

e. Equipment such as VFD's must have hardwired enable (start/stop), speed command, and status points from the controller. Software points are not allowable. Additionally, this equipment shall have a BACnet interface for monitoring.

3.1.6 Hand-Off-Auto Switches

Hand-Off-Auto switches must be physical three position switches. Switches must be accessible from the exterior of any device. Wire safety controls such as smoke detectors, freeze protection thermostats,and emergency shut down switches to protect the equipment during both hand and auto operation.

3.1.7 Emergency Shut Down Switches (ATFP)

Quantity and location as shown on the drawings. Switches must be hardwired such that all fans and dampers that circulate air between rooms, or between inside and outside must shut down/close regardless of equipment HOA switch position and without the use of software. ATFP circuit must be energized to allow equipment to operate; i.e. activation of the emergency shut down switch will de-energize the circuit and open relays at the equipment. Additionally, activation of the switch must signal the DDC system to shut all air moving equipment off/closed and initiate an alarm. Reset of the DDC system must be manual.

3.1.8 Safety and Shutdown Circuit Monitoring

All safety or shutdown circuits, or any circuit that can disable a system, shall be monitored by the DDC system as separate inputs for each circuit. This shall include, but is not limited to, Low Temperature Limit, Duct Mounted Smoke Detector, Discharge Air High Pressure Limit, Boiler Emergency Pushbutton, Carbon Monoxide, Gas Detection, ATFP, etc. Supervisory controller alarm reporting shall be configured for each individual circuit alarm.

3.1.9 Temperature Sensors

Install temperature sensors in locations that are accessible and provide a good representation of sensed media. Installations in dead spaces are not acceptable. Calibrate sensors according to manufacturer's instructions. Only use sensors in their intended application as described by the manufacturer's written instructions.

3.1.10 Room Temperature Sensors

Mount the sensors on interior walls to sense the average room temperature at the locations indicated. Avoid locations near heat sources such as copy machines or locations by supply air outlet drafts. Mount the center of the sensor 54 inches above the floor to meet ADA requirements.

3.1.11 Duct Temperature Sensors

a. Probe Type: Provide a gasket between the sensor housing and the duct wall. Seal the duct penetration air tight. Seal the duct insulation penetration vapor tight.

b. Averaging Type (and coil freeze protection thermostats): Weave the capillary tube sensing element in a serpentine fashion perpendicular to the flow, across the duct or air handler cross-section, using durable non-metal supports. Prevent contact between the capillary and

the duct or air handler internals. Provide a duct access door at the sensor location. The access door shall be hinged on the side, factory insulated, have cam type locks, and be as large as the duct will permit, maximum 18 by 18 inches. For sensors inside air handlers, the sensors shall be fully accessible through the air handler's access doors without removing any of the air handler's internals.

3.1.12 Immersion Temperature Sensors

Provide thermowells for sensors measuring piping, tank, or pressure vessel temperatures. Locate wells to sense continuous flow conditions. Do not install wells using extension couplings. Where piping diameters are smaller than the length of the wells, provide wells in piping at elbows to sense flow across entire area of well. Wells shall not restrict flow area to less than 70 percent of pipe area. Increase piping size as required to avoid restriction. Provide thermal conductivity material within the well to fully coat the inserted sensor.

3.1.13 Outside Air Temperature & Humidity Sensors

Provide outside air temperature and humidity sensors in weatherproof enclosures on the north side of the building, away from exhaust hoods and other areas that may affect the reading. Provide a shield to shade the sensor from direct sunlight.

3.1.14 Energy Meters

Provide and locate energy meters as indicated. Connect each meter output to the DDC system, to measure both instantaneous and accumulated usage.

3.1.15 Damper Actuators

Mount actuators outside the air stream in accessible areas.

3.1.16 Pressure Sensors

Locate pressure sensors as indicated.

-- End of Section --

SECTION 23 09 23.02

BACNET DIRECT DIGITAL CONTROL FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS
02/25 MCBCL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 135	(2024; INT 1-3 2025; Errata 1 2025; INT 4-6 2025; Addenda CU 2025) BACnet—A Data Communication Protocol for Building Automation and Control Networks

UL SOLUTIONS (UL)

UL 916	(2015; Reprint Oct 2021) UL Standard for Safety Energy Management Equipment

1.2 DEFINITIONS

For definitions related to this section, see Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

1.3 SUBMITTALS

Submit detailed and annotated manufacturer's data, drawings, and specification sheets for each item listed, that clearly show compliance with the project specifications.

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

1.4 QUALITY CONTROL

Quality Control requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

PART 2 PRODUCTS

All products used to meet this specification must meet the indicated requirements, but not all products specified here will be required by every project. All products must meet the requirements both Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC and this Section.

2.1 DDC SYSTEM

2.1.1 Supervisory Building Controller (SBC)

ASHRAE 135 building controller that is the main interface for the building control system. Provide a JACE based on the Niagara N4 platform. The JACE (JAVA Application Control Engine) shall be minimally based on a Tridium 8000 with expanded memory and embedded "Niagara Workbench or Workplace" software. The latest software revision available at the time the PVT Report is submitted must be installed.

Any device implementing the Niagara Framework is a Niagara Framework Supervisory Gateway and must meet these requirements. In addition to the general requirements for all DDC Hardware, Niagara Framework Supervisory Gateway Hardware must:

a. Be direct digital control hardware.

b. Have an unrestricted interoperability license and its Niagara Compatibility Statement (NiCS) must follow the Tridium Open NiCS Specification.

c. Manage communications between a field control network and the Niagara Framework Monitoring and Control Software, and between itself and other Niagara Framework Supervisory Gateways. Niagara Framework Supervisory Gateway Hardware must use Fox protocol for communication with other Niagara Framework Components, regardless of the manufacturer of the other components.

d. Be fully programmable using the Niagara Framework Engineering Tool and must support the following:

   (1) Time synchronization, Calendar, and Scheduling using Niagara Scheduling Objects.

   (2) Alarm generation and routing using the Niagara Alarm Service.

   (3) Trending using the Niagara History Service and Niagara Trend Log Objects.

   (4) Integration of field control networks using the Niagara Framework Engineering Tool.

   (5) Configuration of integrated field control system using the Niagara Framework Engineering Tool when supported by the field control system.

e. Meet the following minimum hardware requirements:

   (1) Two 10/100/1000 Mbps Ethernet Port(s)

   (2) One or more MS/TP ports.

   (3) Central Processing Unit of 1000 Mhz or higher.

   (4) Embedded operating system.

f. Provide access to field control network data and supervisory functions

via web interface and support a minimum of 16 simultaneous users. Note: implementation of this capability may not be required on all projects.

g. Submit a backup of each Niagara Framework Supervisory Gateway. The backup must be sufficient to restore a Niagara Framework Supervisory Gateway to the final as-built condition such that a new Niagara Framework Supervisory Gateway loaded with the backup is indistinguishable in functionality from the original.

2.1.1.1 Niagara Framework Engineering Tool

The Niagara Framework Engineering Tool must be Niagara Workbench or an equivalent Niagara Framework engineering tool software and must:

a. Have an unrestricted interoperability license and its Niagara Compatibility Statement (NiCS) must follow the Tridium Open NiCS Specification.

b. Be capable of performing network configuration for Niagara Framework Supervisory Gateways and Niagara Framework Monitoring and Control Software.

c. Be capable of programming and configuring of Niagara Framework Supervisory Gateways and Niagara Framework Monitoring and Control Software.

d. Be capable of discovery of Niagara Framework Supervisory Gateways and all points mapped into each Niagara Framework Supervisory Gateway and making these points accessible to Niagara Framework Monitoring and Control Software.

2.1.1.2 Supervisory Controller MCEN Network Homerun

See Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC paragraph Network Communication Lines for requirements.

2.1.2 EMCS Interface

The EMCS at Camp Lejeune is comprised of two separate systems. Both of the systems communicate over the basewide Marine Corps Enterprise Network (MCEN). One uses the Johnson Controls Network Automation Engine (NAE), Network Control Engine (NCE), Supervisory Network Engine (SNE) or Supervisory Network Control Engine (SNC) to the ADX server. The second system uses a Niagara FX N4 web supervisor with a JACE in the building communicating using Fox protocol. Because of IT security and permissions, only these systems and equipment are permitted as part of the EMCS.

2.1.2.1 Supervisory Building Controller

Provide a JACE. This will serve as both the Supervisory Building Controller and the connection point between the buildings DDC and the EMCS. Provide a five year service license on all Supervisory Controllers. Provide a reserve of 10% of additional points and additional devices on the Supervisory Controller license at the final project acceptance.

The contractor shall assign the BAS Owner as the owner and manager of all licenses including 3rd party drivers.

2.1.2.2 Palo Alto Firewall

For any building provided with a new Supervisory controller, contractor shall also provide a Palo Alto Firewall Model PAN-PA-220R. Contractor shall also provide a five year government support option for the Palo Alto firewall complete with all licenses.

2.1.3 Direct Digital Controllers

a. Direct digital controllers shall be UL 916 rated.

b. Field Controllers:

(1) Acceptable DDC field controllers are Facility Explorer, Metasys or Distech.

c. Except for VAV's, all direct digital controllerss shall have an on board password protected display screen pre-programmed with the device's associated points. Display screens shall only be accessible after opening an enclosure door. Display screens that are accessible from an enclosure exterior are not permitted.

d. Include BACnet PICS for each controller/device type, including smart sensors (B-SS) and smart actuators (B-SA).

2.1.3.1 I/O Point Limitation

The total number of I/O hardware points used by a single stand-alone digital controller, including I/O expansion units, shall not exceed 64, except for complex individual equipment or systems. Place I/O expansion units in the same cabinet as the digital controller. The field controller must have one spare Configurable Output and one spare Universal Input available per system upon project completion, i.e. AHU, ERU, DOAS, HW System, CHW System and other building primary systems. VAV controllers and programmable thermostats are excluded.

2.1.3.2 Environmental Limits

Controllers shall be suitable for, or placed in protective enclosures suitable for the environment (temperature, humidity, dust, and vibration) where they are located.

2.1.3.3 Stand-Alone Controllers

Provide stand-alone direct digital controllers with internal time clocks if not connected to a Supervisory Building Controller. Each piece of equipment shall be controlled by a single controller to provide stand-alone control in the event of any building communication failure. All I/O points specified for a piece of equipment shall be integral to its controller and serial connected expansion modules. Provide stable and reliable stand-alone control using default values or other method for values normally read over the network.

2.1.3.4 Internal Clock

Provide internal clocks and scheduling for all Direct Digital Controllers. Provide controllers with BTL listed profiles for all BACnet Building Controllers (B-BC) and BACnet Advanced Application Controllers (B-AAC) using BACnet time synchronization services. This includes but is

not limited to VAV Controllers, Fan Coil controllers, Heat Pump controllers and any terminal controllers. BACnet Application specific controllers (B-ASC) will only be accepted for dedicated small exhaust system control such as restroom and mechanical room exhaust fans. Automatically synchronize system clocks daily from an operator-designated controller. The system shall automatically adjust for daylight saving time.

2.1.3.5 Memory

Provide sufficient memory for each controller to support the required control, communication, trends, alarms, and messages. Protect programs residing in memory with EEPROM, flash memory, or by an uninterruptible power source (battery or uninterruptible power supply). The backup power source shall have capacity to maintain the memory during a 72-hour continuous power outage. Rechargeable power sources shall be constantly charged while the controller is operating under normal line power. Batteries shall be replaceable without soldering. Trend and alarm history collected during normal operation shall not be lost during power outages less than 72 hours long.

2.1.3.6 Immunity to Power Fluctuations

Controllers shall operate at 90 percent to 110 percent nominal voltage rating.

2.1.3.7 Transformer

The controller power supply shall be fused or current limiting and rated at 125 percent power consumption. Each transformer must singularly serve the connected load, i.e. do not wire transfomers in parallel on the load side. Transformer shall be mounted in the upper portion of the control panel to
aid in heat dissipation. The 120 volt power feed must also enter in the upper portion of the cabinet - power shall not be brought in from the bottom of the panel.

2.1.3.8 Wiring Terminations

Use screw terminal wiring terminations for all field-installed controllers. Provide field-removable modular terminal strip or a termination card connected by a ribbon cable for all controllers other than terminal units.

2.1.3.9 Input and Output Interface

Provide hard-wired input and output interface for all controllers as follows:

a. Protection: Shorting an input or output point to itself, to another point, or to ground shall cause no controller damage. Input or output point contact with sources up to 24 volts AC or DC for any duration shall cause no controller damage.

b. Binary Inputs: Binary inputs shall monitor on and off contacts from a "dry" remote device without external power, and external 5-24 VDC voltage inputs.

c. Pulse Accumulation Inputs: Pulse accumulation inputs shall conform to binary input requirements and accumulate pulses at a resolution

suitable to the application.

d. Analog Inputs: Analog inputs shall monitor low-voltage (0-10 VDC), current (4-20 mA), or resistance (thermistor or RTD) signals.

e. Binary Outputs: Binary outputs shall send a pulsed 24 VDC low-voltage signal for modulation control, or provide a maintained open-closed position for on-off control. Where appropriate, provide a method to select normally open or normally closed operation.

f. Analog Outputs: Analog outputs shall send modulating 0-10 VDC or 4-20 mA signals to control output devices.

g. Tri-State Outputs: Tri-State outputs shall provide three-point floating control of terminal unit electronic actuators.

2.1.3.10 Digital Controller BACnet Internetwork

Provide intermediate gateways, only when requested by the Government and shown on the contract drawings, to connect existing non-BACnet devices to the BACnet internetwork. Controller and operator interface communication shall conform to ASHRAE 135, BACnet. If a controller becomes non-responsive, the remaining controllers shall continue operating and not be affected by the failed controller.

2.1.3.11 Communications Ports

a. Direct-Connect Interface Ports: Provide at least one extra communication port at each local BACnet network for direct connecting a notebook computer or BACnet hand-held terminal so all network BACnet objects and properties may be viewed and edited by the operator.

2.1.3.12 BACnet Gateways

Provide BACnet communication ports, whenever available as a plant equipment OEM standard option, for DDC integration via a single communication cable. Typical BACnet controlled plant equipment includes, but is not limited to, boilers, chillers, and variable frequency motor drives. Include the following information in the submittal:

a. BACnet and workstation display information

b. Bi-directional communication ability

c. Compliance with interoperability schedule

d. Expansion capacity

e. Handling of alarms, events, scheduling and trend data

f. Single device capability (not depending on multiple devices for exchanging information from either side of the gateway)

Provide gateways to connect BACnet to legacy systems, existing non-BACnet devices, and existing non-BACnet DDC controlled plant equipment, only when specifically requested and approved by the Government, and shown on the Government approved BACnet Communication Architecture Schematic. Provide with each gateway an interoperability schedule, showing each point or event on the legacy side that the BACnet "client" will read, and each

parameter that the BACnet network will write to. Describe this interoperability in terms of BACnet services, or Interoperability Building Blocks (BIBBS), defined in ASHRAE 135 Annex K. Provide two-year minimum warranty for each gateway, including parts and labor.

The following minimum capabilities are required:

a. Gateways shall be able to read and view all readable object properties listed in the interoperability schedule on the non-BACnet network to the BACnet network and vice versa where applicable.

b. Gateways shall be able to write to all writeable object properties listed in the interoperability schedule on the non-BACnet network from the BACnet network and vice versa where applicable.

c. Gateways shall provide single-pass (only one protocol to BACnet without intermediary protocols) translation from the non-BACnet protocol to BACnet and vice versa.

d. Gateways shall meet the requirements of Data Sharing Read Property (DS-RP-B), Data Sharing Write Property (DS-WP-B), Device Management Dynamic Device Binding-B (DM-DDB-B), and Device Management Communication Control (DM-DCC-B) BIBBs, in accordance with ASHRAE 135.

e. Gateways shall include all hardware, software, software licenses, and configuration tools for operator-to-gateway communications. Provide backup programming and parameters on CD media and the ability to modify, download, backup, and restore gateway configuration.

2.1.3.13 Digital Controller Cabinet

Provide each digital controller including gateways, in a factory fabricated locked cabinet enclosure. Lock shall accept CAT102 keys.

Cabinets located indoors shall protect against dust and have a minimum NEMA 1 rating, except where indicated otherwise. Cabinets located outdoors or in damp environments shall protect against all outdoor conditions and have a minimum NEMA 4 rating. Mechanical rooms that contain steam service or equipment including new steam boiler rooms are considered damp environments. Outdoor control panels and controllers must be able to withstand extreme ambient conditions, without malfunction or failure, whether or not the controlled equipment is running. If necessary, provide a thermostatically controlled panel heater in freezing locations, and an internal ventilating fan in locations exposed to direct sunlight. Cabinets shall have a hinged lockable door and an offset removable metal back plate, except controllers integral with terminal units, like those mounted on VAV boxes. Provide like-keyed locks for all hinged panels provided and a set of two keys at each panel, with one key inserted in the lock. All devices must be mounted only to the cabinet backplane with adequate space allowed for serviceability and proper heat dissipation from devices. The Supervisory controller cabinet door position (closed/open) shall be monitored with a door switch and BACnet programmable relay such as the Functional Devices RIBTW2401B-BC. An "open" door status shall initiate an alarm to the EMCS Server.

2.1.3.14 Main Power Switch and Receptacle

Provide each control cabinet with a main external power on/off switch located inside the cabinet. Also, provide each cabinet with a separate 120

VAC duplex convenience receptacle.

2.1.4 DDC Software

2.1.4.1 Programming

Provide programming to execute the sequence of operation indicated. Provide all programming, tools, interfaces, cables, etc. to configure and program all controllers. All software shall be licensed to Marine Corps Base, Camp Lejeune Complex for unrestricted use on Camp Lejeune Complex and reproduction for use on Camp Lejeune Complex. Software keys and "dongles" are not permitted. Provide programming routines in simple, easy-to-follow logic with detailed text comments describing what the logic does and how it corresponds to the project's written sequence of operation. All logic programming and control functions shall be closed loop, command and feedback for fault detection and alarming when status does not match the command.

a. Graphic-based programming shall use a library of function blocks made from pre-programmed code designed for BAS control. Function blocks shall be assembled with interconnecting lines, depicting the control sequence in a flowchart. If providing a computer with device programming tools as part of the project, graphic programs shall be viewable in real time showing present values and logical results from each function block.

b. Menu-based programming shall be done by entering parameters, definitions, conditions, requirements, and constraints.

c. For line-by-line and text-based programming, declare variable types (variable types include but are not limited to the following: local, global, real, and integer) at the beginning of the program. Use descriptive comments frequently to describe the programming.

d. If providing a computer with device programming tools as part of the project, provide a means for detecting program errors and testing software strategies with a simulation tool. Simulation may be inherent within the programming software suite, or provided by physical controllers mounted in a NEMA 1 test enclosure. The test enclosure shall contain one dedicated controller of each type provided under this contract, complete with power supply and relevant accessories.

2.1.4.2 Parameter Modification

All writeable object properties, and all other programming parameters needed to comply with the project specification shall be adjustable for devices at any network level, including those accessible with web-browser communication, and regardless of programming methods used to create the applications.

2.1.4.3 Short Cycling Prevention

Provide setpoint differentials and minimum on/off times to prevent equipment short cycling.

2.1.4.4 Equipment Status Delay

Provide an adjustable delay from when equipment is commanded on or off and when the control program looks to the status input for confirmation.

2.1.4.5 Run Time Accumulation

Use the Elapsed Time Property to provide re-settable run time accumulation for each Binary Output Object connected to mechanical loads greater than 1 HP, electrical loads greater than 10 KW, or wherever else specified.

2.1.4.6 Timed Local Override

Provide an adjustable override time for each push of a timed local override button.

2.1.4.7 Time Synchronization

Provide time synchronization, including adjustments for leap years, daylight saving time, and operator time adjustments.

2.1.4.8 Scheduling

Provide operating schedules as indicated, with equipment assigned to groups. Changing the schedule of a group shall change the operating schedule of all equipment in the group. Groups shall be capable of operator creation, modification, and deletion. Provide capability to view and modify schedules in a seven-day week format. Provide capability to enter holiday and override schedules one full year at a time.

2.1.4.9 Object Property Override

Allow writeable object property values to accept overrides to any valid value. Where specified or required for the sequence of control, the Out-Of-Service property of Objects shall be modifiable using BACnet's write property service. When documented, exceptions to these requirement are allowed for life, machine, and process safeties.

2.1.4.10 Alarms and Events

Alarms and events shall be capable of having programmed time delays and high-low limits. When a web server is connected to the BACnet internetwork, alarms/events shall report to web server as defined by an authorized operator. Otherwise alarms/events shall be stored within a device on the BACnet network until connected to a user interface device and retrieved. Provide alarms/events in agreement with the point schedule, sequence of operation, and the BAS Owner. At a minimum, provide programming to initiate alarms/events any time a piece of equipment fails to operate, a control point is outside normal range or condition shown on schedules, communication to a device is lost, a device has failed, or a controller has lost its memory.

2.1.4.11 Trending

Provide BACnet trending all object present values, set points, and other parameters indicated for trending on project schedules or at the request of Camp Lejeune or commissioning agents. Trends may be associated into groups, and a trend report may be set up for each group. Trends are stored within a device on the BACnet network, with operator selectable trend intervals from 10 seconds up to 24 hours. The minimum number of consecutive trend values stored at one time shall be 100 per variable. When trend memory is full, the most recent data shall overwrite the oldest data.

The BACnet system shall allow for Change-Of-Value (COV) subscription based trending at user defined thresholds.

The B-BC shall upload trends automatically upon reaching 3/4 of the device buffer limit (via Notification_Threshold property), by operator request, or by time schedule for archiving. Archived and real-time trend data shall be available for viewing numerically and graphically for at the workstation and connected notebook computers.

Additionally, provide daily trend on geothermal well field supply and return temperatures. Allocate sufficient memory to store 24 months data.

2.1.4.12 Device Diagnostics

Each controller shall have diagnostic LEDs for power, communication, and device fault condition. The DDC system shall recognize and report a non-responsive controller.

2.1.4.13 Power Loss

Upon restoration of power, the DDC system shall perform an orderly restart and restoration of control.

2.1.5 Notebook Computer

Provide a notebook computer for each building, complete with the project's installed DDC software, applications database, final archived field controller programs and Supervisory controller database, and graphics to fully troubleshoot and program the project's devices. Provide the notebook computer with aballistic nylon carrying case with shoulder strap, or backpack,and all necessary cables and interface hardware needed for setup and direct communication with the controllers and control system components. Direct communication shall not be through the Supervisory controller.

At a minimum the notebook computer shall include: Common Access Card Reader, Windows based operating system, minimum 2.7 GHz processor base speed with 3 MB Cache, discrete switchable graphics card with minimum 1 GB dedicated memory, 1 Terabyte hard drive, 32 GB DDR3 RAM, 2 USB 3.0 ports, 10/100/1000 network interface card, 802.11 b/g/n WLAN, 17-inch display, keyboard with numeric keypad, 6-hour battery with charger, internal or external 8X DVD+/-R/RW drive with double layer support with DVD creator software, and Microsoft Office Home and Business bundled software. Provide all original licenses, installation media, documentation, and recovery CDs capable of restoring the original configuration. Provide a means to connect the notebook computer directly to the installed field bus. Provide the manufacturer's 3-year accidental damage protection with 3-day on site response for 2 year warranty with the Government listed as the warranty owner.

When submitting the notebook computer, provide itemized list indicating the following information for all components submitted with the notebook computer:

a. Description

b. Quantity

c. Manufacturer

d. Part Number

e. Serial Number

2.1.6 Notebook Computer Software

2.1.6.1 Password Protection

System shall support role based access. At a minimum, OS administrator, auditor, DDC operator and user roles must be defined. The system must be capable of enforcing role based access by location (e.g., Bob may alter operating parameters for Building 1 but not Building 2. Building 2 is Alice's responsibility).

Workstation shall be capable of DoD Common Access Card (CAC) login in addition to traditional username and password.

The lowest level only allow viewing graphics. The second level allows viewing graphics and changing space temperature setpoints. The third level allows the previous level's capability, plus changing operating schedules. The fourth level allows access to all functions except passwords. The highest level provides all administrator rights and allows full access to all programming, including setting new passwords and access levels. Provide the BAS Owner with the highest level password access. Provide automatic log out if no keyboard or mouse activity is detected after a user-defined time delay.

2.1.6.2 Notebook Computer DDC Software

Provide the workstation software with the manufacturer's installation CDs and licenses. Configure the software according to the DDC system manufacturer's specifications, cybersecurity requirements, and in agreement with BACnet Operator Workstation (B-OWS) device standards found in ASHRAE 135, Annex L. Include BACnet PICS for Operator Workstation software.

The workstation software shall permit complete monitoring, modification, archiving, programming and troubleshooting interface with the DDC system including supervisory controller and field controllers. Software shall include, but not limited to, Niagara Workplace, FX Workbench, JCI SCT, CCT/PCT, Distech EC-gfx or any controls manufacturer Supervisory controller and field controller programming software used to program the system. The operator interface with the software shall be menu-driven with appropriate displays and menu commands to manipulate the DDC system's objects, point data, operating schedules, control routines, system configuration, trends, alarms, messages, graphics, and reports. Trends shall be capable of graphic display in real time, with variables plotted as functions of time. Each alarmed point shall be capable of displaying its alarm history, showing when it went into alarm, if and when it was acknowledged, and when it went out of alarm. The modification of DDC system parameters and object properties shall be accomplished with "fill in the blank" and/or "point and drag" methods. Modifications shall download to the appropriate controllers at the operator's request.

2.1.6.3 Web-Based User Interface (UI) and Graphics

Provide web-based graphics fully compatible with Internet Explorer 9+,

Safari, Firefox, and Google Chrome. Web-based user interface shall be browser agnostic and shall not rely on proprietary client side scripting to function.

Graphic displays shall have full-screen resolution when viewed on the workstation and notebook computers. Dynamic data on graphics pages shall refresh within 10 seconds using an Internet connection, or 30 seconds using a dial-up modem connection. Web-based user interface shall not rely on additional third-party browser "plug-in" software like Adobe Flash. Java client side applets may be used if appropriately signed. If Java client side runtimes are used they shall not require deprecated or otherwise unsupported Java runtime environments.

The graphics shall show the present value and object name for each of the project's I/O points on at least one graphic page. Arrange point values and names on the graphic displays in their appropriate physical locations with respect to the floor plan or equipment graphic displayed. Graphics shall allow the operator to monitor current status, view zone and equipment summaries, use point-and-click navigation between graphic pages, and edit setpoints and parameters directly from the screens. Items in alarm shall be displayed using a different color or other obvious visual indicator.
Provide graphics with the following:

a. Graphic Types: Provide at least one graphic display for each piece of HVAC equipment, building floor, and controlled zone. Indicate dynamic point values, operating statuses, alarm conditions, and control setpoints on each display. Provide summary pages where appropriate.

(1) Building Elevation: For buildings more than one story, provide an elevation view of the building with links to each of the building's floor plans. Simulate the building's architecture and include the building number and floor numbers. If possible, use an actual photograph of the building.

(2) Building Floor Plans: Provide a floor plan graphic for each of the building's floors and roof with dynamic display of space temperature and other important data. If used, indicate and provide links to sub-plan areas. If possible, use the project's electronic drawing files for the graphic backgrounds. Provide clear names for important areas, such as "Main Conference Room." Include room names and numbers where applicable. Include features such as stairwells, elevators, and main entrances. Where applicable, include the mechanical room, HVAC equipment, and control component locations, with corresponding links to the equipment graphics.

(3) Sub-plan Areas: Where a building's floor plan is too large to adequately display on the screen, sub-divide the plan into distinct areas, and provide a separate graphic display for each area. Provide same level of detail requested in building floor plan section above.

(4) HVAC Equipment: Provide a graphic display for each piece of HVAC equipment, such as a fan coil unit, VAV terminal, or air handling unit. Equipment shall be represented by a two or three-dimensional drawing. Where multiple pieces of equipment combine to form a system, such as a central chiller plant or central heating plant, provide one graphic to depict the entire

plant. Indicate the equipment, piping, ductwork, dampers, and control valves in the installed location. Include labels for equipment, piping, ductwork, dampers, and control valves. Show the direction of air and water flow. Include dynamic display of applicable object data with clear names in appropriate locations.

(5) Sequence of Operation: Provide a graphic screen displaying the written out full sequence of operation for each piece of HVAC equipment. Provide a link to the sequence of operation displays on their respective equipment graphics. Include dynamic real-time data within the text for setpoints and variables.

b. Graphic Title: Provide a prominent, descriptive title on each graphic page.

c. Dynamic Update: When the workstation is on-line, all graphic I/O object values shall update with change-of-value services, or by operator selected discrete intervals.

d. Graphic Linking: Provide forward and backward linking between floor plans, sub-plans, and equipment.

e. Graphic Editing: Provide installed software to create, modify, and delete the DDC graphics. Include the ability to store graphic symbols in a symbol directory and import these symbols into the graphics.

f. Dynamic Point Editing: Provide full editing capability for deleting, adding, and modifying dynamic points on the graphics.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Demolition

Demolition requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.2 BACnet Naming and Addressing

Coordinate with the BAS Owner and provide unique naming and addressing consistent with existing buildings already loaded on the EMCS server. All DDC controllers shall have a Camp Lejeune unique instance number and all Supervisory Building Controllers shall have a Camp Lejeune unique name. Names are managed by the Government.

3.1.2.1 MAC Address

Every BACnet device shall have an assigned and documented MAC Address unique to its network. For Ethernet networks, document the MAC Address assigned at its creation. For MS/TP networks, assign addresses from 0-127. Do not use the controls manufacturer reserved addresses for field controllers. This is typically 0-3. Also the BACnet Instance ID for MAC Address 127, Trunk 1, is reserved for the Supervisory controller. Supervisory Controller Global ID and instance numbers are to be obtained from the BAS Owner to ensure duplicates do not occur.

For MS/TP, assign from 01 to 127 unless reserved by the manufacturer. Correlate address with the provided instance number range starting with

the lowest number. If there are reserved addresses, do not use the instance number that correlates to those addresses.

Example: Assigned Global ID is 600. If the first trunk address is 04, the instance number will be 158348. If the first trunk address is 05, the instance number will be 158349. If the manufacturer has reserved addresses 01-03, addresses 01-03 and instance numbers 158345-158347 shall not be used.

3.1.2.2 Network Numbering

Assign unique numbers to each new network installed on the BACnet internetwork. Provide ability for changing the network number; either by device switches, network computer, or field operator interface. The BACnet internetwork (all possible connected networks) can contain up to 65,534 possible unique networks.

3.1.2.3 Device Object Identifier Property Number

Assign unique Device "Object_Identifier" property numbers or device instances for each device on the BACnet internetwork. Provide for future modification of the device instance number; either by device switches, network computer, or field interface. Instance numbers must be field assignable. BACnet allows up to 4,194,302 possible unique devices per internetwork.

3.1.2.4 Device Object Name Property Text

Each object on the Camp Lejeune EMCS has a unique point name, which is made up of the object or short name stored in the controller and the equipment identifier, which is stored in the supervisory building controller (SBC). The long point name combines this object name with the name stored in the SBC that describes the controller or location of the object. The device object name property field shall support 32 minimum printable characters. The point name follows the general convention:

Building.Equipment.Object Name

Example: HP512.AHU-3.DA-T. See Attachments one through three for equipment names, object names, object groupings, and area names.

3.1.2.5 Object Name Property Text (Other than Device Objects)

The object name identifies the specific point. Only object names on the approved Camp Lejeune list shall be used. From the example above, the point name is: "DA-T". See Attachment for the approved Camp Lejeune list. If object name is not in the approved list, then contractor shall send a Request For Information (RFI) to their COTR. The object name property field shall support 32 minimum printable characters.

3.1.2.6 Object Description

The controller shall also store an alpha numeric description of the object name. The controller shall support a minimum of 30 printable characters. From the example above the object description is: "Discharge Air Temperature". Both short names and long names shall be populated in the database.

3.1.2.7 List of Attachments

Attachment 1 - Not Used

Attachment 2 - Object Names

Attachment 3 - NOT USED

Attachment 4 - Niagara BAS Alarms Policy

Attachment 5 - Trend (History)

3.1.3 Minimum BACnet Object Requirements

a. Use of Standard BACnet Objects in accordance with existing Camp Lejeune Standards: For the following points and parameters, use standard BACnet objects, where all relevant object properties can be read using BACnet's Read Property Service, and all relevant object properties can be modified using BACnet's Write Property Service:

(1) All device physical inputs

(2) All device physical outputs

(3) All set points

(4) All PID tuning parameters

(5) All calculated pressures, flow rates, and consumption values

(6) All alarms

(7) All trends

(8) All schedules

(9) All equipment and lighting circuit operating status

b. BACnet Object Description Property: The Object Description property shall support 32 minimum printable characters. For each object, complete the description property field using a brief, narrative, plain English description specific to the object and project application. For example: "HW Pump 1 Proof." Document compliance, length restrictions, and whether the description is writeable in the device PICS.

c. Analog Input, Output, and Value Objects: Support and provide Description and Device_Type text strings matching signal type and engineering units shown on the points list.

d. Binary Input, Output, and Value Objects: Support and provide Inactive_Text and Active_Text property descriptions matching conditions shown on the points list.

e. Calendar Object: For devices with scheduling capability, provide at least one Calendar Object with ten-entry capacity that incorporates Federal Holidays. All operators may view Calendar Objects; authorized operators may make modifications from a workstation. Enable the writeable Date List property and support all calendar entry data types.

f. Schedule Object: Use Schedule Objects for all building system scheduling. All operators may view schedule entries; authorized operators may modify schedules from a workstation.

g. Loop Object or Equal: Use Loop Objects or equivalent BACnet objects in each applicable field device for PID control. Regardless of program method or object used, allow authorized operators to adjust the Update Interval, Setpoint, Proportional Constant, Integral Constant, and Derivative Constant using BACnet read/write services.

h. Setpoints: All setpoints must be BACnet exposed for auto discovery purposes if needed.

3.1.4 Minimum BACnet Service Requirements

a. Command Priorities

(1) Use commandable BACnet objects to control machinery and systems, providing the priority levels listed below. If the sequence of operation requires a different priority, obtain approval from the Contracting Officer.

Priority Level	Application
1	Manual-Life Safety
2	Automatic-Life Safety
3	(User Defined)
4	(User Defined)
5	Critical Equipment Control
6	Minimum On/Off
7	(User Defined)
8	Manual Operator
9	(User Defined)
10	(User Defined)
11	Load Shedding
12	(User Defined)
13	(User Defined)
14	(User Defined)
15	(User Defined)
16	(User Defined)

b. Alarming

(1) Alarm Priorities: Coordinate alarm and event notification with the BAS Owner.

(2) Notification Class: Enable writeable Priority, Ack Required, and Recipient List properties of Notification Class objects.

(3) Event Notification Message Texts: Use condition specific narrative text and numerical references for alarm and event notification.

c. Updating Displayed Property Values

(1) Allow workstations to display property values at discrete polled intervals, or based on receipt of confirmed and unconfirmed Change of Value notifications. The COV increment shall be adjustable by an operator using BACnet services, and polled intervals shall be adjustable at the operator workstation.

3.1.5 Local Area Networks

Connection of new networks with existing networks will be done by the BAS Owner. Network numbers and device instance numbers shall remain unique when joining networks. Do not change existing network addressing without Government approval. See also "BACnet Naming and Addressing".

3.1.6 BACnet Routers and Protocol Gateways

Provide the quantity of BACnet routers necessary for communications shown on the BACnet Communication Architecture schematic. Provide BACnet routers with BACnet Broadcast Message Device (BBMD) capability on each BACnet internetwork communicating across an IP network. Configure BBMD tables to enable unicast forwarding of broadcast messaging across Layer-3 IP subnets.

3.1.7 Plant Controllers

Equipment such as VFD's, chillers, and boilers shall have hardwired enable(start/stop), and status points from the plant controller, VFD's shall also have a hardwired speed command. Additionally, this equipment shall have a BACnet interface for monitoring.

3.1.8 Digital Controllers

a. Install as stand alone control devices (see definitions in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC).

b. Locate control cabinets at the locations shown on the drawings. If not shown on the drawings, install in the most accessible space, close to the controlled equipment.

c. Controllers must be installed in a manfacturer's required/recommended enclosure for each type of controller.

d. Provide a dedicated analog output to each output device, such as variable frequency driven pump motors in an alternating arrangement.

e. Equipment such as VFD's must have hardwired enable (start/stop), speed command and status points from the controller. Software points are not allowable. Additionally, this equipment shall have a BACnet interface for monitoring.

3.1.9 Wiring Criteria

Wiring criteria requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.10 Accessibility

Accessibility requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

3.1.11 Component Identification Labeling

Component identification labeling requirements are specified in Section 23 09 00 INSTRUMENTATION AND CONTROL FOR HVAC.

-- End of Section --

SECTION 23 73 33

HEATING, VENTILATING, AND COOLING SYSTEM

01/07

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z21.22/CSA 4.4	(2015) Relief Valves for Hot Water Supply Systems

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI DCUP	(Online) Directory of Certified Unitary Products
ANSI/AHRI 210/240	(2008; Add 1 2011; Add 2 2012) Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment
AHRI 340/360 I-P	(2015) Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment
AHRI 410	(2001; Addendum 1 2002; Addendum 2 2005; Addendum 3 2011) Forced-Circulation Air-Cooling and Air-Heating Coils
AHRI 430	(2009) Central-Station Air-Handling Units
AHRI 710 I-P	(2009) Performance Rating of Liquid-Line Driers

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 15 & 34	(2013) ASHRAE Standard 34-2016 Safety Standard for Refrigeration Systems/ASHRAE Standard 34-2016 Designation and Safety Classification of Refrigerants-ASHRAE Standard 34-2016
ASHRAE 52.2	(2012) Method of Testing General

	Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B16.18	(2021) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.22	(2021) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.23	(2021) Cast Copper Alloy Solder Joint Drainage Fittings - DWV
ASME B16.26	(2018) Standard for Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B31.1	(2022) Power Piping
ASME B31.5	(2020) Refrigeration Piping and Heat Transfer Components

ASTM INTERNATIONAL (ASTM)

ASTM A653/A653M	(2018) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B32	(2008; R 2014) Standard Specification for Solder Metal
ASTM B42	(2015a) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM B88	(2016) Standard Specification for Seamless Copper Water Tube
ASTM B280	(2020) Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
ASTM B306	(2020) Standard Specification for Copper Drainage Tube (DWV)
ASTM C1071	(2019) Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material)

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-58	(2009) Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation
MSS SP-67	(2017; Errata 1 2017) Butterfly Valves
MSS SP-69	(2003; Notice 2012) Pipe Hangers and

	Supports - Selection and Application (ANSI Approved American National Standard)
MSS SP-71	(2011; Errata 2013) Gray Iron Swing Check Valves, Flanged and Threaded Ends
MSS SP-80	(2013) Bronze Gate, Globe, Angle and Check Valves

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14; TIA 17-15; TIA 17-16; TIA 17-17) National Electrical Code

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

SMACNA 1966	(2020) HVAC Duct Construction Standards Metal and Flexible, 4th Edition
SMACNA 1972 CD	(2012) HVAC Air Duct Leakage Test Manual - 2nd Edition

UNDERWRITERS LABORATORIES (UL)

UL Elec Equip Dir	(2011) Electrical Appliance and Utilization Equipment Directory

1.2 SYSTEM DESCRIPTION

Provide new heating, ventilating, and cooling (HVAC) systems complete and ready for operation. HVAC systems include equipment, ducts, and piping which is located within, on, under, and adjacent to buildings.

1.3 SUBMITTALS

Submit the following in accordance with Section 01 33 00, "Submittal Procedures."

SD-02 Shop Drawings

Temperature control systems; G

SD-03 Product Data

Split-System Air-Conditioners; G

Air-Handling Units; G

Pipe Hangers And Supports; G

Dampers; G

Flexible Pipe Connectors; G

Filter Boxes; G

Valves; G

Pipe And Fittings; G

Duct Lining; G

SD-10 Operation and Maintenance Data

Submit in accordance with Section 01 78 23, "Operation and Maintenance Data."

Air-Handling Units, Data Package 3; G

Variable Air Volume (Vav) Terminals, Data Package 3; G; Submit with respective air handling unit.

SD-11 Closeout Submittals

Air Filter Inventory; G

1.3.1 Temperature Control Systems

Drawings shall include point-to-point electrical wiring diagrams.

1.3.2 Equipment layout drawings

Submit drawings showing equipment layout including foot print, piping, conduit, control cabinets, door swings, and power disconnects.

1.3.3 Installation Manual

Provide for each item of equipment.

1.3.4 Equipment Field Test Plans

Submit within 120 calendar days after contract award for the following equipment.

a. Air conditioners: packaged and split-system; greater than 180,000 Btuh.

b. Heat pumps: packaged, split-system, and water-source; greater than 60,000 Btuh.

c. Air-handling units: packaged and multi-zone; greater than 2,000 cfm.

d. Air-cooled water chillers: greater than 180,000 Btuh.

e. Variable air volume (VAV) terminals and related air handling unit.

1.3.5 Air Filter Inventory

Submit an inventory of sizes and quantity of air filters required to be replaced. Inventory shall indicate location of each piece of equipment. Include sketches of drawings.

PART 2 PRODUCTS

2.1 EQUIPMENT

Dehydrate, purge, and charge refrigerant circuit with refrigerant and oil at factory. Factory oil and refrigerant charge shall be full amount required for operation, if within limits permitted by the Department of Transportation; otherwise, a holding charge shall be furnished. Field charging, where only a holding charge is shipped, shall be accomplished without breaking permanent refrigerant connections. Equipment using R-11, R-12, R-13, R-113, R-114, R-115, R-500, or R-502 as a refrigerant will not be permitted. Refrigerants shall have an Ozone Depletion Factor (ODF) of 0.05 or less. The ODF shall be in accordance with the "Montreal Protocol On Substances That Deplete The Ozone Layer," September 1987, sponsored by the United Nations Environment Program. Refrigerants that operate any where in the cycle below 20 psia will not be permitted. Efficiency of equipment shall meet the minimum's of Table 15701-1.

2.1.1 Split-System Air-Conditioners

Provide units factory assembled, designed, tested, and rated in accordance with ANSI/AHRI 210/240 or AHRI 340/360 I-P for cooling. Units shall be AHRI certified or rated in AHRI DCUP for cooling. Outside unit shall include compressor and condenser. Provide guards to protect condenser fins. Units shall be listed in UL Elec Equip Dir. Units shall include blower fan, evaporator coil, filters, and controls. Provide heating section indicated. Insulate interior of inside unit casing with manufacturer's standard insulation.

a. Filter section: Provide UL listed throwaway 1-inch thick fiberglass filters, standard dust-holding capacity, 350 fpm maximum face velocity. Provide gasketed hinged access panel with quick opening half-twist latches at end of filter rack.

b. Safety controls: Provide low refrigerant pressure protection and pressure relief device. Provide compressor motor with thermal and overload protection, 5 minute anti-recycle timer, and start capacitor kit. Provide compressor with electrical crankcase heater and internal high pressure protection. The above safety controls are not required when scroll compressors are provided.

c. Space temperature controls: Provide controls including adjustable programmable thermostats with COOL-OFF-HEAT system switch and AUTO-ON fan switch. Provide relays, transformers, contactors, and control wiring between thermostats and unit.

2.1.2 Air-Handling Units

Provide units factory assembled, designed, tested, and rated in accordance with AHRI 430. Units shall be AHRI certified for cooling. Provide cooling units including chilled water coils. Unit shall include fan section, coil section with drain pan, variable frequency motor controller, filter section and access panels. Insulate interior of casing with manufacturer's standard insulation. Provide nylon bushings for dampers.

a. Fan section: Provide draw-through fan section including motor, starter, and drives. Provide adjustable sheaves to permit fan

capacity variation from 5 percent above to 5 percent below rated capacity.

b. Coil section: Provide AHRI 410 coils and slope for drainage. Provide insulated drain pans under cooling coils and valves.

c. Filter section: Provide UL listed throwaway 1 inch thick fiberglass filters, standard dust-holding capacity, 350 fpm maximum face velocity. Provide gasketed hinged access panel with quick opening half-twist latches at end of filter rack. Filter rack shall accept 2 inch thick filters.

d. Space temperature controls: Provide controls including adjustable programmable thermostats with COOL-OFF-HEAT system switch and AUTO-ON fan switch. Thermostats shall be furnished by unit manufacturer. Provide relays, transformers, contactors, and control wiring between thermostats and unit.

e. Equipment selection: Air-handling unit (AHU) manufacturer shall certify the capability of the AHU to perform between the cumulative design minimum and maximum airflows of the variable air volume (VAV) terminals. The AHU submittal selection shall be supported by fan curves clearly annotated showing operating points of the minimum and maximum airflow of connected VAV terminals.

2.2 ELECTRICAL

2.2.1 Electrical Motors, Controllers, Contactors, and Disconnects

Furnish with respective pieces of equipment. Motors, controllers, contactors, and disconnects shall conform to Section 26 20 00, "Interior Wiring Systems." Provide electrical connections under Section, 26 20 00, "Interior Wiring Systems." Provide controllers and contactors with maximum of 120-volt control circuits, and auxiliary contacts for use with controls furnished. When motors and equipment furnished are larger than sizes indicated, the cost of providing additional electrical service and related work shall be included under this section.

2.2.2 Electrical Work

Provide under Section 26 20 00, "Interior Wiring Systems." Provide control wiring under Section 23 09 23.13 BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC.

2.3 METAL DUCT SYSTEMS

Provide shop-fabricated, zinc-coated steel ducts conforming to ASTM A653/A653M coating designation G60. Fabricate, construct, brace, reinforce, install, support, and seal ducts and accessories, and test ducts in accordance with SMACNA 1966 and SMACNA 1972 CD. Cover duct transverse joints with single component synthetic rubber type compound suitable for use with passivated coating on zinc-coated steel. Lap joints in direction of flow. Provide ducts straight and smooth on inside with neatly finished airtight joints. Provide air supply and return openings in ducts with air diffusers, registers, or grilles.

2.3.1 Flexible Duct Connectors

Provide airtight flexible duct connectors at duct connections to each air-conditioning unit, air-handling unit, exhaust fan, and ventilating fan. Support connectors at each end with metal angle frame bands, securely bolt in place. Provide not less than 20 ounce glass fabric duct connectors coated on both sides with neoprene.

2.3.2 Turning Vanes

Provide fabricated tees and square elbows with turning vanes in accordance with SMACNA 1966 for vanned elbows. Turning vanes shall be single wall with trailing edges.

2.3.3 Dampers

Provide factory manufactured opposed blade adjustable manual dampers where indicated for duct heights of 12 inches and larger. Provide factory manufactured single leaf dampers for duct heights less than 12 inches. Provide damper shafts with 2 inch standoffs to clear 2 inches of duct insulation with bearings at both ends of the shafts. Provide adjustment quadrant with indicator and locking devices. Provide galvanized steel dampers one gage heavier than duct in which dampers are installed.

2.3.4 Access Doors

Provide for access to volume dampers, fire dampers, plenum chambers, and where indicated. Provide each door with double wall zinc-coated steel construction, gasketed airtight, with continuous hinges and cam latches. Insulate access doors with one-inch thick rigid insulation. Provide 12 inch by 12 inch door, except where larger sizes are indicated, or provide 12 inches by height of duct when duct is less than 12 inches high. Provide keyed-alike 90 degree turn cam locks on each access door in sleeping rooms; furnish three keys.

2.3.5 Filter Boxes

Provide when filters are not provided integral with the air-conditioning units or air-handling units. Construct filter boxes of zinc-coated steel with track, hinged access doors with latches, seal gaskets between frame, and filters. Arrange filters to filter outside air intake and return air. Filter assemblies shall be removable from filter box and replaceable without use of tools. Replaceable filter rack shall be designed to accept 2 inch thick filters.

a. Replaceable filters: Provide UL listed throwaway 1 inch thick fiberglass filters, standard dust-holding capacity, 350 fpm maximum face velocity.

b. High efficiency filters: Provide UL Class 2, mean efficiency of 30 percent when tested in accordance with ASHRAE 52.2. Filter assembly shall include holding frame and fastener assembly, filter cartridge, and mounting frame and retainer assembly. High efficiency filters shall be preceded by replaceable filter.

2.3.6 Duct Lining

Provide where indicated. Provide ASTM C1071 fiberglass duct lining,

minimum of one inch thick, with black-pigmented fire-resistant coating on side exposed to airstream. Secure to duct interior with 100 percent coverage of adhesive and with mechanical fastening devices, spaced in accordance with SMACNA 1966. Provide metal nosing at duct lining beginnings and endings.

2.4 PIPING SYSTEMS

Provide the following pipe and fittings. Provide dielectric fittings, unions or flanges between steel piping and copper tubing for all piping sizes; except that copper alloy valves and strainers may be used without dielectric fittings, unions or flanges. Water piping sizes 4 inches and smaller shall be copper tubing.

2.4.1 Soldered Joint Copper Tubing

Provide ASTM B88, Type L for aboveground piping, Type K for buried piping, with ASME B16.18 or ASME B16.22 solder joint fittings, unions, and flanges; provide adapters as required. Provide ASTM B42 copper pipe nipples with threaded end connections. Provide ASTM B32, 95-5 tin-antimony solder, or provide Plumbing Code approved lead-free solder.

2.4.2 Copper Tubing Piping Systems

Provide copper tubing for the following piping systems, except water piping sizes larger than 4 inches shall be copper tubing or steel piping.

a. Chilled water, chilled-hot water, and hot water piping.

b. Cold drain piping from drain pans.

c. Fuel oil supply and return piping with ASME B16.26 flared fittings or compression type fittings.

2.4.3 Copper Cold Drain Piping

Provide copper tubing in accordance with paragraph entitled "Copper Tubing" for piping sizes one inch and smaller. Provide ASTM B306 copper tubing and ASME B16.23 solder joint fittings for piping sizes larger than one inch. In lieu of copper tubing, 1.25 inch Schedule 40 polyvinyl chloride (PVC) plastic pipe, fittings, and solvent cement may be provided.

2.4.4 Copper Refrigerant Tubing

Provide ASTM B280, cleaned, dehydrated, and sealed. Provide ASME B16.22 solder joint refrigerant fittings and adapters. Provide silver brazing alloy solder and silver brazing alloy flux. During brazing operations bleed a small amount of dry oil-free nitrogen continuously through the refrigerant tubing. Provide ASME B16.26 flared fittings.

2.4.5 Valves

Valves shall have flanged end connections, except valves smaller than 2.5 inches may have threaded end connections with a union on one side of the valve. Solder end connections may be used for connections between copper alloy valves and copper tubing.

2.4.5.1 Check Valves

MSS SP-80, Class 125, swing check; except sizes 2.5 inches and larger shall conform to MSS SP-71, Class 125.

2.4.5.2 Butterfly Valves

MSS SP-67, except sizes 2.5 inches and larger shall have lugged or wafer body designed for installation between ASME Class 150 flanges. Valves shall have two-position lever handles, except when infinite position lever handles are indicated.

2.4.5.3 Ball Valves

Full port design, copper alloy body, except sizes 2.5 inches and larger shall be cast-iron body. Valves shall have two-position lever handles. Ball valves may be provided in lieu of gate valves.

2.4.5.4 Air Venting Valves

Provide copper alloy body valves with automatic or manual air vent as indicated.

2.4.5.5 Combination Pressure and Temperature Relief Valves

ANSI Z21.22/CSA 4.4, copper alloy body, automatic reseating, test lever, and
discharge capacity based on AGA temperature steam rating.

2.4.5.6 Water Temperature Regulating Valves

Provide copper alloy body, direct acting, pilot operated, for the intended service.

2.4.5.7 Flow Control Balancing Valves

Copper alloy or cast iron body, copper alloy or stainless internal working parts, and integral pointer that indicates the degree of valve opening. Valves shall be suitable for 125 psig at 190 degrees F hot water. Valve shall function as a service valve when in fully closed position. Valve body shall have factory-installed tappings for differential pressure meter connections for verification of pressure differential across valve orifice. Meter connections shall have positive check valves or shutoff valves. Each valve shall have metal tag showing the gallons per minute flow for each differential pressure reading.

2.4.5.8 Refrigerant Valves

ASME B31.5, and shall be copper alloy. Provide valves in each system for servicing and for isolating system components in compliance with ASHRAE 15 & 34.

2.5 PIPING ACCESSORIES

2.5.1 Pipe Hangers and Supports

Provide MSS SP-58 and MSS SP-69, Type 1 with adjustable type steel support rods, except as specified or indicated otherwise. Attach to steel joists with Type 19 or 23 clamps and retaining straps. Attach to Steel W or S

beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor. Provide Type 40 insulation protection shield for insulated piping.

2.5.2 Strainers

Pressure and temperature range shall be for the intended service. Provide blowoff outlet with pipe nipple, gate valve, and discharge pipe nipple. Provide stainless steel strainer element with perforations of 0.047 inch for water, 0.031 inch for steam mixed with condensate, and 0.016 inch for steam. Provide copper alloy or cast-iron body strainers in steam and condensate systems up to 100 psig. Provide steel body strainers in steam and condensate systems 100 psig and greater.

2.5.3 Pressure Gages

Provide single style pressure gage with 4.5-inch dial, brass or aluminum case, bronze tube, gage cock, pressure snubber, and syphon. Provide scale range for intended service.

2.5.4 Thermometers

Provide bi-metal dial type thermometers with stainless steel case, stem, and fixed thread connection; 3 inch diameter dial with glass face gasketed within the case; and accuracy within 2 percent of scale range. Provide scale range for intended service.

2.5.5 Pipe Sleeves

Provide where piping passes entirely through walls, ceilings, roofs, and floors. Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, ceilings, roofs, and floors. Provide one-inch minimum clearance between exterior of piping or pipe insulation, and interior of sleeve or core-drilled hole. Firmly pack space with mineral wool insulation. Seal space at both ends of sleeve or core-drilled hole with plastic waterproof cement which will dry to a firm but pliable mass, or provide a mechanically adjustable segmented elastomeric seal. In fire walls and fire floors, seal both ends of sleeves or core-drilled holes with UL listed fill, void, or cavity material.

2.5.5.1 Sleeves in Masonry and Concrete

Provide steel pipe sleeves or schedule 40 PVC plastic pipe sleeves. Sleeves are not required where drain, waste, and vent (DWV) piping passes through concrete floor slabs located on grade. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.

2.5.5.2 Sleeves not in Masonry and Concrete

Provide 26 gage galvanized steel sheet or PVC plastic pipe sleeves.

2.5.6 Flexible Pipe Connectors

Provide flexible bronze or stainless steel piping connectors with single

braid where indicated. Connectors shall be suitable for the intended service.

2.5.7 Sight Glass and Refrigerant Drier

AHRI 710 I-P. Provide in refrigerant liquid piping.

2.5.8 Escutcheon Plates

Provide one piece or split hinge metal plates for piping entering floors, walls, and ceilings in exposed spaces. Provide polished stainless steel plates or chromium-plated finish on copper alloy plates in finished spaces. Provide paint finish on metal plates in unfinished spaces.

2.6 ACCESS DOORS FOR VALVES

Provide factory-prefabricated and primed flush face steel access doors including steel door frame for with continuous hinges and turn-screw-operated latch. Provide door frame installation in plaster and masonry walls. Furnish doors under this section; install doors under appropriate section of this specification.

2.7 PROGRAMMABLE THERMOSTATS

Provide programmable microelectonic thermostats. The thermostats shall have the following attributes:

a. Low voltage

b. Battery backup to maintain programming in the event of power failure

c. Automatic control of single stage heating and single stage cooling

d. Minimum 4 temperature settings per day, minimum of separate weekday/weekend day schedule, or 7 day schedules per week

e. Installation shall include initial programming

f. Temporary temperature override

g. Display clock

h. Display shall prompt for program modifications, or functions of buttons shall be self evident, or instructions shall be permanently mounted on inside of flip down keyboard cover. Thermostat shall be capable of being completely programmed without the use of separate instructions.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 HVAC System

Installation of HVAC system including equipment, materials, installation, workmanship, fabrication, assembly, erection, examination, inspection, and testing shall be in accordance with ASME B31.1, ASME B31.5, NFPA 70, and in accordance with the manufacturer's recommendations.

3.1.2 Connections to Existing Systems

Notify the Contracting Officer in writing at least 15 calendar days prior to the date the connections are required. Obtain approval before interrupting service. Furnish materials required to make connections into existing systems and perform excavating, backfilling, compacting, and other incidental labor as required. Furnish labor and tools for making actual connections to existing systems.

3.2 PIPING

Test, inspect, and approve piping before burying, covering, or concealing. Provide fittings for changes in direction of piping and for connections.
Make changes in piping sizes through tapered reducing fittings; bushings will not be permitted. Install valves with stems horizontal or above. Provide flanges or unions at valves, traps, strainers, and connections to equipment; unions are not required in copper tubing piping systems.

a. Threaded connections: Provide Teflon pipe thread paste on male threads. Do not thread metal pipe into plastic piping.

b. Pipe hangers and supports: Provide additional pipe hangers and supports at in-line water pumps and flanged valves.

c. Piping to receive insulation: Provide temporary wood spacers between the pipe hangers and supports, and the pipe in order to properly slope the piping and establish final elevations. Provide temporary wood spacers of same thickness as insulation to be provided under Section 23 07 00 INSULATION OF MECHANICAL SYSTEMS. Support plastic piping every 4 feet. Support metal piping as follows.

MAXIMUM SPACING (FEET)

Nominal Pipe Size (inches)	One and under	1.25	1.5	2	2.5	3	3.5	4	5	6
Copper Tubing	6	7	8	8	9	10	11	12	13	14
Steel Pipe	7	8	9	10	11	12	13	14	16	17

d. Cleaning of piping: Keep interior and ends of new piping and existing piping affected by Contractor's operations, cleaned of water and foreign matter during installation by using plugs or other approved methods. When work is not in progress, securely close open ends of pipe and fittings to prevent entry of water and foreign matter. Inspect piping before placing into position.

e. Demolition: Remove materials so as not to damage materials which are to remain. Replace existing work damaged by Contractor's operations with new work of same construction.

f. Tee Joints: Extracted tee joints may be made in copper tube. Make joint with an appropriate tool by drilling a pilot hole and drawing out the tube surface to form a collar having a minimum height of three times the thickness of the tube wall. To prevent the branch tube from being inserted beyond the depth of the

extracted joint, provide dimpled depth stops. Notch the branch tube for proper penetration into fitting to assure a free flow joint. Braze extracted joints using a copper phosphorous classification brazing filler metal. Soldered joints shall not be permitted.

3.3 ADJUSTMENTS

Adjust controls and equipment so as to give satisfactory operation. Adjust entire water temperature control system and place in operation so that water quantities circulated are as indicated. Air duct systems shall be adjusted and balanced so that air quantities at outlets are as indicated and so that distribution from supply outlets is free from drafts and has uniform velocity over the face of each outlet.

3.4 INSTRUCTING OPERATING PERSONNEL

Upon completion of work and at time designated by Contracting Officer, provide services of competent technician for period of not less than one 1 8-hour working day for instruction of Government operating personnel in proper operation and maintenance of equipment.

3.5 FIELD QUALITY CONTROL

Upon completion and before final acceptance of work, test each system in service to demonstrate compliance with the contract requirements. Adjust controls and balance systems prior to final acceptance of completed systems. Test controls through every cycle of operation. Test safety controls to demonstrate performance of required function. Correct defects in work provided by Contractor and repeat tests. Furnish steam, fuel, water, electricity, instruments, connecting devices, and personnel for tests. Flush and clean piping before placing in operation.
Clean equipment, piping, strainers, ducts, and filters.

3.5.1 Piping Systems Except for Refrigerant Piping

Before insulating, hydrostatically test each new piping system at not less than 188 psig
Maintain pressure for 2 hours with no leakage or reduction in gage pressure. Obtain approval before applying insulation.

3.5.2 Refrigerant Piping

Perform following when field piping connections are provided.

a. Pressure test: Test refrigerant piping using dry, oil-free nitrogen, and prove tight at 300 psig on the high side and 150 psig on the low side. Maintain pressure for 2 hours with no leakage or reduction in gage pressure

b. Evacuation: Using high vacuum pump and certified micron gage, reduce absolute pressure on both sides of system simultaneously to 300 microns. After reaching this point charge system with proper refrigerant until pressure of zero psig is obtained. Repeat evacuation-charging procedure for two more cycles, totaling to three evacuation-charging cycles. On final evacuation, secure pump and maintain 300 microns for 2 hours before charging with required final refrigerant.

3.5.3 Air Ducts

Obtain approval before applying insulation.

3.5.4 Equipment

3.5.4.1 Field Testing

Test each item of equipment in operation for continuous period of not less than 24 hours under every condition of operation in accordance with each equipment manufacturer's recommendation. Verify that the equipment operating parameters are within limits recommended by the manufacturer.

TABLE 15701-1
EQUPMENT MINIMUM EFFICIENCY REQUIREMENTS
Equipment must meet each rating listed

Equipment Type	Efficiency	Rating Condition
Air to Air Unitary Air Conditioner (Packaged and Split)		
<65 Mbtu/hr	12.0 SEER	
65-135 Mbtu/hr	11.0 EER	
	11.4 IPLV	
136-240 Mbtu/hr	10.8 EER	
	11.2 IPLV	
Air to Air Unitary Heat Pump (Packaged and Split)		
<65 Mbtu/hr	12.0 SEER	
	7.7 HSPF	
65-135 Mbtu/hr	10.1 EER	
	10.4 IPLV	
	3.2 COP	
136-240 Mbut/hr	9.3 EER	
	9.5 IPLV	
	3.1 COP	
Air Cooled Water Chiller	1.23 Full Load kW/ton	ARI 550/590-98
	.90 IPLV kW/ton	ARI 550/590-98
Air Cooled Condensing Units	12.0 SEER	
	11.0 EER	
	11.4 IPLV	
Room Air Conditioner (Window, not thru the wall)		
<20,000 btu/hr	10.7 EER	DOE test procedure
=>20,000 btu/hr	9.42 EER	DOE test procedure
Package Terminal Air Conditioner	10=(.16xCap/1000)*EER	ANSI/AHRI/CSA 310/380 @ 95 F Outdoor
	12.2-(.2xCap/1000)*EER	ANSI/AHRI/CSA 310/380 @ 82 F Outdoor
Package Terminal Heat Pump	10-(.16xCap/1000)*EER	ANSI/AHRI/CSA 310/380 @ 95 F Outdoor
	12.2-(.2xCap/1000)*EER	ANSI/AHRI/CSA 310/380 @ 82 F Outdoor
	2.9-(.026xCap/1000)*COP	ANSI/AHRI/CSA 310/380 @ 47 F Outdoor

*Capacity is cooling capacity in but/hr. Use 7,000 if cap is less than 7,000, use 15,000 if cap is greater than 15.000.

TABLE 15701-1
EQUPMENT MINIMUM EFFICIENCY REQUIREMENTS
Equipment must meet each rating listed

Equipment Type	Efficiency	Rating Condition
Computer Room Air Conditioner	8.9 EER	
Water Source Heat Pump		
Open Loop	16.2 EER	@ 59 F EWT
	3.6 COP	@ 50 F EWT
Closed Loop	14.1 EER	@ 77 F EWT
	3.3 COP	@ 32 F EWT
Oil Fired Heating Boilers		
Water	83% Et	
Steam	83% Et	
Natural Gas Fired Heating Boiler		
Water	80% Et	
Steam		
<2,500,000	79% Et	
=>2,500,000	80% Et	
Direct Vent Gas-Fired Central Furnaces		
<225,000 input	90%	

-- End of Section --

SECTION 25 05 11.00

CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS - ISOLATED SYSTEMS
11/17

PART 1 GENERAL

This section includes requirements in support of the DOD Risk Management Framework (RMF) for implementing cybersecurity. Refer to UFC 4-010-06, Cybersecurity for Facility-Related Control Systems, for requirements on incorporating into control system design and for general information on the RMF process as it applies to control systems.

Many subparts in this Section contain text in curly braces ("{" and "}") indicating which cybersecurity control and control correlation identifier (CCI) the requirements of the subpart relate to. The text inside these curly braces is for Government reference only, and enables coordination of the requirements of this Section with the RMF process throughout the design and construction process. Text in curly braces are not contractor requirements.

This Section refers to Security Requirements Guide (SRGs) and Security Technical Implementation Guide (STIGs). STIGs and SRGs are available online at the Information Assurance Support Environment (IASE) website at http://iase.disa.mil/stigs/Pages/index.aspx. Not all control system components have applicable STIGs or SRGs.

Should any conflict exist between this section and related equipment specifications, the more secure option shall be required and coordinated with Camp Lejeune FRCS Office.

1.1 CONTROL SYSTEM APPLICABILITY

There are multiple versions of this Section associated with this project. Different versions have requirements applicable to different control systems. This specific Section applies only to the following control systems:

a. Elevators and Lift Stations (BCS-C/VTS)

b. Electrical Systems (BCS-ES)

c. Other Isolated Control Systems

1.1.1 CONTROL SYSTEM CLASSIFICATION

The C-I-A impact levels for the control system have been determined to be LOW-LOW-LOW (L-L-L).

1.1.2 INTERCONNECTION

The C/VTS and ES control systems addressed by this specification will have no connection to other systems and function as isolated control systems.

1.2 RELATED REQUIREMENTS

All Sections containing facility-related control systems or control system components are related to the requirements of this Section. Review all specification sections to determine related requirements. Incorporate each of the requirements contained in this specification for systems specified in the following sections:

a. [DB TEAM TO COMPLETE REFERENCES to ELEVATORS & ELECTRICAL SYSTEMS]

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. DEPARTMENT OF DEFENSE (DOD)

DODI 8551.01	(2014) Ports, Protocols, and Services Management (PPSM)
UFC 4-010-06	(2023) Cybersecurity of Facility-Related Control Systems

1.4 DEFINITIONS

1.4.1 Computer

As used in this Section, a computer is one of the following:

a. a device running a non-embedded desktop or server version of Microsoft Windows

b. a device running a non-embedded version of MacOS

c. a device running a non-embedded version of Linux

d. a device running a version or derivative of the Android OS, where Android is considered separate from Linux

e. a device running a version of Apple iOS

1.4.2 Network Connected

A component is network connected (or "connected to a network") only when the device has a network transceiver which is directly connected to the network and implements the network protocol. A device lacking a network transceiver (and accompanying protocol implementation) can never be considered network connected. Note that a device connected to a non-IP network is still considered network connected (an IP connection or IP address is not required for a device to be network connected).

Any device that supports wireless communication is network connected, regardless of whether the device is communicating using wireless.

1.4.3 User Account Support Levels

The support for user accounts is categorized in this Section as one of three levels:

1.4.3.1 FULLY Supported

Device supports configurable individual accounts. Accounts can be created, deleted, modified, etc. Privileges can be assigned to accounts.

1.4.3.2 MINIMALLY Supported

Device supports a small, fixed number of accounts (perhaps only one). Accounts cannot be modified. A device with only a "User" and an "Administrator" account would fit this category. Similarly, a device with two PINs for logon - one for restricted and one for unrestricted rights would fit here (in other words, the accounts do not have to be the traditional "user name and password" structure).

1.4.3.3 NOT Supported

Device does not support any Access Enforcement therefore the whole concept of "account" is meaningless.

1.4.4 User Interface

Generally, a user interface is hardware on a device allowing user interaction with that device via input (buttons, switches, sliders, keyboard, touch screen, etc.) and a screen. There are three types of user interfaces defined in this Section: Limited Local User Interface, Full Local User Interface and Remote User Interface. In this Section, when the term "User Interface" is used without specifying which type, it refers only to Full Local User Interface and Remote User Interface (NOT to Limited Local User Interface).

1.4.4.1 Limited Local User Interface

A Limited Local User Interface is a user interface where the interaction is limited, fixed at the factory, and cannot be modified in the field. The user must be physically at the device to interact with it.

Examples of Limited Local User Interface include thermostats.

1.4.4.2 Full Local User Interface

A Full Local User Interface is a user interface where the interaction and displays are field-configurable.

Examples of a Full Local User Interface include local applications on a computer.

1.4.4.3 Remote User Interface

A Remote User Interface is a user interface on a Client device allowing user interaction with a different Server device. The user need not be physically at the Server device to interact with it.

Examples of Remote User Interfaces include web browsers.

1.4.5 C-I-A Impact Level

A reference to the security objectives of Confidentiality (C), Integrity (I), and Availability (A) associated with a control system. These values

are determined by the System Owner (SO) in conjunction with the Authorizing Official (AO). The potential impact levels for each security objective are LOW (L), MODERATE (M), and HIGH (H).

The determination of control system impact levels is a requirement of UFC 4-010-06.

1.4.6 Isolated Field Control Systems

A control system that does not share its signals, data, or telemetry with any system via communications; the system is completely self-contained. The control system may employ IP and non-IP media and protocols for its own functionality.

1.5 ADMINISTRATIVE REQUIREMENTS

1.5.1 Coordination

Coordinate the execution of this Section with the execution of all other Sections related to control systems as indicated in the paragraph RELATED REQUIREMENTS. Items that must be considered when coordinating project efforts include but are not limited to:

a. If requesting permission for alternate account lock permissions, the Device Account Lock Exception Request must be approved prior to control system device selection and integration by the Camp Lejeune FRCS Office.

b. Wireless testing may be required as part of the control system testing. See requirements for the Wireless Communication Test Report submittal.c. If the Device Audit Record Upload Software is to be installed on a computer not being provided as part of the control system, coordination is required to identify the computer on which to install the software with the Camp Lejeune FRCS Office.

d. Cybersecurity testing support must be coordinated across control systems and with the project cybersecurity testing schedule.

e. Passwords must be coordinated with the Camp Lejeune FRCS Office.

f. If applicable, HTTP web server certificates must be obtained from the indicated contact for the project site.

g. Contractor Computer Cybersecurity Compliance Statements for each contractor using contractor owned computers.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Architect/Engineer approval is required for submittals marked with an "AE" designation. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualifications; G

Device Account Lock Exception Request; G

Contractor Computer Cybersecurity Compliance Statements; G

Contractor Temporary Network Cybersecurity Compliance Statements; G

SD-02 Shop Drawings

Cybersecurity Riser Diagram; G

Control System Inventory Report; G

SD-03 Product Data

Control System Cybersecurity Documentation; G

SD-06 Test Reports

Wireless Communication Test Report; G

SD-07 Certificates

Software Licenses; GSD-11 Closeout Submittals

Password Summary Report; G

Software Recovery And Reconstitution Images; G

Device Audit Record Upload Software; G

1.7 QUALITY CONTROL

1.7.1 Qualifications

1.7.1.1 Control System Cybersecurity Subject Matter Expert

The individual will oversee all work within this specification. This position requires that the individual currently meets Information Assurance Manager Level II Certification in accordance with DoDI 8570 Information Workforce Improvement Program.

Individuals for this position should have experience securing Marine Corps systems and with Risk Management Framework. Control System Experience is highly desirable.

Resumes should be submitted to the Government within 14 days after notice to proceed. All certifications to include computing environment must be in effect prior to beginning work.

Control System Cybersecurity Subject Matter Expert can serve across the contract.

1.8 CYBERSECURITY DOCUMENTATION

1.8.1 Cybersecurity Interconnection Schedule

{For Reference Only: This subpart (and its subparts) relates to CA-3(b)}

The control system(s) addressed by this specification will be isolated

unto themselves and do not connect or interface to any other system. Therefore the contractor will not be required to provide a cybersecurity interconnection schedule.

1.8.2 Control System Inventory Report

{For Reference Only: This subpart (and its subparts) relates to CM-8(a), IA-3}

Provide a Control System Inventory report using the Inventory Spreadsheet listed under this Section at http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic documenting all devices, including networked devices, network infrastructure devices, non-networked devices, input devices (e.g. sensors) and output devices (e.g. actuators). For each device provide all applicable information for which there is a field on the spreadsheet in accordance with the instructions on the spreadsheet.

In addition to the requirements of Section 01 33 00 SUBMITTAL PROCEDURES, provide the Control System Inventory Report as an editable Microsoft Excel file.

1.8.3 Software Recovery and Reconstitution Images

For each control system device on which software is configured or installed under this project, provide a recovery image of the final as-built device. This image must allow for bare-metal restore such that restoration of the image is sufficient to restore system operation to the imaged state without the need for re-installation of software.

If additional user permissions are required to meet this requirement, coordinate the creation of the image with Camp Lejeune FRCS Office.

1.8.4 Cybersecurity Riser Diagram

{For Reference Only: This subpart (and its subparts) relates to PL-2(a)}

Provide a cybersecurity riser diagram of the complete control system including all network and controller hardware. If the control system specifications require a riser diagram submittal, provide a copy of that submittal as the cybersecurity riser diagram. Otherwise, provide a riser diagram in one-line format overlayed on a facility schematic.

1.8.5 Control System Cybersecurity Documentation

Provide a Control System Cybersecurity Documentation submittal containing the indicated information for each device and software application.

1.8.5.1 Default Requirements for Control System Devices

For control system devices where Control System Cybersecurity Documentation requirements are not otherwise indicated in this Section, provide security baseline documentation (CA-5) using CCIs listed below:

a. Documentation that describes secure configuration of the device {for reference only: relates to CCI-003124}

b. Documentation that describes secure installation of the device {for

reference only: relates to CCI-003125}

c. Documentation that describes secure operation of the device {for reference only: relates to CCI-003124}

d. Documentation that describes effective use and maintenance of security functions or mechanisms for the device {for reference only: relates to CCI-003127}

e. Documentation that describes known vulnerabilities regarding configuration and use of administrative (i.e. privileged) functions for the device {for reference only: relates to CCI-003128}

f. Documentation that describes user-accessible security functions or mechanisms in the device and how to effectively use those security functions or mechanisms {for reference only: relates to CCI-003129}

g. Documentation that describes methods for user interaction which enables individuals to use the device in a more secure manner {for reference only: relates to CCI-003130}

h. Documentation that describes user responsibilities in maintaining the security of the device {for reference only: relates to CCI-003131}

1.8.6 PLAN OF ACTION AND MILESTONES

{For Reference Only: This subpart (and its subparts) relates to CA-5(a), (b)}

Develop a plan of action and milestones for the system to document the planned remediation actions of the organization to correct weaknesses or deficiencies noted during the assessment of the controls and to reduce or eliminate known vulnerabilities in the system.

Update existing plan of action and milestones based on the findings from control assessments, independent audits or reviews, and continuous monitoring activities should be completed by the Government as part of continuous monitoring.

1.8.7 Personnel and Access Agreement

{For Reference Only: This subpart (and its subparts) relates to PS-3, PS-4, PS-5, PS-6}

Screen individuals prior to authorizing access to the system; and
b. Rescreen individuals in accordance with organization-defined conditions requiring rescreening and, where rescreening is so indicated, the frequency of rescreening.

Upon termination of individual employment:

Disable system access within organization-defined time period

Terminate or revoke any authenticators and credentials associated with the individual

Conduct exit interviews that include a discussion of information security topics

Retrieve all security-related organizational system-related property

Retain access to organizational information and systems formerly

controlled by terminated individual

Review and confirm ongoing operational need for current logical and physical access authorizations to systems and facilities when individuals are reassigned or transferred to other positions within the organization. Initiate transfer or reassignment actions within organization-defined time period following the formal transfer action. Modify access authorization as needed to correspond with any changes in operational need due to reassignment or transfer. Notify personnel or roles within organization-defined time period.

Develop and document access agreements for organizational systems. Review and update the access agreements. Verify that individuals requiring access to organizational information and systems:

a. Sign appropriate access agreements prior to being granted access

b. Re-sign access agreements to maintain access to organizational systems when access agreements have been updated

1.8.8 Software, Firmware, and Information Integrity
{For Reference Only: This subpart (and its subparts) relates to SI-7}

Employ integrity verification tools to detect unauthorized changes to control system software, firmware, and information. Take appropriate actions determined by the system owner when unauthorized changes to the software, firmware, and information are detected.

1.9 SOFTWARE UPDATE LICENSING

In addition to all other licensing requirements, all software licensing must include licensing of the following software updates for a period of no less than 5 years:

a. Security and bug-fix patches issued by the software manufacturer.

b. Security patches to address any vulnerability identified in the National Vulnerability Database at http://nvd.nist.gov with a Common Vulnerability Scoring System (CVSS) severity rating of MEDIUM or higher.

Provide a single Software Licenses submittal with documentation of the software licenses for all software provided

1.10 CYBERSECURITY DURING CONSTRUCTION

{For Reference Only: This subpart (and its subparts) relates to SA-3}

In addition to the control system cybersecurity requirements indicated in this section, meet following requirement throughout the construction process.

1.10.1 Contractor Computer Equipment

Contractor owned computers may be used for construction. When used, contractor computers must meet the following requirements:

1.10.1.1 Operating System

The operating system must be an operating system currently supported by the manufacturer of the operating system. The operating system must be current on security patches and operating system manufacturer required updates.

1.10.1.2 Anti-Malware Software

The computer must run anti-malware software from a reputable software manufacturer. Anti-malware software must be a version currently supported by the software manufacturer, must be current on all patches and updates, and must use the latest definitions file. All computers used on this project must be scanned using the installed software at least once per day.

1.10.1.3 Passwords and Passphrases

The passwords and passphrases for all computers must be changed from their default values. Passwords must be a minimum of eight characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.10.1.4 Contractor Computer Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Computer Cybersecurity Compliance Statements for each company using contractor owned computers. Contractor Computer Cybersecurity Compliance Statements must use the template published at http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic Each Statement must be signed by a cybersecurity representative for the relevant company.

1.10.2 Temporary IP Networks

Temporary contractor-installed IP networks may be used during construction. When used, temporary contractor-installed IP networks must meet the following requirements:

1.10.2.1 Network Boundaries and Connections

The network must not extend outside the project site and must not connect to any IP network other than IP networks provided under this project or Government furnished IP networks provided for this purpose. Any and all network access from outside the project site is prohibited. Unused network access ports are to be disabled via the management console or command line when not in use.

1.10.3 Government Access to Network

Government personnel must be allowed to have complete and immediate access to the network at any time in order to verify compliance with this specification

1.10.4 Temporary Wireless IP Networks

Temporary Wireless connections are not allowed by default. The ISSM may approve wireless connections on a case-by-case basis. In addition to the

other requirements on temporary IP networks, temporary wireless IP (WiFi) networks must not interfere with existing wireless network and must use WPA2 security. Network names (SSID) for wireless networks must be changed from their default values.

According to DoD, USN, USMC policy there is no separation between temp or perm wireless connections.

1.10.5 Passwords and Passphrases

The passwords and passphrases for all network devices and network access must be changed from their default values. Passwords must be a minimum 8 characters with a minimum of one uppercase letter, one lowercase letter, one number and one special character.

1.10.6 Contractor Temporary Network Cybersecurity Compliance Statements

Provide a single submittal containing completed Contractor Temporary Network Cybersecurity Compliance Statements for each company implementing a temporary IP network. Contractor Temporary Network Cybersecurity Compliance Statements must use the template published at http://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphic Each Statement must be signed by a cybersecurity representative for the relevant company. If no temporary IP networks will be used, provide a single copy of the Statement indicating this.

1.10.7 Security Impact Analysis
{For Reference Only: This subpart (and its subparts) relates to CM-4}

If a change is being made while the system is being developed this change should first be analyzed to determine potential security and privacy impacts by the contractor prior to change implementation and the findings should be submitted to the Government.

1.10.8 Contingency Plan
{For Reference Only: This subpart (and its subparts) relates to CP-2}

Develop a contingency plan for the system that:

a. Identifies essential mission and business functions and associated contingency requirements

b. Provides recovery objectives, restoration priorities, and metrics

c. Addresses contingency roles, responsibilities, assigned individuals with contact information

d. Addresses maintaining essential mission and business functions despite a system disruption, compromise, or failure

e. Addresses eventual, full system restoration without deterioration of the controls originally planned and implemented

f. Addresses the sharing of contingency information

g. Is reviewed and approved by ISSM

Distribute copies of the contingency plan to ISSM. Coordinate contingency

planning activities with incident handling activities. Review the contingency plan for the system. Update the contingency plan to address changes to the organization, system, or environment of operation and problems encountered during contingency plan implementation, execution, or testing. Communicate contingency plan changes to ISSM. Incorporate lessons learned from contingency plan testing, training, or actual contingency activities into contingency testing and training. Protect the contingency plan from unauthorized disclosure and modification.

1.11 CYBERSECURITY DURING WARRANTY PERIOD

All work performed on the control system after acceptance must be performed using Government Furnished Equipment . Access to systems and changes must be coordinated through Camp Lejeune FRCS Office and follow established change management procedures.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 ACCESS CONTROL REQUIREMENTS

3.1.1 User Accounts

{For Reference Only: This subpart (and its subparts) relate to AC-2(a)and AC-3}

Any device supporting user accounts (either FULLY or MINIMALLY) must limit access to the device according to specified limitations for each account. Install and configure any device having a STIG or SRG in accordance with that STIG or SRG.

3.1.1.1 C/VTS and ES Control System Devices

a. Devices with full local user interfaces allowing modification of data must at least MINIMALLY support user accounts.

b. Devices with read-only full local user interfaces must at least MINIMALLY support user accounts.

3.1.1.2 Default Requirements for Control System Devices

For control system devices where User Account requirements are not otherwise indicated in this Section:

a. Devices with web interfaces must either FULLY support user accounts or have their web interface disabled.

b. Field devices with full local user interfaces allowing modification of data must at least MINIMALLY support user accounts.

c. Field devices with read-only full local user interfaces must at least MINIMALLY support user accounts.

3.1.2 Unsuccessful Logon Attempts

{For Reference Only: This subpart (and its subparts) relate AC-7 (a), AC-7 (b); CCI-000043, CCI-000044, CCI-001423, CCI-002236, CCI-002237, CCI-002238}

Except for high availability user interfaces indicated as exempt, devices must meet the indicated requirements for handling unsuccessful logon attempts.

3.1.2.1 Devices MINIMALLY Supporting Accounts

Devices which MINIMALLY support accounts are not required to lock based on unsuccessful logon attempts.

3.1.2.2 Devices FULLY Supporting Accounts

Devices which FULLY support accounts must meet the following requirements. If a device cannot meet these requirements, document device capabilities to protect from subsequent unsuccessful logon attempts and propose alternate protections in a Device Account Lock Exception Request submittal. Do not implement alternate protection measures without explicit permission from the Camp Lejeune FRCS Office.

a. It must lock the user account when three unsuccessful logon attempts occur within a 15 minute interval.

3.1.3 Wireless Access

Wireless networking is not authorized for this project as a default. Do not use any wireless communication unless approved by the ISSM which is done on a case-by-case basis. Any device with wireless communication capability is considered to be using wireless communication, regardless of whether or not the device is actively communicating wirelessly, except when wireless communication has been physically permanently disabled (such as through the removal of the wireless transceiver).

Wireless connections must follow all DoD, USN, and USMC requirements and be approved by the PWD ISSM.

3.1.3.1 Wireless IP Communications

Do not install wireless IP networks, including: do not install a wireless access point; do not install or configure an ad-hoc wireless network; do not install or configure a WiFi Direct communication.

3.1.3.2 Non-IP Wireless Communication

Non-IP Wireless networking is not authorized for this project.

3.1.3.3 Wireless Communication Testing

As part of Performance Verification Testing (PVT), conduct testing of wireless communication for all devices indicated on the approved Wireless Communication Request as requiring testing.

To test wireless communication, test for wireless network reception at multiple points along the wireless test boundary in the vicinity of the

wireless device, and record whether a network connection can be established at each point. The wireless test boundary is the building exterior walls. If wireless testing is required, provide a Wireless Communication Test Report documenting the testing points and results at each point for each wireless device.3.1.4 Physical Access Authorizations and Control

{For Reference Only: This subpart (and its subparts) relates to PE-2, PE-3}

Develop, approve, and maintain a list of individuals with authorized access to the facility where the system resides. Issue authorization credentials for facility access. Review the access list detailing authorized facility access by individuals at organization-defined frequency. Remove individuals from the facility access list when access is no longer required.

Enforce physical access authorizations at entry and exit points to the facility where the system resides by:

a. Verifying individual access authorizations before granting access to the facility

b. Controlling ingress and egress to the facility using physical access control systems or devices

Maintain physical access audit logs for entry or exit points. Control access to areas within the facility designated as publicly accessible by implementing the appropriate controls. Escort visitors and control visitor activity for organization-defined circumstnaces. Secure keys, combinations, and other physical access devices. Inventory physical access devices at organization-defined frequency. Change combinations and keys at organization-defined frequency and/or when keys are lost, combinations are compromised, or when individuals possessing the keys or combinations are transferred or terminated.

3.2 CYBERSECURITY AUDITING

3.2.1 Audit Events, Content of Audit Records, and Audit Generation

{For Reference Only: This subpart (and its subparts) relates to AU-2(a),(c),(d), AU-3}

For devices that have STIG/SRGs related to audit events, content of audit records or audit generation, comply with the requirements of those STIG/SRGs.

3.2.1.1 Default Requirements for Control System Devices

For control system devices where Audit Events, Content of Audit Records, and Audit Generation are not otherwise indicated in this Section:

3.2.1.1.1 Devices Which FULLY Support Accounts

For each device which FULLY supports accounts, provide the capability to select audited events and the content of audit logs. Configure devices to audit the indicated events, and to record the indicated information for each auditable event

3.2.1.1.1.1 Audited Events

Configure each device to audit the following events:

a. Successful and unsuccessful attempts to access, modify, or delete privileges, security objects, security levels, or categories of information (e.g. classification levels)

a. Successful and unsuccessful logon attempts

b. Privileged activities or other system level access

c. Starting and ending time for user access to the system

d. Concurrent logons from different workstations

e. All account creations, modifications, disabling, and terminations

f. All kernel module load, unload, and restart

3.2.1.1.1.2 Audit Event Information To Record

Configure each device to record, for each auditable event, the following information (where applicable to the event):

a. what type of event occurred

b. when the event occurred

c. where the event occurred

d. the source of the event

e. the outcome of the event

f. the identity of any individuals or subjects associated with the event

3.2.1.1.2 Devices Which Do Not FULLY Support Accounts

For each Device which does not FULLY support accounts configure the device to audit all device shutdown and startup events and to record for each event the type of event and when the event occurred.

3.2.2 Audit Storage Capacity and Audit Upload

{For Reference Only: This subpart (and its subparts) relates to AU-4; CCI-001848, CCI-001849}

a. For devices that have STIG/SRGs related to audit storage capacity (CCI-001848 or CCI-001849) comply with the requirements of those STIG/SRGs.

b. For non-computer control system devices capable of generating audit records, provide 60 days worth of secure local storage, assuming 10 auditable events per day.

3.2.2.1 Device Audit Record Upload Software

For each non-computer device required to audit events, provide, and

license to the Camp Lejeune FRCS Office, software implementing a secure mechanism of uploading audit records from the device to a computer and of exporting the uploaded audit records as a Microsoft Excel file or comma separated value text file. Where different devices use different software, provide software of each type required to upload audit logs from all devices.

Submit copies of device audit record upload software. If there are no non-computer devices requiring auditing, provide a document stating this in lieu of this submittal.

3.2.3 Time Stamps

3.2.3.1 C/VTS and ES Control System Devices

Devices generating audit records must have internal clocks capable of providing time with a resolution of 1 second. Clocks cannot drift more than 10 seconds per day. Configure the system so that each device generating audit records maintains accurate time to within 1 second.

3.2.3.2 Default Requirements for Control System Devices

For control system devices where Time Stamps requirements are not otherwise indicated in this Section: Devices generating audit records must have internal clocks capable of providing time with a resolution of 1 second. Clocks must not drift more than 10 seconds per day. Configure the system so that each device generating audit records maintains accurate time to within 1 second.

3.3 REQUIREMENTS FOR LEAST FUNCTIONALITY

{For Reference Only: This subpart (and its subparts), along with the network communication report submittal specified elsewhere in this section, relates to CM-7, CM-7 (1)(b)}

For devices that have a STIG or SRG related to Requirements for Least Functionality (such as configuration settings and port and device I/O access for least functionality), install and configure the device in accordance with that STIG or SRGs.

Do not provide devices with user interfaces where one was not required. Do not use a networked sensor or actuator where a non-networked sensor or actuator would suffice.

3.3.1 Non-IP Control Networks

When control system specifications require particular communication protocols, use only those communication protocols and only as specified. Do not implement any other communication protocol, or use any protocol on ports other than those specified.

When control system specifications do not indicate requirements for communication protocols, use only those protocols required for operation of the system as specified.

3.3.1.1 Allowable Non-IP Control Protocols

3.3.1.1.1 Serial RS-232 and USB

For device configuration and troubleshooting only. That are allowable in a point-to-point configuration only.

3.3.2 IP Control Networks

Do not use nonsecure functions, ports, protocols and services as defined in DODI 8551.01 unless those ports, protocols and services are specifically required by the control system specifications or otherwise specifically authorized by the Camp Lejeune FRCS Office. Do not use ports, protocols and services that are not specified in the control system specifications or required for operation of the control system.

3.3.3 Unspecified Protocol Approval

When unspecified communicaitions protocols are required for proper system operation submit to the Camp Lejeune FRCS Office for approval the protocol, port number if IP based, functional requirement, and cybersecurity conformance.

3.4 IDENTIFICATION AND AUTHENTICATION

3.4.1 User Identification and Authentication

{For Reference Only: This subpart (and its subparts) relates to IA-2,(1),(12), IA-4}

a. Devices that FULLY support accounts must uniquely identify and authenticate organizational users.

b. Devices which allow network access to privileged accounts must implement multifactor authentication for network access to privileged accounts.

3.4.1.1 C/VTS and ES Control System Devices

Isolated systems are not required to authenticate using Personal Identity Verification (PIV) credentials.

3.4.1.2 Default Requirements for Control System Devices

For control system devices where User Identification and Authentication requirements are not otherwise indicated in this Section, User Identification and Authentication for network access to privileged accounts must be implemented by accepting and electronically verify Personal Identity Verification (PIV) credentialsorinheriting identification and authentication from the operating system.

3.4.2 Authenticator Management

{For Reference Only: This subpart (and its subparts) relates to IA-5 (b),(c),(e),(g),(1),(11)}

3.4.2.1 Authentication Type

3.4.2.1.1 C/VTS and ES Control System Devices

Unless otherwise indicated:

a. Devices MINIMALLY supporting accounts must use password-based authentication.

3.4.2.1.2 Default Requirements for Control System Devices

For control system devices where Authentication Type requirements are not otherwise indicated in this Section:

a. Software which FULLY supports accounts and which runs on a computer must use password-based authentication or hardware token-based authentication.

b. Other devices which FULLY support accounts must use either password-based authentication or hardware token-based authentication.

c. Devices MINIMALLY supporting accounts must use either password-based authentication or hardware token-based authentication.

3.4.2.2 Password-Based Authentication Requirements

3.4.2.2.1 Passwords for Non-Computer Devices FULLY Supporting Accounts

All non-computer devices FULLY supporting accounts and supporting password-based authentication must enforce the following requirements:

a. Minimum password length of fifteen (15)) characters

b. Password must contain at least one (1) uppercase character.

c. Password must contain at least one (1) lowercase character.

d. Password must contain at least one (1) numeric character.

e. Password must contain at least one (1) special character.

f. Password must have a maximum lifetime of sixty (60) days. When passwords expire, prompt users to change passwords. Do no lock accounts due to expired passwords.

g. Passwords must be cryptographically protected during storage and transmission.

3.4.2.2.2 Passwords for Devices Minimally Supporting Accounts

Devices minimally supporting accounts must support passwords with a minimum length of four (4) characters.

3.4.2.2.3 Password Configuration and Reporting

For all devices with a password, change the password from the default password. Coordinate selection of passwords with the Camp Lejeune FRCS Office. Do not use the same password for more than one device unless specifically instructed to do so. Provide a Password Summary Report

documenting the password for each device and describing the procedure to change the password for each device.

Do not provide the Password Summary Report in electronic format. Provide two hardcopies of the Password Summary Report, each copy in its own sealed envelope.

3.4.2.3 Hardware Token-Based Authentication Requirements

Devices supporting hardware token-based authentication must use Personal Identity Verification (PIV) credentials for the hardware token.

3.4.3 Device Identification and Authentication

{For Reference Only: This subpart (and its subparts) relates to IA-3}

3.4.3.1 Default Requirements for Control System Devices

For control system devices where Device Identification and Authentication requirements are not otherwise indicated in this Section: Devices using HTTP as a control protocol must use HTTPS using a web server certificate obtained from the Government Trusted Agent instead.

3.4.4 Cryptographic Module Authentication

{For Reference Only: This subpart (and its subparts) relates to IA-7}

For devices that have STIG/SRGs related to cryptographic module authentication, comply with the requirements of those STIG/SRGs.At a minimum the contractor must use FIPS 140-2 VALIDATED cryptographic modules and be approved by the ISSM.

3.5 DURABILITY TO VULNERABILITY SCANNING

{For Reference Only: This subpart (and its subparts) relates to RA-5 (a),(b),(c),(d)}

All IP devices must be scannable, such that the device can be scanned by industry standard IP network scanning utilities without harm to the device, application, or functionality.

For control system devices other than computers:

3.5.1 C/VTS and ES Control System Devices Other Than Computers

Elevator and electrical control system devices other than computers are not required to respond to scans.

3.5.2 Default Requirements for Control System Devices

Non-computer control system devices where Durability to Vulnerability Scanning requirements are not otherwise indicated in this Section are not required to respond to scans.

3.6 SYSTEM AND COMMUNICATION PROTECTION

3.6.1 Denial of Service Protection, Process Isolation and Boundary Protection

{For Reference Only: This subpart (and its subparts) relates to SC-5}

To the greatest extent practical, implement control logic in non-computer hardware and without reliance on the network.

3.7 FIELD QUALITY CONTROL

3.7.1 Tests

In addition to testing and testing support required by other Sections, provide a minimum of eight (8) hours of technical support for cybersecurity testing of control systems.

-- End of Section --

SECTION 26 20 00

INTERIOR DISTRIBUTION SYSTEM
08/23

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM B1	(2013) Standard Specification for Hard-Drawn Copper Wire
ASTM B8	(2023) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C2	(2023) National Electrical Safety Code
IEEE Stds Dictionary	(2009) IEEE Standards Dictionary: Glossary of Terms & Definitions

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

NETA ATS	(2021) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems

NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA)

NECA NEIS 1	(2015) Standard for Good Workmanship in Electrical Construction

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI C80.1	(2020) American National Standard for Electrical Rigid Steel Conduit (ERSC)
ANSI C80.3	(2020) American National Standard for Electrical Metallic Tubing (EMT)
ANSI C80.5	(2020) American National Standard for Electrical Rigid Aluminum Conduit
NEMA ICS 6	(1993; R 2016) Industrial Control and Systems: Enclosures
NEMA KS 1	(2013) Enclosed and Miscellaneous Distribution Equipment Switches (600 V Maximum)

NEMA RN 1	(2005; R 2013) Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
NEMA TC 2	(2020) Standard for Electrical Polyvinyl Chloride (PVC) Conduit
NEMA TC 3	(2021) Polyvinyl Chloride (PVC) Fittings for Use With Rigid PVC Conduit and Tubing
NEMA WD 1	(1999; R 2020) Standard for General Color Requirements for Wiring Devices
NEMA WD 6	(2021) Wiring Devices Dimensions Specifications
NEMA Z535.4	(2023) Product Safety Signs and Labels

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code
NFPA 70E	(2024) Standard for Electrical Safety in the Workplace
NFPA 780	(2023) Standard for the Installation of Lightning Protection Systems

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.303	Electrical, General

UL SOLUTIONS (UL)

UL 1	(2005; Reprint Jan 2022) UL Standard for Safety Flexible Metal Conduit
UL 5	(2016; Reprint Jul 2022) UL Standard for Safety Surface Metal Raceways and Fittings
UL 5A	(2015; Reprint Apr 2024) Nonmetallic Surface Raceways and Fittings
UL 6	(2022) UL Standard for Safety Electrical Rigid Metal Conduit-Steel
UL 6A	(2008; Reprint Mar 2021) UL Standard for Safety Electrical Rigid Metal Conduit - Aluminum, Red Brass, and Stainless Steel
UL 20	(2018; Reprint May 2023) UL Standard for Safety General-Use Snap Switches
UL 50	(2024) UL Standard for Safety Enclosures for Electrical Equipment, Non-Environmental Considerations

UL 83	(2017; Reprint Mar 2020) UL Standard for Safety Thermoplastic-Insulated Wires and Cables
UL 360	(2013; Reprint Jan 2024) UL Standard for Safety Liquid-Tight Flexible Metal Conduit
UL 486A-486B	(2018; Reprint Jul 2023) UL Standard for Safety Wire Connectors
UL 486C	(2018; Reprint May 2021) UL Standard for Safety Splicing Wire Connectors
UL 489	(2016; Rev 2019) UL Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
UL 498	(2017; Reprint Jun 2024) UL Standard for Safety Attachment Plugs and Receptacles
UL 510	(2020; Dec 2022) UL Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape
UL 514A	(2013; Reprint Jun 2022) UL Standard for Safety Metallic Outlet Boxes
UL 514B	(2012; Reprint Mar 2024) UL Standard for Safety Conduit, Tubing and Cable Fittings
UL 514C	(2014; Reprint Apr 2024) UL Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 651	(2011; Reprint May 2022) UL Standard for Safety Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL 797	(2007; Reprint Apr 2023) UL Standard for Safety Electrical Metallic Tubing -- Steel
UL 817	(2015; Reprint May 2023) UL Standard for Safety Cord Sets and Power-Supply Cords
UL 943	(2016; Reprint Sep 2023) UL Standard for Safety Ground-Fault Circuit-Interrupters
UL 1242	(2006; Reprint Apr 2022) UL Standard for Safety Electrical Intermediate Metal Conduit -- Steel
UL 1699	(2017; Reprint Feb 2022) UL Standard for Safety Arc-Fault Circuit-Interrupters

1.2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in

IEEE Stds Dictionary.

1.3 RELATED REQUIREMENTS

Section 25 05 11 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS applies to this section, with the additions and modifications specified herein.

1.4 QUALITY ASSURANCE

1.4.1 Regulatory Requirements

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "must" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Contracting Officer. Provide equipment, materials, installation, and workmanship in accordance with NFPA 70 unless more stringent requirements are specified or indicated. NECA NEIS 1 shall be considered the minimum standard for workmanship.

1.4.2 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship and:

a. Have been in satisfactory commercial or industrial use for 2 years prior to bid opening including applications of equipment and materials under similar circumstances and of similar size.

b. Have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period.

c. Where two or more items of the same class of equipment are required, provide products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.4.2.1 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

1.4.2.2 Material and Equipment Manufacturing Date

Products manufactured more than 3 years prior to date of delivery to site are not acceptable.

1.5 MAINTENANCE

1.5.1 Electrical Systems

Submit operation and maintenance manuals for electrical systems that provide basic data relating to the design, operation, and maintenance of the electrical distribution system for the building. Include the following:

a. Single line diagram of the "as-built" building electrical system.

b. Schematic diagram of electrical control system (other than HVAC, covered elsewhere).

c. Manufacturers' operating and maintenance manuals on active electrical equipment.

1.6 WARRANTY

Provide equipment items supported by service organizations that are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

As a minimum, meet requirements of UL, where UL standards are established for those items, and requirements of NFPA 70 for all materials, equipment, and devices.

2.2 CONDUIT AND FITTINGS

Conform to the following:

2.2.1 Rigid Metallic Conduit

2.2.1.1 Rigid, Threaded Zinc-Coated Steel Conduit

ANSI C80.1, UL 6.

2.2.1.2 Rigid Aluminum Conduit

ANSI C80.5, UL 6A.

2.2.2 Rigid Nonmetallic Conduit

PVC Type EPC-40, and EPC-80 in accordance with NEMA TC 2,UL 651.

2.2.3 Intermediate Metal Conduit (IMC)

UL 1242, zinc-coated steel only.

2.2.4 Electrical, Zinc-Coated Steel Metallic Tubing (EMT)

UL 797, ANSI C80.3.

2.2.5 Plastic-Coated Rigid Steel and IMC Conduit

NEMA RN 1, Type 40(40 mils thick).

2.2.6 Flexible Metal Conduit

UL 1, limited to 6 feet.

2.2.6.1 Liquid-Tight Flexible Metal Conduit, Steel

UL 360, limited to 6 feet.

2.2.7 Fittings for Metal Conduit, EMT, and Flexible Metal Conduit

UL 514B. Ferrous fittings: cadmium- or zinc-coated in accordance with UL 514B.

2.2.7.1 Fittings for Rigid Metal Conduit and IMC

Threaded-type. Split couplings unacceptable.

2.2.7.2 Fittings for EMT

Die Cast compression type.

2.2.8 Fittings for Rigid Nonmetallic Conduit

NEMA TC 3 for PVC, and UL 514B.

2.3 SURFACE RACEWAY

2.3.1 Surface Metal Raceway

UL 5, two-piece painted steel, totally enclosed, snap-cover type. Provide multiple outlet-type raceway with grounding-type receptacle where indicated. Provide receptacles as specified herein. Wire alternate receptacles on different circuits.

2.3.2 Surface Nonmetallic Raceway

UL 5A, nonmetallic totally enclosed, snap-cover type.

2.4 OUTLET BOXES AND COVERS

UL 514A, cadmium- or zinc-coated, if ferrous metal. UL 514C, if nonmetallic.

2.5 CABINETS, JUNCTION BOXES, AND PULL BOXES

UL 50; volume greater than 100 cubic inches, NEMA Type 1 enclosure; sheet steel, hot-dip, zinc-coated. Where exposed to wet, damp, or corrosive environments, NEMA Type 3R.

2.6 WIRES AND CABLES

Provide wires and cables in accordance applicable requirements of NFPA 70 and UL for type of insulation, jacket, and conductor specified or indicated. Do not use wires and cables manufactured more than 24 months prior to date of delivery to site.

2.6.1 Conductors

Provide the following:

a. Conductor sizes and capacities shown are based on copper, unless indicated otherwise.

b. Conductors No. 8 AWG and larger diameter: stranded.

c. Conductors No. 10 AWG and smaller diameter: solid.

d. Conductors for remote control, alarm, and signal circuits, classes 1, 2, and 3: stranded unless specifically indicated otherwise.

e. All conductors: copper.

2.6.1.1 Equipment Manufacturer Requirements

When manufacturer's equipment requires copper conductors at the terminations or requires copper conductors to be provided between components of equipment, provide copper conductors or splices, splice boxes, and other work required to satisfy manufacturer's requirements.

2.6.1.2 Minimum Conductor Sizes

Provide minimum conductor size in accordance with the following:

a. Branch circuits: No. 12 AWG.

b. Class 1 remote-control and signal circuits: No. 14 AWG.

c. Class 2 low-energy, remote-control and signal circuits: No. 16 AWG.

d. Class 3 low-energy, remote-control, alarm and signal circuits: No. 22 AWG.

2.6.2 Color Coding

Provide color coding for service, feeder, branch, control, and signaling circuit conductors.

2.6.2.1 Ground and Neutral Conductors

Provide color coding of ground and neutral conductors as follows:

a. Grounding conductors: Green.

b. Neutral conductors: White.

c. Exception, where neutrals of more than one system are installed in same raceway or box, other neutrals color coding: white with a different colored (not green) stripe for each.

2.6.2.2 Ungrounded Conductors

Provide color coding of ungrounded conductors in different voltage systems as follows:

a. 208/120 volt, three-phase

(1) Phase A - black

(2) Phase B - red

(3) Phase C - blue

b. 480/277 volt, three-phase

(1) Phase A - brown

(2) Phase B - orange

(3) Phase C - yellow

c. 120/240 volt, single phase: Black and red

2.6.3 Insulation

Unless specified or indicated otherwise or required by NFPA 70, provide power and lighting wires rated for 600-volts, Type THWN/THHN conforming to UL 83, except that grounding wire may be type TW conforming to UL 83; remote-control and signal circuits: Type TW or TF, conforming to UL 83. Where equipment or devices require 90-degree Centigrade (C) conductors, provide only conductors with 90-degree C insulation or better.

2.6.4 Bonding Conductors

ASTM B1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

2.6.5 Cord Sets and Power-Supply Cords

UL 817.

2.7 SPLICES AND TERMINATION COMPONENTS

UL 486A-486B for wire connectors and UL 510 for insulating tapes. Connectors for No. 10 AWG and smaller diameter wires: insulated, pressure-type in accordance with UL 486A-486B or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

2.8 DEVICE PLATES

Provide the following:

a. UL listed, one-piece device plates for outlets to suit the devices installed.

b. For metal outlet boxes, plates on unfinished walls: zinc-coated sheet steel or cast metal having round or beveled edges.

c. For nonmetallic boxes and fittings, other suitable plates may be provided.

d. Plates on finished walls: nylon or lexan, minimum 0.03 inch wall thickness and same color as receptacle or toggle switch with which they are mounted.

e. Plates on finished walls: satin finish stainless steel or brushed-finish aluminum, minimum 0.03 inch thick.

f. Screws: machine-type with countersunk heads in color to match finish of plate.

g. Sectional type device plates are not be permitted.

h. Plates installed in wet locations: gasketed and UL listed for "wet locations."

2.9 SWITCHES

2.9.1 Toggle Switches

NEMA WD 1, UL 20, single pole, double pole, totally enclosed with bodies of thermoplastic or thermoset plastic and mounting strap with grounding screw. Include the following:

a. Handles: white thermoplastic.

b. Wiring terminals: screw-type, side-wired.

c. Contacts: silver-cadmium and contact arm - one-piece copper alloy.

d. Switches: rated quiet-type ac only, 120/277 volts, with current rating and number of poles indicated.

2.9.2 Disconnect Switches

NEMA KS 1. Provide heavy duty-type switches where indicated, where switches are rated higher than 240 volts, and for double-throw switches. Utilize Class R fuseholders and fuses for fused switches, unless indicated otherwise. Provide horsepower rated for switches serving as the motor-disconnect means. Provide switches in NEMA 3R, enclosure as indicated per NEMA ICS 6.

2.10 RECEPTACLES

Provide the following:

a. UL 498, general purpose specification grade, grounding-type. Residential grade receptacles are not acceptable.

b. Ratings and configurations: as indicated.

c. Bodies: white as per NEMA WD 1.

d. Face and body: thermoplastic supported on a metal mounting strap.

e. Dimensional requirements: per NEMA WD 6.

f. Screw-type, side-wired wiring terminals or of the solderless pressure type having suitable conductor-release arrangement.

g. Grounding pole connected to mounting strap.

h. The receptacle: containing triple-wipe power contacts and double or triple-wipe ground contacts.

2.10.1 Weatherproof Receptacles

Provide receptacles, UL listed for use in "wet locations" with integral GFCI protection. Include cast metal box with gasketed, hinged, lockable

and weatherproof while-in-use, die-cast metal/aluminum extra-duty rated hood.

2.10.2 Ground-Fault Circuit Interrupter Receptacles

UL 943, duplex type for mounting in standard outlet box. Provide device capable of detecting current leak when the current to ground is 6 milliamperes or higher, and tripping per requirements of UL 943 for Class A ground-fault circuit interrupter devices. Provide screw-type, side-wired wiring terminals or pre-wired (pigtail) leads.

2.10.3 Plugs

Provide heavy-duty, rubber-coveredwire cord of required size, install plugs thereon, and attach to equipment. Provide UL listed plugs with receptacles, complete with grounding blades. Where equipment is not available, turn over plugs and cord assemblies to the Government.

2.11 [Enter Appropriate Subpart Title Here]2.11.1 Circuit Breakers

UL 489, thermal magnetic-type having a minimum short-circuit current rating equal to the short-circuit current rating of the panelboard in which the circuit breaker will be mounted. Breaker terminals: UL listed as suitable for type of conductor provided. Series rated circuit breakers and plug-in circuit breakers are unacceptable.

2.11.1.1 Multipole Breakers

Provide common trip-type with single operating handle. Design breaker such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

2.11.1.2 Circuit Breaker With Ground-Fault Circuit Interrupter

UL 943 and NFPA 70. Provide with auto-monitoring (self-test) and lockout features, "push-to-test" button, visible indication of tripped condition, and ability to detect and trip when current imbalance is 6 milliamperes or higher per requirements of UL 943 for Class A ground-fault circuit interrupter devices.

2.11.1.3 Arc-Fault Circuit Interrupters

UL 489, UL 1699 and NFPA 70. Molded case circuit breakers: rated as indicated. Two pole arc-fault circuit-interrupters: rated 120/240 volts. The provision of (two) one pole circuit breakers for shared neutral circuits in lieu of (one) two pole circuit breaker is unacceptable.

2.12 LOCKOUT REQUIREMENTS

Provide circuit breakers, disconnecting means, and other devices that are electrical energy-isolating capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147, NFPA 70E and 29 CFR 1910.303. Comply with requirements of Division 23, "Heating, Ventilating, and Air Conditioning (HVAC)" for mechanical isolation of machines and other equipment.

2.13 GROUNDING AND BONDING EQUIPMENT

2.14 WARNING SIGNS

Provide warning signs for flash protection in accordance with NFPA 70E and NEMA Z535.4 for switchboards, panelboards, industrial control panels, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized. Provide field installed signs to warn qualified persons of potential electric arc flash hazards when warning signs are not provided by the manufacturer. Provide marking that is clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

2.15 FIRESTOPPING MATERIALS

Provide firestopping around electrical penetrations in accordance with code requirements.

2.16 SOURCE QUALITY CONTROL

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations, including weatherproof and hazardous locations and ducts, plenums and other air-handling spaces: conform to requirements of NFPA 70 and IEEE C2 and to requirements specified herein.

3.1.1 Wiring Methods

Provide insulated conductors installed in rigid steel conduit, IMC, rigid nonmetallic conduit, or EMT, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Grounding conductor: separate from electrical system neutral conductor. Provide insulated green equipment grounding conductor for circuit(s) installed in conduit and raceways. Shared neutral, or multi-wire branch circuits, are not permitted . Minimum conduit size: 1/2 inch in diameter.

3.1.1.1 Pull Wire

Install pull wires in empty conduits. Pull wire: plastic having minimum 200-pound force tensile strength. Leave minimum 36 inches of slack at each end of pull wire.

3.1.2 Conduit Installation

Unless indicated otherwise, conceal conduit under floor slabs and within finished walls, ceilings, and floors. Keep conduit minimum 6 inches away from parallel runs of flues and steam or hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit will be visible after completion of project.

3.1.2.1 Restrictions Applicable to Aluminum Conduit

a. Do not install underground or encase in concrete or masonry.

b. Do not use brass or bronze fittings.

c. Do not use when the enclosed conductors must be shielded from the effects of High-altitude Electromagnetic Pulse (HEMP).

3.1.2.2 Restrictions Applicable to EMT

a. Do not install underground.

b. Do not encase in concrete, mortar, grout, or other cementitious materials.

c. Do not use in areas subject to physical damage including but not limited to equipment rooms where moving or replacing equipment could physically damage the EMT.

d. Do not use in hazardous areas.

e. Do not use outdoors.

f. Do not use in fire pump rooms.

g. Do not use when the enclosed conductors must be shielded from the effects of High-altitude Electromagnetic Pulse (HEMP).

3.1.2.3 Restrictions Applicable to Nonmetallic Conduit

a. PVC Schedule 40.

(1) Do not use where subject to physical damage, including but not limited to, mechanical equipment rooms, electrical equipment rooms, fire pump rooms, and where restrictions are applying to both PVC Schedule 40 and PVC Schedule 80.

(2) Do not use above grade, except where allowed in this section for rising through floor slab or indicated otherwise.

b. PVC Schedule 80.

(1) Do not use where subject to physical damage, including but not limited to, hospitals, power plant, missile magazines, and other such areas.

(2) Do not use in hazardous (classified) areas.

(3) Do not use in penetrating fire-rated walls or partitions, or fire-rated floors.

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3.1.2.4 Restrictions Applicable to Flexible Conduit

Use only as specified in paragraph FLEXIBLE CONNECTIONS. Do not use when the enclosed conductors must be shielded from the effects of High-altitude Electromagnetic Pulse (HEMP).

3.1.2.5 Underground Conduit

Plastic-coated rigid steel; plastic-coated steel IMC; PVC, Type EPC-40; or fiberglass. Convert nonmetallic conduit, other than PVC Schedule 40 or 80, to plastic-coated rigid, or IMC, steel conduit before rising through

floor slab. Plastic coating: extend minimum 6 inches above floor.

3.1.2.6 Conduit for Circuits Rated Greater Than 600 Volts

Rigid metal conduit or IMC only.

3.1.2.7 Conduit Through Floor Slabs

Where conduits rise through floor slabs, do not allow curved portion of bends to be visible above finished slab. Where conduit rises through slab-on grade, seal all electrical penetrations to address radon mitigation and prevent infiltration of air, insects, and vermin.

3.1.2.8 Stub-Ups

Provide conduits stubbed up through concrete floor for connection to free-standing equipment with adjustable top or coupling threaded inside for plugs, set flush with finished floor. Extend conductors to equipment in rigid steel conduit, except that flexible metal conduit may be used 6 inches above floor. Where no equipment connections are made, install screwdriver-operated threaded flush plugs in conduit end.

3.1.2.9 Conduit Support

Support conduit by pipe straps, wall brackets, threaded rod conduit hangers, or ceiling trapeze. Plastic cable ties are not acceptable. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Do not exceed one-fourth proof test load for load applied to fasteners. Provide vibration resistant and shock-resistant fasteners attached to concrete ceiling. Do not cut main reinforcing bars for any holes cut to depth of more than 1 1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete joints. Fill unused holes. In partitions of light steel construction, use sheet metal screws. In suspended-ceiling construction, run conduit above ceiling. Do not support conduit by ceiling support system. Conduit and box systems: supported independently of both (a) tie wires supporting ceiling grid system, and (b) ceiling grid system into which ceiling panels are placed. Do not share supporting means between electrical raceways and mechanical piping or ducts. Identify independent conduit support in both fire and non-fire rated assemblies per NFPA 70. Coordinate installation with above-ceiling mechanical systems to assure maximum accessibility to all systems. Spring-steel fasteners may be used for lighting branch circuit conduit supports in suspended ceilings in dry locations.Where conduit crosses building expansion joints, provide suitable expansion fitting that maintains conduit electrical continuity by bonding jumpers or other means. For conduits greater than 2 1/2 inches inside diameter, provide supports to resist forces of 0.5 times the equipment weight in any direction and 1.5 times the equipment weight in the downward direction.

3.1.2.10 Directional Changes in Conduit Runs

Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in

conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.

3.1.2.11 Locknuts and Bushings

Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least minimum single locknut and bushing. Provide locknuts with sharp edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70.

3.1.2.12 Flexible Connections

Provide flexible steel conduit between 3 and 6 feet in length for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for motors. Install flexible conduit to allow 20 percent slack. Minimum flexible steel conduit size: 1/2 inch diameter. Provide liquid tight flexible conduit in wet and damp locations for equipment subject to vibration, noise transmission, movement or motors. Provide separate ground conductor across flexible connections. Plastic cable ties are not acceptable as a support method.

3.1.3 Boxes, Outlets, and Supports

Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways: cast-metal, hub-type when located in wet locations, when surface mounted on outside of exterior surfaces, and when specifically indicated. Boxes in other locations: sheet steel, except that aluminum boxes may be used with aluminum conduit, and nonmetallic boxes may be used with nonmetallic conduit system. Provide each box with volume required by NFPA 70 for number of conductors enclosed in box. Boxes for mounting lighting fixtures: minimum 4 inches square, or octagonal, except that smaller boxes may be installed as required by fixture configurations, as approved. Boxes for use in masonry-block or tile walls: square-cornered, tile-type, or standard boxes having square-cornered, tile-type covers. Provide gaskets for cast-metal boxes installed in wet locations and boxes installed flush with outside of exterior surfaces. Provide separate boxes for flush or recessed fixtures when required by fixture terminal operating temperature; provide readily removable fixtures for access to boxes unless ceiling access panels are provided. Support boxes and pendants for surface-mounted fixtures on suspended ceilings independently of ceiling supports. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from building structure or by bar hangers. Where bar hangers are used, attach bar to raceways on opposite sides of box, and support raceway with approved-type fastener maximum 24 inches from box. When penetrating reinforced concrete members, avoid cutting reinforcing steel.

3.1.3.1 Boxes

Boxes for use with raceway systems: minimum 1 1/2 inches deep, except where shallower boxes required by structural conditions are approved. Boxes for other than lighting fixture outlets: minimum 4 inches square,

except that 4 by 2 inch boxes may be used where only one raceway enters outlet.

3.1.3.2 Pull Boxes

Construct of at least minimum size required by NFPA 70 of code-gauge aluminum or galvanized sheet steel, except where cast-metal boxes are required in locations specified herein. Provide boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.

3.1.4 Mounting Heights

Mount panelboards, circuit breakers, motor controller and disconnecting switches so height of center of grip of the operating handle of the switch or circuit breaker at its highest position is maximum 79 inches above floor or working platform or as allowed in Section 404.8 per NFPA 70. Mount receptacles 18 inches above finished floor.

3.1.5 Splices

Make splices in accessible locations. Make splices in conductors No. 10 AWG and smaller diameter with insulated, pressure-type connector. Make splices in conductors No. 8 AWG and larger diameter with solderless connector, and cover with insulation material equivalent to conductor insulation.

3.1.5.1 Splices of Aluminum Conductors

Make with solderless circumferential compression-type, aluminum-bodied connectors UL listed for AL/CU. Remove surface oxides from aluminum conductors by wire brushing and immediately apply oxide-inhibiting joint compound and insert in connector. After joint is made, wipe away excess joint compound, and insulate splice.

3.1.6 Covers and Device Plates

Install with edges in continuous contact with finished wall surfaces without use of mats or similar devices. Plaster fillings are not permitted. Install plates with alignment tolerance of 1/16 inch. Use of sectional-type device plates are not permitted. Provide gasket for plates installed in wet locations.

3.1.7 Electrical Penetrations

Seal openings around electrical penetrations through fire resistance-rated walls, partitions, floors, or ceilings in accordance applicable fire code.

3.1.8 Grounding and Bonding

Provide in accordance with NFPA 70 and NFPA 780. Ground exposed, non-current-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, telecommunications system grounds, and neutral conductor of wiring systems. Make ground connection at main service equipment, and extend grounding conductor to point of entrance of metallic water service. Make connection to water pipe by suitable ground clamp or lug connection to plugged tee. If flanged pipes are encountered, make connection with lug bolted to

street side of flanged connection. Supplement metallic water service grounding system with additional made electrode in compliance with NFPA 70. Interconnect all grounding media in or on the structure to provide a common ground potential. This includes lightning protection, electrical service, telecommunications system grounds, as well as underground metallic piping systems. Make interconnection to the gas line on the customer's side of the meter. Use main size lightning conductors for interconnecting these grounding systems to the lightning protection system.

3.1.9 Equipment Connections

Provide power wiring for the connection of motors and control equipment under this section of the specification. Except as otherwise specifically noted or specified, automatic control wiring, control devices, and protective devices within the control circuitry are not included in this section of the specifications and are provided under the section specifying the associated equipment.

3.2 FIELD FABRICATED NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets. Provide nameplate on all equipment in access controlled spaces and areas.

3.3 WARNING SIGN MOUNTING

Provide the number of signs required to be readable from each accessible side. Space the signs in accordance with NFPA 70E.

3.4 FIELD QUALITY CONTROL

Furnish test equipment and personnel and submit written copies of test results. Where applicable, test electrical equipment in accordance with NETA ATS.

3.4.1 Devices Subject to Manual Operation

Operate each device subject to manual operation at least five times, demonstrating satisfactory operation each time.

-- End of Section --

SECTION 28 31 76

INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE
08/20

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACOUSTICAL SOCIETY OF AMERICA (ASA)

ASA S3.2	(2020) American National Standard Method for Measuring the Intelligibility of Speech Over Communication Systems (ASA 85)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1/CSA B44	(2022) Safety Code for Elevators and Escalators

FM GLOBAL (FM)

FM APP GUIDE	(updated on-line) Approval Guide https://www.approvalguide.com/

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41.1	(2002; R 2008) Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.41.2	(2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 4	(2018) Standard for Integrated Fire Protection and Life Safety System Testing
NFPA 70	(2023; ERTA 1 2024; TIA 24-1) National Electrical Code
NFPA 72	(2022; ERTA 22-1) National Fire Alarm and Signaling Code
NFPA 90A	(2024) Standard for the Installation of Air Conditioning and Ventilating Systems
NFPA 170	(2024; ERTA 1 2023) Standard for Fire Safety and Emergency Symbols

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-601-02	(2021) Fire Protection Systems Inspection, Testing, and Maintenance
UFC 4-010-06	(2023) Cybersecurity of Facility-Related Control Systems

UL SOLUTIONS (UL)

UL 268	(2023) UL Standard for Safety Smoke Detectors for Fire Alarm Systems
UL 268A	(2008; Reprint Aug 2023) Smoke Detectors for Duct Application
UL 464	(2023) UL Standard for Safety Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
UL 497A	(2001; Bul. 2019) UL Standard for Safety Secondary Protectors for Communications Circuits
UL 497B	(2004; Reprint Feb 2022) UL Standard for Safety Protectors for Data Communications and Fire Alarm Circuits
UL 521	(1999; Reprint Feb 2023) UL Standard for Safety Heat Detectors for Fire Protective Signaling Systems
UL 864	(2023) UL Standard for Safety Control Units and Accessories for Fire Alarm Systems
UL 1283	(2017; Reprint Feb 2024) UL Standard for Safety Electromagnetic Interference Filters
UL 1449	(2021; Reprint Dec 2022) UL Standard for Safety Surge Protective Devices
UL 1480	(2023) UL Standard for Safety Speakers for Fire Alarm and Signaling Systems, Including Accessories
UL 1638	(2023) UL Standard for Safety Visible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
UL 1971	(2002; Reprint Feb 2024) UL Standard for Safety Signaling Devices for the Deaf and Hard of Hearing
UL 2017	(2008; Reprint Jan 2024) UL Standard for Safety General-Purpose Signaling Devices and Systems
UL 2572	(2016; Bul. 2018) UL Standard for Safety

	Mass Notification Systems
UL Fire Prot Dir	UL Product IQ (updated online) at https://productiq.ulpropsector.com/en

1.2 RELATED SECTIONS

Section 25 05 11.00 CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS - ISOLATED SYSTEMS, applies to this section, with the additions and modifications specified herein. In addition, refer to the following sections for related work and coordination:

Section 21 13 13 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION
Section 14 24 23 HYDRAULIC PASSENGER ELEVATORS for additional work related to elevators.
Section 07 84 00 FIRESTOPPING for additional work related to firestopping.

1.3 SUMMARY

1.3.1 Scope

a. This work includes designing and providing a new, complete, fire alarm and mass notification (MNS) system as described herein and on the contract drawings. Include system wiring, raceways, pull boxes, terminal cabinets, outlet and mounting boxes, control equipment, initiating devices, notification appliances, supervising station fire alarm transmitters/mass notification transceiver, and other accessories and miscellaneous items required for a complete operational system even though each item is not specifically mentioned or described. Provide system(s) complete and ready for operation. Design and installation must comply with UFC 4-010-06.

b. Provide equipment, materials, installation, workmanship, inspection, and testing in strict accordance with NFPA 72, except as modified herein. The system layout on the drawings show the intent of coverage and suggested locations. Final quantity, system layout, and coordination are the responsibility of the Contractor.

c. The fire alarm and mass notification system must be independent of the building security, building management, and energy/utility monitoring systems other than for control functions.

1.3.2 Qualified Fire Protection Engineer (QFPE)

The QFPE in this section is the same as FPQC in Section 01 45 00. Wherever "Qualified Fire Protection Engineer (QFPE)" of "QFPE" appears in this section, substitute with "Fire Protection Quality Control Specialist (FPQC)".

Services of the QFPE must include:

a. Reviewing SD-02, SD-03, and SD-05 submittal packages for completeness and compliance with the provisions of this specification. Construction (shop) drawings and calculations must be prepared by, or prepared under the immediate supervision of, the QFPE. The QFPE must affix their professional engineering stamp with signature to the shop drawings, calculations, and material data sheets, indicating approval prior to submitting the shop drawings to the DFPE.

b. Providing a letter documenting that the SD-02, SD-03, and SD-05 submittal package has been reviewed and noting any outstanding comments.

c. Performing in-progress construction surveillance prior to installation of ceilings (rough-in inspection).

d. Witnessing pre-Government and final Government functional performance testing and performing a final installation review.

e. Signing applicable certificates under SD-07.

1.4 DEFINITIONS

Wherever mentioned in this specification or on the drawings, the equipment, devices, and functions must be defined as follows:

1.4.1 Interface Device

An addressable device that interconnects hard wired systems or devices to an analog/addressable system.

1.4.2 Fire Alarm and Mass Notification Control Unit (FMCU)

A master control unit having the features of a fire alarm control unit (FACU) and an autonomous control unit (ACU) where these units are interconnected to function as a combined fire alarm/mass notification system. The FACU and ACU functions may be contained in a single cabinet or in independent, interconnected, and co-located cabinets.

1.4.3 Remote Fire Alarm and Mass Notification Control Unit

A control unit, physically remote from the fire alarm and mass notification control unit, that receives inputs from automatic and manual fire alarm devices; may supply power to detection devices and interface devices; may provide transfer of power to the notification appliances; may provide transfer of condition to relays or devices connected to the control unit; and reports to and receives signals from the fire alarm and mass notification control unit.

1.4.4 Local Operating Console (LOC)

A unit designed to allow emergency responders or building occupants to operate the MNS including delivery of recorded messages or live voice announcements, initiate visual, textual visual, and audible appliance operation and other relayed functions.

1.4.5 Terminal Cabinet

A steel cabinet with locking, hinge-mounted door where terminal strips are securely mounted inside the cabinet.

1.4.6 Control Module and Relay Module

Terms utilized to describe emergency control function interface devices as defined by NFPA 72.

1.4.7 Designated Fire Protection Engineer (DFPE)

The DoD fire protection engineer that oversees that Area of Responsibility for that project. This is sometimes referred to as the "cognizant" fire protection engineer. Interpret reference to "authority having jurisdiction" and AHJ in referenced standards to mean the Designated Fire Protection Engineer (DFPE). The DFPE may be responsible for review of the contractor submittals having a "G" designation, and for witnessing final inspection and testing.

1.4.8 Qualified Fire Protection Engineer (QFPE)

A QFPE is an individual who is a licensed professional engineer (P.E.), who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and has relevant fire protection engineering experience.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification.

Shop drawings (SD-02), product data (SD-03) and calculations (SD-05) must be prepared by the fire alarm designer and combined and submitted as one complete package. The QFPE must review the SD-02/SD-03/SD-05 submittal package for completeness and compliance with the Contract provisions prior to submission to the Government. The QFPE must provide a Letter of Confirmation that they have reviewed the submittal package for compliance with the contract provisions. This letter must include their registered professional engineer stamp and signature. Partial submittals and submittals not reviewed by the QFPE will be returned by the Government disapproved without review.

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualified Fire Protection Engineer (QFPE); G

SD-02 Shop Drawings

Wiring Diagrams; G

System Layout; G

Voltage Drop Calculations; G

SD-03 Product Data

SD-05 Design Data

SD-06 Test Reports

Test Procedures; G

SD-07 Certificates

Verification of Compliant Installation; G

Request for Government Final Test; G

SD-10 Operation and Maintenance Data

Operation and Maintenance (O&M) Instructions; G

Instruction of Government Employees; G

SD-11 Closeout Submittals

As-Built Drawings

Spare Parts

1.6 SYSTEM OPERATION

Fire alarm system/mass notification system including textual display sign control panel(s), components requiring power, except for the FMCU(s) power supply, must operate on 24 volts DC unless noted otherwise in this section.

The interior fire alarm and mass notification system must be a complete, supervised, noncoded, analog/addressable fire alarm and mass notification system conforming to NFPA 72, UL 864, and UL 2572. Systems meeting UL 2017 only are not acceptable. The system must be activated into the alarm mode by actuation of an alarm initiating device. The system must remain in the alarm mode until the initiating device is reset and the control unit is reset and restored to normal. The system may be placed in the alarm mode by local microphones, LOC, FMCU, or remotely from authorized locations/users.

1.6.1 Alarm Initiating Devices and Notification Appliances (Visual, Voice, Textual)

a. Connect alarm initiating devices to initiating device circuits (IDC) Class "A", or to signaling line circuits (SLC) Class "A" and installed in accordance with NFPA 72.

b. Connect notification appliances to notification appliance circuits (NAC) Class "A".

1.6.2 Functions and Operating Features

The system must provide the following functions and operating features:

a. Power, annunciation, supervision, and control for the system. Addressable systems must be microcomputer (microprocessor or microcontroller) based with a minimum word size of eight bits with sufficient memory to perform as specified.

b. Visual alarm notification appliances must be synchronized as required by NFPA 72.

c. Electrical supervision of the primary power (AC) supply, presence of the battery, battery voltage, and placement of system modules within the control unit.

d. An audible and visual trouble signal to activate upon a single break or open condition, or ground fault. The trouble signal must also operate upon loss of primary power (AC) supply, absence of a battery supply, low battery voltage, or removal of alarm or supervisory control unit modules. After the system returns to normal operating conditions, the trouble signal must again sound until the trouble is acknowledged. A smoke detector in the process of being verified for the actual presence of smoke must not initiate a trouble condition.

e. A trouble signal silence feature that must silence the audible trouble signal, without affecting the visual indicator.

f. Program capability via switches in a locked portion of the FMCU to bypass the automatic notification appliance circuits, fire reporting system, air handler shutdown, and elevator recall features. Operation of this programmed action must indicate on the FMCU display as a supervisory or trouble condition. Notification appliance bypass must be selectable by floor.

g. Alarm functions must override trouble or supervisory functions. Supervisory functions must override trouble functions.

h. The system must be capable of being programmed from the control unit keyboard. Programmed information must be stored in non-volatile memory.

i. The system must be capable of operating, supervising, and monitoring non-addressable alarm and supervisory devices.

j. There must be no limit, other than maximum system capacity, as to the number of addressable devices that may be in alarm simultaneously.

k. Where the fire alarm/mass notification system is responsible for initiating an action in another emergency control device or system, such as HVAC, and elevator recall, the addressable fire alarm relay must be located in the vicinity of the emergency control device.

l. An alarm signal must automatically initiate the following functions:

(1) Transmission of an alarm signal to the fire department using Contact ID Protocol.

(2) Visual indication of the device operated on the FMCU.

(3) Actuation of alarm notification appliances.

(4) Recording of the event electronically in the history log of the FMCU.

(5) Release of doors held open by electromagnetic devices.

(6) Elevator recall as described in this section.

(7) Operation of a sprinkler waterflow switch serving an elevator machinery room or elevator shaft must operate shunt trip circuit breaker(s) to shut down power to the elevators in accordance with ASME A17.1/CSA B44.

m. A supervisory signal must automatically initiate the following

functions:

(1) Visual indication of the device operated on the FMCU.

(2) Transmission of a supervisory signal to the fire department using Contact ID Protocol.

(3) Operation of a duct smoke detector must shut down the appropriate air handler in accordance with NFPA 90A in addition to other requirements of this paragraph and as allowed by NFPA 72.

(4) Recording of the event electronically in the history log of the FMCU.

n. A trouble condition must automatically initiate the following functions:

(1) Visual indication of the device operated on the FMCU.

(2) Transmission of a trouble signal to the fire department using Contact ID Protocol.

(3) Recording of the event electronically in the history log of the FMCU.

o. System control equipment must be programmed to provide a 60-minute to 180-minute delay in transmission of trouble signals resulting from primary power failure.

p. Activation of a LOC pushbutton must activate the audible and visual alarms in the facility. The audible message must be the one associated with the pushbutton activated.

1.6.3 Elevator Recall

Provide elevator recall in accordance with ASME A17.1/CSA B44, Section 14 24 23HYDRAULIC PASSENGER ELEVATORS, and as specified herein. Activation of any smoke/heat detector in an elevator shaft, machine room, or lobby (except at designated recall level) must cause all elevators associated with that shaft, machine room, or lobby to return nonstop to the designated level. Activation of a smoke/heat detector in the lobby or machine room at the designated level must cause all elevators associated with that lobby to return nonstop to the assigned alternate level. Activation of a smoke/heat detector in an elevator shaft, machine room, or lobby must also cause illumination of elevator cab warning signal (fire hat) and complete operation of fire alarm system as specified in paragraph titled "Functions and Operating Features".

1.7 TECHNICAL DATA AND SITE-SPECIFIC SOFTWARE

Technical data and site-specific software (meaning technical data that relates to computer software) that are specifically identified in this project, and may be required in other specifications, must be delivered, strictly in accordance with the CONTRACT CLAUSES. The fire alarm system manufacturer must submit written confirmation of this contract provision as "Fire Alarm System Site-Specific Software Acknowledgement". Identify data delivered by reference to the specification paragraph against which it is furnished. Data to be submitted must include complete system, equipment, and software descriptions. Descriptions must show how the

equipment will operate as a system to meet the performance requirements of this contract. The site-specific software data package must also include the following:

a. Items identified in NFPA 72, titled "Site-Specific Software".

b. Identification of programmable portions of the system equipment and capabilities.

c. Description of system revision and expansion capabilities and methods of implementation detailing both equipment and software requirements.

d. Provision of operational software data on all modes of programmable portions for fire alarm and mass notification.

e. Description of Fire Alarm and Mass Notification Control Unit equipment operation.

f. Description of auxiliary and remote equipment operations.

g. Library of application software.

h. Operation and maintenance manuals.

1.8 EXISTING EQUIPMENT

a. Equipment and devices must be compatible and operable with the existing supervising station and must not impair reliability or operational functions of existing supervising station fire alarm system. The supervising equipment is existing and consists of the following brand and model: Sur-Gard System 5 Multi-Platform Digital Telephone Receiver.

1.9 QUALITY ASSURANCE

1.9.1 Submittal Documents

1.9.1.1 Preconstruction Submittals

Within 36 days of contract award but not less than 14 days prior to commencing any work on site, the Contractor must submit the following for review and approval. SD-02, SD-03 and SD-05 submittals received prior to the review and approval of the qualifications of the fire alarm subcontractor and QFPE must be returned disapproved without review. All resultant delays must be the sole responsibility of the Contractor.

1.9.1.2 Shop Drawings

Shop drawings must not be smaller than the Contract Drawings. Drawings must comply with the requirements of NFPA 72 and NFPA 170. Minimum scale for floor plans must be 1/8"=1'.

1.9.1.3 Nameplates

Nameplate illustrations and data to obtain approval by the Contracting Officer before installation.

1.9.1.4 Wiring Diagrams

One copy of point-to-point wiring diagrams showing the points of connection and terminals used for electrical field connections in the system, including interconnections between the equipment or systems that are supervised or controlled by the system. Diagrams must show connections from field devices to the FMCU and remote FMCU, initiating circuits, switches, relays and terminals, including pathway diagrams between the control unit and shared communications equipment within the protected premises. Point-to-point wiring diagrams must be job specific and must not indicate connections or circuits not being utilized. Provide complete riser diagrams indicating the wiring sequence of all devices and their connections to the control equipment. Include a color-code schedule for the wiring.

1.9.1.5 System Layout

One copy of plan view drawing showing device locations, terminal cabinet locations, junction boxes, other related equipment, conduit routing, conduit sizes, wire counts, conduit fill calculations, wire color-coding, circuit identification in each conduit, and circuit layouts for all floors. Indicate candela rating of each visual notification appliance. Indicate the wattage of each speaker. Clearly identify the locations of isolation modules. Indicate the addresses of all devices, modules, relays, and similar. Show/identify all acoustically similar spaces. Indicate if the environment for the FMCU is within its environmental listing (e.g. temperature/humidity).

Provide a complete description of the system operation in matrix format similar to the "Typical Input/Output Matrix" included in the Annex of NFPA 72.

1.9.1.6 Notification Appliances

Calculations and supporting data on each circuit to indicate that there is at least 25 percent spare capacity for notification appliances. Annotate data for each circuit on the drawings.

1.9.1.7 Initiating Devices

Calculations and supporting data on each circuit to indicate that there is at least 25 percent spare capacity for initiating devices. Annotate data for each circuit on the drawings.

1.9.1.8 Amplifiers

Calculations and supporting data to indicate that amplifiers have sufficient capacity to simultaneously drive all notification speakers at tapped settings plus 25 percent spare capacity. Annotate data for each circuit on the drawings.

1.9.1.9 Battery Power

Calculations and supporting data as required in paragraph Battery Power Calculations for alarm, alert, and supervisory power requirements. Calculations including ampere-hour requirements for each system component and each control unit component, and the battery recharging period, must be included on the drawings.

1.9.1.10 Voltage Drop Calculations

Voltage drop calculations for each notification circuit indicating that sufficient voltage is available for proper operation of the system and all components, at a minimum rated voltage of the system operating on batteries. Include the calculations on the system layout drawings.

1.9.1.11 Product Data

One copy of annotated descriptive data to show the specific model, type, and size of each item. Catalog cuts must also indicate the NRTL listing. The data must be highlighted to show model, size, and options that are intended for consideration. Data must be adequate to demonstrate compliance with all contract requirements. Product data for all equipment must be combined into a single submittal.

Provide an equipment list identifying the type, quantity, make, and model number of each piece of equipment to be provided under this submittal. The equipment list must include the type, quantity, make and model of spare equipment. Types and quantities of equipment submitted must coincide with the types and quantities of equipment used in the battery calculations and those shown on the shop drawings.

1.9.1.12 Operation and Maintenance (O&M) Instructions

Six copies of the Operation and Maintenance Instructions. The O&M Instructions must be prepared in a single volume or in multiple volumes, with each volume indexed, and may be submitted as a Technical Data Package. Manuals must be approved prior to training. The Interior Fire Alarm And Mass Notification System Operation and Maintenance Instructions must include the following:

a. "Manufacturer Data Package five" as specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

b. Operating manual outlining step-by-step procedures required for system startup, operation, and shutdown. The manual must include the manufacturer's name, model number, service manual, parts list, and preliminary equipment list complete with description of equipment and their basic operating features.

c. Maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. The manuals must include conduit layout, equipment layout and simplified wiring, and control diagrams of the system as installed.

d. Complete procedures for system revision and expansion, detailing both equipment and software requirements.

e. Software submitted for this project on CD/DVD media utilized.

f. Printouts of configuration settings for all devices.

g. Routine maintenance checklist. The routine maintenance checklist must be arranged in a columnar format. The first column must list all installed devices, the second column must state the maintenance activity or state no maintenance required, the third column must state the frequency of the maintenance activity, and the fourth column provided for additional comments or reference. All data (devices,

testing frequencies, and similar) must comply with UFC 3-601-02.

h. A final Equipment List must be submitted with the Operating and Maintenance (O&M) manual.

1.9.1.13 As-Built Drawings

The drawings must show the system as installed, including deviations from both the project drawings and the approved shop drawings. A bill of material and Contact ID Point Description Table must be included on the as-built drawings. These drawings must be submitted within two weeks after the final Government test of the system. At least one set of the as-built (marked-up) drawings must be provided at the time of, or prior to the final Government test.

1.9.2 Qualifications

1.9.2.1 Fire Alarm System Designer

The fire alarm system designer must be certified as a Level III (minimum) Technician by National Institute for Certification in Engineering Technologies (NICET) in the Fire Alarm Systems subfield of Fire Protection Engineering Technology or meet the qualifications for a QFPE.

1.9.2.2 Supervisor

A NICET Level IV fire alarm technician must supervise the installation of the fire alarm/mass notification system. The fire alarm technicians supervising the installation of equipment must be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.9.2.3 Technician

Fire alarm technicians with a minimum of four years of experience must be utilized to install and terminate fire alarm/mass notification devices, cabinets and control units. The fire alarm technicians installing the equipment must be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.9.2.4 Installer

Fire alarm installer with a minimum of two years of experience utilized to assist in the installation of fire alarm/mass notification devices, cabinets and control units. A licensed electrician must be allowed to install wire, cable, conduit and backboxes for the fire alarm system/mass notification system. The fire alarm installer must be factory trained in the installation, adjustment, testing, and operation of the equipment specified herein and on the drawings.

1.9.2.5 Test Technician

Fire alarm technicians with a minimum of eight years of experience and NICET Level IV utilized in testing and certification of the installation of the fire alarm/mass notification devices, cabinets and control units. The fire alarm technicians testing the equipment must be factory trained in the installation, adjustment, testing, and operation of the equipment installed as part of this project.

1.9.2.6 Manufacturer

Components must be of current design and must be in regular and recurrent production at the time of installation. Provide design, materials, and devices for a protected premises fire alarm system, complete, conforming to NFPA 72, except as specified herein.

1.9.3 Regulatory Requirements

Equipment and material must be listed or approved. Listed or approved, as used in this section, means listed, labeled or approved by a Nationally Recognized Testing Laboratory (NRTL) such as UL Fire Prot Dir or FM APP GUIDE. The omission of these terms under the description of any item of equipment described must not be construed as waiving this requirement. All listings or approvals by testing laboratories must be from an existing ANSI or UL published standard. The recommended practices stated in the manufacturer's literature or documentation must be considered as mandatory requirements.

1.10 DELIVERY, STORAGE, AND HANDLING

Protect equipment delivered and placed in storage from the weather, humidity, and temperature variation, dirt and dust, and other contaminants.

1.11 MAINTENANCE

1.11.1 Spare Parts

Furnish the following spare parts in the manufacturers original unopened containers:

a. Five complete sets of system keys.

b. One manual stations.

c. Two of each type of detector base and head installed.

d. Two of each type of audible and visual alarm device installed.

e. Two of each type of addressable monitor module installed.

f. Two of each type of addressable control module installed.

g. Two low voltage, one telephone/internet/ethernet, and one 120 VAC surge protective device.

1.11.2 Special Tools

Software, connecting cables and proprietary equipment, necessary for the maintenance, testing, and reprogramming of the equipment must be furnished to the Contracting Officer, prior to the instruction of Government employees.

PART 2 PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENT

All fire alarm and mass notification equipment must be listed for use

under the applicable reference standards. Interfacing of UL 864 or similar approved industry listing with Mass Notification equipment listed to UL 2572 must be done in a laboratory listed configuration, if the software programming features cannot provide a listed interface control.

2.2 MATERIALS AND EQUIPMENT

2.2.1 Standard Products

Provide materials, equipment, and devices that have been tested by a nationally recognized testing laboratory and listed for fire protection service when so required by NFPA 72 or this specification. Select material from one manufacturer, where possible, and not a combination of manufacturers, for any particular classification of materials. Material and equipment must be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 2 years prior to bid opening.

2.2.2 Nameplates

Major components of equipment must have the manufacturer's name, address, type or style, model or serial number, catalog number, date of installation, installing Contractor's name and address, and the contract number provided on a new name plate permanently affixed to the item or equipment. Major components include, but are not limited to, the following:

a. FMCU

Nameplates must be etched metal or plastic, permanently attached by screws to control units or adjacent walls.

2.2.3 Keys

Keys and locks for equipment, control units and devices must be identical. Master all keys and locks to a single key as required by the Installation Fire Department.

2.2.4 Instructions

Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the FMCU. The card must show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory, and trouble. The instructions must also include procedures for operating live voice microphones. The instructions and their mounting location must be approved by the Contracting Officer before being posted.

2.3 FIRE ALARM AND MASS NOTIFICATION CONTROL UNIT

Provide a complete fire alarm and mass notification control unit (FMCU) fully enclosed in a lockable steel cabinet as specified herein. Operations required for testing or for normal care, maintenance, and use of the system must be performed from the front of the enclosure. If more than a single unit is required at a location to form a complete control unit, the unit cabinets must match exactly. The system must be capable of defining any module as an alarm module and report alarm trouble, loss of

polling, or as a supervisory module, and reporting supervisory short, supervisory open or loss of polling such as waterflow switches, valve supervisory switches, relays for output function actuation.

a. Each control unit must provide power, supervision, control, and logic for the entire system, utilizing modular components, internally mounted and arranged for easy access. Each control unit must be suitable for operation on a 120 volt, 60 hertz, normal building power supply. Provide each control unit with supervisory functions for power failure, internal component placement, and operation.

b. Visual indication of alarm, supervisory, or trouble initiation on the FMCU must be by liquid crystal display or similar means with a minimum of 80 characters. The mass notification control unit must have the capability of temporarily deactivate the fire alarm audible notification appliances while delivering voice messages.

c. Provide secure operator console for initiating recorded messages, strobes and displays; and for delivering live voice messages. Provide capacity for at least eight prerecorded messages. Provide the ability to automatically repeat prerecorded messages. Provide a secure microphone for delivering live messages. Provide adequate discrete outputs to temporarily deactivate fire alarm audible notification, initiate/synchronize strobes and initiate textual visual notification appliances. Provide a complete set of self-diagnostics for controller and appliance network. Provide local diagnostic information display and local diagnostic information and system event log file.

2.3.1 Cabinet

Install control unit components in cabinets large enough to accommodate all components and also to allow ample gutter space for interconnection of control units as well as field wiring. The cabinet must be a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions. The enclosure must be identified by an engraved phenolic resin nameplate. Lettering on the nameplate must say "Fire Alarm and Mass Notification control unit" and must not be less than 1-inch high. Provide prominent rigid plastic or metal identification plates for lamps, circuits, meters, fuses, and switches.

2.3.2 Silencing Switches

2.3.2.1 Alarm Silencing Switch

Provide an alarm silencing switch at the FMCU that must silence the audible and visual notification appliances. Subsequent activation of initiating devices must cause the notification appliances to re-activate.

2.3.2.2 Supervisory/Trouble Silencing Switch

Provide supervisory and trouble silencing switch(es) that must silence the audible trouble and supervisory signal(s), but not extinguish the visual indicator. This switch must be overridden upon activation of a subsequent supervisory or trouble condition. Audible trouble indication must resound automatically every 24 hours after the silencing feature has been operated if the supervisory or trouble condition still exists.

2.3.3 Non-Interfering

Power and supervise each circuit such that a signal from one device does not prevent the receipt of signals from any other device. Initiating devices must be manually reset by switch from the FMCU after the initiating device or devices have been restored to normal.

2.3.4 Audible Notification System

The Audible Notification System must comply with the requirements of NFPA 72 for Emergency Voice/Alarm Communications System requirements, except as specified herein. The system must be a one-way, multi-channel voice notification system incorporating user selectability of a minimum eight distinct sounds for tone signaling, and the incorporation of a voice module for delivery of recorded messages. Audible appliances must produce a three-pulse temporal pattern for three cycles followed by a voice message that is repeated until the control unit is reset or silenced. Automatic messages must be broadcast through speakers throughout the building/facility but not in stairs or elevator cabs. A live voice message must override the automatic audible output through use of a microphone input at the control unit or the LOC.

a. When using the microphone, live messages must be broadcast throughout a selected floor or floors, or all call. The system must be capable of operating all speakers at the same time. The microphone must be hand-held style. Hand-held microphones must be housed in a separate protective cabinet. The cabinet must be accessible without the use of a key. The location of the microphone(s) must be approved by the Designated Fire Protection Engineer (DFPE).

b. The microprocessor must actively interrogate circuitry, field wiring, and digital coding necessary for the immediate and accurate rebroadcasting of the stored voice data into the appropriate amplifier input. Loss of operating power, supervisory power, or any other malfunction that could render the digitalized voice module inoperative must automatically cause the three-pulse temporal pattern to take over all functions assigned to the failed unit in the event an alarm is activated.

2.3.4.1 Outputs and Operational Modules

All outputs and operational modules must be fully supervised with on-board diagnostics and trouble reporting circuits. Provide form "C" contacts for system alarm and trouble conditions. Provide circuits for operation of auxiliary appliance during trouble conditions. During a Mass Notification event, the control unit must not generate nor cause any trouble alarms to be generated with the Fire Alarm system.

2.3.4.2 Mass Notification

a. The system must have the capability of utilizing an LOC with redundant controls of the FMCU. Notification Appliance Circuits (NAC) must be provided for the activation of strobe appliances. Audio output must be selectable for line level. A hand-held microphone must be provided and, upon activation, must take priority over any tone signal, recorded message or PA microphone operation in progress, while maintaining the strobe NAC circuit activation.

b. The Mass Notification functions must override the manual or automatic

fire alarm notification. Other fire alarm functions including transmission of a signal(s) to the fire department must remain operational. When a mass notification announcement is disengaged and a fire alarm condition still exists, the audible and visual notification appliances must resume activation for alarm conditions. The fire alarm message must be of lower priority that all other messages (except any "test" messages) and must not override any other messages. If not manually ended, any mass notification announcement will automatically end after 10 minutes.

c. Messages must be recorded professionally utilizing standard industry methods, in a professional female voice. Message and tone volumes must both be at the same decibel level. Messages recorded from the system microphone must not be accepted. A 1000 Hz tone (as required by NFPA 72) must precede messages and be similar to the following unless Installation or Facility specific messages are required:

(1) Fire: "May I have your attention please. May I have your attention please. A fire emergency has been reported in the building. Please leave the building by the nearest exit or exit stairway. Do not use the elevators." (Provide a 2 second pause.) "May I have your attention please, (repeat the tones and message on a continuous loop)."

d. Auxiliary Input Module must be designed to be an outboard expansion module to either expand the number of optional LOC's, or allow a telephone interface.

2.3.4.3 Installation-Wide Control

If an installation-wide control system for mass notification exists on the Base, the autonomous control unit must communicate with the central control unit of the Installation-wide system. The autonomous control unit must receive commands/messages from the central control unit and provide status information.

2.3.5 Memory

Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors, or other age-dependent devices must not be considered as equal to non-volatile processors, PROMS, or EPROMS.

2.3.6 Field Programmability

Provide control units and control units that are fully field programmable for both input and output of control, initiation, notification, supervisory, and trouble functions. The system program configuration must be menu driven. System changes must be password protected. Any proprietary equipment and proprietary software needed by qualified technicians to implement future changes to the fire alarm system must be provided as part of this contract.

A lockout code must not be installed in the hardware, firmware, or software of any fire protection system. The installer and operator codes must remain as the factory default setting.

2.3.7 Input/Output Modifications

The FMCU must contain features that allow the bypassing of input devices from the system or the modification of system outputs. These control features must consist of a control unit mounted keypad. Any bypass or modification to the system must indicate a trouble condition on the FMCU.

2.3.8 Resetting

Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory or trouble condition on the system still exists.

2.3.9 Walk Test

The FMCU must have a walk test feature. When using this feature, operation of initiating devices must result in limited system outputs, so that the notification appliances operate for only a few seconds and the event is indicated in the history log, but no other outputs occur.

2.3.10 History Logging

The control unit must have the ability to store a minimum of 400 events in a log. These events must be stored in a battery-protected memory and must remain in the memory until the memory is downloaded or cleared manually. Resetting of the control unit must not clear the memory.

2.3.11 Manual Access

An operator at the control unit, having a proper access level, must have the capability to manually access the following information for each initiating device.

a. Primary status.

b. Device type.

c. Present average value.

d. Present sensitivity selected.

e. Detector range (normal, dirty).

2.3.12 Heat Detector Self-Test Routines

Automatic self-test routines must be performed on each detector that will functionally check detector sensitivity electronics and ensure the accuracy of the value being transmitted. Any detector that fails this test must indicate a trouble condition with the detector location at the control unit.

2.3.13 Floor Plans

A laminated building floor plan (22" x 34") must be provided and mounted at the FMCU location. The floor plan must indicate the FMCU, LOC, annunciators, remote power supply panel(s), and all initiating devices. The floor plan must indicate all rooms by number.

A laminated as-installed fire alarm wiring diagram (22" x 34") must be

provided and mounted at the FMCU location. The wiring diagram must indicate fire alarm wiring, FMCU, LOC, annunciators, remote power supply panel(s), and all initiating device and notification appliances keyed to floor plans by room number. Provide a different color for each signaling line circuit, notification appliance circuit, speaker circuit, and data circuits.

2.4 LOCAL OPERATING CONSOLES (LOC)

2.4.1 General

The LOC must consist of a remote microphone station incorporating a push-to-talk (PTT) hand-held microphone and system status indicators. The LOC must have the capability of being utilized to activate prerecorded messages. The unit must incorporate microphone override of any tone generation or recorded messages. The unit must be fully supervised from the FMCU. The housing for the LOC must not be lockable.

2.5 AMPLIFIERS, PREAMPLIFIERS, TONE GENERATORS

Any amplifiers, preamplifiers, tone generators, digitalized voice generators, and other hardware necessary for a complete, operational, textual audible circuit conforming to NFPA 72 must be housed in a remote FMCU, terminal cabinet, or in the FMCU. Individual amplifiers must be 100 watts maximum.

2.5.1 Operation

The system must automatically operate and control all building speakers.

2.5.2 Construction

Amplifiers must utilize computer grade components and must be provided with output protection devices sufficient to protect the amplifier against any transient up to 10 times the highest rated voltage in the system.

2.5.3 Inputs

Equip each system with separate inputs for the tone generator, digitalized voice driver and control unit mounted microphone. Microphone inputs must be of the low impedance, balanced line type. Both microphone and tone generator input must be operational on any amplifier.

2.5.4 Tone Generator

The tone generator must produce a three-pulse temporal pattern and must be constantly repeated until interrupted by either the digitalized voice message, the microphone input, or the alarm silence mode as specified. The tone generator must be single channel with an automatic backup generator per channel such that failure of the primary tone generator causes the backup generator to automatically take over the functions of the failed unit and also causes transfer of the common trouble relay. The tone generator must be provided with securely attached labels to identify the component as a tone generator and to identify the specific tone it produces.

2.5.5 Protection Circuits

Each amplifier must be constantly supervised for any condition that could

render the amplifier inoperable at its maximum output. Failure of any component must cause illumination of a visual "amplifier trouble" indicator on the control unit, appropriate logging of the condition in the history log, and other actions for trouble conditions as specified.

2.6 MANUAL STATIONS

Provide metal or plastic, surface mounted, double-action, addressable manual stations, that are not subject to operation by jarring or vibration. Stations must be addressable via a dual in-line pacakge (DIP) switch or sundial that is manufactured within the device. Stations must be equipped with screw terminals for each conductor. Stations that require the replacement of any portion of the device after activation are not permitted. Stations must be finished in red with molded raised lettering operating instructions of contrasting color. The use of a key must be required to reset the station.

2.7 SMOKE DETECTORS

2.7.1 Spot Type Detectors

Provide addressable photoelectric smoke detectors as follows:

a. Provide analog/addressable photoelectric smoke detectors utilizing the photoelectric light scattering principle for operation in accordance with UL 268. Smoke detectors must be listed for use with the FMCU.

b. Provide self-restoring type detectors that do not require any readjustment after actuation at the FMCU to restore them to normal operation. The detector must have a visual indicator to show actuation.

c. Vibration must have no effect on the detector's operation. Protect the detection chamber with a fine mesh metallic screen that prevents the entrance of insects or airborne materials. The screen must not inhibit the movement of smoke particles into the chamber.

d. Provide twist lock bases with sounder that produces a minimum of 90 dBA at 10 feet with screw terminals for each conductor. The detectors must maintain contact with their bases without the use of springs.

e. The detector address must identify the particular unit, its location within the system, and its sensitivity setting. Detectors must be of the low voltage type rated for use on a 24 VDC system.

2.7.2 Duct Smoke Detectors

Duct-mounted addressable photoelectric smoke detectors must consist of a smoke detector, as specified in paragraph Spot Type Detectors, mounted in a special housing fitted with duct sampling tubes. Detector circuitry must be mounted in a metallic or plastic enclosure exterior to the duct. It is not permitted to cut the duct insulation to install the duct detector directly on the duct. Detectors must be listed for operation over the complete range of air velocities, temperature and humidity expected at the detector when the air-handling system is operating. Detectors must be powered from the FMCU.

a. Sampling tubes must run the full width of the duct. The duct detector package must conform to the requirements of NFPA 90A, UL 268A, and

must be listed for use in air-handling systems. The control functions, operation, reset, and bypass must be controlled from the FMCU.

b. Lights to indicate the operation and alarm condition must be visible and accessible with the unit installed and the cover in place. Remote indicators must be provided where required by NFPA 72. Remote indicators as well as the affected fan units must be properly identified in etched plastic placards.

c. Detectors must provide for control of auxiliary contacts that provide control, interlock, and shutdown functions specified in Section 23 09 23.02 BACnet DIRECT DIGITAL CONTROL SYSTEMS FOR HVAC AND OTHER BUILDING CONTROL SYSTEMS. Auxiliary contacts provide for this function must be located within 3 feet of the controlled circuit or appliance. The auxiliary contacts must be supplied by the fire alarm system manufacturer to ensure complete system compatibility.

2.8 HEAT DETECTORS

2.8.1 Heat Detectors

Heat detectors must be analog/addressable and designed for detection of fire by combination fixed temperature and rate-of-rise principle in accordance with UL 521. The alarm condition must be determined by comparing detector value with the stored values.. Detectors located in areas subject to moisture, exterior atmospheric conditions, must be types approved for such locations.

2.9 ADDRESSABLE INTERFACE DEVICES

The initiating device being monitored must be configured as a Class "A" initiating device circuits. The module must be listed as compatible with the control unit. The module must provide address setting means compatible with the control unit's SLC supervision and store an internal identifying code. Monitor module must contain an integral LED that flashes each time the monitor module is polled and is visible through the device cover plate. Pull stations with a monitor module in a common backbox are not required to have an LED. Modules must be listed for the environmental conditions in which they will be installed.

2.10 ADDRESSABLE CONTROL MODULES

The control module must be capable of operating as a relay (dry contact form C) for interfacing the control unit with other systems, and to initiate elevator fire service. The module must be listed as compatible with the control unit. The indicating device or the external load being controlled must be configured as Class A notification appliance circuits. The system must be capable of supervising, audible, visual and dry contact circuits. The control module must have both an input and output address. The supervision must detect a short on the supervised circuit and must prevent power from being applied to the circuit. The control module must provide address setting means compatible with the control unit's SLC supervision and store an internal identifying code. The control module must contain an integral LED that flashes each time the control module is polled and is visible through the device cover plate. Control Modules must be listed for the environmental conditions in which they will be installed.

2.11 NOTIFICATION APPLIANCES

2.11.1 Audible Notification Appliances

Audible appliances must conform to the applicable requirements of UL 464. Appliances must be connected into notification appliance circuits. Surface mounted audible appliances must be painted white. Recessed audible appliances must be installed with a grill that is painted white.

2.11.1.1 Speakers

a. Speakers must conform to the applicable requirements of UL 1480. Speakers must have six different sound output levels and operate with audio line input levels of 70.7 VRMs and 25 VRMs, by means of selectable tap settings. Interior speaker tap settings must include taps of 1/4, 1/2, 1, and 2 watt, at a minimum. Exterior speakers must also be multi-tapped with no more than 15 watt maximum setting. Speakers must incorporate a high efficiency speaker for maximum output at minimum power across a frequency range of 400 Hz to 4,000 Hz, and must have a sealed back construction. Speakers must be capable of installation on standard 4-inch square electrical boxes. Where speakers and strobes are provided in the same location, they may be combined into a single unit. All inputs must be polarized for compatibility with standard reverse polarity supervision of circuit wiring via the FMCU.

b. Provide speaker mounting plates constructed of cold rolled steel having a minimum thickness of 16 gage or molded high impact plastic and equipped with mounting holes and other openings as needed for a complete installation. Fabrication marks and holes must be ground and finished to provide a smooth and neat appearance for each plate. Each plate must be primed and painted.

c. Speakers must utilize screw terminals for termination of all field wiring.

2.11.2 Visual Notification Appliances

Visual notification appliances must conform to the applicable requirements of UL 1638, UL 1971 and conform to the Architectural Barriers Act (ABA). Visual Notification Appliances must have clear high intensity optic lens, xenon flash tubes, or light emitting diode (LED) and be marked "Alert" in letters of contrasting color. The light pattern must be dispersed so that it is visible above and below the strobe and from a 90 degree angle on both sides of the strobe. Strobe flash rate must be 1 flash per second and a minimum of 15 candela based on the UL 1971 test. Strobe must be surface mounted.

2.12 ELECTRIC POWER

2.12.1 Primary Power

Power must be 120 VAC 60 Hz service for the FMCU from the AC service to the building in accordance with NFPA 72.

2.13 SECONDARY POWER SUPPLY

Provide for system operation in the event of primary power source failure. Transfer from normal to auxiliary (secondary) power or

restoration from auxiliary to normal power must be automatic and must not cause transmission of a false alarm.

2.13.1 Batteries

Provide sealed, maintenance-free, sealed lead acid batteries as the source for emergency power to the FMCU. Batteries must contain suspended electrolyte. The battery system must be maintained in a fully charged condition by means of a battery charger. Provide an automatic transfer switch to transfer the load to the batteries in the event of the failure of primary power.

2.13.1.1 Capacity

Battery size must be the greater of the following two capacities. This capacity applies to every control unit associated with this system, including supplemental notification appliance circuit panels, auxiliary power supply panels, fire alarm transmitters, and Base-wide mass notification transceivers. When determining the required capacity under alarm condition, visual notification appliances must include both textual and non-textual type appliances.

a. Sufficient capacity to operate the fire alarm system under supervisory and trouble conditions, including audible trouble signal devices for 48 hours and audible and visual signal devices under alarm conditions for an additional 15 minutes.

b. Sufficient capacity to operate the mass notification for 60 minutes after loss of AC power.

2.13.1.2 Battery Power Calculations

a. Verify that battery capacity exceeds supervisory and alarm power requirements for the criteria noted in the paragraph "Capacity" above.

   (1) Substantiate the battery calculations for alarm and supervisory power requirements. Include ampere-hour requirements for each system component and each control unit component, and compliance with UL 864.

   (2) Provide complete battery calculations for both the alarm and supervisory power requirements. Submit ampere-hour requirements for each system component with the calculations.

   (3) Provide voltage drop calculations to indicate that sufficient voltage is available for proper operation of the system and all components. Calculations must be performed using the minimum rated voltage of each component.

b. For battery calculations assume a starting voltage of 24 VDC for starting the calculations to size the batteries. Calculate the required Amp-Hours for the specified standby time, and then calculate the required Amp-Hours for the specified alarm time. Using 20.4 VDC as starting voltage, perform a voltage drop calculation for circuits containing devices or appliances remote from the power sources.

2.13.2 Battery Chargers

Provide a fully automatic, variable charging rate battery charger. The

charger must be capable of providing 120 percent of the connected system load and must maintain the batteries at full charge. In the event the batteries are fully discharged (20.4 Volts dc), the charger must recharge the batteries back to 95 percent of full charge within 48 hours after a single discharge cycle as described in paragraph CAPACITY above. Provide pilot light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high rate switch is provided.

2.14 SURGE PROTECTIVE DEVICES

Surge protective devices must be provided to suppress all voltage transients which might damage fire alarm control unit components. Systems having circuits located outdoors, communications equipment must be protected against surges induced on any signaling line circuit. Cables and conductors, that serve as communications links, must have surge protection circuits installed at each end. The surge protective device must wire in series to the power supply of the protected equipment with screw terminations. Line voltage surge arrestor must be installed directly adjacent to the power panel where the FMCU breaker is located.

a. Surge protective devices for nominal 120 VAC must be UL 1449 listed with a maximum 500 volt suppression level and have a maximum response time of 5 nanoseconds. The surge protective device must also meet IEEE C62.41.1 and IEEE C62.41.2 category B tests for surge capacity. The surge protective device must feature multi-stage construction and be provided with a long-life indicator lamp (either light emitting diode or neon) which extinguishes upon failure of protected components. Any unit fusing must be externally accessible.

b. Surge protective devices for nominal 24 VAC, fire alarm telephone dialer, or ethernet connection must be UL 497B listed, meet IEEE C62.41.1 and have a maximum response time of 1-nanosecond. The surge protective device must feature multi-stage construction and be self-resetting. The surge protective device must be a base and plug style. The base assembly must have screw terminals for fire alarm wiring. The base assembly must accept "plug-in" surge protective module.

c. All surge protective devices (SPD) must be the standard product of a single manufacturer and be equal or better than the following:

   (1) For 120 VAC nominal line voltage: UL 1449 and UL 1283 listed, series connected 120 VAC, 20A rated, surge protective device in a NEMA 4x enclosure. Minimum 50,000 amp surge current rating with EMI/RFI filtering and a dry contact circuit for remote monitoring of surge protection status.

   (2) For 24-volt nominal line voltage: UL 497B listed, series connected low voltage, 24-volt, 5A rated, loop circuit protector, base and replaceable module.

   (3) For alarm telephone dialers: UL 497A listed, series connected, 130-volt, 150 mA rated with self-resetting fuse, dialer circuit protector with modular plug and play.

   (4) For IP-DACTS: UL 497B listed, series connected, 6.4-volt, 1.5A rated with 20 kA/pair surge current, data network protector with modular plug and play.

2.15 WIRING

Provide wiring materials under this section as specified in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM with the additions and modifications specified herein.

2.15.1 Alarm Wiring

IDC and SLC wiring must be solid copper or stranded copper cable in accordance with the manufacturers requirements. Copper signaling line circuits and initiating device circuit field wiring must be No. 14 AWG size conductors at a minimum. Visual notification appliance circuit conductors, that contain audible alarm appliances, must be copper No. 16 AWG size conductors at a minimum. Speaker circuits must be copper No. 16 AWG size twisted and shielded conductors at a minimum. Wire size must be sufficient to prevent voltage drop problems. Circuits operating at 24 VDC must not operate at less than the listed voltages for the detectors and appliances. Power wiring, operating at 120 VAC minimum, must be a minimum No. 12 AWG solid copper having similar insulation. Acceptable power-limited cables are FPL, FPLR or FPLP as appropriate with red colored covering. Nonpower-limited cables must comply with NFPA 70.

2.16 AUTOMATIC FIRE ALARM TRANSMITTERS

2.16.1 Digital Alarm Communicator Transmitter (DACT)

Provide DACT that is compatible with the existing supervising station fire alarm system. Transmitter must have a means to transmit alarm, supervisory, and trouble conditions via a single transmitter. Transmitter must have a source of power for operation that conforms to NFPA 72. Transmitter must be capable of initiating a test signal daily at any selected time. Transmitter must be arranged to seize telephone circuits in accordance with NFPA 72. Transmitter must be compatible with the Sur-Gard System 5 Multi-Platform Digital Telephone Receiver.

2.16.2 Signals to Be Transmitted to the Base Receiving Station

Points must be sent to the base receiving station utilizing Contact ID Protocol.

2.17 SYSTEM MONITORING

2.17.1 Valves

Each valve affecting the proper operation of a fire protection system, including automatic sprinkler control valves, sprinkler service entrance valve, isolating valves for pressure type waterflow or supervision switches, and valves at backflow preventers, whether supplied under this contract or existing, must be electrically monitored to ensure its proper position. Provide each tamper switch with a separate address, unless they are within the same room, then a maximum of five can use the same address.

2.18 ENVIRONMENTAL ENCLOSURES OR GUARDS

Environmental enclosures must be provided to permit fire alarm/mass notification components to be used in areas that exceed the environmental limits of the listing. The enclosure must be listed for the device or appliance as either a manufactured part number or as a listed compatible accessory for the component is currently listed. Guards required to deter

mechanical damage must be either a listed manufactured part or a listed accessory for the category of the initiating device or notification appliance.

PART 3 EXECUTION

3.1 VERIFYING ACTUAL FIELD CONDITIONS

Before commencing work, examine all adjoining work on which the contractor's work is in any way dependent for perfect workmanship according to the intent of this specification section, and report to the Contracting Officer's Representative any condition which prevents performance of first class work. No "waiver of responsibility" for incomplete, inadequate or defective adjoining work will be considered unless notice has been filed before submittal of a proposal.

3.2 INSTALLATION

3.2.1 Fire Alarm and Mass Notification Control Unit (FMCU)

Locate the FMCU where indicated on the drawings. Surface mount the enclosure with the top of the cabinet 6 feet above the finished floor or center the cabinet at 5 feet, whichever is lower. Conductor terminations must be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection must be permanently mounted in the FMCU. Locate the document storage cabinet adjacent to the FMCU unless the Contracting Officer directs otherwise.

3.2.2 Battery Cabinets

When batteries will not fit in the FMCU, locate battery cabinets below or adjacent to the FMCU. Battery cabinets must be installed at an accessible location when standing at floor level. Battery cabinets must not be installed lower than 12 inches above finished floor, measured to the bottom of the cabinet, nor higher than 36 inches above the floor, measured to the top of the cabinet. Installing batteries above drop ceilings or in inaccessible locations is prohibited. Battery cabinets must be large enough to accommodate batteries and also to allow ample gutter space for interconnection of control units as well as field wiring. The cabinet must be provided in a sturdy steel housing, complete with back box, hinged steel door with cylinder lock, and surface mounting provisions.The cabinet must be identified by an engraved phenolic resin nameplate. Lettering on the nameplate must indicate the control unit(s) the batteries power and must not be less than 1-inch high.

3.2.3 Manual Stations

Locate manual stations as required by NFPA 72 and as indicated on the drawings. Mount stations so they are located no farther than 5 feet from the exit door they serve, measured horizontally. Manual stations must be mounted at 48 inches measured to the operating handle.

3.2.4 Notification Appliances

a. Locate notification appliance devices where indicated. Where two or more visual notification appliances are located in the same room or corridor or field of view, provide synchronized operation. Devices must use screw terminals for all field wiring. Audible and visual notification appliances mounted in acoustical ceiling tiles must be

centered in the tiles plus or minus 2 inches.

b. Audible and visual notification appliances mounted on the exterior of the building, within unconditioned spaces, or in the vicinity of showers must be listed weatherproof appliances installed on weatherproof backboxes.

c. Speakers must not be located in close proximity to the FMCU or LOC so as to cause feedback when the microphone is in use.

3.2.5 Smoke and Heat Detectors

Locate detectors as required by NFPA 72 and their listing and as indicated on the drawings on a 4-inch mounting box. Install heat detectors not less than 4 inches from a side wall to the near edge. Heat detectors located on the wall must have the top of the detector at least 4 inches below the ceiling, but not more than 12 inches below the ceiling. Smoke detectors are permitted to be on the wall no lower than 12 inches from the ceiling with no minimum distance from the ceiling. Install smoke detectors no closer than 3 feet from air handling supply diffusers. Detectors installed in acoustical ceiling tiles must be centered in the tiles plus or minus 2 inches.

3.2.6 Local Operating Console (LOC)

Locate the LOC(s) as required by NFPA 72 and as indicated. Mount the console so that the top message button and microphone is no higher than 4 feet above the floor and the bottom (lowest) message button and microphone is at least 3 feet above the finished floor.

3.2.7 Ceiling Bridges

Provide ceiling bridges for ceiling-mounted appliances. Ceiling bridges must be as recommended/required by the manufacturer of the ceiling-mounted notification appliance.

3.3 SYSTEM FIELD WIRING

3.3.1 Wiring within Cabinets, Enclosures, and Boxes

Provide wiring installed in a neat and professional manner and installed parallel with or at right angles to the sides and back of any box, enclosure, or cabinet. Conductors that are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting, or junction box must be connected to screw-type terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. The use of wire nuts, crimped connectors, or similar devices is prohibited. The twisting of conductors is prohibited. Wiring to conform with NFPA 70.

Indicate the following in the wiring diagrams:

a. Point-to-point wiring diagrams showing the points of connection and terminals used for electrical field connections in the system, including interconnections between the equipment or systems that are supervised or controlled by the system. Diagrams must show connections from field devices to the FMCU and remote fire alarm/mass notification control units, initiating circuits, switches, relays and terminals.

b. Complete riser diagrams indicating the wiring sequence of devices and their connections to the control equipment. Include a color code schedule for the wiring. Include floor plans showing the locations of devices and equipment.

3.3.2 Terminal Cabinets

Provide a terminal cabinet at the base of any circuit riser, on each floor at each riser, and where indicated on the drawings. Terminal size must be appropriate for the size of the wiring to be connected. Conductor terminations must be labeled and a drawing containing conductors, their labels, their circuits, and their interconnection must be permanently mounted in the terminal cabinet. Minimum size is 8 inches by 8 inches. Only screw-type terminals are permitted. Provide an identification label, that displays "FIRE ALARM TERMINAL CABINET" with 2-inch lettering, on the front of the terminal cabinet.

3.3.3 Alarm Wiring

a. Voltages must not be mixed in any conduit or junction box, housing or device, except those containing power supplies and control relays.

b. Utilize shielded wiring where recommended by the manufacturer. For shielded wiring, ground the shield at only one point, in or adjacent to the FMCU.

c. Pigtail or T-tap connections to signal line circuits, initiating device circuits, supervisory alarm circuits, and notification appliance circuits are prohibited.

d. Color coding is required for circuits and must be maintained throughout the circuit. Conductors used for the same functions must be similarly color coded. Conform wiring to NFPA 70.

e. Pull all conductors splice free. The use of wire nuts, crimped connectors, or twisting of conductors is prohibited. Where splices are unavoidable, the location of the junction box or pull box where they occur must be identified on the as-built drawings. The number and location of splices must be subject to approval by the Designated Fire Protection Engineer (DFPE).

3.3.4 Back Boxes and Conduit

In addition to the requirements of Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM, provide all wiring in rigid metal conduit or intermediate metal conduit unless specifically indicated otherwise. Minimum conduit size must be 3/4-inch in diameter. Do not use electrical non-metallic tubing (ENT) or flexible non-metallic tubing and associated fittings.

a. Galvanized rigid steel (GRS) conduit must be utilized where exposed to weather, where subject to physical damage, and where exposed on exterior of buildings. Intermediate metal conduit (IMC) may be used in lieu of GRS as allowed by NFPA 70.

b. Electrical metallic tubing (EMT) is permitted above suspended ceilings or exposed where not subject to physical damage. Do not use EMT underground, encased in concrete, mortar, or grout, in hazardous locations, where exposed to physical damage, outdoors or in fire pump rooms. Use die-cast compression connectors.

c. For rigid metallic conduit (RMC), only threaded type fitting are permitted for wet or damp locations.

d. Flexible metal conduit is permitted for initiating device circuits, notification appliance circuits and signaling line circuits 6 feet in length or less. Use liquid tight flexible metal conduit in damp and wet locations.

e. Schedule 40 (minimum) polyvinyl chloride (PVC) is permitted where conduit is routed underground or underground below floor slabs. Convert non-metallic conduit, other than PVC Schedule 40 or 80, to plastic-coated rigid, or IMC, steel conduit before turning up through floor slab.

f. Exterior wall penetrations must be weathertight. Conduit must be sealed to prevent the infiltration of moisture.

g. For Class "A" or "X" circuits with conductor lengths of 10 feet or less, the conductors must be permitted to be installed in the same raceway in accordance with NFPA 72.

3.3.5 Conductor Terminations

Labeling of conductors at terminal blocks in terminal cabinets, FMCU, and the LOC must be provided at each conductor connection. Each conductor or cable must have a shrink-wrap label to provide a unique and specific designation. Each terminal cabinet, FMCU, and remote FMCU must contain a laminated drawing that indicates each conductor, its label, circuit, and terminal. The laminated drawing must be neat, using 12 point lettering minimum size, and mounted within each cabinet, control unit, or unit so that it does not interfere with the wiring or terminals. Maintain existing color code scheme where connecting to existing equipment.

3.4 DISCONNECTION AND REMOVAL OF EXISTING SYSTEM

Maintain existing fire alarm/mass notification equipment fully operational until the new equipment has been tested and accepted by the Contracting Officer. As new equipment is installed, label it "NOT IN SERVICE" until the new equipment is accepted. Once the new system is completed, tested, and accepted by the Government, it must be placed in service and connected to the supervising station. Remove tags from new equipment and tag the existing equipment "NOT IN SERVICE" until removed from the building.

a. After acceptance of the new system by the Contracting Officer, remove existing equipment not connected to the new system, remove unused exposed conduit, and restore damaged surfaces. Remove the material from the site and dispose.

b. Disconnect and remove the existing fire alarm/mass notification and smoke detection systems where indicated and elsewhere in the specification.

c. Control units and fire alarm devices and appliances disconnected and removed must be turned over to the Contracting Officer.

d. Properly dispose of fire alarm outlet and junction boxes, wiring, conduit, supports, and other such items.

3.5 CONNECTION OF NEW SYSTEM

The following new system connections must be made during the last phase of construction, at the beginning of the pre-Government tests. New system connections must include:

a. Connection of new relays to existing magnetic door hold-open devices.

b. Connection of new elevator recall relays to existing wiring and conduit.

c. Connection of new system transmitter to existing installation fire reporting system.

Once these connections are made, system must be left energized. Report immediately to the Contracting Officer, coordination and field problems resulting from the connection of the above components.

3.6 FIRESTOPPING

Provide firestopping for holes at conduit penetrations through floor slabs, fire-rated walls, partitions with fire-rated doors, corridor walls, and vertical service shafts in accordance with Section 07 84 00 FIRESTOPPING.

3.7 PAINTING

a. In unfinished areas (including areas above drop ceilings), paint all exposed electrical conduit (serving fire alarm equipment), fire alarm conduit, surface metal raceway, junction boxes and covers red. In lieu of painting conduit, the contractor may utilize red conduit with a factory applied finish.

b. In finished areas, paint exposed electrical conduit (serving fire alarm equipment), fire alarm conduit, surface metal raceways, junction boxes, and electrical boxes to match adjacent finishes. The inside cover of the junction box must be identified as "Fire Alarm" and the conduit must have painted red bands 3/4-inch wide at 10-foot centers and at each side of a floor, wall, or ceiling penetration.

c. Painting must comply with Section 09 90 00 PAINTS AND COATINGS.

3.8 FIELD QUALITY CONTROL

3.8.1 Test Procedures

Submit detailed test procedures, prepared and signed by the NICET Level IV Fire Alarm Technician, and the representative of the installing company, and reviewed by the QFPE 60 days prior to performing system tests. Detailed test procedures must list all components of the installed system such as initiating devices and circuits, notification appliances and circuits, signaling line devices and circuits, control devices/equipment, batteries, transmitting and receiving equipment, power sources/supply, annunciators, special hazard equipment, emergency communication equipment, interface equipment, and surge protective devices. Test procedures must include sequence of testing, time estimate for each test, and sample test data forms. The test data forms must be in a check-off format (pass/fail with space to add applicable test data; similar to the forms in NFPA 72 and NFPA 4.) The test procedures and accompanying test data forms must be

used for the pre-Government testing and the Government testing. The test data forms must record the test results and must:

a. Identify the NFPA Class of all Initiating Device Circuits (IDC), and Notification Appliance Circuits (NAC), Voice Notification System Circuits (NAC Audio), and Signaling Line Circuits (SLC).

b. Identify each test required by NFPA 72 Test Methods and required test herein to be performed on each component, and describe how these tests must be performed.

c. Identify each component and circuit as to type, location within the facility, and unique identity within the installed system. Provide necessary floor plan sheets showing each component location, test location, and alphanumeric identity.

d. Identify all test equipment and personnel required to perform each test including equipment necessary for smoke detector testing. The use of magnets is not permitted.

e. Provide space to identify the date and time of each test. Provide space to identify the names and signatures of the individuals conducting and witnessing each test.

3.8.2 Pre-Government Testing

3.8.2.1 Verification of Compliant Installation

Conduct inspections and tests to ensure that devices and circuits are functioning properly. Tests must meet the requirements of paragraph entitled "Minimum System Tests" as required by NFPA 72. The contractor and an authorized representative from each supplier of equipment must be in attendance at the pre-Government testing to make necessary adjustments. After inspection and testing is complete, provide a signed Verification of Compliant Installation letter by the QFPE that the installation is complete, compliant with the specification and fully operable. The letter must include the names and titles of the witnesses to the pre-Government tests. Provide all completion documentation as required by NFPA 72 including all referenced annex sections and the test reports noted below.

a. NFPA 72 Record of Completion.

b. NFPA 72 Record of Inspection and Testing.

c. Fire Alarm and Emergency Communication System Inspection and Testing Form.

d. Audibility test results with marked-up test floor plans.

e. Intelligibility test results with marked-up floor plans.

f. Documentation that all tests identified in the paragraph "Minimum System Tests" are complete.

3.8.2.2 Request for Government Final Test

When the verification of compliant installation has been completed, submit a formal request for Government final test to the Designated Fire

Protection Engineer (DFPE). Government final testing will not be scheduled until the DFPE has received copies of the request for Government final testing and Verification of Compliant Installation letter with all required reports. Government final testing will not be performed until after the connections to the installation-wide fire reporting system and the installation-wide mass notification system have been completed and tested to confirm communications are fully functional. Submit request for test at least 15 calendar days prior to the requested test date.

3.8.3 Correction of Deficiencies

If equipment was found to be defective or non-compliant with contract requirements, perform corrective actions and repeat the tests. Tests must be conducted and repeated if necessary until the system has been demonstrated to comply with all contract requirements.

3.8.4 Government Final Tests

The tests must be performed in accordance with the approved test procedures in the presence of the DFPE. Furnish instruments and personnel required for the tests. The following must be provided at the job site for Government Final Testing:

a. The manufacturer's technical representative.

b. The contractor's Qualified Fire Protection Engineer (QFPE).

c. Marked-up red line drawings of the system as actually installed.

d. Loop resistance test results.

e. Complete program printout including input/output addresses.

f. Copy of pre-Government Test Certificate, test procedures and completed test data forms.

g. Audibility test results with marked-up floor plans.

h. Intelligibility test results with marked-up floor plans.

Government Final Tests will be witnessed by the Qualified Fire Protection Engineer (QFPE). At this time, any and all required tests noted in the paragraph "Minimum System Tests" must be repeated at their discretion.

3.9 MINIMUM SYSTEM TESTS

3.9.1 System Tests

Test the system in accordance with the procedures outlined in NFPA 72. The required tests are as follows:

a. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests must be witnessed by the Contracting Officer and test results recorded for use at the final Government test.

b. Verify the absence of unwanted voltages between circuit conductors and ground. Wiring must be free of opens, shorts, and grounds. The tests

must be accomplished at the pre-Government test with results available at the final system test.

c. Verify that the control unit is in the normal condition as detailed in the manufacturer's O&M manual.

d. Test each initiating device and notification appliance and circuit for proper operation and response at the control unit. Smoke detectors must be tested in accordance with manufacturer's recommended calibrated test method. Use of magnets is prohibited. Testing of duct smoke detectors must comply with the requirements of NFPA 72 except disconnect at least 20 percent of devices. If there is a failure at these devices, then supervision must be tested at each device.e. Test the system for specified functions in accordance with the contract drawings and specifications and the manufacturer's O&M manual.

f. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the time period and in the manner specified.

g. Determine that the system is operable under trouble conditions as specified.

h. Visually inspect wiring.

i. Test the battery charger and batteries.

j. Verify that software control and data files have been entered or programmed into the FMCU. Hard copy records of the software must be provided to the Contracting Officer.

k. Verify that red-line drawings are accurate.

l. Measure the current in circuits to ensure there is the calculated spare capacity for the circuits.

m. Measure voltage readings for circuits to ensure that voltage drop is not excessive.

n. Disconnect the verification feature for smoke detectors during tests to minimize the amount of smoke needed to activate the sensor. Testing of smoke detectors must be conducted using real smoke or the use of canned smoke which is permitted.

o. Measure the voltage drop at the most remote appliance (based on wire length) on each notification appliance circuit.

p. Verify the documentation cabinet is installed and contains all as-built shop drawings, product data sheets, design calculations, site-specific software data package, and all documentation required by paragraph titled "Test Reports".

3.9.2 Audibility Tests

Sound pressure levels from audible notification appliances must be a minimum of 15 dBa over ambient with a maximum of 110 dBa in any occupiable area. The provisions for audible notification (audibility and intelligibility) must be met with doors, fire shutters, movable partitions, and similar devices closed.

3.9.3 Intelligibility Tests

Intelligibility testing of the System must be accomplished in accordance with NFPA 72 for Voice Evacuation Systems, and ASA S3.2. Following are the specific requirements for intelligibility tests:

a. Intelligibility Requirements: Verify intelligibility by measurement after installation.

b. Ensure that a CIS value greater than the required minimum value is provided in each area where building occupants typically could be found. The minimum required value for CIS is 0.7. Rounding of values is permitted.

c. Areas of the building provided with hard wall and ceiling surfaces (such as metal or concrete) that are found to cause excessive sound reflections may be permitted to have a CIS score less than the minimum required value if approved by the DFPE, and if building occupants in these areas can determine that a voice signal is being broadcast and they must walk no more than 33 feet to find a location with at least the minimum required CIS value within the same area.

d. Areas of the building where occupants are not expected to be normally present are permitted to have a CIS score less than the minimum required value if personnel can determine that a voice signal is being broadcast and they must walk no more than 50 feet to a location with at least the minimum required CIS value within the same area.

e. Take measurements near the head level applicable for most personnel in the space under normal conditions (e.g., standing, sitting, sleeping, as appropriate).

f. The distance the occupant must walk to the location meeting the minimum required CIS value must be measured on the floor or other walking surface as follows:

   (1) Along the centerline of the natural path of travel, starting from any point subject to occupancy with less than the minimum required CIS value.

   (2) Curving around any corners or obstructions, with a 12 inches clearance there from.

   (3) Terminating directly below the location where the minimum required CIS value has been obtained.

g. Intelligibility test is required after the system installation as part of the preliminary tests and final inspection and acceptance tests. This project has a separate FF&E contractor who installs the furniture systems after the construction contractor. FF&E affects tremendously to the fire alarm and mass notification system intelligibility level. To ensure the facility is code compliant prior to building occupancy, the construction contractor is required to conduct another intelligibility test after the completion of FF&E installation, and witnessed by the Government. If the fire alarm and mass notification system fails the intelligibility test, the construction contractor must be responsible to modify the system to meet intelligibility requirement in accordance with the contract without incurring

additional cost to the Government.

Use commercially available test instrumentation to measure intelligibility as specified by NFPA 72 as applicable. Use the mean value of at least three readings to compute the intelligibility score at each test location.

3.10 SYSTEM ACCEPTANCE

Following acceptance of the system, as-built drawings and O&M manuals must be delivered to the Contracting Officer for review and acceptance. The drawings must show the system as installed, including deviations from both the project drawings and the approved shop drawings. These drawings must be submitted within two weeks after the final Government test of the system. At least one set of as-built (marked-up) drawings must be provided at the time of, or prior to the Final Government Test.

a. The drawings must be prepared electronically and sized no less than the contract drawings. Furnish one set of CDs or DVDs containing software back-up and CAD based drawings in latest version of AutoCAD, DXF and portable document formats of as-built drawings and schematics.

b. Include complete wiring diagrams showing connections between devices and equipment, both factory and field wired.

c. Include a riser diagram and drawings showing the as-built location of devices and equipment.

d. Provide Operation and Maintenance (O&M) Instructions.

3.11 INSTRUCTION OF GOVERNMENT EMPLOYEES

3.11.1 Instructor

Provide the services of an instructor, who has received specific training from the manufacturer for the training of other persons regarding the operation, inspection, testing, and maintenance of the system provided. The instructor must train the Government employees designated by the Contracting Officer, in the care, adjustment, maintenance, and operation of the fire alarm system. The instructor must be thoroughly familiar with all parts of this installation. The instructor must be trained in operating theory as well as in practical O&M work. Submit the instructors information and qualifications including the training history.

3.11.2 Required Instruction Time

Provide 8 hours of instruction after final acceptance of the system. The instruction must be given during regular working hours on such dates and times selected by the Contracting Officer. The instruction may be divided into two or more periods at the discretion of the Contracting Officer. The training must allow for rescheduling for unforeseen maintenance and fire department responses.

3.11.2.1 Technical Training

Equipment manufacturer or a factory representative must provide 1 days of on site and 5 days of technical training to the Government at the manufacturing facility for 5 government personnel. Training must allow for classroom instruction as well as individual hands on programming,

troubleshooting and diagnostics exercises. Factory training must occur within 6 months of system acceptance.

3.11.3 Technical Training Manual

Provide, in manual format, lesson plans, operating instructions, maintenance procedures, and training data for the training courses. The operations training must familiarize designated government personnel with proper operation of the installed system. The maintenance training course must provide the designated government personnel adequate knowledge required to diagnose, repair, maintain, and expand functions inherent to the system.

3.12 EXTRA MATERIALS

3.12.1 Repair Service/Replacement Parts

Repair services and replacement parts for the system must be available for a period of 10 years after the date of final acceptance of this work by the Contracting Officer. During the warranty period, the service technician must be on-site within 24 hours after notification. All repairs must be completed within 24 hours of arrival on-site.

During the warranty period, the installing fire alarm contractor is responsible for conducting all required testing and maintenance in accordance with the requirements and recommended practices of NFPA 72 and the system manufacturer(s). Installing fire alarm contractor is NOT responsible for any damage resulting from abuse, misuse, or neglect of equipment by the end user.

3.12.2 Spare Parts

Install a spare parts box adjacent to the FMCU. Spare parts box must be a steel cabinet with locking, hinge-mounted door. Spare parts box must be mounted no more than 3-ft above the finished floor.

Spare parts furnished must be directly interchangeable with the corresponding components of the installed system(s). Spare parts must be suitably packaged and identified by nameplate, tagging, or stamping. Spare parts must be placed in the spare parts box and must be accompanied by an inventory list.

3.12.3 Document Storage Cabinet

Upon completion of the project, but prior to project close-out, place in the document storage cabinet copies of the following record documentation:

a. As-built shop drawings

b. Product data sheets

c. Design calculations

d. Site-specific software data package

e. All documentation required by SD-06.

-- End of Section --

CONTRACTOR ENVIRONMENTAL GUIDE

Marine Corps Base Camp Lejeune
Camp Lejeune, North Carolina

September 2023

Table of Contents

Table of Contents i

Record of Changes x

Contractor Phone Directory xi

1.0 Contractor Environmental Guide Overview 1-1

1.1 Key Definitions and Concepts 1-1
1.1.1 Key Definitions 1-1
1.1.2 Key Concepts 1-2

1.2 Installation Background 1-2
1.2.1 Environmental Management Division and Installation and Environment Department 1-3
1.2.2 Expectations 1-4

1.3 Overview of Requirements 1-4
1.3.1 Contractor Environmental Guide 1-5
1.3.2 Environmental and EMS Training 1-5

1.4 Points of Contact 1-6

2.0 Environmental Management System 2-1

2.1 Key Definition and Concepts 2-1
2.1.1 Key Definitions 2-1
2.1.2 Key Concepts 2-1

2.2 Overview of Requirements 2-2

2.3 Environmental Management System 2-3

2.4 EMS Responsibilities 2-4

2.5 Contractor Environmental Guide and EMS 2-4

3.0 Training 3-1

3.1 Key Definitions and Concepts 3-1
3.1.1 Key Definitions 3-1
3.1.2 Key Concepts 3-1
3.1.3 Environmental Management System 3-2

3.2 Overview of Requirements 3-2

3.3 Training Requirements 3-2
3.3.1 General Environmental Awareness 3-2
3.3.2 Environmental Management System (EMS) 3-2
3.3.3 Recordkeeping 3-2

4.0 Air Quality 4-1

4.1 Key Definitions and Concepts 4-1
4.1.1 Key Definitions 4-1
4.1.2 Key Concepts 4-1
4.1.3 Environmental Management System 4-1

4.2 Overview of Requirements 4-2
4.3 Permit Requirements 4-2
4.4 Additional Activities of Concern 4-3
5.0 Environmental Emergency Planning and Response 5-1
5.1 Key Definitions and Concepts 5-1
5.1.1 Key Definitions 5-1
5.1.2 Key Concepts 5-1
5.1.3 Environmental Management System 5-2
5.2 Overview of Requirements 5-2
5.3 Spill Notification 5-3
5.3.1 POL/HazMat Spill Notification Procedures 5-3
5.3.2 Wastewater Spill and Water Line Break Notification 5-3
5.4 Follow Up 5-4
6.0 Cultural Resource 6-1
6.1 Key Definitions and Concepts 6-1
6.1.1 Key Definitions 6-1
6.1.2 Key Concepts 6-1
6.1.3 Environmental Management System 6-2
6.2 Overview of Requirements 6-2
6.3 Procedures 6-3
7.0 Hazardous Materials/Hazardous Waste Management 7-1
7.1 Key Definitions and Concepts 7-1
7.1.1 Key Definitions 7-1
7.1.2 Key Concepts 7-2
7.1.3 Environmental Management System 7-3
7.2 Overview of Requirements 7-4
7.3 Hazardous Materials Requirements 7-5
7.4 Hazardous Waste Requirements 7-8
7.4.1 Storage 7-8
7.4.2 Manifesting and Disposal 7-9
7.5 Non-RCRA-Regulated Waste Requirements 7-9
7.5.1 Used Oil and Oil Filters 7-9
7.5.2 Used Antifreeze 7-10
7.5.3 Petroleum-Contaminated Wipes and Oily Rags 7-10
7.5.4 Used Electronic Equipment 7-10
7.5.5 New and Used Batteries 7-10
8.0 Asbestos 8-1
8.1 Key Definitions and Concepts 8-1

8.1.1 Key Definitions 8-1
8.1.2 Key Concepts 8-2
8.1.3 Environmental Management System 8-2
8.2 Overview of Requirements 8-2
8.3 Responsibilities Before a Demolition or Renovation Project 8-3
8.3.1 Identification of ACM and PACM 8-3
8.3.2 Notification 8-3
8.3.3 Removal 8-3
8.3.4 Training 8-4
8.4 Responsibilities During a Demolition or Renovation Project 8-4
8.5 Disposal of ACM Waste 8-4
9.0 Lead-Based Paint 9-1
9.1 Key Definitions and Concepts 9-1
9.1.1 Key Definitions 9-1
9.1.2 Key Concepts 9-1
9.1.3 Environmental Management System 9-2
9.2 Overview of Requirements 9-2
9.3 Responsibilities Before Renovation or Demolition 9-3
9.4 Permits 9-3
9.5 Disposal 9-3
9.6 Training 9-4
10.0 Natural Resources 10-1
10.1 Key Definitions and Concepts 10-1
10.1.1 Key Definitions 10-1
10.1.2 Key Concepts 10-2
10.1.3 Environmental Management System 10-2
10.2 Overview of Requirements 10-2
10.3 National Environmental Policy Act 10-4
10.4 Timber 10-4
10.5 Wildlife and Protected Species 10-5
10.6 Wetlands and Streams 10-6
10.6.1 Impacts 10-6
10.6.2 Permitting 10-7
10.7 Temporary Construction 10-8
11.0 Stormwater 11-1
11.1 Key Definitions and Concepts 11-1
11.1.1 Key Definitions 11-1
11.1.2 Key Concepts 11-2

11.1.3 Environmental Management System 11-3

11.2 Overview of Requirements 11-4

11.3 Prior to Site Work 11-5
11.3.1 Construction Notifications 11-5
11.3.2 Familiarity with the NPDES Municipal Separate Storm Sewer System (MS4) 11-5
11.3.3 Project-Specific Construction Permits 11-5

11.4 Responsibilities During Site Work 11-6

12.0 Solid Waste, Recycling, and Pollution Prevention (P2) 12-1

12.1 Key Definitions and Concepts 12-1
12.1.1 Key Definitions 12-1
12.1.2 Key Concepts 12-1
12.1.3 Environmental Management System 12-2

12.2 Overview of Requirements 12-2

12.3 Solid Waste Requirements 12-3
12.3.1 MCB Camp Lejeune Landfill Acceptable Waste Streams 12-4

12.4 Recycling Requirements 12-5
12.4.1 Recycling Center 12-5
12.4.2 Other Recyclables 12-6

12.5 Pollution Prevention and Green Procurement 12-6

13.0 Potential Discovery of Undocumented Contaminated Sites 13-1

13.1 Key Definitions and Concepts 13-1
13.1.1 Key Definitions 13-1
13.1.2 Key Concepts 13-1
13.1.3 Environmental Management System 13-1

13.2 Overview of Requirements 13-1

13.3 Unforeseen Site Condition Procedures 13-2
13.3.1 Petroleum, Oil, and Lubricants 13-2
13.3.2 Munitions and Ordnance 13-2

14.0 Permitting 14-1

14.1 Key Definitions and Concepts 14-1
14.1.1 Key Definitions 14-1
14.1.2 Key Concepts 14-1
14.1.3 Environmental Management System 14-1

14.2 Overview of Requirements 14-1

14.3 Project Permits and Approvals 14-1
14.3.1 Stormwater (Section 11.0) 14-2
14.3.2 Asbestos (Section 9.0) 14-2
14.3.3 Lead-Based Paint (Section 9.0) 14-2
14.3.4 Air Quality (Section 4.0) 14-2

14.3.5 Wetlands (Section 10.6) 14-3
14.3.6 Drinking Water/Wastewater 14-3
14.3.7 Aboveground Storage Tanks 14-4

List of Tables

Table 1-1: Contacts in Case of Spill 1-6
Table 2-1: Practices Identified Under MCB Camp Lejeune's EMS 2-5
Table 5-1: Environmental Emergency Response Contacts 5-2

List of Figures

Figure 1-1: Environmental Management Division (MCB Camp Lejeune) Organization Chart 1-3
Figure 1-2: Installation and Environment Department (MCAS New River) Organization Chart 1-4
Figure 2-1: Plan, Do, Check, Act Cycle 2-2
Figure 2-2: Potential Interactions of Construction and Demolition Activities with the Environment 2-3
Figure 6-1: Possible Cultural Resource Discovery Flow Chart 6-3
Figure 7-1: Diamond Hazard Label 7-3
Figure 7-2: NAVOSHENTRACEN Compatibility Chart 7-7
Figure 12-1: Base Landfill Requirements 12-4

List of Attachments

Attachment 2-1 – Marine Corps Installations East Policy Statement on Environmental Management and Conservation
Attachment 5-1 – MCIEAST-MCB CAMP LEJEUNE Spill Report Form
Attachment 7-1 – MCIEAST-MCB CAMP LEJEUNE Satellite Accumulation Area (SAA) Weekly Inspection Form
Attachment 7-2 – Weekly Hazardous Waste (HW) Storage Area Inspection Form
Attachment 7-3 – Marine Corps Installations East Marine Corps Base Camp Lejeune Initial AUL Build Form

List of Acronyms and Abbreviations

A

ACM	Asbestos-Containing Material
AHERA	Asbestos Hazard and Emergency Response Act
AHPA	Archaeological and Historic Preservation Act
ARPA	Archaeological Resources Protection Act
ASHARA	Asbestos School Hazard Abatement Reauthorization Act
ASD	Accumulation Start Date
ASO	Air Station Order
AST	Aboveground Storage Tank
AUL	Authorized Use List

B

BMP	Best Management Practice
BO	Base Order

C

C&D	Construction and Demolition
CAA	Clean Air Act
CAMA	Coastal Area Management Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CETEP	Comprehensive Environmental Training and Education Program
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
CG	Commanding General
CWA	Clean Water Act
CZMA	Coastal Zone Management Act

D

DHHS	Department of Health and Human Services
DLADS	Defense Logistics Agency Disposition Services
DM	Decision Memorandum
DMM	Discarded Military Munitions
DoD	Department of Defense
DoN	Department of Navy
DOT	Department of Transportation

E

EA	Environmental Assessment
ECATTS	Environmental Compliance Assessment, Training, and Tracking System
ECON	Environmental Conservation Branch
EHS	Extremely Hazardous Substance
EISA	Energy Independence and Security Act
ELLAP	Environmental Lead Laboratory Accreditation Program
EMD	Environmental Management Division
EMS	Environmental Management System
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency

EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
F	
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FOG	Fats, Oils, and Grease
FSC	Facilities Support Contracts
FWS	Fish and Wildlife Service
G	
GHG	Greenhouse Gas
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GIS	Geographic Information System
GP	Green Procurement
H	
HAP	Hazardous Air Pollutants
HCFC	Hydrochlorofluorocarbon
HCS	Hazard Communication Standard
HHCU	Health Hazards Control Unit (North Carolina)
HM	Hazardous Material
HMTA	Hazardous Materials Transportation Act
HQMC	Headquarters Marine Corps
HW	Hazardous Waste
HWMP	Hazardous Waste Management Plan
I	
I&E	Installation and Environment Department
IGI&S	Installation Geospatial Information & Services
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
L	
LBP	Lead-Based Paint
LDA	Land-Disturbing Activities
LID	Low Impact Development
LQG	Large Quantity Generator
M	
MAG	Marine Aircraft Group
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCM	Minimum Control Measure
MCIEAST	Marine Corps Installations East
MCO	Marine Corps Order
MEC	Munitions and Explosives of Concern
MEF	Marine Expeditionary Force
MMPA	Marine Mammal Protection Act
MS4	Municipal Separate Storm Sewer Systems
MSW	Municipal Solid Waste
N	
NAPL	Non-Aqueous Phase Liquid

NC	North Carolina
NCAC	North Carolina Administrative Code
NCDAQ	North Carolina Department of Air Quality
NCDCM	North Carolina Division of Coastal Management
NCDEQ	North Carolina Department of Environmental Quality
NCDFR	North Carolina Division of Forest Resources
NCDWR	North Carolina Division of Water Resources
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	National Response Center
NRHP	National Register of Historic Places
O	
ODS	Ozone-Depleting Substance
OPA	Oil Pollution Act
OSHA	Occupational Safety and Health Administration
OWS	Oil-Water Separator
P	
P2	Pollution Prevention
PACM	Presumed Asbestos-Containing Material
PCB	Polychlorinated biphenyl
POC	Point of Contact
POL	Petroleum, Oil, and Lubricant
PPA	Pollution Prevention Act
ppm	Parts Per Million
PPV	Public-Private Venture
PWD	Public Works Division
Q	
QRP	Qualified Recycling Program
R	
RACM	Regulated Asbestos-Containing Material
RCRA	Resource Conservation and Recovery Act
RCRS	Resource Conservation and Recovery Section
ROICC	Resident Officer in Charge of Construction
RRP	Renovation, Repair, and Painting
S	
SAA	Satellite Accumulation Area
SARA	Superfund Amendments & Reauthorization Act
SCM	Stormwater Control Measure
SDS	Safety Data Sheet
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention, Control, and Countermeasures
SWDA	Solid Waste Disposal Act
SWMP	Stormwater Management Plan

SWPPP	Stormwater Pollution Prevention Plan (*Also referred to as SPPP in NC*)
T	
TCLP	Toxic Characteristic Leaching Procedure
TSD	Treatment, Storage, and Disposal
TSI	Thermal System Insulation
U	
ULCP	Unit Level Contingency Plan
USC	United States Code
USACE	United States Army Corps of Engineers
USMC	United States Marine Corps
UW	Universal Waste
UXO	Unexploded Ordnance
X	
XRF	X-Ray Fluorescence

Record of Changes

Date	Description of Changes	Page #	Name/Initials

Contractor Phone Directory

In the event of an emergency, refer to the emergency numbers below. All non-emergency contractor inquirers regarding the operations at Marine Corps Base Camp Lejeune and Marine Corps Air Station New River should be directed to the Resident Officer in Charge of Construction (ROICC) or Contract Representative. The ROICC or Contract Representative will either directly contact or refer contractors to the appropriate Division or Organization.

Emergency and Important Non-Emergency Numbers

Fire and Emergency Services Division 911

Ambulance 911

Hearing Impaired ..... (910) 451-4444

CHEMTREC (Emergency 24-hour/ Outside MCB Camp Lejeune) ..... (800) 424-9300

Hazardous Chemical Spill 911

Military Police 911

National Response Center (NRC, Outside MCB Camp Lejeune) ..... Toll Free (800) 424-8802

Provost Marshall Office 911

Marine Corps Base Camp Lejeune

Operator/ Directory Assistance ..... (910) 451-1113

Confined Space Program Manager ..... (910) 451-7454

..... (910) 451-5725

Environmental Management Division ..... (910) 451-5003

- -Environmental Compliance Branch ..... (910) 451-5837
  - Asbestos Management ..... (910) 451-0718
  - Resource Conservation and Recovery Section ..... (910) 451-1482
  - Hazardous Material Consolidation Site ..... (910) 451-1482
  - Free Issue ..... (910) 451-1718
  - Recycling Center, Building 982 ..... (910) 451-4214
  - Qualified Recycling Program Manager ..... (910) 451-2037
- -Environmental Conservation Branch ..... (910) 451-9384
  - Fish & Wildlife ..... (910) 451-9384
  - Forestry Management ..... (910) 451-9384
  - NEPA ..... (910) 451-4542
  - Conservation Law Enforcement ..... (910) 451-2196/5226

-Environmental Quality Branch

Air Quality .....(910) 451-5836
Storage Tanks Manager .....(910) 451-9641

Water Quality .....(910) 451-9518

Explosives and Ordnance Disposal.....(910) 451-5419

Public Works Division .....(910) 451-5307

-Contracts Branch .....(910) 451-0034

-Officer In Charge of Construction (Main) .....(910) 451-2581 (x5237)

-Public Works Base Utility Director .....(see Water Line Break or Steam Generation)

Water Line Break/Wastewater Line Break.....(910) 451-7190 (x223)

Steam Generation and High Voltage.....(910) 581-1249

-Public Works Solid Waste Division/Landfill .....(910) 451-4998

Range Control .....(910) 451-3064

Installation Geospatial Information & Services .....(910) 451-4755

Safety Department.....(910) 451-5725

Marine Corps Air Station New River

Confined Space Program.....(910) 449-4964

Consolidated Hazardous Material Reutilization and Inventory Management Program ....(910) 449-4533

Installation and Environment (Director) .....(910) 449-5442

-Installation and Environment (Deputy Director) .....(910) 449-5441

-Installation and Environment (Environmental Supervisor).....(910) 449-6143

-Installation and Environment (GIS Manager) .....(910) 449-4731

-Installation and Environment (Hazardous Waste Manager) .....(910) 449-5997

-Conservation Law Enforcement.....(910) 449-4776

.....(910) 449-4777

Explosives Safety Officer .....(910) 449-5443

Military Police (Non-Emergency).....(910) 449-4248

-Officer In Charge of Construction .....(910) 449-5587

Safety Department.....(910) 449-5440

1.0 Contractor Environmental Guide Overview

Environmental protection is an integral part of the Marine Corps mission in order to protect public health, preserve environmental quality, comply with regulatory requirements, and develop and strengthen relationships between the Marine Corps community and external stakeholders. The purpose of this Contractor Environmental Guide is to assist contractors working aboard Marine Corps Installations East's (MCIEAST's) Marine Corps Base (MCB) Camp Lejeune and Marine Corps Air Station (MCAS) New River in maintaining the mission by complying with Federal and State environmental laws and regulations, as well as the United States Marine Corps (USMC) and installation environmental policies. This guide is written in accordance with Marine Corps Order (MCO) 5090.2 and designed to answer many of the environmental questions that arise, as well as to provide pertinent information on environmental topics and training requirements.

Note: This document should be used only as a guide to environmental issues contractors may face while working aboard MCB Camp Lejeune and MCAS New River. It is expected that contractors will work closely with the Environmental Management Division (EMD) at MCB Camp Lejeune, the Installation and Environment Department (I&E) at MCAS New River, and Contract Representatives regarding environmental management issues, concerns, and/or questions. Should the need arise, this guide provides contractors with EMD, I&E, and emergency response points of contact (POC). All initial inquiries should be directed to the Resident Officer in Charge of Construction (ROICC) or Contract Representative, who will either direct the contractor or contact the appropriate environmental office if additional clarification regarding an environmental issue is necessary. Contact the ROICC or Contract Representative with any questions.

Note: It is very important to note that this guide is designed to provide requirements specific to MCB Camp Lejeune-issued contracts. It is the contractor's responsibility to know and comply with all Federal, State, and local regulations. MCB Camp Lejeune environmental personnel will assist contractors with compliance issues; however, the primary burden of regulatory identification, familiarity, and compliance lies with the contractor. This training *does not* replace any required regulatory environmental training or certification as per contract requirements. All required environmental training should be completed *prior* to working at MCIEAST installations.

Note: It is the contractor's responsibility to review the project-specific contract and specifications. Additional environmental requirements, submissions, and/or meetings not documented in this guide may be required.

1.1 Key Definitions and Concepts

The following key definitions and concepts are used throughout this guide. Consult the ROICC or Contract Representative with any questions about these definitions or concepts, who will contact the appropriate environmental office for clarification, as necessary.

1.1.1 Key Definitions

- **Environment.** Surroundings, to include all surface water, groundwater, drinking water supply, land surface or subsurface area, or ambient air within the United States or under the jurisdiction of the United States, including manmade structures, indoor air environments, natural resources, and archeological and cultural resources.
- **Environmental Management Division.** MCB Camp Lejeune's division responsible for environmental issues and compliance at MCB Camp Lejeune.

- **Installation and Environment Department.** MCAS New River's department responsible for environmental issues and compliance at MCAS New River.
- **Environmental Management System (EMS).** A systematic approach for integrating environmental considerations and accountability into day-to-day decision-making and long-term planning processes across all missions, practices, and functions. The EMS institutionalizes processes for continual environmental improvement and reducing risks to mission through ongoing planning, review, and preventive or corrective action.

1.1.2 Key Concepts

- **Environmental Requirement.** A defined standard pertaining to environmental compliance, pollution prevention (P2), or natural/cultural resources, subject to uniform application. Environmental requirements may be in the form of a law, regulation, Executive Order (EO), policy, ordinance, permit, Base Order (BO), or other form that prescribes a standard.
- **Executive Order.** Legally binding orders given by the President, as head of the Executive Branch, to direct Federal agencies and officials in their execution of congressionally established laws or policies.
- **MCB Camp Lejeune.** Throughout this document, MCB Camp Lejeune includes all real property and associated outlying areas.
- **Marine Corps Order.** A directive of continuing authority or information, meant to be a permanent reference, and requiring continuing action issued by Headquarters Marine Corps (HQMC). In accordance with MCO 5215.1K (10 May 2007), all MCOs shall, where applicable: establish, describe, or change existing policy, programs and major activities, and organizations; define missions; assign responsibilities; issue procedural guidance; and be written in standardized format.
- **Resident Officer In Charge of Construction.** The ROICC administers construction contracts and is the contractor's first line of contact with the government.
- **Regulatory Requirements.** Government (including Federal, States, and local) environmental regulations implemented by environmental statutes. Federal regulations often establish minimum standards for State and local governments' implementing programs.
- **Statutory Requirements.** Federal environmental statutes are laws that generally require compliance by U.S. Department of Defense (DoD) installations.

1.2 Installation Background

MCB Camp Lejeune was established in 1941 in Onslow County, along the southern coast of North Carolina (NC). MCB Camp Lejeune is just south of MCAS New River. MCB Camp Lejeune takes advantage of 156,000 acres and 11 miles of beach capable of supporting amphibious operations, 32 gun positions, 48 tactical landing zones, three state-of-the-art training facilities, and 80 live fire ranges for its training mission.

The primary function of MCB Camp Lejeune is national defense, providing a home installation for the II Marine Expeditionary Force (MEF), 2nd Marine Division, 2nd Force Service Support Group, and other combat units and support commands. MCB Camp Lejeune's mission is to maintain combat-ready units for expeditionary deployment. MCB Camp Lejeune maintains and utilizes supply warehouses, maintenance shops, hazardous material storage, non-hazardous and hazardous waste storage, bulk fuel storage and transfer facilities, fleet parking, housing areas, recreational areas, two golf courses, and a marina.

MCAS New River is the principal USMC helicopter operating location on the East Coast and supports aircrew training in the CH-53 helicopter. It is also the evaluation and prospective bed-down site for the V-22 Osprey. The mission of MCAS New River is to provide the necessary support for its Marine Aircraft Group (MAG) tenant units, MAG-26 and MAG-29.

1.2.1 Environmental Management Division and Installation and Environment Department

MCB Camp Lejeune's EMD, within the GF Department, is responsible for all natural resource and environmental matters aboard the installation. EMD works closely with activities at MCB Camp Lejeune, educating and training personnel to comply with environmental laws while accomplishing the military mission.

The I&E Department at MCAS New River works closely with the EMD on environmental compliance and protection matters. Due to various joint operations, MCB Camp Lejeune and MCAS New River participate together in one EMS. See Figures 1-1 and 1-2 below for organization charts of EMD and I&E.

Figure 1-1: Environmental Management Division (MCB Camp Lejeune) Organization Chart

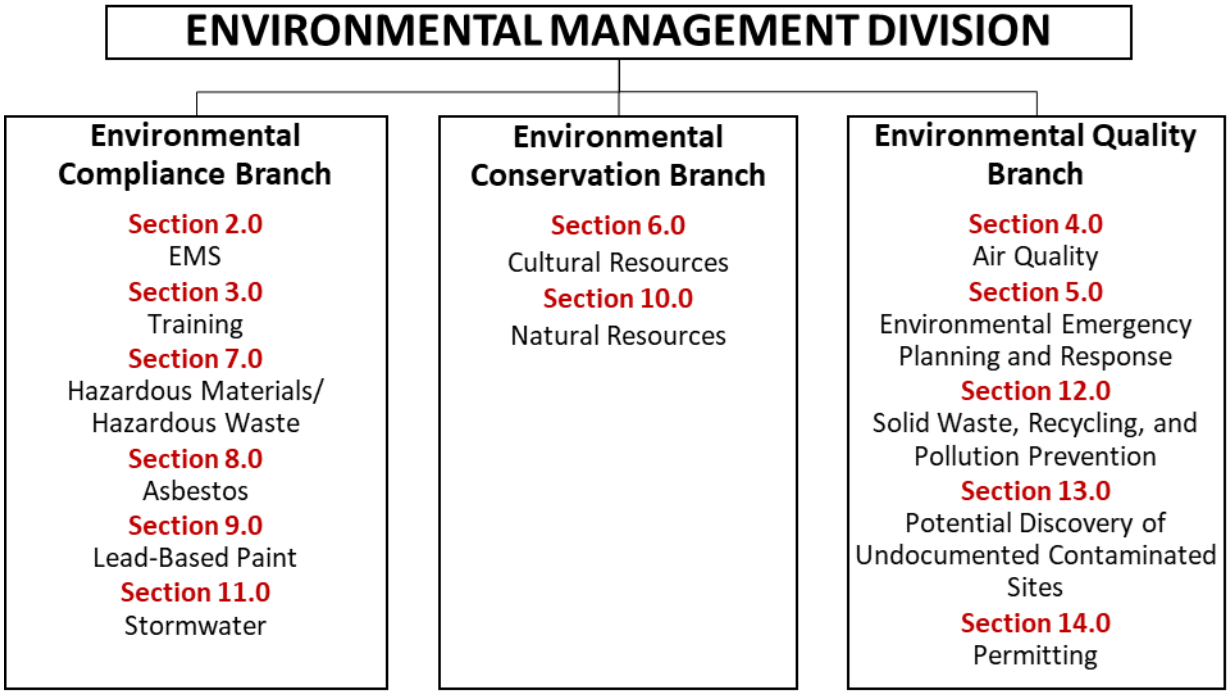
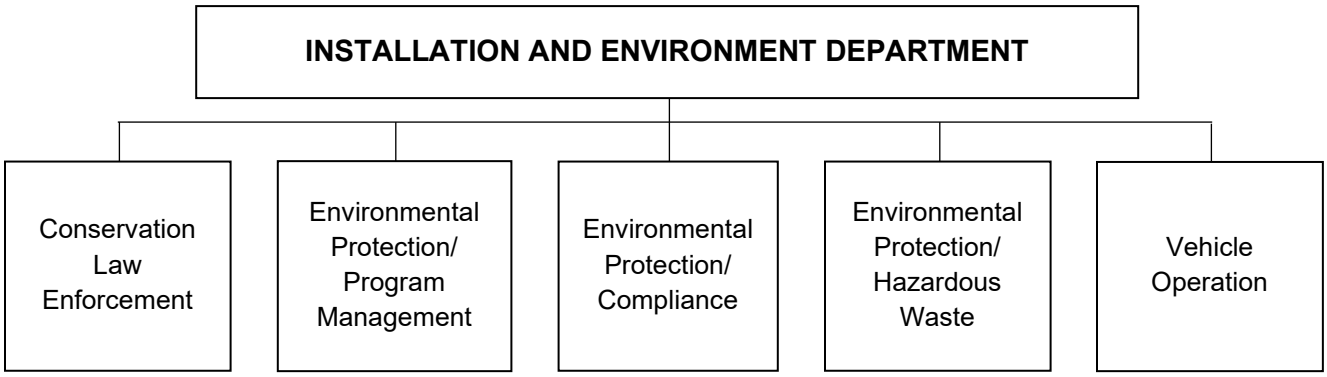


Figure 1-2: Installation and Environment Department (MCAS New River) Organization Chart



1.2.2 Expectations

Contractors aboard the installation exhibiting commitment to strict compliance with environmental laws and regulations assist MCB Camp Lejeune in providing the best possible training facilities for today's Marines and Sailors, while honoring our environmental responsibilities and objectives. Violation of environmental laws may result in severe civil or criminal penalties and fines.

1.3 Overview of Requirements

Contractors operating aboard MCB Lejeune and MCAS New River must be aware of and adhere to all applicable environmental regulations and requirements, which include but may not be limited to:

- **EO 12088, Federal Compliance with Pollution Control Standards (October 13, 1978).** Requires all facilities owned by or leased to or by the military to be designed, operated, and maintained in compliance with all applicable environmental standards. Military and civilian personnel must cooperate with Federal, State, and local environmental protection agencies and comply with applicable standards and criteria issued by these agencies to the extent permitted by law.
- **EO 13834, Efficient Federal Operations (May 17, 2018).** EO 13834 was revoked except for Sections 6, 7, and 11 by EO 13990 and revoked in full by EO 14057. The Implementing Instructions for EO 13834 (April 2019) provides instructions to Federal agencies regarding the implementation of EO 13834 including agency planning, reporting requirements (e.g., Emergency Planning and Community Right-to-Know Act [EPCRA] reporting), and accountability.
- **EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All (April 21, 2023).** EO 14096 requires that each agency make achieving environmental justice part of its mission and requires each agency to report in accordance with sections 301 through 313 of EPCRA after considering applicable EPA guidance and without regard to the Standard Industrial Classification or North American Industry Classification System delineations. Implementation instructions for EO 14096 have not yet been released and should be available within 6 months of the date of the EO.
- **MCO 5090.2, Environmental Compliance and Protection Program Volumes 1-21 (11 June 2018).** USMC policies and responsibilities for compliance with environmental statutes and regulations, as well as the management of USMC environmental programs.

1.3.1 Contractor Environmental Guide

This guide consists of the following information:

- MCB Camp Lejeune Contractor Environmental Guide
  - EMS overview and requirements
  - Environmental program-specific requirements
- MCB Camp Lejeune General EMS and Environmental Awareness Training for Contractors and Vendors
- Signature Page

Prior to beginning work onsite, or within 30 days of beginning work onsite, all contractors and their employees performing work aboard MCB Camp Lejeune must review these materials and complete EMS and General Environmental Awareness training. This guide summarizes the EMS and environmental programs at MCB Camp Lejeune, as well as key requirements associated with the various environmental issues contractors may encounter while performing work aboard the installation. Contractors are expected to work with their ROICC or Contract Representatives and EMD/I&E when environmental concerns or issues arise.

1.3.2 Environmental and EMS Training

In accordance with DoD instructions and MCOs, EMD has implemented a Comprehensive Environmental Training and Education Program (CETEP). The goal of the CETEP is to ensure that appropriate environmental instruction and related information are provided to all levels of the Marine Corps in the most effective and efficient manner to achieve full compliance with all applicable environmental training requirements. A major component of the CETEP is to provide general environmental awareness training to all individuals associated with the installation, including contractors.

In addition to CETEP requirements, MCB Camp Lejeune has implemented an installation-wide EMS. The EMS highlights the fact that the authority and principal responsibility for controlling environmental impacts belong to those commands, units, offices, and personnel (including contractors) whose activities have the potential to impact the environment.

All contractors are required to receive both EMS and general environmental awareness training at the level necessary for their job function within the Environmental Compliance Assessment, Training, and Tracking System (ECATTS).

As such, contractors working aboard MCB Camp Lejeune will do the following:

- Conduct job responsibilities in compliance with environmental regulations and in conformance with EMS requirements.
- Complete all applicable environmental training and maintain associated records as per contract requirements.
- Complete EMS and general environmental awareness training and be aware of and understand the MCB Camp Lejeune Environmental Policy.
- Contact their ROICC or Contract Representative immediately regarding environmental and/or EMS issues.

Prior to beginning work onsite or within 30 days, all contractors must sign and date the signature page and return it to the installation Contract Representative. Anyone who works on a contract at any point during the contract period must receive this information and training.

1.4 Points of Contact

EMD Branches and phone numbers are found in the Contractor's Phone Directory on page xi of this guide. All initial inquiries regarding an environmental issue should be directed to the ROICC or Contract Representative, who will either direct the contractor to or contact the appropriate environmental office if additional clarification is necessary. In the case of a spill or environmental emergency, immediately dial 911. Additional emergency response procedures are provided in Section 5.0 of this guide.

Table 1-1: Contacts in Case of Spill

For spills of:	Call:
Hazardous waste	**911**
Unknown materials	**911**
Material on a permeable surface	**911**
Any amount of a material	**911**
Non-hazardous waste	**911**

2.0 Environmental Management System

MCB Camp Lejeune and MCAS New River jointly operate an EMS, which provides a systematic way of continually implementing environmental requirements and evaluating performance. The EMS is founded on the principles of MCB Camp Lejeune's Environmental Policy, which is endorsed by the Commanding General (CG). Three key principles of the Environmental Policy are to:

- Comply with relevant environmental laws and regulations;
- Prevent pollution; and
- Continually improve the EMS.

The EMS promotes sustained mission readiness through actively identifying and implementing opportunities for efficient resource use. The USMC implements EMS at all levels to continually improve environmental compliance programs and meet evolving EOs and DoD requirements for mission sustainability. The EMS highlights the fact that the authority and principal responsibility for controlling environmental impacts belong to those commands, units, offices, and personnel (including contractors and vendors) whose activities have the potential to impact the environment. Contact the ROICC or Contract Representative with any questions.

2.1 Key Definition and Concepts

The following key definitions and concepts are associated with an EMS. Contact the ROICC or Contract Representative with any questions about these definitions or concepts.

2.1.1 Key Definitions

- **Environment.** Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation.
- **Environmental Aspect.** A characteristic of an organization's activities, products, or services that may cause, in normal operation or upset mode, an impact to an environmental or other resource. Each practice may have several aspects.
- **Environmental Impact.** An effect, beneficial or adverse, of a practice's aspect on an environmental or other resource. Each practice may have several impacts.
- **Environmental Resources.** Sensitive environmental receptors (e.g., air, water, natural resources) or cultural or historic assets at MCB Camp Lejeune or MCAS New River, in the surrounding community, within the ecosystem, or beyond, that may be impacted by the operation of practices.
- **Practice.** A unit process that supports a military mission and may impact environmental resources. (It is the ability to impact an environmental resource that is key to defining a practice. However, practices may also impact other resources.)
- **Practice Owner.** Person(s) responsible for control of practices. EMS procedures use the term *practice owner* when the assignment of more specific responsibilities is left to the owning organizations.
- **Requirement.** Legislation, regulation, or policy issued by any Executive, Federal, State, local, DoD, Department of Navy (DoN), or USMC authority that addresses environmental considerations and requires action.

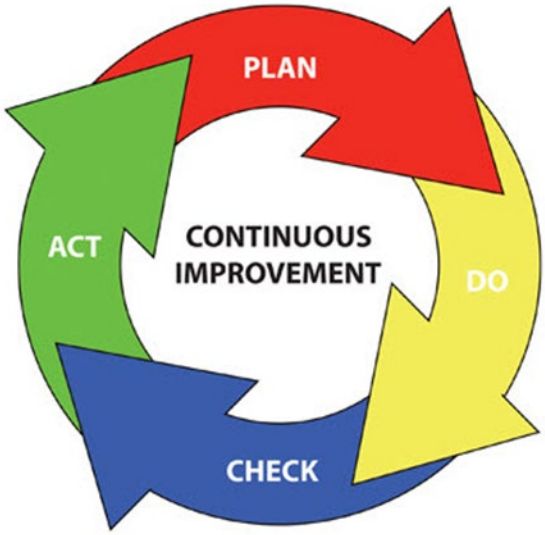
2.1.2 Key Concepts

- **Environmental Management System.** A systematic approach for integrating environmental considerations and accountability into day-to-day decision-making and long-term planning

processes across all missions, activities, and functions. The EMS institutionalizes processes for continual environmental improvement and reducing risks to mission through ongoing planning, review, and preventive or corrective action.

- **Environmental Policy.** Public commitment by senior leaders to the management of the installation's environmental affairs, including environmental compliance, pollution prevention, natural/cultural resource management, cleanup, risk to mission, and continual improvement of the EMS.
- **Plan, Do, Check, Act.** Four-step model by which the EMS carries out change – Plan: establish objectives and processes, Do: implement and execute the plan, Check: study and analyze the results, Act: take action based on what you learned.

Figure 2-1: Plan, Do, Check, Act Cycle



2.2 Overview of Requirements

Contractors operating aboard MCB Camp Lejeune and MCAS New River must be aware of and adhere to all applicable regulations and requirements concerning EMS, which include but may not be limited to:

- **EO 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability (December 8, 2021).** EO 14057 outlines a coordinated, whole-of-government approach, along with individual agency goals and actions, to transform Federal procurement and operations to reduce greenhouse gas (GHG) emissions and environmental impacts and secure a transition to clean energy and sustainable technologies. The Implementing Instructions for EO 14057 (August 2022) states that agencies should continue to use effective management strategies, such as EMS, if it aligns with and supports their agency needs and facilitates implementation and progress toward EO goals.
- **DoD Instruction 4715.17, Environmental Management Systems (April 15, 2009, and Incorporating Change 2 from August 31, 2018).** DoD Instruction 4715.17, in accordance with DoD Directive 5134.01, establishes policy, assigns responsibilities, and prescribes procedures for achieving conformance with EMS.
- **MCO 5090.2, Environmental Compliance and Protection Program Volume 2 (11 June 2018).** Volume 2 establishes policy and responsibilities for effective environmental program

management through execution of the USMC EMS. The goal of the EMS is to enable USMC units, tenants, commands, installations, and regions to achieve, maintain, and proactively address environmental compliance and protection requirements while sustaining resources essential to combat training and readiness. This Volume further states that USMC shall implement functional EMSs at all appropriate levels (e.g., installation) to facilitate the continual improvement of USMC environmental compliance programs while meeting evolving EO and DoD policy requirements for mission sustainability.

2.3 Environmental Management System

An EMS is a systematic way to identify and eliminate or minimize the installation's environmental risk-to-mission. MCB Camp Lejeune's EMS identifies practices and their aspects as a starting point for prioritizing environmental management initiatives. Each installation practice, such as construction/renovation/demolition, equipment operation/maintenance/disposal, landscaping, or pesticide/herbicide management and application, has one or more environmental aspects. The following figure illustrates simplified potential interactions of one practice, construction/renovation/demolition, with the environment.

Figure 2-2: Potential Interactions of Construction and Demolition Activities with the Environment

2.4 EMS Responsibilities

Contractors are expected to understand that the practices they support on the installation may interact with and have impacts on the environment. Therefore, it is expected that contractors will do the following:

- Review the Contractor Environmental Guide.
- Be aware of the Environmental Policy (Attachment 2-1)
- Conduct practices in a way that avoids and/or minimizes impacts to the environment by complying with all applicable Federal, State, and local environmental regulations and BOs.
- Be familiar with spill response procedures.
- Report all environmental emergencies and spills.
- Report any environmental problems or concerns promptly and notify the ROICC or contract representative.
- Respond to data collection efforts upon request.

2.5 Contractor Environmental Guide and EMS

The Contractor Environmental Guide comprises sections that are categorized based on the type of environmental requirements routinely encountered by contractors at MCB Camp Lejeune. The following matrix is derived from MCB Camp Lejeune's EMS Working Group sessions and relates the contents of this guide to the practices aboard MCB Camp Lejeune. It is provided to assist contractors in narrowing down specific requirements that may apply to onsite activities.

Table 2-1: Practices Identified Under MCB Camp Lejeune's EMS

MCB Camp Lejeune 2020 Practices	Env. Emergency Response/Spill Response, Section 5.0	HM/HW, Section 7.0	Potential Discovery of Undocumented Contaminated Sites, Section 13.0	Asbestos, Section 8.0	Lead-Based Paint, Section 9.0	Stormwater, Section 11.0	Solid Waste, Recycling, and P2, Section 12.0	Training, Section 3.0	Cultural Resources, Section 6.0	Permitting, Section 14.0	Air Quality, Section 4.0	Natural Resources, Section 10.0
Battery management	Applicable To All Practices Conducted Aboard MCB Camp Lejeune	●	Applicable To All Practices Conducted Aboard MCB Camp Lejeune				●	Applicable To All Practices Conducted Aboard MCB Camp Lejeune				
Boat operation/ maintenance		●									●	
Boat, ramp, dock cleaning						●						
Boiler operation		●									●	
Building operation/ maintenance/repair		●		●			●					
Channel dredging						●						
Chlorination		●									●	
Composting						●	●					
Construction/demolition/ renovation				●	●	●	●		●			
Cooling tower operation and maintenance		●										
Degreasing		●									●	
Drinking water management		●										
Engine operation and maintenance		●									●	
Equipment operation/ maintenance/disposal		●		●			●					
Erosion/runoff control						●						●
Fish stocking												
Fueling and fuel management/storage		●				●					●	
Grease traps							●					
Habitat management		●									●	●
HCP operation		●										
HM storage		●				●					●	
HM transportation		●									●	
HW disposal offsite transport		●					●					
HW satellite accumulation area		●									●	
HW storage (<90 days)		●										
HW transportation		●		●	●						●	

MCB Camp Lejeune 2020 Practices	Env. Emergency Response/Spill Response, Section 5.0	HM/HW, Section 7.0	Potential Discovery of Undocumented Contaminated Sites, Section 13.0	Asbestos, Section 8.0	Lead-Based Paint, Section 9.0	Stormwater, Section 11.0	Solid Waste, Recycling, and P2, Section 12.0	Training, Section 3.0	Cultural Resources, Section 6.0	Permitting, Section 14.0	Air Quality, Section 4.0	Natural Resources, Section 10.0
Land clearing	Applicable To All Practices Conducted Aboard MCB Camp Lejeune		Applicable To All Practices Conducted Aboard MCB Camp Lejeune			●	●	Applicable To All Practices Conducted Aboard MCB Camp Lejeune	●			●
Landfill gas energy recovery system												
Landscaping		●				●						
Laundry		●										
Live fire range operations		●				●					●	●
Livestock operations						●	●					
Metal working		●					●				●	
Non-destructive inspection		●										
ODS/halon management		●									●	
Packaging/unpackaging							●					
Paint booth											●	
Paint gun cleaning		●									●	
Paint removal		●			●		●				●	
Painting		●					●				●	
Parts replacement		●		●			●					
Pesticide/herbicide management and application		●				●						
Polishing		●					●				●	
Pumping station/force main		●										
Range residue clearance		●				●	●					
Recreational facilities operation		●					●					
Road construction and maintenance						●	●		●	●	●	●
Rock-crushing operations							●				●	
Roofing kettle		●										
Sewers												
Sidewalk and road deicing		●				●						
Soil excavation/grading						●			●			●
Solid waste collection/transportation							●				●	

MCB Camp Lejeune 2020 Practices	Env. Emergency Response/Spill Response, Section 5.0	HM/HW, Section 7.0	Potential Discovery of Undocumented Contaminated Sites, Section 13.0	Asbestos, Section 8.0	Lead-Based Paint, Section 9.0	Stormwater, Section 11.0	Solid Waste, Recycling, and P2, Section 12.0	Training, Section 3.0	Cultural Resources, Section 6.0	Permitting, Section 14.0	Air Quality, Section 4.0	Natural Resources, Section 10.0
Storage tank management	Applicable To All Practices Conducted Aboard MCB Camp Lejeune	●	Applicable To All Practices Conducted Aboard MCB Camp Lejeune				●	Applicable To All Practices Conducted Aboard MCB Camp Lejeune			●	
Stormwater collection/conveyance						●						
Surface washing												
Swimming pool operation and maintenance		●										
Timber management												●
Universal waste storage/ collection		●										
Urban wildlife management							●					●
UXO/EOD operations		●									●	
Vehicle maintenance		●					●				●	
Vehicle parking						●						
Wash rack						●						

3.0 Training

The contractor is responsible for ensuring that every employee completes a program of classroom instruction or on-the-job training that teaches the employee to perform his or her duties in compliance with Federal, State, and local regulatory requirements. To minimize the environmental impact of MCB Camp Lejeune operations, all contractors are required to receive both EMS and general environmental awareness training at the level necessary for their job function.

To minimize the environmental impact of MCB Camp Lejeune operations, all civilian and military personnel, including contractors, are required to receive both EMS and general environmental awareness training at the level necessary for their job function. Required training can be conducted through ECATTS.

NOTE: The contractor is responsible for knowing and complying with Federal, State, and local regulations. MCB Camp Lejeune environmental personnel will assist contractors with compliance issues; however, the primary burden of regulatory identification, familiarity, and compliance lies with the contractor. This training ***does not*** replace any required regulatory training as per contract requirements. Required training should be completed ***prior*** to working at MCB Camp Lejeune. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

3.1 Key Definitions and Concepts

The following key definitions and concepts are associated with contractor training. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

3.1.1 Key Definitions

- **Explicitly Required Training.** Training expressly required by specific laws, regulations, or policies that apply due to the nature of work assignments, job functions, and/or specific licensing or certification requirements mandated by environmental laws, regulations, or policies.
- **Implicitly Required Training.** Instruction/information that is not expressly required by laws, regulations, or policies, but that may be reasonably inferred as being required to maintain compliance or is determined through EMS to reduce overall environmental risk.

3.1.2 Key Concepts

- **Comprehensive Environmental Training and Education Program (CETEP).** The USMC training program designed to ensure that high-quality, efficient, and effective environmental training, education, and information are provided at all levels of the USMC.
- **Environmental Management System (EMS).** The part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, reviewing, and maintaining the Environmental Policy.
- **EMS Training.** All contractors are required to receive EMS training at the level necessary for their job function.
- **General Environmental Awareness Training.** Instruction designed to ensure that MCB Camp Lejeune and MCAS New River personnel become familiar with the installation environmental policies and programs for regulatory compliance, natural resource conservation, P2, and environmental protection. General EMS and Environmental Awareness Training for contractors and vendors is required for all MCB Camp Lejeune contractors. Required training can be conducted through ECATTS.

3.1.3 Environmental Management System

Training is potentially applicable to all EMS practices conducted aboard MCB Camp Lejeune.

3.2 Overview of Requirements

Contractors operating aboard MCB Lejeune and MCAS New River must be aware of and adhere to all applicable regulations and requirements concerning training.

3.3 Training Requirements

3.3.1 General Environmental Awareness

In accordance with DoD instructions and MCO, the EMD at MCB Camp Lejeune has implemented a CETEP. A major component of the CETEP is to provide general environmental awareness training to all individuals associated with the installation, including contractors and vendors. Prior to or within 30 days of beginning work onsite, all contractors and their employees performing work aboard MCB Camp Lejeune must receive general environmental awareness training.

3.3.2 Environmental Management System (EMS)

In addition to CETEP requirements, MCB Camp Lejeune has implemented an installation-wide EMS per DoD and USMC EMS policy. The EMS highlights the fact that the authority and principal responsibility for controlling environmental impacts belong to those commands, units, offices, and personnel (including contractors and vendors) whose activities have the potential to impact the environment.

Prior to or within 30 days of beginning work onsite, all contractors and their employees performing work aboard MCB Camp Lejeune must receive EMS training.

3.3.3 Recordkeeping

Upon completion of the required training in ECATTS, the contractor must provide the completed training certificate to the contracting representative if required. The contracting representative must maintain these records in the contract file.

All training records, including other applicable environmental training, must be maintained onsite for review.

4.0 Air Quality

The Air Quality Program is responsible for ensuring that the installation complies with all applicable Federal, State, and local air quality regulations. The ROICC or Contract Representative will provide a copy of BO 5090.6A, Air Quality Management, which has additional information.

4.1 Key Definitions and Concepts

The following key definitions and concepts are associated with air quality. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

4.1.1 Key Definitions

- **Criteria Pollutants.** Pollutants that the EPA Administrator has determined will cause or contribute to air pollution, that may reasonably be anticipated to endanger public health and welfare, and for which air quality criteria have been established (i.e., sulfur dioxide, nitrogen oxides, ground-level ozone, carbon monoxide, lead, and particulate matter).
- **Dust-Causing Activity.** Any activity that has the potential to generate dust, including but not limited to construction and demolition (C&D), blasting and sanding, construction of haul roads, land clearing, or fallow fields.
- **Hazardous Air Pollutants (HAP).** Air pollutants identified in 42 United States Code (USC) 7412, that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or have adverse environmental and ecological effects.
- **Ozone-Depleting Substance (ODS).** Chemicals, such as certain refrigerants, which cause depletion of the stratospheric ozone layer - primarily chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC) and their blends.
- **Particulate Matter.** A criteria air pollutant that includes dust, soot, and other small materials that are released into and transported by air.
- **Title V Operating Permit.** Permit issued under the Clean Air Act (CAA) Amendments of 1990 for all major sources of air pollution. All emission sources at the installation must be listed on the permit.

4.1.2 Key Concepts

- **Emission Sources.** Please have the ROICC or Contract Representative contact EMD before beginning any air emissions emitting activity to determine whether any permitting, monitoring, reporting, testing, and/or recordkeeping requirements apply.
- **Permitted Sources.** Ensure that construction/authorization permits are in place prior to beginning construction and/or prior to the arrival onsite of new or additional emission sources (emergency generators, paint booths, etc.).

4.1.3 Environmental Management System

Contractors associated with air quality include the following:

- Boat operation/maintenance
- Boiler operation
- Chlorination
- Degreasing
- Engine operation and maintenance
- Fueling and fuel management/storage

- Hazardous materials (HM) storage/HM transportation
- Hazardous waste (HW) satellite accumulation area (SAA)/HW transportation
- Live fire range operations
- Metal working
- ODS/halon management
- Paint booth operations/Paint gun cleaning/Paint removal
- Polishing
- Road construction and maintenance
- Rock crushing operations
- Solid waste collection/transportation
- Storage tank management
- Unexploded Ordnance (UXO)/Explosive Ordnance Disposal (EOD) operations
- Woodworking
- Vehicle maintenance

The potential impacts of these activities on the environment include degradation of air quality, degradation of quality of life, and depletion of nonrenewable resources.

4.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable regulations and requirements regarding air quality, which include but may not be limited to:

- **Clean Air Act Amendments of 1990.** Protect human health and clean air resources by establishing standards and regulations for the control of air pollutants.
- **Title V Operating Permit.** Operating permit required for any major stationary source that emits or has the potential to emit 100 tons per year or more of any criteria air pollutant or 25 tons per year of HAPs and outlines the requirements to address and ensure air quality compliance.
- **BO 5090.6A, Air Quality Management.** Implements policies and procedures at the installation level that all personnel must follow in order to demonstrate compliance with the Title V permit and USMC requirements.
- **Base Bulletin 5090, Open Burning of Vegetative Debris.** Outlines procedures for conducting open burning in accordance with State regulations and installation procedures.
- **North Carolina Department of Air Quality (NCDAQ) Rules.** Outlines all State-specific air quality rules, control requirements, procedures for permits, and approvals contained in 15A North Carolina Administrative Code (NCAC) 02D and 02Q applicable to North Carolina entities.

4.3 Permit Requirements

The installation has a single permit, the CAA Title V Construction and Operating Permit that includes all stationary air emission sources at the facility; therefore, all permit application submittals to the NCDAQ must be coordinated through the EMD. The NCDAQ will review and process the application and then issue a permit to construct and operate or to modify the emission source(s). A permit may be required prior to the construction of any emission source. Timely submittal of the permit application is required to obtain the final permit prior to commencing construction. The most common types of emission sources at the installation are as follows:

- Boilers
- Generators
- Engine test stands
- Surface coating/painting operations

- Paint removal (chemical and mechanical), abrasive blasting, or other surface preparation activities
- Fuel storage and fuel dispensing
- Grinding
- Woodworking
- Welding
- ODS/refrigerant recovery and recycling operations (industrial chillers, refrigerators, air conditioning compressors, cleaning agents, etc.)
- Bulk chemical and flammable materials storage

4.4 Additional Activities of Concern

Contact the ROICC or Contract Representative for additional information regarding activities that do not necessarily require modification to the Title V permit, but that must be coordinated with or tracked by EMD or the NCDAQ. Examples of these activities include, but are not limited to, the following:

- **Use, Maintenance, and Management of Refrigerants and other ODS.** Includes installation, recovery, replacement, conversion, or service of refrigerant-containing equipment (chillers, refrigerators, air conditioning condensers, etc.). All contractors will use Best Management Practices (BMP) during refrigerant management activities. All HVAC technicians will maintain their appropriate State-specific licenses and present them to the ROICC or Contract Representative upon request.
- **Small Emergency Generators.** Includes the installation and temporary use of emergency generators during electrical failures and construction activities. All contractors will coordinate with the ROICC or Contract Representative to determine if the intended generator may be exempted or must be temporarily permitted for the intended use.
- **Open Burning (e.g., right-of-way clearing, storm debris burning).** Open burning activities aboard MCB Camp Lejeune and MCAS New River must coordinated through EMD and the Fire Department. Open burning activities are only permissible for land clearing and right-of-way maintenance when the following conditions are met:
    - The wind direction at the time the burning is initiated is away from any public transport roads within 250 feet so they are not affected by smoke, ash, or other air pollutants from the burning.
    - The burning is at least 1,000 feet from any residential building, unless an air curtain burner is used. If an air curtain burner is used, the location should be at least 500 feet from a residential building.
    - Heavy oils, asphaltic materials (e.g., shingles and other roofing materials), items containing natural or synthetic rubber, or any materials other than vegetative plant growth are not burned.
    - Initial burning must begin between 0800 and 1800. After 1800, no material may be added to the fire until 0800 the following day.
    - No fires may be started, and no vegetation may be added to existing fires, when the North Carolina Division of Forest Resources (NCDFR) has banned burning for that area.
    - Air Curtain Burners are required to have an Air Permit unless they are temporary burners to be used in instances in natural disasters.

Situations that require a regulatory exemption evaluation by the NCDAQ Regional Office Supervisor are coordinated through EMD's Environmental Quality Branch Air Quality Program Manager. The ROICC or Contract Representative will address any additional questions or provide a copy of Base Bulletin 5090, which contains a summary of the installation's open burning requirements.

The four designated sites at MCB Camp Lejeune that are permitted for storing and/or burning storm debris are in the following areas: Mainside at the borrow pit near the Piney Green landfill, Courthouse Bay, Camp Johnson, and Camp Geiger. Only storm debris may be accumulated at these sites. EMD must notify the NCDAQ if the installation intends to burn the storm debris at one of these sites. Contact the ROICC or Contract Representative for more information.

- **Fire training outside of designated fire training pits.** State approval is required to conduct fire training outside of the designated fire training pits. First, complete the Notification of Open Burning for the Training of Firefighting Personnel form. The form is available at the following site: https://www.deq.nc.gov/air-quality/compliance/openburning/ob-firefighting-training-notification-form-1272021/download?attachment

  An accredited North Carolina Asbestos Inspector must inspect any structure to be burned to ensure that it is free from asbestos before the training exercise. Turn in the completed form to EMD for submittal to NCDAQ and the Division of Public Health, Health Hazards Control Unit. Contact the ROICC or Contract Representative for additional information.

- **Dust-causing activities (e.g., concrete and rock crushing).** Wet suppression is required during the entire dust-causing operation. Ensure that an adequate water supply is available and coordinate with the Fire and Emergency Services Division if access to a fire hydrant is necessary. Applicable wet suppression may be required during temporary concrete crushing operations during C&D activities.
- **Noise Management.** USMC commands engaged in any activity resulting in noise emissions must comply with Federal, State, interstate, and local requirements for the control and management of environmental noise to minimize disruption to the local community. To the maximum extent practicable, personnel should limit the use of power tools, machinery, construction equipment, and other noisy devices to normal working hours.

5.0 Environmental Emergency Planning and Response

Emergency planning and response can reduce injuries, protect employees, reduce asset losses, minimize downtime, and minimize environmental impacts of uncontrolled releases of pollutants to air, land, and water. The purpose of emergency planning is to prepare for, mitigate, respond to, and recover from environmental emergencies while minimizing any potential impacts to human health and the environment. Contractors operating aboard MCB Camp Lejeune must be aware of and adhere to all environmental emergency response procedures and notification requirements to minimize detrimental effects from inadvertent releases.

Procedures relating to emergencies caused by unforeseen site conditions are addressed in Section 5.0 of this guide. Additional inquiries should be directed to the ROICC or Contract Representative. If it is an environmental emergency, contact 911 immediately.

5.1 Key Definitions and Concepts

The following key definitions and concepts are associated with environmental emergency response and spill response requirements. Contact the ROICC or Contract Representative with any questions.

5.1.1 Key Definitions

- **Berm.** A mound used to prevent the spread of a contaminant.
- **Discharge.** Any spilling, leaking, pumping, pouring, emitting, emptying, or dumping not explicitly permitted.
- **Navigable waters.** The waters of the United States and territorial seas, including waters that have been or may be used for commerce, waters subject to tidal flow, interstate waters and wetlands, and all other waters (intrastate lakes, rivers, streams intermittent streams, flats, wetlands, sloughs, prairies, wet meadows, natural ponds, tributaries, etc.).
- **Petroleum, Oil, and Lubricant (POL).** A broad term that includes all petroleum and associated products or oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, vegetable oil, animal oil, sludge, oil refuse, and oil mixed with wastes.
- **Release.** Pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles) of any hazardous chemical, hazardous substance, or extremely hazardous substance (EHS). Releases may be aboveground, belowground, or to water.
- **Spill Event.** The reportable discharge of oil into or upon the navigable waters of the United States or adjoining shorelines in harmful quantities, as defined by the Code of Federal Regulations (CFR) in 40 CFR 110.

5.1.2 Key Concepts

- **Environmental Emergency Response Contacts.** The following table identifies the emergency contact information for various spill scenarios. In addition to these emergency response contacts, the ROICC or Contract Representative should be notified immediately after an incident.

Table 5-1: Environmental Emergency Response Contacts

For spills of:	Call:	Follow-up:
Hazardous waste	**911**	Spill Report
Unknown materials	**911**	Spill Report
Material on a permeable surface	**911**	Spill Report
Any amount of a material	**911**	Spill Report
Material that reaches stormwater inlets or waterways	**911**	Illicit Discharge Report
Non-hazardous waste	451-1482	911

- Contractors have containment and cleanup responsibilities following a spill, and there may be additional follow-up reporting or requirements. Contact the ROICC or Contract Representative for additional guidance.

5.1.3 Environmental Management System

Environmental planning and response are potentially applicable to all EMS practices conducted aboard MCB Camp Lejeune.

5.2 Overview of Requirements

Contractors operating aboard MCB Lejeune and MCAS New River must be aware of and adhere to all applicable regulations and requirements regarding emergency response and spill response procedures, which include but may not be limited to:

- **CAA of 1970, Section 112r.** Mandates the prevention and control of air emissions and specifies emergency planning where the potential exists for accidental release of hazardous air pollutants.
- **Clean Water Act (CWA) of 1972.** Establishes the basic structure for regulating discharges of pollutants into the waters of the United States. The CWA establishes that there should be no discharges of oil or hazardous substances into or upon the navigable waters of the United States or adjoining shorelines, which may affect natural resources under the management of the United States.
- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980.** Authorizes a Federal response to any release or threatened release of hazardous substance into the environment. This act defines hazardous substances by reference to substances that are listed or designated under other environmental statutes.
- **EPCRA of 1986, Section 304.** Establishes requirements for the reporting of a release to ensure a quick response by local emergency responders. Notification requirements apply to two chemical lists: the CERCLA Hazardous Substance list and the EHS list. The “List of Lists” provides a comprehensive identification of hazardous substances and EHSs. In addition, facilities may be required to submit a list of their hazardous materials inventory maintained onsite or Safety Data Sheets (SDS) to response personnel.
- **Oil Pollution Act (OPA) of 1990.** Addresses oil storage at facilities and emphasizes preparedness and response activities. This act prohibits the harmful discharge of oil and hazardous substances into waters of the United States. The OPA requires contingency planning for “worst case” discharges and demonstrated response capabilities through planning, equipment, training, and exercises.
- **Resource Conservation and Recovery Act (RCRA) of 1976.** Protects human health and the environment from the hazards associated with HW handling, generation, transportation,

treatment, storage, and disposal. Subtitle C of RCRA requires owners and operators of HW facilities to develop comprehensive management plans that address spill prevention and cleanup.

5.3 Spill Notification

5.3.1 POL/HazMat Spill Notification Procedures

In accordance with MCB Camp Lejeune notification requirements any discharge of oil or hazardous materials must be immediately reported to the MCB Camp Lejeune Fire Department at 911.

Contractors must develop a Unit Level Contingency Plan (ULCP) that addresses spill response for their specific sites and potential spill types. MCB Camp Lejeune maintains a Spill Prevention, Control, and Countermeasures (SPCC) Plan that establishes the procedures to prevent an oil spill and documents existing oil spill prevention structures, procedures, and equipment. The Installation SPCC Plan provides general information for any type of response actions needed for spills aboard MCB Camp Lejeune. Contractors engaged in the handling and transfer of POL or HM must develop a ULCP that addresses the spill response for their specific sites and potential spill types. This ULCP must be maintained onsite, and all personnel working within that site must be made aware of its location and use.

In the event of a spill, contact ROICC/Contract Representative after contacting emergency response to obtain a spill report form. Return the completed spill report form to EMD (Fax to (910) 451-3471) and to the ROICC or Contract Representative. A copy of the spill reporting form is included as Attachment 5-1. The following information must be provided when reporting a spill:

- Name and phone number
- Location of spill (building number, street)
- Number and type of injuries, if any
- Type and amount of spilled material
- Source of the spill (container, vehicle, etc.)
- Action being taken, if any, to control the spill
- Estimated time of spill

Do not wait to report a spill, even if all of the required information is not immediately available.

5.3.2 Wastewater Spill and Water Line Break Notification

Contractors operating aboard MCB Camp Lejeune and MCAS New River must be aware of water and wastewater utilities in their specific work/project area.

5.3.2.1 Wastewater Spills

In the event of a wastewater spill, contact the Public Works Base Utilities at (910) 451-7190 (x225) to report the incident. In addition, the incident should be immediately reported to the ROICC or Contract Representative. The contractor will be responsible for providing the following information:

- Name and phone number
- Location of spill (building number, street address)
- Type and amount of spilled material
- Source of the spill
- Action being taken, if any, to control the spill
- Estimated time of spill

5.3.2.2 Water Line Breaks

In the event of a water line break, contact the Public Works Base Utilities at (910) 451-7190 (x225) to report the incident. In addition, the incident should be immediately reported to the ROICC or Contract Representative. The contractor will be responsible for providing the following information:

- Name and phone number
- Location of spill (building number, street address)
- Reason for the break
- Estimated time of the break

5.4 Follow Up

If surface run-off is contaminated, the contractor will, under the advisement of the Fire Department or EMD, construct a temporary berm or containment area. Contaminated surface water will be removed in accordance with all safety and environmental requirements for the installation. Notify the Resource Conservation and Recovery Section (RCRS) at (910) 451-1482, which will provide concurrence for temporary containment areas and removal of contaminated runoff.

If solid or HW was generated as the result of a spill, refer to Sections 12.0 and 7.0 of this guide for disposal requirements.

6.0 Cultural Resource

MCB Camp Lejeune enjoys a rich history, and remnants of our past may be found throughout the real properties that make up the installation. All personnel at MCB Camp Lejeune are responsible for ensuring the cultural resources entrusted to the USMC care remain intact and available for future generations. Contractors are responsible for notifying the ROICC or Contract Representative immediately if suspected archaeological sites, artifacts, or human remains are encountered.

6.1 Key Definitions and Concepts

The following key definitions and concepts are associated with cultural resource management. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

6.1.1 Key Definitions

- **Archaeological Resource.** Defined by the Archaeological Resources Protection Act (ARPA) as any material remains of past human life or activities that are at least 100 years old and are capable of providing scientific or human understanding of past human behavior and cultural adaptation, including the site on which the remains are located. Examples include pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal materials/remains, or any portion or piece of any of the foregoing items or structures. Non-fossilized and fossilized paleontological specimens, or any portion or piece thereof, are not considered archaeological resources unless found in an archaeological context. (According to the National Historic Preservation Act [NHPA] of 1966, some historic properties can achieve significance within the past 50 years if they are of exceptional importance [National Register Criteria Consideration G].)
- **Cultural Resource.** A generic term for the collective evidence of the past activities and accomplishments of people, including buildings, structures, districts, sites, features, and objects of significance in history, architecture, archaeology, engineering, or culture, per MCO P5090.2.
- **Effect.** Any condition of a project that may cause a change in the quality of the historic, architectural, archaeological, or cultural character of a property that qualifies it for listing in the National Register of Historic Places (NRHP). A project is considered to have an effect on a historic or cultural property when any aspect of the project changes the integrity of the location, design, setting, materials, workmanship, feeling, or association of the property that contributes to its significance.
- **Historic Property.** Any prehistoric or historic district, site, building, structure, or object significant in United States history, architecture, archaeology, engineering, or culture and included, or eligible for listing in, the NRHP per the NHPA of 1966 and MCO P5090.2.
- **State Historic Preservation Officer (SHPO).** The person designated to administer the State Historic Preservation Program, including identifying and nominating eligible properties to the NRHP and administering applications for listing historic properties in the NRHP.

6.1.2 Key Concepts

- **Notification.** Contractors must notify the ROICC or Contract Representative if any cultural resources are encountered.
- **Policy.** DoD policy is to preserve significant historic and archaeological resources.

6.1.3 Environmental Management System

Contractor practices associated with cultural resources include:

- Construction/demolition/renovation
- Land clearing
- Road construction and maintenance
- Soil excavation/grading

The potential impacts of these activities on the environment include damage, destruction, alteration, theft, or demolition of historic properties.

6.2 Overview of Requirements

It is DoD policy to integrate the archeological and historic preservation requirements of applicable laws with the planning and management of activities under DoD control; to minimize expenditures through judicious application of options available in complying with applicable laws; and to encourage practical, economically feasible rehabilitation and adaptive use of significant historical resources.

Contractors operating aboard MCB Lejeune and MCAS New River must be aware of and adhere to all applicable regulations and requirements regarding cultural resources, which include but may not be limited to:

- **BO 5090.8A.** Sets forth regulations and establishes responsibilities associated with management of archaeological and historic resources aboard MCB Camp Lejeune.
- **Archaeological and Historic Preservation Act (AHPA) of 1974 (16 USC 469 *et seq.*).** Amends the Reservoir Salvage Act to extend its provisions beyond the construction of dams to any terrain alteration resulting from any Federal construction project or federally licensed project, activity, or program.
- **Archeological Resources Protection Act of 1979 (16 USC 470 *et seq.*).** Requires Federal land managers to issue permits for the excavation or removal of artifacts from lands under their jurisdiction. The ARPA requires that relevant Native American tribes be notified of permit issuance if significant religious or cultural sites will be affected. It prohibits the excavation, damage, alteration, theft, or defacement of an archaeological site or artifacts unless permitted by the Federal Land Manager.
- **DoD Directive 4710.1, Archaeological and Historic Resources Management.** Provides policy for the management of archaeological and historic resources on land and in water under DoD control.
- **EO 11593, Protection and Enhancement of the Cultural Environment May 13, 1971.** Requires all Federal agencies to administer cultural properties under their control. Agencies are required to direct their policies, plans, and programs so that significant sites and structures are preserved.
- **Historic Sites, Buildings, and Antiquities Act of 1935 (Public Law 74-292, 16 USC 461 *et seq.*).** States that it is Federal policy to preserve historic and prehistoric properties of national significance.
- **National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 *et seq.*).** States that it is Federal government policy to preserve important historic, cultural, and natural aspects of our national heritage and requires the consideration of environmental concerns during project planning and execution.
- **NHPA of 1966 (54 USC 300101 *et seq.*).** Establishes historic preservation as a national policy and requires Federal agencies undertaking actions that may affect NRHP-eligible historic

properties to consult State historic preservation offices and the Advisory Council on Historic Preservation. Section 110 of NHPA requires Federal agencies to inventory, evaluate, identify, and protect cultural resources that are determined eligible for listing in the NRHP.

- **Public Buildings Cooperative Use Act of 1976 (Public Law 94-541).** Encourages adaptive reuse of historic buildings as administrative facilities for Federal agencies.
- **Title 36 CFR Part 65, National Historic Landmarks Program.** Identifies and designates National Historic Landmarks and encourages the long-range preservation of nationally significant properties that illustrate or commemorate the history and prehistory of the United States.

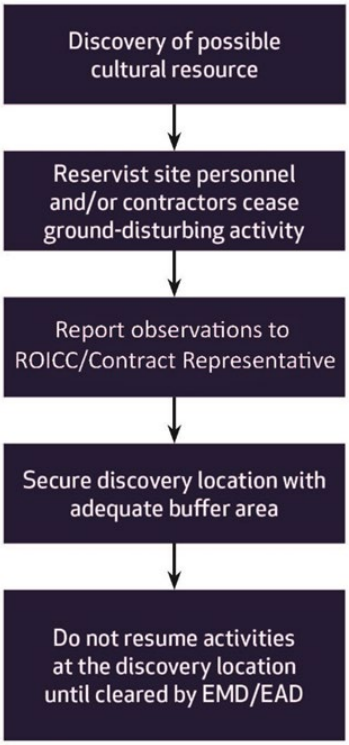
6.3 Procedures

All contractors are expected to follow these procedures:

- Notify the ROICC or Contract Representative immediately concerning any encounter with suspected archaeological sites, artifacts, human remains, or any other suspected cultural resources during contractor activities.
- Stop work in the immediate area of the discovery until directed by the Contract Representative to resume work.

Be particularly aware of surroundings when working in a designated historic area. The Camp Lejeune Installation Geospatial Information & Services (IGI&ES) Office of the Geospatial Services Division can provide resource mapping of known cultural resource areas for all planners, project managers, contractors, and others through formal request. The ROICC or Contract Representative will assist with making arrangements to request access for Geographic Information System (GIS) mapping.

Figure 6-1: Possible Cultural Resource Discovery Flow Chart



7.0 Hazardous Materials/Hazardous Waste Management

All persons on a USMC installation are subject to compliance with Federal, State, and local regulations and permit conditions addressing the proper management of hazardous materials and waste. Mishandling these wastes and materials may result in violation notices, fines, and/or penalties. The U.S. Environmental Protection Agency (EPA) regulates HW through the RCRA, which provides specific regulatory definitions for HW and its management. RCRA governs all HW from the point of generation to ultimate disposal, including HW generated by contractors aboard MCB Camp Lejeune and MCAS New River. Hazardous materials, including those used by contractors aboard the installation, are also regulated by EPCRA. Additionally, the North Carolina Department of Environmental Quality (NCDEQ) has issued more stringent rules and regulations governing HM and HW management that also apply to contractors.

7.1 Key Definitions and Concepts

The following key definitions and concepts are associated with HM, HW, and their management. Direct questions or concerns about the information in this section to the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

7.1.1 Key Definitions

- **Less than 90-day Accumulation Facility.** These facilities are used to accumulate HW temporarily until it is either manifested and shipped off site for disposal or transferred to a permitted storage facility. HW may be accumulated for less than 90 days in these facilities. MCB Camp Lejeune's Less than 90-day Accumulation facility is located on Michael Road.
- **Generator.** Any person whose activity or process produces HW or whose activity or process subjects HW to regulation.
- **Hazardous Material.** A chemical compound, or a combination of compounds, posing or capable of posing a significant risk to public health, safety, or the environment as a result of its quantity, concentration, or physical/chemical/infectious properties.
- **Hazardous Waste.** Any discarded material (including solid, liquid, or gas) or combination of discarded materials which, due to quantity, concentration, or physical, chemical, or infectious characteristics may:
  - Cause or significantly contribute to an increase in mortality or cause a serious irreversible or incapacitating reversible illness; or
  - Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.
- **Manifest.** A document that allows all parties involved in HW management (e.g., generators, transporters, disposal facilities, EPA, State agencies) to track the movement of HW from the point of generation to the point of ultimate treatment, storage, or disposal. All hazardous waste manifests for waste generated aboard MCB Camp Lejeune must be reviewed and released by personnel from the Resource Conservation and Recovery Section, EMD at (910) 451-1482.
- **Non–RCRA-Regulated Waste.** Waste that is not regulated or is exempt from regulation under RCRA HW requirements but has other regulatory requirements for proper management.
- **Satellite Accumulation Area.** Designated areas at or near the point of generation, where HW is accumulated. Generators may accumulate up to 55 gallons of HW or one quart of acute HW at a satellite area. When 55 gallons of HW (or 1 quart of acute HW) are exceeded, the generator must date the container and transfer it to an approved Less than 90-day site or long-term HW storage facility within 72 hours. An EMD authorization for an SAA must be obtained and posted at the site

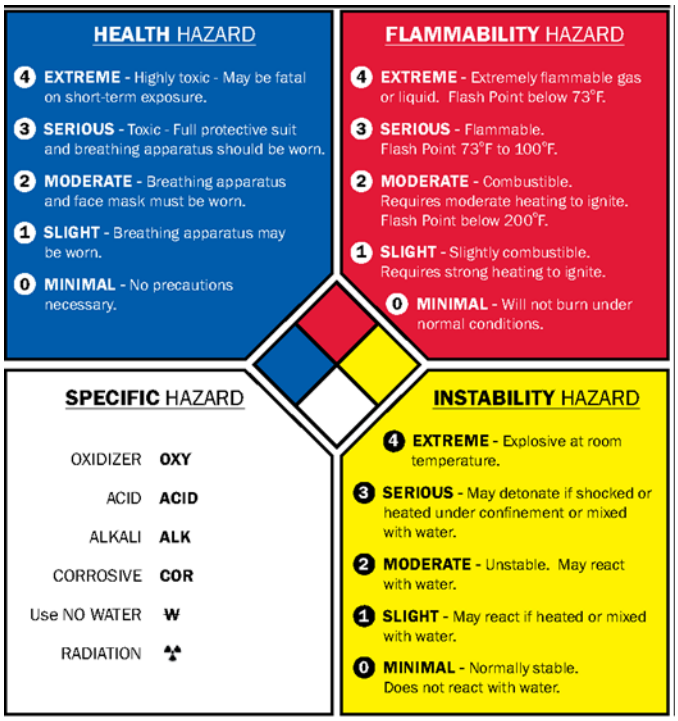
prior to generation or accumulation of waste. EMD authorization will establish individual limits for each SAA. No SAA authorizations will exceed 55 gallons of HW or 1 quart of acute HW. In accordance with installation policy, storage of HW in an SAA should not exceed 365 days even if the container is not full.

- **Safety Data Sheet.** A document that provides information about (1) chemical properties, environmental hazards, and health hazards and (2) protective measures, along with safety precautions, for handling, storing, and transporting. Hazard Communication Standard (HCS), 29 CFR 1910.1200(g), was revised in 2012 to mandate the use of a single Globally Harmonized System of Classification and Labelling of Chemicals (GHS) by manufacturers, distributors and importers to communicate information on chemical-related hazards. The information contained in the SDS is standardized in a 16-section format. Employers must ensure that the SDSs for all hazardous chemicals in the workplace are readily accessible to employees.
- **Treatment.** Any method, technique, or process designed to change the physical, chemical, or biological character or composition of any HW to neutralize the waste; or to recover energy or material resources from the waste; or to render such waste non-hazardous or less hazardous, safer to transport, store, or dispose of, or amenable for recovery or storage, or reduction in volume.
- **Treatment, Storage, and Disposal (TSD) Facilities.** TSD facilities conduct HW treatment, storage, or disposal operations and require an RCRA part B permit for final approval to operate. The part B permit is maintained to accurately identify the most current operations at the TSD facility. MCB Camp Lejeune does not have a TSD facility.
- **Universal Waste (UW).** Universal waste regulations streamline HW management standards for batteries, pesticides, mercury-containing equipment, aerosol cans, and fluorescent lamps. The regulations govern the collection and management of these widely generated wastes, thus facilitating environmentally sound collection and proper recycling or treatment. In North Carolina, batteries, thermostats, obsolete agricultural pesticides, aerosol cans and fluorescent lamps may be managed under the UW Rule. UW must be transferred off site within 1 year of the date when the material was first identified as waste.
- **Used Oil.** Any oil that has been refined from crude oil or synthetic oil and, as a result of use, storage, or handling, has become unsuitable for its original purpose due to the presence of impurities or loss of original properties. Used oil may be suitable for further use and is economically recyclable; therefore, it is managed as a separate category of material.

7.1.2 Key Concepts

- **HW Management.** The systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of HW. In addition, HW Management includes processes to reduce the HW's effect on the environment and to recover resources from it.
- **HW Minimization.** The USMC policy is to reduce the quantity of HW disposed of by source reduction, recycling, treatment, and disposal. The highest priorities are reduction of HW generation, and recycling. The goal of the USMC is to achieve continuous reduction of HW generation through P2 initiatives, BMPs, and use of the best available demonstrated technology.
- **National Fire Protection Association.** The United States trade association that creates and maintains private, copyrighted standards and codes, including the diamond hazard label in Figure 7-1 below that is used by emergency personnel to quickly and easily identify the risks posed by hazardous materials.

Figure 7-1: Diamond Hazard Label



7.1.3 Environmental Management System

Contractor practices associated with HM and HW management include, but are not limited to, the following:

- Battery management
- Boat operation/maintenance
- Boiler operation
- Building operation/maintenance/repair
- Chlorination
- Cooling tower operation and maintenance
- Construction/renovation/demolition
- Degreasing
- Drinking water management
- Engine operation and maintenance
- Equipment operation/maintenance/disposal
- Fueling and fuel management/storage
- Habitat Management
- HCP operation
- HM storage
- HM transportation
- HW disposal offsite transport
- HW satellite accumulation area
- HW storage (<90 days)
- HW transportation
- Laboratory

- Landscaping
- Laundry
- Live fire range operations
- Metal working
- Non-destructive inspection
- ODS/halon management
- Paint gun cleaning
- Paint removal
- Painting
- Parts replacement
- Pesticide/herbicide management and application
- Polishing
- Pumping station/force main
- Range residue clearance
- Recreational facilities operation
- Roofing kettle
- Sidewalk and road deicing
- Storage tank management
- Swimming pool operation and maintenance
- Universal waste storage/collection
- UXO/EOD operations
- Vehicle maintenance

The potential impacts of these activities on the environment include depletion of the HW landfill, depletion of non-renewable resources, and degradation of soil quality.

7.2 Overview of Requirements

Contractors operating aboard MCB Lejeune and MCAS New River must be aware of and adhere to all applicable regulations and requirements regarding HM and HW, which include but may not be limited to:

- **BO 5090.9, Hazardous Material/Waste Management/Air Station Order (ASO) 5090.2, Environmental Compliance and Protection Program for MCAS New River.** Establishes procedures and general responsibilities for the disposal of HM and HW under environmental permits and authorizations.
- **Emergency Planning and Community Right-to-Know Act.** Establishes requirements regarding emergency planning and the reporting of hazardous chemical storage and usage.
- **Hazardous Material Transportation Act (HMTA) of 1975.** The principal Federal law regulating the transportation of HM. Established to mitigate the risks to health, property, and the environment inherent in the transportation of HM in intrastate, interstate, and foreign commerce. The HMTA is administered by the U.S. Department of Transportation (DOT) and regulates the shipping, marking, labeling, placarding, and recordkeeping requirements for HM, including HW and military munitions.
- **Resource Conservation and Recovery Act of 1976.** Establishes standards for HW generators as necessary to protect human health and the environment by instituting statutory standards for generators and transporters of HW that will ensure the following: proper recordkeeping and reporting; use of manifest system; use of appropriate labels and containers; containerization and

accumulation time; and proper management of TSD facilities. In addition, it gives the EPA and State agencies access authority to facility premises and all records regarding HW management.

- **40 CFR Subchapter I (Parts 260–299), Solid Wastes.** Federal regulations promulgated under the 1976 RCRA that regulate HW management, generators, transporters, and owners or operators of TSD facilities. North Carolina has adopted the Federal HW rules by reference.

Because the installation is designated as a Large Quantity Generator (LQG) of HW, all HW generated aboard MCB Camp Lejeune must meet the regulatory requirements of this generator designation. An LQG may maintain three types of HW accumulation/storage areas: satellite, Less than 90-day, and permitted. Typically, HW is accumulated at an SAA and later transferred to a Less than 90-day or permitted storage area.

Both MCB Camp Lejeune and MCAS New River maintain Hazardous Waste Management Plans (HWMP) that outline the specific requirements for managing HM and HW. The HWMP identifies and provides guidance to implement all regulatory HW management activities and is available to all personnel who accumulate, generate, transport (including on-installation transportation), treat, store, or dispose of HW.

Contractors are responsible for the management of all HM and the ultimate disposition of any HW generated aboard MCB Camp Lejeune during a contract performance period. The ROICC or Contract Representative will contact Environmental personnel who will provide additional guidance and oversight to verify compliance with applicable Federal, State, and local laws governing the generation, handling, and disposal of HM, HW, UW, used oil, petroleum-contaminated materials, RCRA-regulated HW, and non–RCRA-regulated waste.

Depending on the type of project, contractors may be required to submit a site-specific HWMP to the ROICC or the Contract Representative prior to beginning work. Additionally, the Contracting Officer may require a Contractor Hazardous Material Inventory Log and corresponding SDSs for all materials to be used during the execution of the contract. EMD/I&E will use the SDSs to help contractors establish their Hazardous Material Storage and SAAs.

7.3 Hazardous Materials Requirements

If a project uses HM:

- Reduce/reuse/recycle when possible; meet contract requirements for recycling.
- All contractors exceeding 30 days in a calendar year must submit an Authorized Use List (AUL) using the Marine Corps Installation East Marine Corps Base Camp Lejeune Initial AUL Build Form (MCIEAST-MCB CAMLEJ/G-F/EMD/34), Attachment 7-3, to lejeune_aul@usmc.mil for review and approval.
- Segregate incompatible materials. Consult the SDS or material manufacturers with questions about a material's compatibility. Some examples of incompatible materials likely to be used by contractors are:
    - *Corrosives* (e.g., batteries, stripping and cleaning compounds containing acids or bases) and Flammables (e.g., fuels, oils, paints, and adhesives)
    - *Corrosives and Oxidizers* (e.g., peroxide, perchlorates, sodium hypochlorite/bleach, or calcium hypochlorite)
    - *Oxidizers and Flammables*
- All compatible materials should be segregated and stored within designated storage lockers or cabinets (i.e., flammable materials should be stored in designated flammable storage lockers or cabinets and corrosives should be stored in designated corrosives storage lockers or cabinets).

- Do not store large quantities of materials. Keep on hand only what can be used.
- Maintain an inventory of all HM maintained onsite, with adequate controls in place to prevent unauthorized access.
- Do not dump any HM into floor drains, sinks, oil-water separators (OWS), or storm drains, or onto the ground.
- Store containers that hold 55 gallons or more (including in-use electrical generators and portable equipment) in proper secondary containment. Permanent secondary containment must be inspected weekly, temporary secondary containment must be inspected daily; all inspections and drainage of stormwater from secondary containment must be documented.
- Maintain SDSs and appropriate spill control/cleanup materials onsite at all times.
- Provide HM storage and usage information for regulatory reporting to the appropriate environmental office upon request.
- Stop work immediately if a project unearths any unknown HM (e.g., munitions and explosives of concern [MEC], discarded military munitions [DMM], or UXO), and immediately report the situation to the ROICC or Contract Representative.
- Do not leave HM (or HW) onsite once the contract is completed. Remove it from the installation or make arrangements through the ROICC or Contract Representative to contact RCRS or I&E for turn-in procedures upon completion of the contract.

Figure 7-2: NAVOSHENTRACEN Compatibility Chart

NAVOSHENVTRACEN COMPATIBILITY CHART

HMUG GROUP	HCC see note 2	GROUP NAME	EXAMPLES	INCOMPATIBLE MATERIALS	EXAMPLES	REACTION IF MIXED
1	C1, C2, C4, C5	ACIDS	Battery Acid Paint Removers De-Rust Spray	FLAMMABLES/ COMBUSTIBLES ALKALIS/BASES/CAUSTICS OXIDIZERS (HMUG Groups 2, 3, 4, 6, 7, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 22)	Degreasers, Carbon Removers, Anti-Fogging Compounds	HEAT Gas Generation VIOLENT REACTION
2	F1 to F7, P1, T6, V3, V4	ADHESIVES	Epoxies Isocyanates Diethylenetriamine	ACIDS ALKALIS/BASES/CAUSTICS OXIDIZERS (HMUG Groups 1, 3, 18)		HEAT FIRE HAZARD
3	B1, B2	ALKALIES BASES/ CAUSTICS	Ammonia Sodium Hydroxide Cleaners	ACIDS/OXIDIZERS FLAMMABLES/COMBUSTIBLES (HMUG Groups 1, 2, 6, 8, 9, 10, 11, 14, 17, 18, 19, 20, 22)	Battery acid, Paint Removers, De-Rust Sprays, Paints, Solvents	HEAT Gas Generation VIOLENT REACTION
4	C1-C4, B1-B3, F2 to F7, T4, T6, V2-V4	CLEANING COMPOUNDS	Degreasers Carbon Removers Antifogging Compounds	DETERGENTS/SOAPS OXIDIZERS (HMUG Groups 1, 7, 18)	Calcium Hypochlorite, Sodium Nitrite, Hydrogen Peroxide	HEAT FIRE HAZARD
5	G1 to G9	COMPRESSED GASES	Acetylene, Propane, Nitrogen, Argon, Helium, Oxygen	HEAT SOURCES Consult paragraph C23 for specific handling and stowage guidance (HMUG Groups 8, 9, 10, 11, 12, 15, 18, 19)		FIRE HAZARD EXPLOSION HAZARD
6	F2 to F5, T6, V2, V3, V4	CORROSION PREVENTIVE COMPOUNDS	Corrosion Inhibitors Chemical Conversion Compounds	ACIDS/BASES OXIDIZERS IGNITION SOURCES (HMUG Group 1, 3, 18, 20)		FIRE HAZARD
7	B3	DETERGENTS/ SOAPS	Trisodium Phosphate Scouring Powders Disinfectants	ACID-CONTAINING COMPOUNDS (HMUG Groups 1, 4, 18)	Battery Acid, Paint Removers De-Rust Sprays	VIOLENT REACTION HEAT
8	F6, V6, V7	GREASES	Lithium Grease Silicone Molybdenum	OXIDIZERS ALKALIS/BASES/CAUSTICS (HMUG Groups 3, 5, 18)		FIRE HAZARD HEAT
9	T6, V4, V6, V7	HYDRAULIC FLUIDS	Petroleum-Based Synthetic Fire-Resistant	CORROSIVES, OXIDIZERS (HMUG Groups 1, 3, 5, 18)		VIOLENT REACTION
10	F2 to F4, T4, T6, V2-V6	INSPECTION PENETRANTS	Petroleum-Based Dyes	CORROSIVES, OXIDIZERS (HMUG Groups 1, 3, 5, 18)	Battery Acid Caustic Soda Chlorine laundry bleach Calcium Hypochlorite Hydrogen Peroxide OBA Canisters Paint Removers	
11	F4, T6, V2, V3, V4, V6	LUBRICANTS/ OILS	General Purpose, Gear, Turbine, Weapons			EXPLOSION HAZARD
12	F2 to F6, P1, T3, T4, T6, V1-V4	PAINT MATERIALS	Primers, Enamels, Urethanes, Lacquers, Varnishes, Non-Skid, Thinners	ACIDS, OXIDIZERS (HMUG Groups 1, 5, 18)		HEAT FIRE HAZARD
13	C1-C4, B1-B3, D1	PHOTO CHEMICALS	Developers, Stopbath, Toners, Bleaches, Replenishers	ACIDS HEAVY METALS (HMUG Groups 1, 18, 20)		HEAT FIRE HAZARD
14	F4	POLISH/WAX COMPOUNDS	Buffing Compounds Metal Polishes General Purpose Waxes	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 18)		HEAT, FIRE HAZARD VIOLENT REACTION
15	F2 to F6, T3, T4, T6, V1-V4	SOLVENTS	Methyl Ethyl Ketone (MEK) Toluene, Xylene Acetone	CORROSIVES OXIDIZERS BATTERIES (HMUG Groups 1, 5, 18, 21, 22)	Battery Acid Calcium Hypochlorite Sodium Nitrite Sodium Hydroxide	HEAT FIRE HAZARD
16	T6, T7, Z1	THERMAL INSULATION	Asbestos Fiberglass Glass Wool	MATERIAL IS NOT REACTIVE KEEP DRY		NO REACTION
17	C1-C4, B1-B3, D1	WATER TEST/ TREATMENT CHEMICALS	Nitric Acid Mercuric Nitrate Caustic Soda	CORROSIVES OXIDIZERS HEAVY METALS (HMUG Groups 1, 3, 18, 20, 21)		HEAT VIOLENT REACTION
18	D1 to D4	OXIDIZERS	Calcium Hypochlorite Laundry Bleach OBA Canisters	PETROLEUM BASED MATERIALS FUELS, SOLVENTS, CORROSIVES, HEAT (HMUG Groups 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20, 21, 22)		FIRE HAZARD VIOLENT REACTION EXPLOSION HAZARD TOXIC GAS GENERATION
19	F1 to F4, V4, V5, V6	FUELS	JP4, JP5 Gasoline Diesel Fuel	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 5, 18)	Battery Acid Calcium Hypochlorite Sodium Nitrite Sodium Hydroxide	FIRE HAZARD TOXIC GAS GENERATION
20	T6, V7, Z2	HEAVY METALS	Mercury Lead Beryllium	CORROSIVES OXIDIZERS WATER TREATMENT/PHOTO CHEMICALS (HMUG Groups 1, 3, 6, 13, 17, 18, 21)		VIOLENT REACTION GENERATION OF TOXIC AND FLAMMABLE GAS
21	Z4 to Z7	BATTERIES	Lead-Acid Dry-Cell Alkaline	SOLVENTS HEAVY METALS OXIDIZERS (HMUG Groups 15, 17, 18, 20)	Xylene Toluene Alcohol	HEAT VIOLENT REACTION TOXIC GAS GENERATION TOXIC
22	T2 to T6	PESTICIDES	Insecticides, Fungicides Rodenticides Fumigants	CORROSIVES OXIDIZERS (HMUG Groups 1, 3, 15, 18)		TOXIC GAS GENERATION

1. This chart is to be used as a ***GUIDE ONLY!***
2. Compare the desired HMUG Group/HCC in the left column with the Incompatible Material(s) of that Group in the center column on the same row. Mixing of the HMUG Group/HCC with the Incompatible Material(s) may result in the reaction(s) listed in the right column.
3. Not all applicable HCCs are listed; only the most frequently encountered HCCs (except N1) are listed.

REV 09-03

7.4 Hazardous Waste Requirements

The appropriate environmental office must be notified before any HW is generated on projects managed by the ROICC or the Facilities Support Contracts (FSC). Have the ROICC or Contract Representative contact RCRS or I&E with questions regarding whether or not a waste meets the definition of HW. Installation personnel must approve all regulated waste and HW storage locations.

If a project generates HW:

- Minimize generation through waste minimization and P2 techniques.
- Have the ROICC or Contract Representative contact RCRS or I&E with questions regarding how to manage the waste. Do not mix waste types (e.g., used oil rags and solvent rags).
- Have the ROICC or Contract Representative contact RCRS or I&E for turn-in procedures as wastes are generated to determine if waste can be disposed of on the installation.
- Do not dump any HW into floor drains, sinks, OWSs, or storm drains, or onto the ground. Do not place HW into general/municipal trash dumpsters.
- Ensure that HW drums are properly labeled and lids are secured (wrench tight).
- Ensure that SAAs are managed properly and storage limits are not exceeded; have the ROICC or Contract Representative consult RCRS or I&E prior to creating a new SAA.

7.4.1 Storage

All HW must be properly containerized, stored, and labeled at the time the waste is first generated. HW must be stored in containers that meet applicable specifications of the DOT. HW labels, as required by the EPA and the NCDEQ, must contain the following information.

- Words: HAZARDOUS WASTE.
- Content: Noun name found on the specific Profile Sheet provided by RCRS or I&E.
- Accumulation Start Date (ASD): For HW accumulated in an SAA, the ASD will be affixed once the container is filled or at the 1-year anniversary, whichever comes first.
- Hazard indicator (ignitable, corrosive, toxic, reactive)
- Number of Containers: Reflects the total number of containers (e.g., 1 of 1, etc.).

Any HW generated by contractors must be stored in an approved HW SAA. Contractors who need an SAA should contact the ROICC or Contract Representative, who will contact RCRS or I&E personnel to help the contractor establish each SAA. A summary of procedures follows:

- The HW generator may accumulate as much as 55 gallons of a specific HW stream (or up to one quart of acute HW) in a container at or near the point of generation.
- The containers must be under the control of the contractor generating the waste and must be kept closed (wrench tight) at all times except when adding waste.
- HW containers must be inspected weekly using the *Satellite Accumulation Area* (SAA) *Weekly Inspection Form*, included as Attachment 7.1. Written records noting discrepancies and corrective actions must be maintained for a period of 3 years. Copies of inspection reports should be provided to the ROICC or Contract Representative.
- The generating contractor shall monitor the level of waste in the SAA container and contact the ROICC or Contract Representative to coordinate disposal or determine if the contractor can turn in the HW to RCRS or I&E before the container is full. If the SAA container becomes full, the generating contractor has 72 hours (3 days) to arrange for the transport of the HW to an RCRA Part B permitted storage area. Storage of HW in an SAA should not exceed 365 days, even if the container is not full.

7.4.2 Manifesting and Disposal

All disposal of HW generated by contractors must be coordinated with the RCRS on Camp Lejeune or I&E EAD on MCASNR. HW generated aboard MCB Camp Lejeune and MCAS New River must be transported off the installation by a permitted HW transporter and must include a Uniform Hazardous Waste Manifest form (EPA Form 8700-22) or an equivalent approved manifest. The following procedures must be followed for disposal of HW:

- Use the MCB Camp Lejeune or MCAS New River EPA identification number for disposal of all contractor-generated HW.
- HW may only be transported by authorized personnel or permitted companies. Prior to transportation offsite, the HW generator must ensure that all DOT requirements for labeling, marking, placarding, and containerizing are met. The HW generator must also ensure that the transporter has obtained the installation's EPA identification number for the transportation of HW and that an appropriate waste manifest accompanies each shipment.
- The HW manifest can only be signed by personnel from the installation who have been designated in writing by the CG. The ROICC or Contract Representative should contact RCRS or I&E about manifesting regulated and non-regulated wastes offsite. Under NO circumstances can a contractor, ROICC, or Contract Representative sign a HW manifest or use another EPA identification number for wastes generated at the installation.
- All HW must be submitted to a permitted TSD facility. HW generators must certify that the facility receiving the waste employs the most practical and current treatment, storage, or disposal methods for minimizing present and future threats to human health and the environment.

7.5 Non-RCRA-Regulated Waste Requirements

Non-RCRA-regulated wastes include used oil (when recycled), non-terne (tin and lead alloy) plated oil filters (not mixed with listed waste), CFC refrigerants (from totally enclosed equipment), certain Polychlorinated biphenyl (PCB) containing wastes, asbestos, and batteries not managed as UW.

7.5.1 Used Oil and Oil Filters

Used motor oil itself is not regulated as HW in North Carolina if it is recycled or burned for energy recovery. If used oil is not recycled, the generator must determine prior to disposal whether it is HW. Used oil must be collected in drums or another approved container marked "Used Oil." If the used oil storage container has a volume of 55 gallons or more, it must be stored in secondary containment.

- Do not dump used oil into drains, sinks, or trash containers, or onto the ground.
- Do not store used oil in open buckets or drip pans, damaged or rusted containers, or containers that cannot be fully closed.
- Do not mix used oil with other waste materials.

Terne plated oil filters contain an alloy of tin and lead. They are considered HW due to their lead content and are typically located on industrial and heavy-duty vehicles and equipment. All other used oil filters are not regulated as HW in North Carolina as long as they are not mixed with listed HW. To qualify for this exclusion, the following conditions must be met:

- Used oil filters must be gravity hot-drained by puncturing the filter anti-drain back valve or filter dome and hot draining into a "Used Oil" storage drum. "Hot-drained" means that the oil filter is drained at a temperature that approximates the temperature at which the engine operates.

- Any incidental spillage that occurs must be cleaned up with dry sweep, rags, or “absorbent matting.”
- Drained used oil filters must be collected in a container that is in good condition and is labeled with the words “Drained Used Oil Filters.”
- No other waste streams should be deposited in containers collecting used oil filters for disposal.
- Coordinate with the ROICC or Contract Representative to turn-in drained used oil filters and or dry sweep to RCRS or I&E.

7.5.2 Used Antifreeze

Antifreeze is composed of regulated chemicals, including ethylene glycol and propylene glycol, and during typical use may become contaminated with traces of fuel or metal particles (i.e., lead, cadmium, or chromium). It may also become HW if it has been mixed with other wastes, such as gasoline or solvents. Additional characterization may be required to determine whether or not used antifreeze is HW. Used antifreeze that is not recycled may be regulated as HW if the results from the Toxic Characteristic Leaching Procedure (TCLP) indicate metal contents that meet or exceed RCRA thresholds.

The State of North Carolina does not regulate used antifreeze as HW, as long as it is recycled by reuse, distillation, filtration, or ion exchange. Used antifreeze must be stored in closed containers on an impermeable concrete surface with adequate spill controls (secondary containment, appropriate stocked spill kits, etc.). Contact the ROICC or Contract Representative to determine if used antifreeze can be given to RCRS or I&E.

7.5.3 Petroleum-Contaminated Wipes and Oily Rags

Petroleum-contaminated wipes and oily rags are to be managed as non-regulated waste. Follow these procedures:

- Store oil-contaminated wipes and oily rags in metal containers because of their flammability/combustibility and to protect them from the weather.
- Do not throw these non-regulated waste items into solid waste dumpsters or garbage cans.
- Contact the ROICC or Contract Representative to determine if petroleum-contaminated wipes and oily rags can be given to RCRS or I&E.

7.5.4 Used Electronic Equipment

Used electronic equipment may contain lead solder or PCB oils (e.g., light ballast). Turn in these items as they are generated. Have the ROICC or Contract Representative contact RCRS or I&E for proper handling and/or turn-in procedures.

7.5.5 New and Used Batteries

- Store compatible batteries together (e.g., lithium batteries should be stored with other lithium batteries).
- Store batteries off the ground to prevent them from coming into contact with water.
- Store lead-acid batteries away from an open flame.
- Place rechargeable batteries in plastic bags before storing them with other rechargeable batteries.
- Do not dispose of batteries unless authorized.
- Have the ROICC or Contract Representative contact RCRS or I&E for proper handling and/or turn-in procedures.

8.0 Asbestos

Asbestos was widely used in many products (especially building parts) prior to 1990 for its fire resistance, strength, and affordability. However, exposure to friable asbestos can lead to lung diseases including cancer. Contractors working aboard the installation must follow all Federal, State, and local regulations/specifications for the proper notification, removal, disposal, and management of all asbestos-containing materials (ACM) associated with demolition and renovation project. If you have any additional questions, please call (910) 451-7018.

8.1 Key Definitions and Concepts

The following key definitions and concepts are associated with asbestos and its management. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate EMD program if additional clarification is necessary.

8.1.1 Key Definitions

- **Abatement.** Work performed to repair, maintain, remove, isolate, or encapsulate ACM.
- **Asbestos.** Asbestos is the generic term for a group of naturally occurring fibrous silicate minerals, including those that typically exhibit high tensile strength, flexibility, and resistance to thermal, chemical, and electrical conditions. Asbestos was commonly used in installed products such as roofing shingles, floor tiles, cement pipe and sheeting, roofing felts, insulation, ceiling tiles, fire-resistant drywall, and acoustical products.
- **Asbestos-Containing Material.** Any material containing more than 1 percent asbestos, per 29 CFR 1926.1101.
- **Category I Non-friable ACM.** Asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos, per 40 CFR 61, Subpart M.
- **Category II Non-friable ACM.** Any material, excluding Category I non-friable ACM, containing more than 1 percent asbestos that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure, per 40 CFR 61, Subpart M.
- **Demolition.** The wrecking or removal of any load-bearing walls or structure with any related handling operations.
- **Friable.** Any ACM that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure (may include damaged ACM that was previously identified as non-friable), per 40 CFR 763.
- **Glove Bag.** A sealed compartment with attached inner gloves that are used for handling ACM. Glove bags provide a small work area enclosure typically used for small-scale asbestos stripping operations.
- **Presumed Asbestos-Containing Material (PACM).** Thermal system insulation (TSI) and surfacing material found in buildings constructed no later than 1980, per 29 CFR 1926.1101.
- **Regulated Asbestos-Containing Material (RACM).** Includes friable ACM, Category I non-friable ACM that has become friable, Category I non-friable ACM that has been sanded, ground, cut, etc., and Category II non-friable ACM that has a high probability of becoming crumbled, pulverized, or reduced to powder during demolition or renovation, per 40 CFR 61, Subpart M.
- **Removal.** Stripping, chipping, sanding, sawing, drilling, scraping, sucking, and other methods of separating material from its installed location in a building.
- **Renovation.** Altering a facility or its components in any way, including stripping or removal of RACM, per 40 CFR 61, Subpart M.

8.1.2 Key Concepts

- **Demolition Notification.** North Carolina law requires notification for all demolition, regardless of whether asbestos is present, 10 working days prior to starting demolition.
- **Disposal.** ACM waste can be accepted at the MCB Camp Lejeune Sanitary Landfill. Work with the ROICC or Contract Representative to coordinate the disposal through the MCB Camp Lejeune Sanitary Landfill. Asbestos waste is only accepted on Mondays through Thursdays from 0700 to 1000.
- **Removal Requirements.** Permits for asbestos removal or demolition must be obtained when the ACM present exceeds 260 linear feet, 160 square feet, or 35 cubic feet. Additionally, proper work practice procedures must be followed during demolition or renovation operations.
- **Renovation Notification.** If ACM is present within a structure, North Carolina law requires notification of renovation 10 working days prior to starting renovation.

8.1.3 Environmental Management System

Contractor practices associated with asbestos management include the following:

- Building operation/maintenance/repair
- Construction/demolition/renovation
- Equipment operation/maintenance/disposal
- HW transportation
- Parts replacement

The potential impacts of these activities on the environment include soil contamination and degradation of water quality, air quality, and the potential exposure of installation occupants.

8.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable regulations and requirements regarding ACM, which include but may not be limited to:

- **Asbestos General Standard, 29 CFR 1910.1001 – Asbestos.** Applies to all occupational exposures to asbestos in all industries covered by OSHA.
- **Asbestos Hazard and Emergency Response Act (AHERA), 1986.** AHERA was written primarily to provide officials in schools, grades K-12, with rules and guidance for the management of ACM.
- **Asbestos School Hazard Abatement Reauthorization Act (ASHARA), 1992.** This act extended AHERA regulations to cover public and commercial buildings.
- **National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart A, General Provisions, and 40 CFR 61 – Subpart M – National Emission Standard for Asbestos.** Includes standards for asbestos demolition and renovation, disposal, and administrative requirements.
- **Naval Facilities Engineering Service Center, Facilities Management Guide for Asbestos and Lead.** Summarizes asbestos and lead requirements that routinely affect facilities operations, to protect workers, building occupants, and the environment.
- **Naval Facilities Guide Specifications and Engineering Control of Asbestos Materials.** Covers the requirements for safety procedures and requirements for the demolition, removal, encapsulation, enclosure, repair, and disposal of ACM.
- **North Carolina Asbestos Hazard Management Program, NC General Statutes, Chapter 130A, Article 19; 10A NCAC 41C.0601–.0608 and .0611.** Incorporates 40 CFR 763 and 29 CFR

1926.1101 by reference and outlines criteria for asbestos exposures in public areas, accreditation of persons conducting asbestos management activities, and asbestos permitting and fee requirements.

- **Safety and Health Regulations for Construction, Asbestos, 29 CFR 1926.1101.** Regulates asbestos in construction, demolition, alteration, repair, maintenance, or renovation of structures that contain asbestos.

8.3 Responsibilities Before a Demolition or Renovation Project

Prior to starting a demolition or renovation project, contractors must:

- Determine whether ACM, PACM, and/or RACM are present in the buildings involved in the project.
- Complete the necessary notifications to the State of North Carolina and obtain any necessary permits for the removal of ACM, PACM, and/or RACM.
- Understand what actions to take if ACM, PACM, and/or RACM are unexpectedly encountered during project execution.
- Remove all non-friable and friable ACM in accordance with all Federal, State, and local regulations, prior to demolition activities.
- Know how to properly dispose of ACM and provide any waste disposal manifests generated for disposal.

8.3.1 Identification of ACM and PACM

Contract documents will identify the presence of known ACM, PACM, and RACM. Contact the ROICC or Contract Representative with questions regarding the presence of these materials as identified in the contract documents. An inspection conducted by a North Carolina Health Hazards Control Unit (HHCU) licensed asbestos inspector may be necessary to confirm the location and quantities of any ACM, PACM, and/or RACM and determine if any previously unidentified materials are present.

8.3.2 Notification

To maintain accurate files and records, the ROICC or Contract Representative is required to notify the Asbestos Program Manager, who is part of I&E, of all work involving asbestos removals, including glove bag projects.

The North Carolina Department of Health and Human Services (DHHS) Form 3768, *Asbestos Permit Application and Notification for Demolition and Renovation*, must be submitted to the North Carolina HHCU 10 working days in advance of demolition activities, regardless of whether asbestos is present.

This form must be posted onsite during the entire duration of the project. Have the ROICC or Contract Representative contact the Asbestos Program Manager with questions or concerns about requirements for notification of demolition or renovation.

8.3.3 Removal

Any ACM, PACM, and/or RACM present must be removed before the area is disturbed during renovation or demolition activities (except in certain rare instances). Certification and handling requirements for asbestos removal are provided in 10A NCAC 41C and the Asbestos NESHAP. Refer to these regulations for detailed requirements.

8.3.4 Training

North Carolina regulations require that all persons who perform asbestos management activities in the State of North Carolina must be accredited by the North Carolina HHCU under the appropriate accreditation category (i.e., Building Inspector, Project Supervisor, and/or Abatement Worker). Training documentation should be available upon request.

8.4 Responsibilities During a Demolition or Renovation Project

North Carolina regulations require that DHHS Form 3768, *Asbestos Permit Application and Notification for Demolition and Renovation*, be acquired by the contractor and posted onsite during all permitted projects. Contractors must post this form when the project will remove the following: 260 linear feet, 160 square feet, or 35 cubic feet of RACM or asbestos that might become regulated as a result of handling. The form must also be posted for nonscheduled asbestos removal that will exceed these numbers in a calendar year.

During a renovation or demolition project, if the contractor suspects the presence of additional ACM (other than the materials identified in contract documents), the contractor must immediately report the suspected area to the ROICC or Contract Representative. Before proceeding, the facility must be inspected by an asbestos inspector licensed by the North Carolina HHCU. The individual performing the asbestos survey will coordinate with the ROICC or Contract Representative throughout the process. A legible copy of the building inspection report must be provided to the North Carolina HHCU prior to each demolition and upon request for renovations; a building inspection report will be acceptable only if the inspection was performed during the 3 years prior to the demolition. A copy of the report should also be forwarded to the Asbestos Program Manager.

For specific work procedures and requirements for glove bag projects, refer to 29 CFR 1926.1101.

8.5 Disposal of ACM Waste

Contractors can dispose of ACM waste at the MCB Camp Lejeune Sanitary Landfill after first coordinating with the MCB Camp Lejeune Landfill office through the ROICC or Contract Representative. The contractor must provide the MCB Camp Lejeune Landfill with Form DHHS 3787, *North Carolina Health Hazards Control Unit's Asbestos Waste Shipment Record*. The contractor must submit this form to the North Carolina HHCU for all permitted asbestos removal projects.

9.0 Lead-Based Paint

Lead was used in paint for its color and water-resistant properties until it was banned in 1978 for its highly toxic properties that may cause a range of health problems especially in young children. Improper removal of lead-based paint (LBP) may result in paint chips and dust, which may contaminate a structure inside and out. The North Carolina DHHS regulations require any person who performs an inspection, risk assessment, or abatement to be certified. North Carolina DHHS also requires a person to obtain a permit for conducting an abatement of a child-occupied facility or target housing. If you have any additional questions, please call Base Safety at (910) 450-5930.

9.1 Key Definitions and Concepts

The following key definitions and concepts are associated with LBP activities. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate Environmental Department or Safety Representative if additional clarification is necessary.

9.1.1 Key Definitions

- **Abatement.** The permanent removal or elimination of all LBP hazards.
- **Demolition.** The removal of any load-bearing walls or structure.
- **Inspection.** A surface-by-surface investigation to determine the presence of LBP, and a report explaining the results of the investigation.
- **Lead-Based Paint.** Surface coatings that contain lead in amounts equal to or in excess of 1.0 milligram per square centimeter, as measured by X-ray fluorescence (XRF) or laboratory analysis, or more than 0.5 percent by weight, per 40 CFR 745.
- **Lead-Containing Paint.** Surface coatings that contain lead in any amount greater than the laboratory reporting limit but less than 1.0 milligram per square centimeter, or less than 0.5 percent by weight, per 29 CFR 1926.62 and 29 CFR 1910.1025; also contained in 40 CFR 745 Subpart L and adopted by the State of North Carolina under North Carolina General Statute Chapter 130A, Article 19A.
- **Renovation.** Alteration of a facility or its components in any way.
- **Target Housing.** Any housing constructed before 1978, with the exception of housing for the elderly and persons with disabilities (unless a child under the age of six lives there) and residential dwellings where the living areas are not separated from the sleeping areas (efficiencies, studio apartments, dormitories, etc.).

9.1.2 Key Concepts

- **Disposal.** Analysis is required to determine proper disposal of waste (non-hazardous or hazardous). A TCLP analysis must be conducted to determine whether lead levels have exceeded 5 parts per million (ppm), which is the RCRA threshold for HW determination.
- **LBP Survey.** An LBP survey is required prior to disturbing painted surfaces to determine whether the paint meets the criteria of lead containing over 1.0 milligram per square centimeter or over 0.5 percent by weight.
- **Training.** LBP training requirements set forth by the OSHA must be followed by all personnel involved in all LBP removal activities. MCB Camp Lejeune Base Safety tracks this training for contract staff, as the Safety Office houses the Lead Program Manager.

9.1.3 Environmental Management System

Contractor practices associated with LBP include the following:

- Construction/demolition/renovation
- HW transportation
- Paint removal

The potential impacts of these activities on the environment include the potential degradation of soil, water, and air environments, and the potential exposure of installation occupants.

9.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable Federal, State, and local regulations and requirements regarding LBP activities, which include but may not be limited to:

- **Naval Facilities Engineering Service Center, Facilities Management Guide for Asbestos and Lead.** Summarizes asbestos and lead requirements that routinely impact facilities operations in order to protect workers, building occupants, and the environment.
- **Lead-Based Paint Hazard Management Program, NC General Statutes, Chapter 130A, Article 19A. Section 130A-453.01 through 453.11.** Requires a person who performs an inspection, risk assessment, abatement, or abatement design work in a child-occupied facility (daycares, pre-schools, etc.) or housing built before 1978 to be certified and establishes the requirements for certification, including the oversight of required training. It also requires a person who conducts an abatement of a child-occupied facility or target housing to obtain a permit for the abatement; establishes work practice standards for LBP abatement activities; and has adopted requirements included in 40 CFR Part 745, Subpart L and 40 CFR Part 745, Subpart D.
- **Lead-Based Paint Hazard Management Program for Renovation, Repair, and Painting (RRP), 10A NCAC 41C.0900.** Common renovation activities may create hazardous lead dust and chips by disturbing LBP, which may be harmful to adults and children. This article requires that dust sampling technicians, firms, and individuals performing renovation, repair, and painting projects for compensation that disturb LBP in housing and child-occupied facilities built before 1978 be certified and follow specific work practices to prevent lead contamination. Child-occupied facilities include, but are not limited to, childcare facilities and schools (with children under the age of 6) that were built before 1978.
- **10A NCAC 41C.0800, Lead-Based Paint Hazard Management Program.** Requires (1) all individuals and firms involved in LBP activities to be certified and (2) all LBP activities to be carried out in accordance with 40 CFR 745.
- **29 CFR 1926, Safety and Health Regulations for Construction.** Contains the OSHA requirements for construction activities where workers may come into contact with lead.
- **40 CFR Part 745, Lead-Based Paint Poisoning Prevention in Certain Residential Structures.** Ensures that (1) LBP abatement professionals, including workers, supervisors, inspectors, risk assessors, and project designers, are well trained in conducting LBP activities; and (2) inspections for the identification of LBP, risk assessments for the evaluation of LBP hazards, and abatements for the permanent elimination of LBP hazards are conducted safely, effectively, and reliably by requiring certification of professionals.

9.3 Responsibilities Before Renovation or Demolition

Ordinary renovation and maintenance activities may create dust that contains lead, but following lead-safe work practices may help mitigate or prevent lead hazards. The North RRP Program (10A NCAC 41C.0900) mandates that contractors, property managers, and others working for compensation in homes and child-occupied facilities built before 1978 be trained in and use lead-safe work practices, as Building constructed prior to 1978 are assumed to contain LBP. In addition, it mandates that contractors provide the owner and occupants with *The Lead-Safe Certified Guide to Renovate Right* information pamphlet, which are found at the following website:

http://epi.publichealth.nc.gov/lead/pdf/RenovateRight.pdf

Individuals must be certified by the State of North Carolina to perform RRP activities for compensation in housing and child-occupied facilities built before 1978. A firm engaged in regulated renovation activities (such as RRP that disturbs more than 6 square feet of interior painted surfaces or 20 square feet of exterior painted surfaces, or dust sampling after renovation) must be a certified renovation firm.

To address the hazards associated with the improper abatement or removal of LBP, any person who performs an inspection, risk assessment, abatement, or abatement design work in a child-occupied facility (child development centers, preschools, etc.) or housing built before 1978 must be certified by the State of North Carolina. Any person who conducts an abatement of a child-occupied facility or target housing must also obtain a permit for the abatement. Individuals conducting LBP abatement activities in North Carolina, such as inspections, risk assessments, LBP hazards abatement, clearance testing, or abatement project design in housing and child-occupied facilities built before 1978, must be certified by the State of North Carolina. A firm engaged in abatement activities must be a certified lead abatement firm.

Prior to any renovation or demolition aboard the installation that involves the disturbance of painted surfaces, an LBP survey must be completed by a North Carolina certified inspector, retained through the ROICC or Public Works Division (PWD). Certain projects will use PWD staff to conduct the sampling, and other projects will use contracted personnel. Buildings constructed prior to 1978 are assumed to contain LBP; therefore, no LBP survey is necessary. The LBP survey (through sampling and analysis) will determine whether painted surfaces meet the criteria of LBP (lead content equal to or greater than 1.0 milligram per square centimeter as measured by XRF or lab analysis, or 0.5 percent by weight). Naval Facilities Guide Specifications and contract documents must be implemented for contracts where LBP is to be abated/removed prior to demolition or renovation.

If the area is to be reoccupied, final clearance must be conducted, including a visual inspection and sample collection, prior to reoccupation. Clearance on all projects involving abatement must be done by a certified risk assessor or a certified LBP inspector. Clearance for RRP projects may be conducted by a certified risk assessor, certified LBP inspector, or certified dust sampling technician.

9.4 Permits

Contractors must obtain a North Carolina LBP Abatement Permit from North Carolina DHHS when lead paint is removed from targeted housing (child-occupied facilities or housing built prior to 1978).

9.5 Disposal

If the LBP survey determines that LBP will be abated as part of a renovation or demolition project, the contractor must take analytical samples to determine whether the waste material is hazardous. Usually, a TCLP sample is collected from a “representative” sample of the material removed. The laboratory

conducting the sample analysis must be accredited by the Environmental Lead Laboratory Accreditation Program (ELLAP). A list of these accredited labs is available by contacting (703) 849-8888 or visiting:

http://apps.aiha.org/qms_aiha/public/pages/reports/publicScopeView.aspx?ProgramCode=37&Version=2.

If the LBP is removed from the underlying building material, then the paint is the waste stream. If the LBP is removed with the building material, then both materials are considered the waste stream.

If the lead content is below HW regulatory disposal levels, consult the ROICC or Contract Representative to determine whether if the contract allows for the disposal of the material in the MCB Camp Lejeune Sanitary Landfill. Lead waste is only accepted on Mondays through Thursdays from 0700 to 1000.

If the abated LBP is above HW regulatory levels, refer to Section 7.0 of this guide for information on HW management and disposal requirements.

9.6 Training

Before the project begins, workers who are subject to lead exposure during abatement or removal activities must be trained according to the OSHA regulations in 29 CFR 1926.62 concerning lead exposure in construction, and they must receive all training and certification specified by 10A NCAC 41C.0800 and 10A NCAC 41C.0900. The contractor is responsible for providing this training certification before initiating any work aboard MCB Camp Lejeune.

10.0 Natural Resources

The installation has stewardship and recovery responsibilities over the natural resources on the installation. These responsibilities are regulated under numerous laws described in this section. The installation ensures compliance with these laws through an interdisciplinary process of review and coordination of all activities occurring on the installation.

Contractors working on the installation are responsible for complying with conditions and measures imposed on their work as a result of this process; these responsibilities include preserving the natural resources associated with the work site, restoring work sites to an equivalent or improved condition after the work is complete, and confining construction activities to the limits of the work area indicated or specified. The contractor is advised that the installation is subject to strict compliance with Federal, State, and local laws and regulations.

10.1 Key Definitions and Concepts

The following key definitions and concepts are associated with natural resources management. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the Environmental Conservation Branch (ECON).

10.1.1 Key Definitions

- **Conservation.** The planned management, use, and protection of natural resources to provide their sustained use and continued benefit to present and future generations.
- **Ecosystem.** A dynamic, natural complex of living organisms interacting with each other and with their associated nonliving environment.
- **Habitat.** An area where a plant or animal species lives, grows, and reproduces, and the environment that satisfies its life requirements.
- **Natural Resource.** The naturally occurring assets that provide use benefits through the provision of raw materials and energy used in economic activity and that are subject primarily to depletion through human use. They are subdivided into four categories: mineral and energy resources, soil resources, water resources and biological resources. Endangered or Threatened Species. Federally listed taxon that is “in danger of extinction throughout all or a significant portion of its range” or “likely to become endangered within the foreseeable future throughout all or a significant portion of its range.”
- **Riparian Buffer.** Vegetated area bordering a body of water, such as a stream, lake, or pond.
- **Timber.** A type of forest product used to create lumber, veneer, engineered wood products, poles, pilings, paper products, biofuel, etc.
- **Waters of the United States.** All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce; including tidal waters, tributaries, ponds, lakes, and impoundments of jurisdictional waters; and adjacent wetlands; as defined in 33 USC 1251 et seq. Section 328.3. Waters of the United States associated with MCB Camp Lejeune include rivers, streams, sounds, waterways, ponds, and wetlands.
- **Wetland.** Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas, per the EPA.
- **Streams.** A body of concentrated flowing water in a natural low area or natural channel on the land surface as defined in 15A NCAC 02B .0233(2).

10.1.2 Key Concepts

- **Ecosystem Management.** A goal-driven approach to managing natural and cultural resources that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole.
- **Environmental Planning.** The process of incorporating environmental protection into overall project planning. All projects that involve Federal funding are required to engage in environmental planning and document the process according to NEPA 1969 (see section 10.2).
- **Forest Management.** The art and science of managing forests and associated resources for human and environmental benefits.

10.1.3 Environmental Management System

Contractor practices associated with natural resources include the following:

- Erosion/runoff control
- Habitat management
- Land clearing
- Building and parking lot construction
- Dock and ramp construction
- Live fire range operations
- Range construction
- Road construction and maintenance
- Soil excavation/grading
- Soil/debris/waste stockpiling and laydown yards
- Soil excavation/grading
- Timber management

The potential impacts of these activities on the environment include harmful air emissions, sedimentation, water pollution, degradation of habitat, damage to timber, and impacts to wildlife and protected species.

10.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable regulations and requirements regarding natural resources, which include but may not be limited to:

- **Bald and Golden Eagle Protection Act of 1940, as Amended (16 USC 688 *et seq.*).** Prohibits taking, possessing, and transporting bald eagles and golden eagles and importing and exporting their parts, nests, or eggs. The definition of “take” includes pursue, shoot, shoot at, poison, wound, capture, trap, collect, molest, or disturb.
- **BO 5090.11A, Protected Species Program.** Sets forth regulations and establishes responsibilities to ensure the conservation of threatened and endangered species and species at risk aboard MCB Camp Lejeune.
- **BO 5090.12, Environmental Impact Review Procedures.** Implements NEPA 1969 and NEPA policy and guidance in Chapter 12 of MCO P5090.2A.
- **Clean Water Act of 1972.** The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Section 404 of the CWA regulates the placement of dredged or fill material into wetlands, lakes, streams, rivers, estuaries and certain other types of waters. The goal of Section 404 is to avoid and minimize losses to wetlands and other waters and to compensate for unavoidable loss through mitigation and restoration. Section 401 of the CWA provides states and authorized tribes

with an important tool to help protect the water quality of federally regulated waters within their borders, in collaboration with federal agencies.

- **Coastal Zone Management Act of 1972 (CZMA) (16 USC 1451 *et seq.*).** Requires that Federal actions affecting any land/water use or coastal zone natural resource be implemented consistent with the enforceable policies of an approved State coastal management program. Requires concurrence from the State before taking an action affecting the use of land, water, or natural resources of the coastal zone.
- **Endangered Species Act of 1973 (16 USC 1531 *et seq.*).** Requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (FWS) and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a “taking” of any federally listed species.
- **EO 11990, Protection of Wetlands, 24 May 1977**. Addresses Federal agency actions required to identify and protect wetlands, minimize the risk of wetlands destruction or modification, and preserve and enhance the natural and beneficial values of wetlands.
- **EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, 10 January 2001.** Requires each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a plan to promote the conservation of migratory bird populations.
- **Marine Mammal Protection Act of 1972 (MMPA), as Amended (16 USC 1361 *et seq.*).** Mandates a moratorium on the killing, capturing, harming, and importing of marine mammals and marine mammal products. The MMPA also prohibits the taking of any marine mammal, including to harass, hunt, capture, collect, or kill any marine mammal, including any of the following: collection of dead animals or their parts, restraint or detention of a marine mammal, tagging a marine mammal, the negligent or intentional operation of an aircraft or vessel, or any other negligent or intentional act that results in disturbing or molesting a marine mammal.
- **Migratory Bird Treaty Act of 1918, as Amended (16 USC 703 *et seq.*).** Protects migratory birds (listed in 50 CFR 10.13) and their nests and eggs and establishes a permitting process for the taking of migratory birds by establishing a Federal prohibition to “pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird or any part, nest, or egg of any such bird.”
- **MCO P5090.2, Environmental Compliance and Protection Manual.** Provides guidance and instruction to installations to ensure the protection, conservation, and management of watersheds, wetlands, natural landscapes, soils, forests, fish and wildlife, and other natural resources as vital USMC assets.
- **National Environmental Policy Act of 1969 (42 USC 4321 *et seq.*).** Requires Federal agencies, including the USMC, to consider the environmental impacts of projects prior to implementation. All projects that support military training, minor and major military construction, maintenance, and natural resources management actions are reviewed for potential environmental impacts. Contractors must obtain and review any NEPA documentation associated with their projects. All NEPA documentation can be obtained from the ROICC or Contract Representative.

- **Rivers and Harbors Act of 1899.** Prohibits the excavation, filling, or alteration of the course, condition, or capacity of any port, harbor, or channel without prior approval from the Chief of Engineers.
- **Sikes Act of 1960, as Amended (16 USC 670 *et seq.*).** Requires military installations to manage natural resources for multipurpose uses and public access appropriate for those uses, as well as ensuring no net loss to training, testing or other defined missions of the installation through the development and implementation of an INRMP.
- **Neuse River Basin Riparian Buffer Rules (15A NCAC 02B.0233).** Require a 50-foot riparian buffer that is divided into two zones. The 30 feet closest to the water (Zone 1) must remain undisturbed. The outer 20 feet (Zone 2) may include managed vegetation, such as lawns or shrubbery. The riparian buffer rules also require diffuse flow of stormwater runoff. The buffers apply to intermittent streams, perennial streams, lakes, ponds, estuaries, and modified natural streams that are depicted on the most recent printed version of the soil survey map prepared by the Natural Resources Conservation Service or the 1:24,000 scale quadrangle topographic map prepared by the U.S. Geologic Survey.
- **Wetland Buffer.** MCB Camp Lejeune requires a 50-foot buffer around all wetlands and streams. Any ground disturbing activity within the buffer area will require coordination with the base EMD.
- **North Carolina Wetland Standards (15A NCAC 02B .0231).** A set of Standards set in Rule by the NC Division of Water Resources. The water quality standards for all wetlands are designed to protect, preserve, restore, and enhance the quality and uses of wetlands and other waters of the State influenced by wetlands.

10.3 National Environmental Policy Act

Staff specialists from various installation departments participate in the NEPA process, which coordinates the review of projects and documents any potential environmental impacts for projects to incorporate into the design process. Any expansion or relocation of the site or a design change that would impact resources not previously reviewed, may require the project to go back through the NEPA review process.

The documentation of this review process occasionally includes mandatory conditions affecting the design and construction/ implementation of the project. The documentation, when completed, is provided to the action proponent, who is expected to provide it to the ROICC or Contract Representative.

Consult the ROICC or Contract Representative to obtain and review any NEPA documentation associated with the project. The documentation marks the end of the NEPA review process; it does not constitute approval for the proponent of the action to implement the action. This documentation is most often a Decision Memorandum (DM) but is sometimes an Environmental Assessment (EA) or Environmental Impact Statement. Some contracts may include stipulations from the NEPA document that must be implemented prior to the onset of work to prevent environmental impacts and violations of Federal or State rules and regulations. Stipulations could include replacing monitoring wells if damages occur from contractor operations, stopping work if contamination is encountered, notification that a wetlands permit is required, seasonal restrictions, etc.

10.4 Timber

Contractors must ensure that the ROICC or Contract Representative notify the EMD's Forest Management Program prior to conducting site work. Potential timber resources are identified during the NEPA process. The contractor is responsible for advising the ROICC or Contract Representative to notify EMD's Forest Management Program at (910) 451-9384 prior to beginning site work. Additionally, the ROICC or Contract Representative and/or contractor is required to notify the Forest Management

Program if the contract has been amended with modifications to the site location. Timber will not be released to contractors without the approval of the Forest Management Program.

MCB Camp Lejeune manages its forest in accordance with the installation INRMP. The Forest Management Program maintains first right of refusal for all timber products on construction projects and will determine whether the Government will harvest the timber or release it to the contractor. The Government retains exclusive rights to all forest products on construction projects. If the Government elects to harvest the timber, only merchantable timber will be removed.

Contractors must adhere to the following requirements when performing site work that may impact timber resources:

- Do not remove, cut, deface, injure, or destroy trees or shrubs without authorization from the ROICC or Contract Representative.
- Do not fasten or attach ropes, cables, or guy wires to nearby trees for anchorages without authorization from the ROICC or Contract Representative. (If these actions are authorized, the contractor is responsible for any resultant damage.)
- Protect existing trees that are to remain in place and that may be injured, bruised, defaced, or otherwise damaged by construction operations.
- With the ROICC or Contract Representative's approval, use approved methods of excavation to remove trees with 30 percent or more of their root systems destroyed.
- With the ROICC or Contract Representative's approval, remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features.

Please refer to Section 12.0 for disposal information for land-clearing debris.

10.5 Wildlife and Protected Species

The contractor must not disturb wildlife (birds, nesting birds, mammals, reptiles, amphibians, and fish) or the native habitat adjacent to the project area except when indicated or specified. Water flows may not be altered; the native habitat adjacent to the project and critical to the survival of fish and wildlife may not be significantly disturbed, except as indicated or specified.

Specific requirements regarding protected areas on the installation apply to contractor activities. Nine federally threatened and endangered species are currently managed at MCB Camp Lejeune – red-cockaded woodpecker, green sea turtle, loggerhead sea turtle, rough-leaved loosestrife, seabeach amaranth, piping plover, red knot, eastern black rail, and American alligator. Consult the ROICC or Contract Representative to determine if there are any project requirements regarding any threatened or endangered species.

With the exception of improved roadways, entry into a threatened or endangered species site or shorebird nesting area marked with signs and/or white paint is prohibited without written permission from installation personnel. BO 5090.11 lists threatened and endangered species that may be encountered at the installation. The following restrictions apply on the installation unless written permission is explicitly provided:

- Work on Onslow Beach or Brown's Island is not permitted between April 1 and October 31. Traffic on the beaches should be limited to below the high tide line.
- Vehicles and lighting are prohibited on the beaches overnight between May 1 and October 31.

- Construction activities are prohibited within 1,500 feet of a bald eagle's nest (JD, MC, and IF Training area).
- Cutting or damaging pine trees is not permitted.
- Altering hydrology through excavation, ditching, etc., is prohibited.
- Wildlife must not be disturbed, captured, or fed (including snakes and alligators). For assistance with a situation involving wildlife, please call (910) 451-5226 or email CLJN_LWRS@usmc.mil.

10.6 Wetlands and Streams

Wetlands and streams are protected per the CWA as waters of the United States. These areas are important for water quality, as habitat, for flood storage, and to prevent erosion. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas, per the EPA.

The base contains both freshwater and saltwater or coastal wetlands.

Coastal wetlands are specifically defined as any marsh subject to regular or occasional flooding by wind or lunar tides and also contains one or more of 10 specific plant species. They generally are located adjacent to sounds and estuaries. They are characterized by marsh grasses and rarely contain trees. Coastal wetlands are regulated by the NC Division of Coastal Management (NCDCM) in addition to the U.S. Army Corps of Engineers (USACE) and NC Division of Water Resources (NCDWR) that regulate streams and freshwater wetlands.

A stream is a body of concentrated flowing water in a natural low area or natural channel on the land surface. There are three stream types: ephemeral, intermittent, and perennial.

Ephemeral streams are features that only carry stormwater in direct response to precipitation. They may have a well-defined channel and they typically lack the biological, hydrological, and physical characteristics commonly associated with intermittent or continuous conveyances of water. These features are typically not regulated by NCDWR or USACE.

Intermittent streams have a well-defined channel that contains water for only part of the year (typically during winter and spring). The flow may be heavily supplemented by stormwater. When dry, they typically lack the biological and hydrological characteristics commonly associated with continuous conveyances of water. These features are regulated by NCDWR and typically regulated by USACE.

Perennial streams have a well-defined channel that contains water year-round during a year with normal rainfall. Groundwater is the primary source of water, but they also carry stormwater. They exhibit the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water. These features are regulated by NCDWR and typically regulated by USACE.

10.6.1 Impacts

Impacts to wetlands and streams includes activities that result in adding or removing soil/construction materials, ditching and/or draining, grading, impounding, piping, addition of pollutants, and permanent conversion of vegetation type. Any disturbance to the soil or substrate (bottom material) of a wetland or water body, including a stream bed or protected buffer, is an impact and may adversely affect the soils, vegetation, and hydrology of an area.

In accordance with MCO P5090.2, all facilities and operational actions must avoid, to the maximum degree feasible, wetlands destruction or degradation, regardless of the wetland size or legal necessity for a permit. Any identified and mapped boundaries of the legally defined wetlands on all USMC lands within the project area will be distributed to the ROICC or Contract Representative for use and included in all design products, including drawings, plans, and figures.

In order to prevent impacts, there is a 50-foot buffer around all streams and wetlands on Camp Lejeune in which unauthorized ground disturbance is not allowed. Safety fencing shall be installed around wetlands, streams and the buffer in project areas where they are not to be impacted, to prevent any accidental impacts to the wetland features. This safety fence also serves as a visual cue to the construction workers/contractors to stay out of these areas.

Prior to the onset of construction, coordination with the ECON of EMD should have taken place during project design to ensure CWA permitting issues are addressed by the contractor at the earliest opportunity. Contractors must incorporate avoidance and minimization measures to the maximum extent practicable to protect wetlands, streams, and waters of the United States. Any proposed action that would significantly affect wetlands or streams must be coordinated with the CG of MCB Camp Lejeune. Contractors must incorporate avoidance and minimization measures to comply with the national policy to permit no overall net loss wetlands.

All unavoidable potential impacts to wetlands or streams require prior coordination as described in this section. Failure to acquire written authorization for impacts to wetlands and/or waters of the United States may result in significant project delays or design modifications. Impacts within a project are cumulative, meaning that if there is an increase in impacts, permits may no longer be valid and result in additional NEPA and permitting requirements. Contact the ROICC or Contract Representative if you have concerns there will be about additional impacts.

10.6.2 Permitting

No discharge of fill material, mechanized land clearing, or any other activity is allowed in jurisdictional wetlands or streams without the proper approvals. If work in wetlands is required, know who is responsible for obtaining permits and what the terms and conditions of permits require. The contractor may be responsible for obtaining the following permits (including pre-permit coordination, preparation, and submission of all permit applications and appropriate drawings after review and concurrence by the installation) and complying with all regulations and requirements stipulated by USACE and the State of North Carolina as conditions upon issuance of the permits:

- USACE, Section 404 Permit (individual or applicable nationwide permit); CWA of 1977, as Amended (Public Law 95-217, 33 U. S. C. 1251 et seq.)
- NCDWR, Section 401 Water Quality Certification – (15A NCAC 02H) NCDEQ; CWA of 1977, as Amended (Public Law 95-217, 33 U. S. C. 1251 et seq.)
- NCDWR, Discharges to Federally Non-jurisdictional Wetlands and Federally Non-jurisdiction Classified Waters (15A NCAC 02H). 1400 State issued Individual Certification Temporarily adopted Effective May 28, 2019
- NCDWR, Isolated Wetland and Isolated Waters Rules (15A NCAC 02H.1300) Effective 5/28/21
- NCDCM, Federal Consistency Determination (15A NCAC 07) NCDEQ; CZMA of 1972 (16 USC 1451 et seq.)

Two types of activities generally require a permit from the USACE:

- **Activities within navigable waters.** Activities such as dredging, constructing docks and bulkheads, and placing navigation aids require review under Section 10 of the Rivers and Harbors Act of 1899 to ensure that they will not cause an obstruction to navigation.
- **Activities in wetlands and waters of the United States (regulated by Section 404 of the CWA of 1972).** A major aspect of the regulatory program under Section 404 of the CWA is determining which areas qualify for protection as wetlands. Contractors should contact the USACE, the NCDWR, or the NCDCM if there is any question about whether activities could impact wetlands, streams, or protected buffers.

Contractors working on the installation shall not perform ANY work in waters or wetlands of the United States or State without an approved permit (even if the work is temporary). Examples of temporary discharges include dewatering of dredged material prior to final disposal and temporary fills for access roadways, cofferdams, storage, laydown yards, spoil/waste piles and work areas. Areas to be cleared of vegetation also need to be approved by the USACE and NCDWR.

It is the responsibility of the contractor constructing the project to:

1. Keep a copy of all USACE and NCDWR permits at the job site. It is the project contractor's responsibility to review and follow the conditions of these permits and permit plans.
2. Review and comply the stream and wetlands conditions of these permits and permit plans. Any questions or concerns relating to the issued permits and their implementation, the ROICC or Contract Representative should call the Environmental Planning office at (910) 451-6287.
3. Review the permit drawings for constructability and report concerns to your ROICC or Contract Representative. Any construction drawing that has a USACE or NCDWR permit for the project will reference the permit plans in the construction drawings. This is necessary to maintain compliance with the permit conditions. If your construction drawings do not show locations of all streams, wetlands, and AECs within 50 feet of the project boundary, please request this information from your ROICC or contract representative.
4. Compare construction drawings with the permit drawings to make sure the construction drawings are consistent with the permit drawings and report their findings to the Environmental Planning Office at (910) 451-6287 and ROICC or Contract Representative.
5. Protect the 50-foot stream and wetland buffer from impacts. This can be done with the installation of a safety fence along the buffer boundary to provide a visible reminder to avoid these areas.
6. Report any violation in wetlands/streams, outside the permitted areas to the base Environmental Planning office at (910) 451-6287, the Compliance Branch of ECB at (910) 450-5806, and the ROICC or Contract Representative.
7. Report any turbidity found in streams to the Compliance Branch of ECB at (910) 450-5806, the Environmental Planning Office at (910) 451-6287, and ROICC or Contract Representative. It is also the responsibility of the project contractor to locate the source of the turbidity and eliminate/repair the issue.
8. Solely be responsible for any non-compliance issues with the USACE or NCDWR issued permits. The project construction contractor will be required to restore and mitigate for the wetland/stream non-compliance issues to the satisfaction of the Regulatory Agencies.

10.7 Temporary Construction

Traces of temporary construction facilities, such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other signs of construction, should be

removed upon completion of a contract or project. Temporary roads, parking areas, and similar temporarily used areas should be graded to conform to surrounding contours and the area restored, to the degree practical, to its state prior to any disturbing activities. The use of fabric to be placed on original ground prior to the construction of temporary roads, stockpiles, waste and other temporary features is encouraged as it makes the restoration of these areas easier and more cost effective.

11.0 Stormwater

MCIEAST – MCB CAMLEJ PWD is responsible for stormwater permits associated with construction, industrial, or municipal activities that discharge to outfalls leading to receiving waters. The most applicable permit for contractors is the construction permit since the majority of the contractor activities are affiliated with construction/renovation. However, the contractor is also responsible for adhering to the requirements of the industrial and municipal permits held by MCIEAST – MCB CAMLEJ for all of the contractor activities on the installation. All contractors are responsible for the implementation of the necessary stormwater control measures (SCM) to prevent stormwater pollution runoff from land disturbing activities (and associated construction permit requirements) as well as industrial and municipal activities. The general requirements for each area, as they apply to contractors, are discussed in the following subsections.

11.1 Key Definitions and Concepts

The following key definitions and concepts are associated with stormwater. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

11.1.1 Key Definitions

- **Stormwater Control Measures.** Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs include structural and nonstructural stormwater controls, operation and maintenance procedures, treatment requirements, and practices to control site runoff (e.g., sediment, spillage or leaks, sludge or waste disposal, or drainage from material storage). Website: https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater
- **NCG01.** The permit which provides the approval for development activities that meet the requirements for coverage under a stormwater general permit.
- **Discharge (Pollutant).** The addition of any pollutant or combination of pollutants to waters of the United States from any point source, including, but not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of any pollutant; this excludes discharges in compliance with a National Pollution Discharge Elimination System (NPDES) permit.
- **Erosion and Sedimentation Control Plan.** Any plan, amended plan, or revision to an approved plan submitted to the North Carolina Division of Land Resources or its delegated authority in accordance with North Carolina General Statute 113A-57. Erosion and Sedimentation Control Plans show the devices and practices that are required to retain sediment generated by the land-disturbing activity within the boundaries of the tract during construction and upon development of the tract. *Note that in North Carolina, the Erosion and Sedimentation Control Plan and the NCG010000 Construction General Permit are considered the Stormwater Pollution Prevention Plan (SWPPP) for a construction site. Website:* https://deq.nc.gov/about/divisions/energy-mineral-and-land-resources/erosion-and-sediment-control
- **Land Disturbance.** Areas that are subject to clearing, excavating, grading, stockpiling, and placement/removal of earth material.
- **Nonpoint Source Discharge.** All discharges from stormwater runoff that isn't attributed to a discernible, confined, and discrete conveyance. (*See also point source discharge definition below.*)
- **Point Source Discharge.** Any discernible, confined, and discrete conveyance, including but specifically not limited to, any pipe, ditch, channel, tunnel conduit, well, discrete fissure, container,

rolling stock, or concentrated animal feeding operation from which pollutants are or may be discharged to waters of the State.

- **Stormwater (Runoff).** The portion of precipitation (rain and/or snowmelt) that does not naturally infiltrate into the ground or evaporate but flows via overland flows, channels, or pipes into a defined surface water channel or stormwater system during and immediately following a storm event. As the runoff flows over the land or impervious surfaces (such as streets, parking lots, and building rooftops), it accumulates sediment and/or other pollutants that could pollute receiving streams.
- **Stormwater Associated with Construction Activities.** The discharge of stormwater from construction activities, including clearing, grading, and excavating, that result in a land disturbance of equal to or greater than 1 acre, per 40 CFR 122.
- **Stormwater Associated with Industrial Activities.** The discharge from any conveyance that is used for collecting and conveying stormwater and which is directly related to manufacturing, processing, or raw materials storage areas from an applicable industrial plant or activity, per 40 CFR 122.
- **Stormwater Associated with Municipal Activities.** The discharge of stormwater from municipal activities, including public works shops, vehicle maintenance shops and other municipal activities with the potential to cause stormwater pollution.

11.1.2 Key Concepts

- **Energy Independence and Security Act (EISA).** In December 2007, Section 438 of EISA was issued. This section requires that Federal facility projects over 5,000 square feet must “maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to temperature, rate, volume, and duration of flow.” In January 2010, the DoD Policy of Implementing Section 438 of the EISA was issued; this document includes a flowchart with implementation steps.
- **Good Housekeeping.** Good housekeeping practices refer to the maintenance of a clean and orderly facility to prevent potential pollution sources from coming into contact with stormwater. Good housekeeping requires maintaining all areas that may contribute pollutants to stormwater discharges by ensuring that they stay in a clean, orderly state. Practices pay particular attention to areas where raw materials are stockpiled, material handling areas, liquid storage areas, and loading/unloading areas. Good housekeeping is one of the six minimum control measures (MCM) of the Municipal Separate Storm Sewer Systems (MS4) permit requirements.
- **Low Impact Development (LID).** LID is a holistic approach that incorporates site-specific ecosystem and watershed-based considerations for planning and design. The goal of LID is to mimic a site’s predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source. LID seeks to control non-point source pollutants “nature’s way” through the application of plant-soil-water mechanisms that maintain and protect the ecological and biological integrity of receiving waters and wetlands.
- **National Pollution Discharge Elimination System.** The national program for issuing, modifying, revoking, reissuing, terminating, monitoring, and enforcing permits. The NPDES stormwater program regulates stormwater discharges from three potential stormwater sources, as follows:
- **Construction Activities.** Land disturbing activities which disturb one or more acres need an NPDES permit. At a minimum, these permits require the development of a site-specific Erosion and Sedimentation Control Plan to address sediment controls during construction and upon development of the tract. As previously noted, the Erosion and Sedimentation Control Plan and

the NCG010000 Construction General Permit are considered the Stormwater Pollution Prevention Plan (SWPPP) for a construction site in North Carolina. In the applicable areas of the installation, a State Stormwater Management Permit and coverage under the Construction General Permit may be required. Construction site erosion and sediment runoff control is also one of the six MCMs of the MS4 permit requirements.

  - **Industrial Activities.** Owners and operators of industrial facilities that fall into any of the 30 industrial sectors identified by EPA stormwater regulations need an NPDES Phase II permit if stormwater is discharged directly into surface water (or MS4). The permit regulations specify steps that facility operators must take prior to becoming eligible for permit coverage and actions that must be taken to continue coverage under an existing permit. These steps and actions include, but are not limited to, effluent limits, monitoring, inspection, sampling, reporting, and corrective action requirements.
  - **Municipal Separate Storm Sewer Systems.** Owners and operators of MS4s need an NPDES Phase II permit. An MS4 is a system of pipes and drainage ditches within an urbanized area used to collect storm runoff and convey it to receiving waters. Polluted runoff is commonly transported through MS4s, from which it is often discharged untreated into local waterbodies.

- **Operational Requirements.** Equipment, discharge, and material use requirements that apply to all construction and industrial activities.
- **Post-Construction Requirements.** The management of stormwater generated on a stable, established site after the construction process is complete. The Stormwater Management Plan (SWMP) sets forth requirements for post-construction stormwater program elements. Post-Construction is one of the six MCMs of the MS4 permit requirements.
- **Stormwater Pollution Prevention Plan.** A plan required by permits provided under NPDES that provides guidance to prevent stormwater pollution from construction, industrial, or municipal activities.

11.1.3 Environmental Management System

Contractor practices associated with stormwater include the following:

- Boat, ramp, dock cleaning
- Channel dredging
- Composting
- Construction/demolition/renovation
- Erosion/runoff control
- Fueling and fuel management/storage
- HM storage
- Land clearing
- Laundry
- Landscaping
- Livestock operations
- Pesticide/herbicide management and application
- Range residue clearance
- Road construction and maintenance
- Sewers
- Sidewalk and road deicing
- Soil excavation/grading

- Stormwater collection/conveyance
- Surface washing
- Vehicle parking
- Wash rack

Other activities that contractors could be involved in that may cause stormwater pollution include:

- Grounds maintenance (herbicide, pesticides, fertilizer, etc.)
- Outdoor material storage
- Building/roof repairs
- Industrial activities

11.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable regulations and requirements regarding potential stormwater contamination, which include but may not be limited to:

- **Clean Water Act of 1972.** Establishes the basic structure for regulating discharges of pollutants into the waters of the United States. The CWA establishes that no oil or hazardous substances should be discharged into or upon the navigable waters of the United States or adjoining shorelines, which may affect natural resources under the management of the United States through the following goals: (1) eliminate the introduction of pollutants into waters of the United States, and (2) develop water quality, which protects and propagates fish, shellfish, and wildlife and provides for recreation in and on the water.
- **40 CFR 122, National Pollutant Discharge Elimination System.** Requires industrial, construction, and municipal stormwater permits for the discharge of pollutants from any point source into waters of the United States.
- **15A NCAC Chapter 4.** Requires all persons conducting a land-disturbing activity to take all reasonable measures to protect all public and private property from damage caused by the release of sediments from the activity. The primary tool used to accomplish the objective is the development of an Erosion and Sedimentation Control Plan.
    - Identify critical areas
    - Limit exposure areas
    - Limit time of exposure
    - Control surface water
    - Control sedimentation
    - Manage stormwater runoff
- **15A NCAC 02H.1000 Stormwater Management.** The State Stormwater Management Program requires all persons conducting land-disturbing activities that (1) require a Coastal Area Management Act (CAMA) Major Development Permit or an Erosion and Sedimentation Control Plan, and (2) are located within coastal counties or drain to specific classifications of water bodies, to protect surface waters and highly productive aquatic resources from the adverse impacts of uncontrolled high-density development or the potential failure of stormwater control measures. To receive permit approval, projects must limit the density of development, reduce the use of conventional collection systems in favor of vegetative systems, and incorporate post-construction, structural SCMs.

11.3 Prior to Site Work

Contractors are responsible for preparing project-specific permit applications and related plans and coordinating the permit review schedule with the ROICC or Contract Representative. Contractors are required to address the following in the below section prior to beginning site work.

11.3.1 Construction Notifications

Any project involving land-disturbing activities aboard the installation must be reviewed by the installation's NEPA Review Board prior to the onset of work so that potential impacts of the project and associated mitigation measures (if necessary) can be determined. Documentation of this review should have been provided to the ROICC or Contract Representative and may include mandatory conditions affecting the construction/implementation of the project. Consult the ROICC or Contract Representative to obtain or review any NEPA documentation associated with the project in the contract.

11.3.2 Familiarity with the NPDES Municipal Separate Storm Sewer System (MS4)

Discharges of industrial stormwater have the potential to contain contaminants from industrial activity. Because of this, MCB Camp Lejeune holds a Stormwater Phase II industrial permit. This type of discharge is defined and regulated in 40 CFR 122, the EPA final rule regarding NPDES stormwater permitting.

Daily industrial operations discharging stormwater aboard MCB Camp Lejeune and MCAS New River are covered under an individual NPDES permit. In accordance with the permit, the installation maintains an industrial SWPPP that identifies potential sources of pollution that may affect the water quality of stormwater discharges associated with an industrial activity. Refer to the end of this section for more information on contractor responsibilities associated with this permit.

11.3.3 Project-Specific Construction Permits

Contractors are responsible for preparing all project-specific stormwater permit applications and related plans and for coordinating the permit review schedule with the ROICC or Contract Representative. MCIEAST - MCB CAMLEJ PWD is the responsible party for all project-specific stormwater permits located outside of Public-Private Venture (PPV) housing. All permit-required plans and applications must be submitted to the appropriate MCIEAST - MCB CAMLEJ organization to go through internal approval prior to submission to the appropriate State agency. The permit review schedule should allow adequate time for internal review prior to State submission deadlines. Adequate review time fluctuates and is based on the type of permit application. Stormwater compliance should be coordinated with the appropriate PPV partner for housing-related projects outside the jurisdiction of MCIEAST - MCB CAMLEJ.

Permit coverage is required under the North Carolina General Permit No. NCG010000 (General Permit) for construction activities that disturb one acre or more of land. Two copies of a proposed Erosion and Sedimentation Control Plan must be prepared and submitted to the NC DEQ Sedimentation Control Commission (or to an approved local program) at least 30 days prior to beginning construction activity to obtain coverage under the General Permit. After receiving Erosion and Sedimentation Control Plan approval, an electronic Notice of Intent form must be submitted to receive a Certificate of Coverage under the permit. No land-disturbing activities may take place prior to receiving a Certificate of Coverage. A copy of the Erosion and Sedimentation Control plan, NCG010000 permit, and the Certificate of Coverage will be kept on file at the job site at all times while the site is active. The approved plan is considered a requirement or condition of the General Permit; deviation from the approved plan will constitute a violation of the terms and conditions of the permit unless prior approval for the deviations has been obtained.

11.4 Responsibilities During Site Work

The contractor is responsible for maintaining the quality of the stormwater runoff and preventing pollution of stormwater at the construction/job site. The job site may be inspected by installation environmental personnel to ensure compliance with the contractor's construction and/or the installation's industrial SWPPP, municipal stormwater plan and applicable permits. The following requirements apply to all projects occurring at the installation that have the potential to impact water quality:

- Any changes to the project area that do not comply with the approved Erosion and Sedimentation Control Plan, alter the approved post-construction stormwater conveyance system, or could otherwise significantly change the nature or increase the quantity of pollutants discharged should be immediately communicated to the ROICC or Contract Representative.
- All permitted erosion and sedimentation control projects will be inspected by the contractor at least once every 7 calendar days (unless discharges to a 303(d)-listed water body are occurring) and within 24 hours after any storm event greater than 0.5 inch of rain per 24-hour period, as required by the North Carolina General Permit No. NCG010000 (General Permit). Inspection results shall be maintained by the designated contractor throughout the duration of the active construction project.
- Equipment used during the project activities must be operated and maintained in such a manner as to prevent the potential or actual pollution of the surface or ground waters of the State.
- POL products (e.g., fuels, lubricants, hydraulic fluids), coolants (e.g., antifreeze), or any other substance shall not be discharged onto the ground, into surface waters, or down storm drains (to include leaking vehicles, heavy equipment, pumps and/or structurally deficient containers of hazardous materials).
- Spent fluids shall be disposed of in a manner so as not to enter surface or ground waters of the State, or storm drains. Disposal of spent fluids is outlined in Section 7.0.
- Implement spill prevention measures, clean up all spills immediately, and follow spill reporting requirements presented in Section 5.0. Any spilled fluids shall be cleaned up to the extent practicable and disposed of in a manner so as not to allow their entry into the water (surface or ground) of the State. Refer to Section 5.0 for emergency and spill response procedures.
- Herbicide, pesticide, and fertilizer use shall be consistent with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and shall be used in accordance with label restrictions. Refer to Section 7.0 for additional information on Hazardous Material/Hazardous Waste Management.
- Particular care must be used when storing materials outside. Materials and equipment stored outside that could potentially affect the quality of stormwater runoff include, but are not limited to, garbage dumpsters, vehicles, miscellaneous metals, chemical storage, fuels storage, wood products, and empty storage drums. These materials should be stored under cover whenever practicable. Contact the ROICC or Contract Representative with any questions about whether an outdoor storage practice is acceptable.
- Use good housekeeping practices to maintain clean and orderly work areas, paying particular attention to those areas that may contribute pollutants to stormwater.
- For industrial activities, refer to the link below for more information on SCMs to prevent stormwater pollution. EPA Industrial Fact Sheet Series for Activities Covered by EPA's multi-sector general stormwater permit: https://www.epa.gov/npdes/stormwater-discharges-industrial-activities-fact-sheets-and-guidance#factsheet.

12.0 Solid Waste, Recycling, and Pollution Prevention (P2)

The installation has a proactive P2 and recycling program. Contractors should minimize the amount of solid waste requiring disposal in a landfill. This section addresses solid waste, including both municipal solid waste (MSW) and C&D waste. HM and HW are discussed in Section 7.0 of this guide. Contractors are required to comply with all Federal, State, and local laws and regulations for proper disposal and recycling of all solid wastes.

12.1 Key Definitions and Concepts

The following key definitions and concepts are associated with solid waste, recycling, and pollution prevention. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

12.1.1 Key Definitions

- **Construction and Demolition Debris.** Inert materials generated during the construction, renovation, and demolition of buildings, roads, and bridges. C&D waste often contains bulky, heavy materials such as concrete, lumber (from buildings), asphalt (from roads and roofing shingles), gypsum (the main component of drywall), and glass (from windows).
- **Green Procurement (GP).** The purchase of products and services that are environmentally preferable, when compared with competing products that serve the same purpose, in accordance with federally mandated “green” procurement preference programs. GP is intended to have a lesser or reduced negative effect on human health and the environment, and to permit fulfilling the social, economic, and other requirements of present and future generations.
- **Pollution Prevention.** Reducing the amount of pollution entering waste streams or otherwise released to the environment through source reduction and process efficiencies.
- **Recycling.** Activities that may include collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use as raw materials in the manufacturing of new products. Recycling also includes using, reusing, or reclaiming materials, as well as processes that regenerate a material or recover a usable product from it.
- **Municipal Solid Waste.** Any solid materials discarded, including garbage, construction debris, commercial refuse, non-hazardous materials, non-recyclable wood, or other non-recyclable material per BO 11350.2D, Refuse Disposal Procedures.

12.1.2 Key Concepts

- **Pollution Prevention/Green Procurement.** Installation contractors are strongly encouraged to use P2 and GP practices.
- **Qualified Recycling Program (QRP).** An organized operation that diverts or recovers scrap or waste streams and that identifies, segregates, and maintains the integrity of the recyclable materials in order to maintain or enhance the marketability of the materials.
- **Recycling.** Recycling is required on the installation. The MCB Camp Lejeune Landfill (Base Landfill) Recycling Center accepts specified recyclables according to the schedule in Table 12-1. Call (910) 451-4214 prior to a bulk turn-in.
- **Solid Waste.** Solid waste is disposed of in accordance with contract specifications (off the installation or at the Base Landfill). Data related to disposal off the installation (to include C&D waste) must be provided to the ROICC or Contract Representative on a monthly basis.

- **Source Reduction.** Any practice that reduces the amount of any HM, pollutant, or contaminant entering any waste stream or released into the environment prior to recycling, treatment, and disposal that potentially reduce the hazard to public health and the environment. Source reduction may include equipment or technology modification; process or procedure modification; reformulation or redesign of products; substitution of raw materials; and improvements in housekeeping, maintenance, training, or inventory control.

12.1.3 Environmental Management System

Contractor practices associated with solid waste, recycling, and P2 include the following:

- Battery management
- Building operation/maintenance/repair
- Composting
- Construction/demolition/renovation
- Equipment operation/maintenance/disposal
- Grease traps
- HW disposal offsite transport
- Land clearing
- Livestock operations
- Metal working
- Packaging/unpackaging
- Paint removal
- Painting
- Parts replacement
- Polishing
- Range residue clearance
- Recreational facilities operation
- Road construction maintenance
- Rock crushing operations
- Solid waste collection/transportation
- Storage tank management
- Urban wildlife management
- Vehicle maintenance

The potential impacts of these activities on the environment include soil degradation, surface water quality degradation, depletion of landfill space, and depletion of nonrenewable resources.

12.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable regulations and requirements regarding solid waste disposal, recycling, and P2, which include but may not be limited to:

- **BO 5090.17, Solid Waste Reduction – Qualified Recycling Program.** Provides guidance for solid waste reduction, P2, and management of recyclable materials.
- **BO 11350.2D, Refuse Disposal Procedures.** Establishes procedures for the separation, collection, and disposal of refuse and the disposal of waste wood products.
- **DoD Instruction 4715.4, Pollution Prevention.** Establishes the DoD requirement for installation QRPs, calls for GP.

- **EO 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability.** Leading the Nation on a firm path to net-zero emissions by 2050 and achieving the policy set forth in section 101 of this order will require bold action to transform Federal procurement and operations and secure a transition to clean, zero-emission technologies.
- **Pollution Prevention Act (PPA) of 1990 (42 USC 13101 et seq.).** Establishes the national policy that "pollution should be prevented or reduced at the source whenever feasible," and establishes the following hierarchy: source reduction, recycling, treatment, and disposal.
- **Resource Conservation and Recovery Act of 1976.** Governs the disposal of solid waste and establishes Federal waste disposal standards and requirements for State and regional authorities. The objectives of Subtitle D are to assist in developing and encouraging methods for the disposal of solid waste that are environmentally sound and that maximize the utilization of valuable resources recoverable from solid waste.
- **Solid Waste Disposal Act (SWDA) of 1965.** Requires Federal facilities to comply with all Federal, State, interstate, and local requirements concerning the disposal and management of solid wastes, including permitting, licensing, and reporting requirements. The SWDA encourages the reuse of waste through recycling and requires the procurement of products that contain recycled materials.

12.3 Solid Waste Requirements

Contractors shall follow all Federal, State, and local requirements regarding the collection, storage, and disposal of solid waste. Contact the ROICC or Contract Representative for additional information regarding solid waste requirements.

At a minimum, the following actions are required for all contractors:

1. Prior to performing work that will or may generate solid waste at the installation, all contractors must provide their ROICC or Contract Representative with a copy of their Solid Waste Disposal Permit unless the use of the Base Landfill is authorized for disposal. If the Base Landfill is authorized, the contractor must contact the Base Landfill Operations Clerk to ensure the contract is registered in the Landfill Tracking System. Recycling should be coordinated with the ROICC or Contract Representative and the Landfill Manager.
2. Provide the weight of ALL waste, both MSW and C&D that is either disposed of or recycled to the ROICC or Contract Representative, with a copy to the Landfill Manager. This requirement does not apply if the landfill/recycling facility picks up or accepts materials directly from the contractor. If contractors transport waste offsite for disposal, it is mandatory that they track the material weight and provide that information to their ROICC or Contract Representative for input into the annual Pollution Prevention Annual Data Summary.

In addition, contractors producing solid waste on the installation are required to take these steps:

- Pick up solid waste, separate it according to material type, and place it in covered containers of the correct type that are regularly emptied for recycling or landfilling.
- Verify that the solid waste contains no HM or HW.
- Prevent contamination of the site and the surrounding areas when handling and disposing of waste.
- Leave the project site clean upon completion of a project.

12.3.1 MCB Camp Lejeune Landfill Acceptable Waste Streams

To dispose of waste at the Base Landfill, contractors must be authorized with a valid construction pass and placard representing the related contract. Contractors must also contact the Landfill Operator prior to unloading refuse. Contact the ROICC or Contract Representative with any questions regarding use of the landfill or to coordinate disposal.

The Base Landfill accepts certain types of solid waste under the conditions specified in Table 12- 1. Base Landfill hours of operation are 0730 to 1530, Monday through Friday, but ACM waste must be delivered between 0700 and 1000, Monday through Thursday. Each material must be separated into different loads. Please utilize the base website for any changes. (https://www.lejeune.marines.mil/Disposal)

Figure 12-1: Base Landfill Requirements

No Personal Property/Off-Base Trash Accepted	
Landfill Operating Hours	
0700-1500 Monday-Thursday 0700-1400 Friday	
Wood Products	
The following products may be mixed together and delivered to the landfill: • Scrap lumber (unpainted) • Embark boxes (broken down) • Pallets (broken/untreated)	The following products must be separated and delivered to the landfill: • Trees (cut to 10 feet or less and free of soil) • Leaves and scrubs • Serviceable pallets
Lead Based Painted Wood Products	
• Delivered before 1400 Monday – Thursday • Not accepted on Friday	• Cut in less than 8-foot lengths • Wrapped in 6-millimeter plastic bags/sealed
Asbestos (all types)	
• Appointment needed (451-5011/2946) • Delivered by 1000 (Mon – Thurs.) • Not accepted on Friday	• Double wrapped in 6-millimeter plastic bags • Sealed with duct tape • Labeled and manifested prior to delivery
Organic Products	
• Leaves, pine straw, grass, and shrub clippings • No bags or containers allowed	• No twigs or limbs over 2 inches in diameter • Less than 6-foot lengths
Concrete	
• Delivered separately from other items • Wire and rebar must be cut off flush with exposed surfaces	• Concrete and culverts (no longer than 3ft x 3ft) • Bricks and blocks • Mortar products
Soil	
Non-contaminated soil accepted	
Recyclable Products **(Must be separated and dropped off at a designated recycling drop-off point or at a Recycling Center)**	
• Wood pallets (delivered separately) • White paper (mixed flat or shredded) • Newspaper • Military publications (binders removed) • Scrap fired brass shells (.50 cal and below, MDAS required)	• Plastic and glass (containers or bottles) • Toner cartridges • Cardboard (delivered separately if in bulk) • Vinyl siding (delivered separately, in less than 6-foot lengths) • Scrap Metal (iron, steel, aluminum, copper, copper wire) • Appliances (Refrigerators must be purged of refrigerant by EMI and accompanied with paperwork) • Concertina/Barbed Wire (only accepted if cut into 3 foot sections or less)

Other Related Information	
Asphalt may be accepted in small quantities, as needed, at the discretion of the Landfill Manager (large quantities of asphalt must be taken off the installation).	
All furniture must be accompanied by DD Form 1348 classification of rejected by Base Property Office.	
All other Base or USMC property must be accompanied by a DD Form 1348 downgraded to scrap by DLADS. Call (910) 451-4214 for more information.	
Scrap materials related to Ordinance or Ammunition, including containers, tubes, and packing, must also be accompanied by Material Documented As Safe (MDAS) certifications, and copies of the certifier and verifier's appointment letters.	
Phone Numbers: • Landfill Manager 451-4998 • Recycling Coordinator 451-4214 • Recycling Manager 451-2037 • Landfill Fax 451-9935	• Landfill Clerk 451-2946 • EMD 451-5837 • EOD 451-0558
Unacceptable Items	
• Hazardous Waste • Liquid Waste • Paint and Paint Cans • Electronics • Computer Equipment • Batteries (Can be turned in at Bldg. 901) • Oyster Shells	• Contaminated Soil • Tires • 55-Gallon Drums • Oil Filters • Petroleum Containers • Regulated Medical Waste • PCBs or PCB containers • Demilitarized Waste • Construction and Demolition Debris (unless specified in the contract)

12.4 Recycling Requirements

The installation's QRP is managed by the EMD in collaboration with the Public Works Division. Reducing solid waste saves money and helps protect the environment by conserving natural resources. Additionally, USMC facilities are mandated to recycle, and the installation must meet solid waste diversion goals specified in EO 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability.

12.4.1 Recycling Center

The MCB Camp Lejeune Recycling Center, Building 982, is co-located with the Base Landfill on Piney Green Road. Normal working hours are Monday through Friday, 0730–1530. All materials should be brought to the Recycling Center. Have the ROICC or Contract Representative contact the Recycling Center at (910) 451-4214 for additional details. See Table 12-1 for acceptable types and categories of materials.

The following types and categories of materials are accepted for recycling but must be delivered to the Recycling Center on Piney Green Road:

- Scrap metal
- Steel (high temperature, corrosion resistant)
- Brass (includes spent/fired munitions)
- Copper and copper wire
- Aluminum (plate, sheet, scrap) and aluminum cans

Special arrangements may be made for other materials (C&D waste) or larger volumes of commonly recycled materials from events such as C&D. Regulations set forth in BO 11350.2D must be followed.

12.4.2 Other Recyclables

- **Asphalt Pavement.** Asphalt must be removed and delivered to an asphalt recycling facility. Contractors must provide a record of the total tons of asphalt recycled and the corporate name and location of the recycling facility to their ROICC or Contract Representative, with a copy to the Landfill Manager.
- **Empty Metal Paint Cans.** Take empty metal paint cans to Building S-962 for recycling. Turn in all HM cans or HM containers that are generated from MCB Camp Lejeune or MEF contracts to Building S-962 on Michael Road on the scheduled contractor turn-in day. Have the ROICC or Contract Representative contact EMD for more information. Any waste generated from this process must be managed appropriately.
- **Other Metals.** Take other metals to the Defense Logistics Agency Disposition Services (DLADS). Follow the guidelines of BO 5090.17 and utilize: https://www.lejeune.marines.mil/Disposal
- **Red Rag Recycling.** Contractors should seek a red rag program to supply and launder shop rags. This service supplies clean rags and picks them up after use. The rags are laundered offsite and returned.
- **Universal Waste.** See Section 7.0 of this guide for management procedures.
- **Unused Hazardous Materials.** Turn in these materials to the RCRS, Building 977 on Michael Road. Have the ROICC or Contract Representative contact the Free Issue Point at (910) 451-1482.
- **White Rag Recycling.** White rags are used in painting (these have no dye and thus do not interfere with these types of operations) and may be laundered offsite in a program analogous to the red rags service.

12.5 Pollution Prevention and Green Procurement

MCB Camp Lejeune is subject to GP requirements. GP implements environmentally protective principles in the procurement arena and includes preferential use of the following:

- Recovered materials products
- Biobased products
- Water- and energy-efficient products
- Alternatives to ozone-depleting substances
- Non-toxic and less-toxic products
- Electronics that meet Electronic Product Environmental Assessment Tool (EPEAT) standards
- Products that do not contain toxic chemicals, hazardous substances, and other pollutants targeted for reduction and elimination by the DoD
- Alternative fuel use/increased fuel efficiency
- Environmentally preferable purchasing practices

Contractors are encouraged to employ GP practices whenever feasible.

13.0 Potential Discovery of Undocumented Contaminated Sites

MCB Camp Lejeune was placed on the EPA National Priorities List (NPL), effective November 4, 1989. To ensure the protection of human health and the environment, a proactive Installation Restoration Program (IRP) has been established and is in the process of assessing and remediating various sites on the installation. Numerous investigations have been performed to ensure that all of the installation's contaminated sites have been found, but additional contaminated areas may still exist. It is the contractor's responsibility to notify the ROICC or Contract Representative of any unforeseen site conditions while on the installation. It is recommended that any contractors performing intrusive activities on the installation be properly trained in accordance with the Occupational Safety and Health Act (OSHA) standards in 29 CFR 1910.120(e). If intrusive activities are planned in known contaminated areas, all required environmental training should be completed prior to working at MCB Camp Lejeune. Copies of training records should be available upon request by Federal or State regulators.

13.1 Key Definitions and Concepts

The following key definitions and concepts are associated with unforeseen site conditions. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

13.1.1 Key Definitions

- **Free Product.** A discharged HM/HW, POL, or environmental pollutant that is present in the environment as a floating or sinking non-aqueous phase liquid (NAPL) that exists in its free state (i.e., exceeds the solubility limit of liquids or saturation limit of soil/solids).
- **National Priorities List.** List of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants.
- **Petroleum, Oil, and Lubricants.** A broad term that includes all petroleum and associated products or oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, vegetable oil, animal oil, sludge, oil refuse, and oil mixed with wastes.
- **Unforeseen Site Condition.** A potentially hazardous or unanticipated site condition encountered on a job site.
- **Munitions and Explosives of Concern.** Military munitions that may pose explosives safety risks, including MEC, UXO, DMM, and munitions constituents present in a high enough concentration to present an explosives hazard.

13.1.2 Key Concepts

- **Notification.** Contractors must notify the ROICC or Contract Representative, in writing, of any unforeseen site conditions prior to disturbing them.
- **Response.** Contractors must stop working and evacuate work areas if unforeseen site contaminants, HM, or MEC/DMM/UXO are suspected to be present.

13.1.3 Environmental Management System

Unforeseen site conditions are potentially applicable to all EMS practices conducted aboard MCB Camp Lejeune.

13.2 Overview of Requirements

Contractors operating aboard the installation must be aware of and adhere to all applicable regulations and requirements regarding unforeseen site conditions, which include but may not be limited to:

- **CERCLA of 1980 and Superfund Amendments & Reauthorization Act (SARA) of 1986.** Establishes the Nation's HW site cleanup program.
- **Occupational Safety and Health Standards, 29 CFR 1910.** Federal standards that govern occupational health and safety to ensure the protection of employees from recognized hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, or unsanitary conditions. The standards include provisions for many facets of employee safety and health, including, but not limited to: employee training, personal protective equipment, HM communication, medical surveillance, and emergency planning.

13.3 Unforeseen Site Condition Procedures

Contractors must promptly, before the conditions are disturbed, give a written notice to the ROICC or Contract Representative of any (1) subsurface or latent physical conditions at the site that differ materially from those indicated in the contract, or (2) any unknown physical conditions at the site, of an unusual nature, that differ materially from those ordinarily encountered.

The ROICC or Contract Representative will investigate the site conditions promptly after receiving the notice.

The most common unforeseen conditions at MCB Camp Lejeune typically relate to POL contamination and MEC/DMM/UXO. Procedures for these scenarios are provided in the following sections.

13.3.1 Petroleum, Oil, and Lubricants

The condition most frequently encountered that requires EMD assistance is the presence of a POL odor while excavating. If there is an odor or encounter any free product during any construction or excavation activities, take the following actions:

- Stop work.
- Immediately clear the area of all personnel to a safe distance upwind of the suspected area.
- Call the Fire and Emergency Services Division (911) immediately if personnel are affected or injured by the suspected contaminant.
- Call the Fire and Emergency Services Division to properly secure the area.
- Notify the ROICC or Contract Representative so that the EMD Spill Response Team will be contacted to determine the appropriate course of action.

Please note that if contaminated soil is removed during excavation activities, the soil will have to be characterized prior to disposition. While it is staged and awaiting characterization sampling results, contaminated soil is to be placed within a bermed area on an impervious surface or barrier and securely covered with plastic or appropriate material. Sample results and characterization will determine the ultimate disposition of the soil. In accordance with installation policy, contaminated soils are not permitted to be reintroduced into excavations.

13.3.2 Munitions and Ordnance

MCB Camp Lejeune has been in operation as a military training installation since the early 1940s. As such, munitions or an ordnance item may be encountered during site excavation or construction activities. MEC, DMM, or UXO at MCB Camp Lejeune and its outlying areas typically include flares, mines, grenades, rockets, artillery projectiles, bulk explosives, fuses, or blasting caps. These items may vary in condition from very good/easily recognizable to unrecognizable, fragmented, or corroded scrap metal. MEC, DMM, or UXO may be encountered on the ground surface, partially buried, or completely buried.

Contractors operating aboard the installation should follow the “3R” concept if a possible munitions or ordnance item is discovered: **“Recognize, Retreat, and Report.”**

- Recognize. Contractors with the potential to encounter any possible MEC, DMM, or UXO should have a basic knowledge of these items. The item does not have to be specifically recognized or identified, but it is important for personnel to recognize the potential hazard.
- Retreat. If a suspected MEC, DMM, or UXO item is encountered, leave the immediate area and DO NOT DISTURB the item. If possible, note the general size and shape of the item, any markings, and the location.
- Report. Report all occurrences to the appropriate authority, including any observations (e.g., size, shape, markings, and location).

If a project unearths any potential MEC/DMM/UXO, recognize the potential hazard. Stop work immediately, and have all personnel clear the immediate area. Report the situation and any observations to the ROICC or Contract Representative, who will then report the item to Range Control and EOD. The following link is to a 6-minute “UXO Safety” awareness training video that provides additional guidance.

http://www.lejeune.marines.mil/OfficesStaff/ExplosivesSafety/ %20trainingandguides.aspx

For other emergency response procedures, please refer to Section 5.0 of this guide.

14.0 Permitting

Contractors operating aboard the installation must ensure that all relevant environmental permits are obtained before work commences onsite. Contractors must work with their ROICC or Contract Representative to determine permitting responsibilities prior to beginning work. Contractors must adhere to all permit conditions. Examples of environmentally related permits are provided in Section 14.3.

14.1 Key Definitions and Concepts

The following key definitions and concepts are associated with contractor permitting requirements. Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section, who will contact the appropriate environmental office if additional clarification is necessary.

14.1.1 Key Definitions

- **Major Source.** Any source that emits or has the potential to emit 100 tons per year or more of any criteria air pollutant in accordance with Title V of the CAA.
- **Permit.** A legally enforceable document required by statutory regulation for potential sources of pollution that is required for operations that may have an environmental impact. Permits may be administered at the Federal, State, or local level.
- **Target Housing.** Any housing constructed before 1978, with the exception of housing for the elderly and persons with disabilities (unless a child under the age of 6 lives or is expected to live there) and residential dwellings where the living areas are not separated from the sleeping areas (efficiencies, studio apartments, dormitories, etc.).

14.1.2 Key Concepts

- **Permits.** Prior to beginning work aboard the installation, consult applicable permit requirements and ensure that they are met before work begins. Copies of all applicable permits/authorizations should be retained onsite for the life of the project. Additional information on North Carolina permits is found at the following web page:

  http://portal.ncdenr.org/web/deao/ea/pa

Consult the ROICC or Contract Representative for additional information concerning the contract's permit requirements. The contractor is responsible for ensuring that all required permits are acquired prior to any work aboard MCB Camp Lejeune.

14.1.3 Environmental Management System

Currently, no practices are associated with permitting under the EMS.

14.2 Overview of Requirements

Please refer to the individual sections of this guide for applicable permitting regulations and requirements for each environmental media. Many permits have specific timetables for submittal prior to project initiation. Contractors must consult the permit requirements and ensure that all pertaining permits are obtained in the required timeframe.

14.3 Project Permits and Approvals

Prior to work being awarded, the installation-associated action proponent should have had an environmental review by EMD's NEPA Section to comply with NEPA 1969. The outcome of this review would be in the form of a Decision Memorandum or an Environmental Assessment. Contractors must

refer to their contract and the requirements outlined in the NEPA documentation for specific permitting requirements. EMD Program Managers are available for guidance; however, if the contractor is tasked with preparing permit applications, the contractor is expected to have the capability and expertise required to complete the submittals in accordance with the guidance provided by the regulatory agency that issues the permit. In addition, EMD must be provided with copies of all permits submitted to the NCDEQ. In some cases, EMD must submit the permit application. Please direct questions to the ROICC or Contract Representative.

Some permits that may be required are discussed in applicable sections of this guide. The following list of permits is not meant to be all-inclusive; please be aware that other permits may also be required. The NCDEQ website (https://deq.nc.gov/) is a useful reference for determining required permits and obtaining necessary forms. In addition, any inspection and/or data collection required by the permits must be retained onsite for review upon request.

14.3.1 Stormwater (Section 11.0)

- **NPDES Stormwater Discharge Permit for Construction Activities (also referred to as General Permit No. NCG010000).** Required for all land-disturbing activities (LDA) that exceed 1 acre; also requires an accompanying Erosion and Sedimentation Control Plan.
- **General Permit SWG050000.** Required for residential development activities within the 20 coastal counties (including Onslow County) located within 1/2 mile and draining to class SA waters that disturb less than 1 acre if adding more than 10,000 sf of built upon area that will result in a built upon area greater than 12 percent.
- **High-Density Stormwater Permit.** Required when (1) the LDA exceeds 1 acre and impervious surfaces are greater than or equal to 25 percent of the total project area adjacent to non-SA waters (waters classified as SA are tidal salt waters that are used for commercial shellfishing or marketing purposes) or greater than or equal to 12 percent of the total project area adjacent to SA water; or (2) total development exceeds 10,000 square feet of impervious surface.
- **Low-Density Stormwater Permit.** Required when the LDA exceeds 1 acre and impervious surfaces are less than 25 percent when adjacent to non-SA waters or less than 12 percent when adjacent to SA waters.

14.3.2 Asbestos (Section 9.0)

- **Asbestos Permit Application and Notification for Demolition/Renovation.** DHHS Form 3768, available at the following website (under Forms & Applications):

http://www.epi.state.nc.us/epi/asbestos/ahmp.html

14.3.3 Lead-Based Paint (Section 9.0)

North Carolina Lead-Based Paint Abatement Permit Application. Any person or firm conducting an abatement of a child-occupied facility or target housing is required to obtain a Lead Hazard Management Plan Permit. The application is available at the following website:

http://epi.publichealth.nc.gov/lead/pdf/LeadAbatePermit08-07.pdf

14.3.4 Air Quality (Section 4.0)

- Construction Permits. Construction permits are required for all new stationary sources and all existing stationary sources that are added to or are modified with new equipment that may emit

air pollutants. Permits may be required for the construction or modification of the following types of emission sources:
  - Boilers
  - Generators
  - Engine test stands
  - Surface coating/painting operations
  - Refrigerant recovery and recycling operations for other ozone-depleting substances (ODSs), such as industrial chillers, refrigerators, air conditioning compressors, or cleaning agents.
  - Chemical or mechanical paint removal, abrasive blasting, grinding, or other surface preparation activities
  - Fuel storage and fuel dispensing
  - Woodworking shops
  - Welding shops
  - Bulk chemical or flammables storage
  - Open burning
  - Fire training
  - Rock crushing or other dust-causing activities
- New Source Review Permit. A New Source Review permit is a pre-construction permit that authorizes the construction of new major sources of air pollution or major modifications of existing sources.

14.3.5 Wetlands (Section 10.6)

Section 404 Clean Water Act Permit. Contractors working aboard the installation will not perform any work in waters of the United States or wetlands (see definition below) without an approved permit (even if the work is temporary). Unavoidable impacts to wetlands or waters of the United States will require coordination and written approval from USACE for a Section 404 CWA permit (individual or applicable nationwide permit), the NCDWR for a Section 401c Water Quality certification, and the NCDCM for a Federal Consistency Determination. Failure to acquire written authorization for making impacts to wetlands and/or waters of the United States may result in significant project delays or design modifications. Website link:

http://water.epa.gov/lawsregs/guidance/wetlands/sec404.cfm

14.3.6 Drinking Water/Wastewater

- **Approval of Engineering Plans and Specifications for Water Supply Systems.** Applicants must submit engineering plans and specifications at least 30 days prior to the date upon which the Authorization to Construct is desired. Authorization to Construct must be obtained prior to onset of work.
- **MCIEAST-MCB CAMLEJO 5090.16 Drinking Water Systems and Water Conservation.** Establishes and implements requirements for drinking water supply wells, treatment/distribution systems, and water conservation objectives. Outlines planning and management requirements for drinking water-related processes and infrastructure.
- **MCIEAST-MCB CAMLEJO 5090.5 Grease Control Program Standard Operating Procedures.** Outlines procedures to be implemented by all new and existing non-residential food preparation facilities aboard the Installation and shall be instituted by all area commanders that oversee and are involved with the construction, operation, and maintenance of facilities that generate and/or work with Fats, Oils, and Grease (FOG).

- **Wastewater Extension Permit.** NCDEQ Form FTA 04-16 (Fast Track), ASEA 04-16, SSEA 04-16. Applicant submitting any of these Forms should plan accordingly to allow the State approximately 90 days to issue the permit. The Wastewater Extension Permit must be obtained prior to onset of work.

14.3.7 Aboveground Storage Tanks

- **Removals/Closures/Installations.** When removing, closing, or installing an Aboveground Storage Tank (AST) that contains Petroleum, Oils, or Lubricants, contractors must provide the Base Tank Manager (William Ratliff (910) 451-5878) with tank information prior to completion of work. Information should include at a minimum Tank Identification Number with building number (e.g., A98-01A), Tank Volume (gallons), Tank Contents, GPS Coordinates (decimal degrees) along with any other closure documentation available.
- **Contact Tank Manager.** Coordination with the Base EMD tank manager is recommended for any work removing, closing, or installing an AST.

Attachment 2-1 – Marine Corps Installations East Policy Statement on Environmental Management and Conservation

MARINE CORPS INSTALLATIONS EAST POLICY STATEMENT ON ENVIRONMENTAL MANAGEMENT AND CONSERVATION

Marine Corps Installations East (MCIEAST) is a key national defense asset where Marines, Sailors and their families live, work, and train. MCIEAST offers unique and irreplaceable training venues in which to hone our warfighting capabilities, enable Force readiness, and prepare for future conflict. Protecting these critical assets through sound, professional environmental management and compliance is crucial for its continued, sustained availability. Failure to adequately protect natural and cultural resources and environmental non-compliance carry significant risk to our mission through fines, lawsuits, and readiness impacts such as restrictions on how, when, and where we train; delays in new construction; failure of facilities and equipment; and degraded relationships with regulatory agencies and the public whose support we need for our continued mission success. We must meet our environmental and sustainability responsibilities, meet or exceed our goals, minimize the risk to mission, and strive for continuous improvement by:

- Complying with all applicable environmental legislation, regulations, and policy in order to protect human health and the environment;
- Conserving the natural and cultural resources entrusted to us by the American people;
- Promoting environmental sustainability through pollution prevention, source reduction, recycling, sustainable procurement, water and energy efficiency and conservation, use of native plants in landscaping, and adaptive reuse of existing infrastructure;
- Initiating environmental planning actions early in project planning and involving all appropriate internal and external stakeholders;
- Proactively engaging with regulatory agencies and the public to foster partnerships and build trust.
- Remediating areas of contamination that are the result of past disposal practices; and
- Eliminating preventable accidental releases of Aqueous Film Forming Foam.

U.S. Marine Corps operational and tactical success is linked to responsible stewardship of the environment, while we enable our tenant organizations to conduct realistic, full-spectrum training in support of their readiness and mission requirements. We must understand and fulfill our collective roles in protecting the environment within our training venues, our bases, and our stations. I expect our Commanders and all personnel aboard our installations to take a personal interest in meeting our environmental responsibilities and protecting our mission. Our future Marine Corps operational readiness depends on it.

R. A. GNECCO
Sergeant Major, U. S. Marine Corps

A. GARCIA JR.
Colonel, U. S. Marine Corps
Commander

MCIEAST-MCB CAMLEJ Environmental Management Division is located in Building 12 at (910) 451-5003.

Attachment 5-1 – MCIEAST-MCB CAMP LEJEUNE Spill Report Form

MCIEAST-MCB CAMP
LEJEUNE SPILL REPORT

*** SHADED AREAS RCRS USE ONLY ***

TITLE/LOCATION

DATE | TIME

RESPONSE NAME/UNIT:

SPILL CATEGORY (SELECT ONE) ☐ HAZMAT ☐ HAZWASTE ☐ POL ☐ WASTEWATER ☐ OTHER

PRODUCT SPILLED

QUANITY SPILLED

LATITUDE | LONGITUDE

HOW WAS SPILL DISCOVERED

SOURCE OF THE SPILL

CAUSE OF THE SPILL

MISSION IMPACT

WERE SAMPLES TAKEN (CHECK ONE) YES ☐ NO ☐

ANALYSES REQUESTED / PERFORMED ON SAMPLES

DID THE SPILL (CHECK ONE)

ENTER A WATERWAY?	REACH WITHIN 100' OF SURFACE WATER?	REACH WITHIN 1500' OF A WATER SUPPLY WELL?	GO OFF BASE?
☐ YES ☐ NO	YES ☐ NO ☐	YES ☐ NO ☐	YES ☐ NO ☐

HOW WAS THE SPILL CONTAINED?

WHAT DANGERS DID THE SPILL PRESENT?

WHAT WERE THE ENVIRONMENTAL IMPACTS?

WHAT RECOVERY EFFORTS WERE USED?

IF OIL SPILLED, WHAT PERCENT WAS RECOVERED?

HOW WERE RESIDUALS DISPOSED OF?

WEATHER CONDITIONS?

REPORTABLE SPILL? (CHECK ONE) ☐ YES ☐ NO WAS A REGULATORY AGENCY CONTACTED: ☐ YES ☐ NO

AGENCY NAME (IF) ☐ NCDEQ NCDEQ REPORT# ☐ NCDEM NCDEM REPORT#

REGULATORY DRIVER

NRC NOTIFIED ☐ YES ☐ NO NRC INCIDENT NUMBER:

WHAT MEASURES WERE PUT IN PLACE TO PREVENT RECURRENCE?

ADDITIONAL INFORMATION OR COMMENTS

SPILL POC | E-MAIL | PHONE

Attachment 7-1 – MCIEAST-MCB CAMP LEJEUNE Satellite Accumulation Area (SAA) Weekly Inspection Form

MCIEAST-MCB CAMP LEJEUNE **Satellite Accumulation Area (SAA) Weekly Inspection**				
Bldg Number/Location of HW Site:				
Unit Inspected:	Inspection Date:			
Inspected By:	Inspection Time:			
REQUIREMENT	**Regulation Citation**	**Yes**	**No**	**Location of Discrepancy *and* Proposed Corrective Action**
1. Is housekeeping maintained in acceptable manner?	§262.251			
2. Is waste accumulated at or near the point of generation and "under the control of the operator?"	§262.15(a)			
3. HW container is marked with the words Hazardous Waste, Hazard Indicator (i.e., toxic, flammable), and contents name.	§262.15(a)(5)			
4. HW container has less than 55 gallons of HW or less than 1 quart or acute HW.	§262.15(a)			
5. HW container in serviceable condition, non-leaking, free of rust and deterioration?	§262.15(a)			
6. Waste is compatible with container that it is stored in.	§262.15(a)(2)			
7. Each container is closed except when adding or removing waste.	§262.15(a)(4)(i)			
8. Weekly inspections are conducted?	§262.17(a)(1)(v)			
9. Is ULCP prominently posted?	§262.262			
10. Are "Dangerous-Unauthorized Personnel Keep Out" signs posted so that they may be seen from any approach?	§265.14(c)			
11. Are "No Smoking" signs posted?	§262.17(a)(1)(vi)(B)			
12. Does the site have emergency communication system or two man rule in effect? If the two man rule is implemented is there a sign with the legend "Two Man Rule in Effect" posted?	§262.252			
13. Are properly charged fire extinguishers, eye wash stations present and are they inspected monthly?	§262.253			
14. Is the proper spill response equipment readily available?	§262.261			
15. Is 911 spill response sign posted and is the post indicator valve in good operating condition and secured in the closed position? Are there any structural defects such as cracked concrete?				
16. Is the site designated, recognizable, and is the EMD SAA Authorization letter posted within the site as to be visible to personnel placing waste into the container?				
17. Are all hazardous wastes properly segregated and stored in the designated site?	§262.15(a)(3)			

Attachment 7-2 – Weekly Hazardous Waste (HW) Storage Area Inspection Form

Weekly Hazardous Waste Storage
Area Inspection Form

Squadron: _____ Inspector: _____

Date: _____ Signature: _____

Question	Yes	No	Corrective Actions or N/A
1. Is the HW container located at or near the point of generation?			
2. Is the HW container DOT approved?			
3. Is the HW container marked correctly with the words “Hazardous Waste,” correct noun name of contents, NSN’S and unit designator?			
4. Is the HW container closed and wrench tight when no one is adding to the container?			
5. If a funnel is left in place, does that funnel have a plug or ball valve to be considered closed or secured?			
6. Is the HW container in good condition? (no excessive rust or dents in critical areas, seals are in place, no bulging or collapsing and no signs of spillage or leakage)			
7. Is the Spill Contingency Plan posted and in plain view?			
8. Is the SAA Site approval letter from EAD posted at the SAA site?			
9. Is the SAA Site limited to Authorized Personnel only?			
10. Is the HW container below the proper ullage for a liquid to expand? (4 inches from the top)			
11. Are SAA HW containers moved to the 90-Day Site within 72 hours when filled to the proper ullage or weight capacity of the container?			
12. (90-Day Site only) Are all palletized waste streams correctly marked with “Hazardous Waste” or “Universal Waste,” noun name of the waste, NSN and unit designator on the pallet or wall of the waste structure?			
13. (90-Day Site only) Are all HW containers turned in prior to the 90th day after the ASD?			
14. Are adequate spill response supplies readily available for use in case of spill or leakage?			
15. Is there a means of emergency communication between storage facilities and working spaces?			
16. Is the SAA site or 90-Day Site in a good state of police?			

Attachment 7-3 – Marine Corps Installations East Marine Corps Base Camp Lejeune Initial AUL Build Form

MARINE CORPS INSTALLATIONS EAST MARINE CORPS BASE CAMP LEJEUNE INITIAL AUL BUILD FORM

Unit/Tenant Name:	Point of Contact:
Work Center Name:	Telephone:
Building:	

1. NSN/LSN	2. Manufacture	3. Material Name	4. Part #	5. MOHQ	6. Justification
Maximum on Hand Quanity (MOHQ) will be based on a 90 day					

MCI EAST – MCB CAMLEJ/G-F/EMD/34

Initial Authorized Use List (AUL) Build Form Instruction

UNIT/TENANT NAME: Provide the name of the unit/tenant where the material will be stored.
POINT OF CONTACT: Provide the name of person completing the Initial AUL build form.
WORK CENTER NAME: Should be the section (armory, maintenance, supply, boats, etc.) that will be using the HM.
PHONE NUMBER: Contact number for the POC.
BUILDING NUMBER: Enter the building number where the Work Center is located.

1. NSN/LSN: Enter the National Stock Number (NSN) (9150-00-111-6255) or Local Stock Number (LSN) (8010-MC-000-0863), using standard formatting.

2. MANUFACTURE: Enter the name as it appears on the Material Safety Data Sheet (MSDS). Manufacture is only required for materials with an LSN, for ALL NSN materials use “ALL MANUFACTURES.” If the material does not have an NSN/LSN assigned to it, the manufacture is required.

3. MATERIAL NAME: Enter the name as it appears on the MSDS from the manufacturer. If appropriate, a common or brand name (i.e., WD-40, Castrol motor oil) may be entered in parentheses.

4. PART NUMBER: Enter the part number for the material with an LSN. If the material does not have an LSN/NSN assigned, provide the part number.

5. ESTIMATED MOHQ: Enter how much of the HM you will need for no more than a 90-day supply based on standard operations, not on “worst case”, surge, or emergency operations.

6. JUSTIFICATION: Provide the proper reference that requires the use of the material. EXAMPLE: Technical Manual/Order (TM 9-2320-280-10), Owner's Manual (Johnson Operation/Maintenance Manual), Base Order (B.O. 11014.1K Facilities Maintenance) etc. Use “Special Authorization” for HMs that are deemed mission essential and may not have a guiding reference. Commanders Special Authorization (CSA) may be used on a case-by-case basis.

Environmental Standard Operating Procedure (ESOP) 5090.10.2

Last Date Updated: June 20, 2024

TITLE: Marine Corps Installations East-Marine Corps Base Camp Lejeune (MCIEAST-MCB CAMLEJ) Environmental Media Screening Procedures for Construction Sites on Marine Corps Base Camp Lejeune (MCB CAMLEJ) and Marine Corps Air Station New River (MCAS NR)

RELATED MCIEAST-MCB CAMLEJO: 5090.10

PURPOSE: To define procedures for managing environmental media (e.g., soils, groundwater, surface water, etc.) and construction debris at construction sites on MCB CAMLEJ and MCAS NR (the Base).

BACKGROUND:
Historic management of construction across the Base has identified a need to develop processes to maintain environmental compliance. This ESOP has been expanded from only soils to include different media and contaminant impacts summarized below. In addition to the purpose outlined above, this ESOP addresses the requirements outlined in the 30 Jan 2021 Naval Facilities Mid-Atlantic OPSNOTE 2021-001, which requires a Standard Operating Procedure to address management of excess soil and construction debris.

Environmental Response Sites
As part of the environmental response programs, the Base has identified several sites that have contamination to soil and/or groundwater. Site-specific contaminants impact management options for disposal of soils and/or groundwater. Environmental responses at these sites are administered under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA).

PFAS
Per- and Polyfluoroalkyl Substances (PFAS) are a family of chemicals with evolving regulatory requirements, and PFAS-impacted soil and water require special handling considerations. The existence of PFAS-impacted media resulting from the use of Aqueous Film Forming Foam and other industrial uses has been discovered across the Base. While PFAS compounds PFOA and PFOS were early compounds of concern, the list of PFAS compounds of concern continues to expand and currently includes PFOS, PFOA, PFHxS, PFNA, HFPO-DA (and its salts), and PFBS.

Base impacts were identified in September 2021, with the investigation of suspect PFAS areas during the Site Investigation step in the CERCLA process. Limited sampling has been conducted, and understanding the full nature and extent of PFAS impacts on the Base will occur over time. This guidance provides guidelines for managing PFAS-impacted soil and groundwater on the Base to protect human health and the environment.

Environmental Review Process
As required by the National Environmental Policy Act (NEPA), construction projects are required to submit a Request for Environmental Impact Review (REIR) to the NEPA coordinator. This process allows subject matter experts to review and comment on applicable environmental compliance requirements. These requirements along with guidance and contact information are documented in the Decision Memorandum (DM).

APPLICABILITY:
This ESOP applies to organizations and contractors conducting intrusive work on the Base where the removal or addition of soil or other environmental media is expected. Moving media from either the originating construction site or Base property is considered removal of media. This applies to topsoil, grub material, unsuitable soil, groundwater, surface water, and other media. This ESOP should be used as guidance for installation procedures and does not circumvent the need/recommendation for sample collection by knowledgeable environmental professionals.

RESPONSIBILITIES:
The Environmental Management Division (EMD) is responsible for communicating environmental requirements during the NEPA REIR process and supporting the planning and construction process to include providing supporting documentation where existing data is available and review of environmental sampling data.

The Public Works Division (PWD) sections charged with planning or implementing construction projects are responsible for incorporating the below procedural requirements into scope, specifications, and funding of projects.

The Resident Officer in Charge of Construction (ROICC) is responsible for implementing the requirements included in the construction contract and will provide required documentation to the appropriate EMD personnel within 30 days of project completion to ensure appropriate record keeping.

PROCEDURE:
Note: A list of program contacts is listed in Appendix A.

1. Project managers will submit project descriptions to evaluate environmental requirements through the NEPA REIR process. Please contact the NEPA coordinator to begin. Once completed, the project manager should review the DM for environmental requirements.
   Note: If your project site changes, you will need to coordinate the new boundaries with the NEPA program.
2. Project managers will coordinate with the EMD early in the project (design kickoff or Request for Proposal development) to discuss concerns with known soil and/or groundwater contamination or

unexploded ordnance (UXO). If a DM has not been generated for this project, please contact the NEPA coordinator to begin the REIR process, see Appendix A for contact information.

a. If your construction site is identified with PFAS impacts or is within a PFAS buffer area, site-specific additional sampling may be required to advise dewatering management and soil disposal requirements. The 'Sampling and Laboratory Information' section provides details on media-specific sampling methods.

3. All construction workers must receive "3R" UXO Safety Awareness Training. The Project DM will specify if a roster of attendance must be maintained on-site for the ROICC to review. Training can be obtained by watching the MCB CAMLEJ specific video online at: https://www.lejeune.marines.mil/Offices-Staff/Environmental-Mgmt/Training-Video/
4. If at any time during construction suspect munitions-related items are identified, on-site personnel will immediately stop work and notify **Emergency Response (911)** then Blackburn (910-451-3064/4449). Base Explosives Ordnance Disposal (EOD) will provide proper identification and coordinate with the Explosive Safety Officer (ESO). Additionally, incidents should be reported to the ROICC and EMD Installation Restoration (IR) Program. The sooner incidents are reported to EMD and the ESO the sooner follow-on UXO construction support actions can be managed and determined.
5. Contact information for any programs identified in this ESOP are included in **Appendix A**.
6. Follow the below media specific procedures:

a. **Soils coming onto a project site (fill):**

- Soils brought from off-Base must be received from a permitted borrow pit or permitted soils land-farm. Analytical data must be provided upon request.
- Petroleum impacted soils excavated from a construction site to be removed from the project site for any reason must be analyzed using EPA methods 8260 & 8270 to confirm that contaminant levels are below the lesser of the soil to groundwater (STG) or residential maximum soil contaminant concentration levels (MSCCs) before being considered for "unrestricted use". MSCC Tables are provided as Enclosure (1). Petroleum impacted soils above the lesser of their respective STG or residential MSCCs must be properly disposed at an appropriate permitted disposal facility.
- If soils are brought from any other on-base source a soil characterization must be completed using US Environmental Protections Agency (EPA) methods 6010 (metals), 8260 (VOCs), 8270 (SVOCs), and 1633 (PFAS) must be used to confirm that contaminant levels are below the lesser of the STG or residential MSCCs (See Enclosure (1).
- If soils brought from any other off-base source a

soil characterization must be completed using US Environmental Protections Agency (EPA) methods 6010 (metals), 8260 (VOCs), 8270 (SVOCs), 8081 (pesticides), 8151 (herbicides), and 1633 (PFAS) must be used to confirm that contaminant levels are below the lesser of the STG or residential MSCCs (See Enclosure (1).

- Sampling data can be provided to IR program contacts if you are unsure if soil analytical data meets acceptance criteria.

b. Soils excavated from an on-base construction site (cut):

All soils leaving a project site:

Surplus soil shall be mechanically screened* before leaving its originating site to remove all objects greater than 3 inches and deleterious material (organic debris such as roots, stumps, timber) or construction debris. Dispose of deleterious material and objects larger than 3 inches in accordance with state and federal regulations, and applicable contract requirements. Construction debris, to include hazardous and non-hazardous waste, shall be properly disposed in accordance with the RCRA and applicable federal and state regulations.

*In special circumstances (i.e., site is <1 acre) manual screening can be done with proper justification and written approval by the ROICC. Details on how the screening is being performed shall additionally be provided to the ROICC. Spreading material out on the ground in lifts, for example, and manually removing debris larger than 3 inches is an adequate method to visually inspect soil prior to leaving a site. Observing an excavator direct load into a dump truck is not considered an acceptable method of screening soil.

The contractor shall provide a daily written certification statement, signed by the Quality Control (QC) Manager, indicating volume, in cubic yards (CY), stating that the material is free of deleterious material greater than 3 inches, stating where the surplus soil was delivered, and confirming the material is free of contaminants. Documentation regarding disposal of deleterious material shall also be provided in writing.

Uncontaminated, screened, surplus soil can be stored at one of the designated locations on government property (see stipulations below), reused on base at another approved location, or it can be disposed off-base as determined by the contractor. The government has first right of refusal for screened soil. Written documentation of proper screening and where the soil will be going is required a minimum 10 days prior to allowing any soil to leave the base. The contractor could be held civilly and/or

criminally liable if it transports soil impacted with contaminants, munitions, solid waste, or other possible harmful contaminants to any location without proper approval from the Government and in compliance with applicable federal and state regulations.

Proper documentation and waste characterization is required for transporting and disposing of contaminated soils or debris (i.e., hazardous or non-hazardous waste manifest signed by a Base representative designated in writing by the Commanding General to sign hazardous waste manifests). The waste manifests must properly characterize, document volume and concentrations, and should be coordinated with the Resource Conservation and Recovery Section (RCRS) or Consolidated Hazardous Material Reutilization and Inventory Control Program (CHRIMP), see Appendix A for contact information. Under no circumstances shall a contractor sign on behalf of the government on a waste profile or a waste manifest. Contaminated soils cannot be stored on base or transported off-base without proper documentation.

A review of the project DM will provide guidance on whether your site is known or suspected of having contaminated soil. Additional documentation on what contaminants and contaminant levels can be requested from the program specified in the DM. EMD contacts are listed at the end of this ESOP.

NOTE: Rubbish and other construction debris shall be transported off-base for disposal in accordance with RCRA and federal and state solid waste regulations. A minimum 24-hours advanced written notice shall be provided to the Contracting Office of the Contractor’s intention to dispose of rubbish and debris off-base. Disposal at sites or landfills not holding a valid state of North Carolina permit is prohibited. The prohibition also applies to sites where a permit may have been applied for but not yet obtained. If construction debris has been disposed off-base outside the parameter of this ESOP at a site without state permits or not in accordance with regulatory requirements, the Contractor is to remove, transport, and relocate the debris to a state-approved site at the Contractor’s expense. Any fines, penalties, or fees related to the illegal disposal of construction debris will be paid by the Contractor, not the Government. All soil transported off its originating site shall be screened for construction debris and other trash by the Contractor generating the waste prior to transportation, either on-base or off-base.

i. PFAS-impacted soils (non-comingled)
PFAS-impacted soils are defined as soil with any

detections of PFAS compounds (presence/absence). Laboratory guidance is provided in the 'Laboratory Information' section below. Currently, there are no promulgated State of North Carolina or federal soil cleanup standards. However, the State of North Carolina Department of Environmental Quality (NCDEQ) verbally clarified that soils containing PFAS compounds may only be disposed of in a subtitle C or D landfill.[2] Additional constraints may exist on accepting NCDEQ permitted facilities.

All PFAS analytical results should be provided to EMD. Your project DM will state if PFAS impacted soils are expected on site. PFAS-impacted soil, with no other contaminants, may be managed with the following options:

- Left on-site (Preferred):
  - PFAS-Impacted or potentially-impacted materials (i.e., soil) can be left on site (i.e., within the original construction footprint/area of disturbance) in a manner which minimizes cross-contamination and prevents the spread of the impacted footprint. Soils will be managed to prevent runoff, i.e., stockpiled on site with sediment and erosion controls. Soil not impacted by PFAS can be used as fill for a PFAS-impacted site, but PFAS-impacted soil cannot be transported to other, non-contiguous sites on the Base that are not permitted to receive the waste, even if the other areas are also impacted by PFAS. Sampling is not required if the soil does not leave the site.
- Landfilled:
  - PFAS-impacted soil leaving the construction site of origin must go to a lined, permitted landfill and will require sampling and testing of the soil as determined by the accepting landfill. It cannot be reused/recycled, or land-farmed. Testing requirements for the receiving facility may vary. Coordination with the receiving facilities should be included in planning stages to confirm PFAS acceptance levels and sampling requirements.

    ON BASE LANDFILL: Any acceptance of PFAS-impacted soils will need to be negotiated with the Base Landfill contacts listed in appendix A.

    OFF BASE LANDFILL: PFAS impacted soils can be disposed of at an off-base permitted

subtitle D (non-hazardous landfill). This will require disclosure that the soil contains or may contain PFAS. PFAS-impacted soils can be disposed of at a Subtitle C landfill (hazardous waste landfill); however, this may be costly. A copy of the landfill's current permit license, EPA ID, and a recent Enforcement and Compliance History Online report from the EPA's website must be provided to the appropriate installation material collection section, along with the Waste Profile to validate the receiving facility is approved and not out of compliance.

- Manifesting requirements: All impacted soils leaving the Base will be manifested through the appropriate installation material collection section:

  MCB CAMLEJ: Resource Conservation and Recovery Section (RCRS),
  MCAS NR: Consolidated Hazardous Material Reutilization and Inventory Control Program (CHRIMP)

  Once analytical data are generated, a waste profile must be created. The waste manifests must properly characterize, document volume and concentrations, and clearly indicate that PFAS compounds are present and should be coordinated with RCRS/CHRIMP, see appendix A.

- No Impacts: Areas outside of known PFAS impacts may require PFAS sampling if receiving facilities have their own sampling requirements, which may require PFAS testing even if the base does not. If soil and/or groundwater are determined to be "impacted" at any point, including if the contractor has tested the soil due to off-base soil receiving facility testing requirements, the requirements outlined above for impacted media will apply. Due to the limited nature and extent of installation PFAS data available, appropriate precautions and contingency cost planning should be done in the project planning process.
- For PFAS impacted soils comingled with other contaminants see following sections.

ii. <u>Petroleum impacted soils:</u>

- Soil may remain on the construction site footprint and/or placed back into the excavation if Gasoline Range Organics (GRO) are below 50

mg/kg and Diesel Range Organics (DRO) are below 100 mg/kg using the Total Petroleum Hydrocarbon (TPH) Gasoline Range Organics/Diesel Range Organics method referenced in 'Sampling and Laboratory Information' below.

- Alternatively, the North Carolina Department of Environmental Quality (NCDEQ) allows the use of EPA methods 8260 for Volatile Organic Carbons (VOCs) & 8270 Semi-Volatile Organic Carbons(SVOCs) to be used to confirm that contaminant levels are below the lesser of the STG or residential MSCCs, see enclosure (1). If soils remain on site, PFAS sampling is not required.
- Soil leaving the construction site to be reused (i.e., to be used as backfill elsewhere) must be characterized using EPA methods 8260 (VOCs) & 8270 (SVOCs) to confirm that contaminant levels are below the lesser of the STG or residential MSCCs. Note: accepting facilities may require additional sampling, including PFAS.
- Soils leaving the project site with detections of GRO above 50 mg/kg or DRO above 100 mg/kg using the TPH GRO/DRO method or soils above the lesser of the STG or residential MSCCs must be disposed of at a NC permitted land application or landfill facility.
    - If this soil has PFAS impacts it should be disposed of at a permitted subtitle D or C landfill (lined landfill) and follow the same requirements listed above for landfilled PFAS soils, see Section 5.b.i.
    - Note: NC Land application facilities are likely to require PFAS sampling prior to accepting material.

iii. <u>Contaminated (other than PFAS or Petroleum) Soil</u>
If contaminated soils are suspected or confirmed through presence of UXO, odors, visual staining, or were previously identified in the project (i.e., constructing in a known impacted area), affected soils must be properly characterized, manifested, transported, and disposed of in accordance with RCRA and federal and state regulations.

- Soils deemed non-hazardous through waste characterization are to be disposed of at a permitted subtitle D landfill or an offsite treatment facility permitted to receive such wastes. Non-hazardous soils can be disposed at the on-base landfill, accompanied by their waste

profile, with acceptance from landfill personnel. Disposal requirements should be confirmed with the receiving facility.

- Soils deemed hazardous through waste characterization are to be disposed of at a permitted subtitle C treatment, storage, and disposal facility. Any Personal Protective Equipment (PPE) associated with the generation of hazardous waste must be properly contained and disposed of in the same manner. Disposal requirements should be confirmed with the receiving facility.
- Soils comingled with any contaminant and PFAS impacts should be disposed of at a permitted subtitle D or C landfill (lined landfill), based on the hazardous/non-hazardous characterization.

iv. On-Base Reuse on an Active Construction Site

If not taken to one of the soil storage locations listed below, screened, uncontaminated (by PFAS, petroleum, or other compounds as described above), surplus soil can be reused on base at another construction site, if the following conditions are met:

- The proposed site has an active erosion control permit, managed by PWD, in place.
- The soil has already been mechanically screened by the construction contractor **prior to** leaving its originating construction site (cannot be screened at the new location).
- The contractor has received written authorization to use the soil at the new construction site by the ROICC for both the originating and receiving sites (i.e., for reuse, not to be "disposed of" at the new site).
- The contractor shall provide ROICC a daily written certification statement to the ROICC, signed by the QC Manager, indicating volume, in Cubic Volume (CY), and stating that the material is free of deleterious material greater than 3 inches, where the surplus soil was delivered, and confirming the material is free of contaminants.
- Documentation regarding disposal of deleterious material shall also be provided by the construction contractor to the ROICC in writing.

v. On-Base Surplus Soil Storage Locations

Screened, uncontaminated (by PFAS, petroleum, or other compounds as described above), surplus soil can be

stored at the following on-Base designated locations, if authorized by the area manager. The project manager should coordinate with the area manager prior to contract award and while developing the design or Request for Proposals. Verify again at the start of project to determine capacity available and contact POCs listed below 7 to 10 days in advance to coordinate delivery of material at the storage locations. Provide an estimate of the volume of soil to be delivered and an estimated timeline for soil delivery.
On base locations include the following:

Area managed by PWD for use as daily cover:

A. Base landfill, located on Piney Green Road, building 982, approximate coordinates 34°41'26.9"N 77°19'27.4"W. All deliveries will be screened and weighed at the Landfill scale house. The contractor shall provide temporary silt fencing around designated stockpile areas as needed. The project manager will coordinate with landfill contacts listed in Appendix A. Landfill use letters will be provided by the ROICC so that deliveries can be tracked.
This site operates Monday through Thursday between 0730 and 1500 and on Friday between 0700 and 1400.

B. Area managed by G-3/5 for reuse on training areas for various maintenance activities:
3.5-acre storage, adjacent to Tactical Landing Zone Condor off Verona Loop Road, approximate coordinates 34°38'07.3"N 77°26'41.7"W.
The project manager will coordinate with G-3/5 Project Development Specialist, listed in Appendix A, to determine capacity available at the storage location, prior to delivery.
This site operates Monday through Thursday between 0730 and 1500.

- All contractors will be provided a designated area by the ROICC, as defined by the storage location manager and the ROICC, in which they will be responsible for all management of soil, to include: constructing and maintaining a perimeter silt fence; installing signage to identify the Contract, Contractor point of contact (POC), and Government POC; frequent shaping of stockpiled material to ensure economical use of space and proper drainage, as determined by the Landfill Manager or G-3/5 Project Development Specialist; applying grass seed as needed or monthly at a minimum to

minimize erosion; properly closing out site by removing silt fencing/signage, and properly shaping and seeding the stockpiled material.

- The contractor is responsible for providing all material, equipment, and labor for placement and management of the surplus material at the designated on-base locations. Grade surplus material to a flat condition and slope to provide positive drainage daily.
- The contractor is responsible for submitting the following verification documents to the ROICC and the storage location manager for review and approval at the end of each day soil is delivered, worked, and/or site work is completed.
- The contractor is responsible for providing photographic documentation that surplus soil has been properly placed. Photograph will include time and date of image. Photos of each truck delivery are required.
- The contractor is responsible to provide a certification statement, signed by the QC Manager, indicating volume, in cubic yards (CY), stating that the material is free of deleterious material greater than 3 inches, stating where the surplus soil was delivered, and confirming the material is free of contaminants.
- If soil delivered does not meet the requirements outlined in this ESOP (i.e., it is not properly screened, or is not being stacked and managed properly at the on-base soil storage location), the contractor will be responsible for correcting or removing said soil and will no longer be allowed to use on-base soil storage locations.

vi. Off-Base Disposal of Surplus Soil

Screened, uncontaminated (by PFAS, petroleum, or other compounds as described above), surplus soil can be disposed of off-base if the following conditions are met:

- Soil has been properly screened on-site, prior to removal, as outlined in the previous sections.
- The contractor shall provide a daily written certification statement to the ROICC, signed by the QC Manager, indicating volume, in CY, and stating that the material is free of deleterious material greater than 3 inches, where the surplus soil was delivered, and confirming the material is free of contaminants.

- The contractor shall provide documentation regarding disposal of deleterious material to the ROICC in writing.

vii. Addressing Munitions Concerns

The above screening stipulations will likely capture any potential munitions-related items (should they be present). However, sites with a potential for munitions and explosives of concern (MEC) or material potentially presenting an explosive hazard (MPPEH) may require an additional level of UXO construction support. The project DM will explain if your site is in one of these areas. Sites recommended to have UXO soil screening or UXO construction support include the following:

- Construction is located on a Munitions Response Program (MRP) Site, which is a former live-fire range that has been officially closed and assessed under the CERLA. MRP sites that are currently or have previously been assessed and documented to have MEC/MPPEH present will have UXO screening requirements specific to their project site. Contact the IR Program Manager for details on what munitions have been found and what level of UXO construction support will be required. Reference MCO 8020.10 for guidance.
- Construction is located within operational training area. This may require some level of UXO construction support, depending on the current and historic use of the property. Consult with G-3/5 and the MCIEAST-MCB CAMLEJ Explosives Safety Officer (not EMD) on what level of UXO screening and/or construction support is warranted.
- Documentation exists that the property was previously used for training (maneuver and live fire areas, to include firing lines and impact areas), and was administratively closed as a training area in accordance with MCO 5090.2, Volume 10 (administrative closure), **and** there exists documentation or evidence that MEC or MPPEH have been found on or close to the property.
    - Recent construction on sites documented as non-live fire maneuver areas have resulted in practice munitions being discovered during survey and ground intrusive activities supporting construction. Consult with the IR Program Manager, Base EOD, and/or the ESO on whether additional UXO construction support is warranted.

- Documentation exists that MCB CAMLEJ EOD has responded to and identified munitions-related items on the proposed project site. This may include the current project (i.e., if munitions items are found during the project, UXO screening and/or construction support may be required to complete the project). The items found will determine what level of UXO screening or construction support are warranted (e.g., finding a flare would not necessarily require soil screening, but finding a 3.5" practice rocket might).
    - This can be determined through interviews of EOD or MCIEAST-MCB CAMLEJ Explosives Safety Office (ESO) personnel.
    - Confirm with MARCORSYSCOM and the ESO if the items found by EOD require soil screening and/or UXO construction support.
- Exceptions:
    - Sites currently or previously assessed under the MRP with documentation concluding no further action (NFA) with regards to munitions would **not** need to be rescreened for UXO or require the soil from that site to remain on base. The IR Program Manager will identify sites that have been assessed under the MRP.
      Note: soil screening to remove deleterious material is still required.
    - Sites that have already been developed and are being redeveloped (i.e., demolish and rebuild, installation of utilities, etc.), regardless of their historic use as a training area are not recommended for UXO soil screening, unless EOD has responded to the area, or if there is past or current documentation to indicate the presence of munitions-related items (i.e., MRP).
      Note: soil screening to remove deleterious material is still required.

c. **Groundwater**

i. <u>PFAS Impacted groundwater</u>:
PFAS-impacted groundwater is defined as any exceedances of PFAS levels per current DoD guidance.

- Dewatering PFAS-impacted groundwater: Per Department of Navy Policy, groundwater impacted above 70 parts per trillion (ppt) PFOA and/or PFOS must be treated to below 70 ppt prior to release (additional permitting may be required); otherwise, it must be containerized and properly manifested for disposal at a permitted

facility. For construction sites identified as impacted and groundwater concentrations are unknown, sampling must be conducted to determine PFAS concentrations in groundwater if dewatering is required. If groundwater is found to be above 70 ppt PFOA and PFOS (combined), treatment is required prior to discharging onsite.
Note: In April 2024, EPA finalized National Primary Drinking Water Regulation for five PFAS and their mixtures (PFOA, PFOS, PFNA, PFHxS, or HPFO-DA). The EPA or the State may eventually list certain PFAS as hazardous wastes under regulations implementing the Resource Conservation and Recovery Act. In anticipation of additional regulations and implementing policy, it is recommended to use MCL concentrations in lieu of the above DON policy of a combined 70 ppt of PFOS and PFOA.
Coordinate with the Installation restoration program to confirm current DON policy for PFAS management.

- Extracted groundwater with confirmed PFAS below applicable maximum contaminant levels (and not containing any other contaminants) does not currently require special management.
  a. Currently applies to five PFAS compounds and their mixtures (PFOA, PFOS, PFNA, PFHxS, or HPFO-DA).
- Soils leaving the originating construction site within known groundwater should be tested for PFAS impacts unless existing soil data is available.

ii. Petroleum and VOC Impacted Groundwater:
Sites with known VOC impacted groundwater plumes will be identified in the project DM. Groundwater extracted (through dewatering, etc.) from these areas must be properly tested, manifested through RCRS/CHRIMP, and disposed of in accordance with state and federal regulations. Contact the IR program, for more information. Refer to the most current *Investigation and Remediation Waste Management Plan* for additional guidance.

- If contaminated groundwater is suspected or confirmed through presence of odors, visual staining, or was previously identified in the project (i.e., constructing in a known impacted area) affected groundwater must be properly tested, manifested, and disposed of in accordance

with applicable federal and state RCRA regulations.

- Contaminated groundwater must be containerized, characterized to determine if it is hazardous or non-hazardous, manifested, and disposed of or treated at an appropriately permitted facility. Any PPE associated with the generation of hazardous waste must be properly contained and disposed of in the same manner. Disposal requirements should be confirmed with the receiving facility.

d. **Leachate, Sediment and/or Surface water**

It is unlikely that construction would require collecting these environmental samples. In the event leachate, sediment or surface water sampling is required, coordinate with the IR Program.

i. For PFAS or Petroleum/VOC impacts, follow groundwater sampling guidance listed above.

ii. Contractors and planners can use Table 1 to determine which sample method to use depending on their target media. However, this is not an exhaustive list and should be used as supplemental guidance

e. **Drilling Mud Disposal**

The contractor, prior to using drilling fluid additives, must submit the Safety Data Sheets to Contract Representative and EMD/RCRS for review to ensure harmful chemicals are not being injected into the ground. Excess soil cuttings and drilling fluids shall be managed to not impact surface water or stormwater conveyance systems. Assuming the material is not contaminated by regulated compounds or impacted by PFAS, excess drilling mud and soil cuttings can either be spread on site around the borehole, or once dried on site, transported to the base landfill for use as daily cover. Material transported to the base landfill must be coordinated in advance with the Base Landfill Manager and must pass paint filter test for excess moisture. Additional testing requirements may be required, coordinate with the landfill manager.

f. Concrete and construction debris

Concrete sampling should be coordinated with the IR program, see appendix A for contact information. There are limited sampling methods available for concrete/construction debris. In most applications, a swipe sample can be collected and tested using many established sampling methods shown in Table 1. However, with emerging contaminants, such as PFAS, these methods may not be appropriate.

g. **Drinking Water, Wastewater, and Biosolids**
Sampling for Drinking Water or Wastewater/Biosolids should not be conducted as part of construction and are beyond the scope of this ESOP. If you have a project requiring sampling of drinking water, wastewater or biosolids please coordinate with the Water Quality Program points of contact listed in Appendix A.

h. **Other Media**
If your work requires sampling of any media not listed within this ESOP, please coordinate with the IR Program.

Sampling and Laboratory Information:

The publicly accessible Department of Defense (DoD) Environment, Safety & Occupational Health Network and Information Exchange (DENIX) database should be used as a starting point when selecting a laboratory for a project. It does not provide all information needed (e.g., version of method or requirements and list of analyte lists under accreditation). To ensure the laboratory you select is accredited for your project analytes, the project manager/chemist must review the laboratory's scope of accreditation, which is found on their accreditation body's website.

To find a DoD-Environmental Laboratory Accreditation Program (ELAP) accredited laboratory, use the following link under the heading "Search Accredited Labs" on the Environmental Data Quality Workgroup page on the DENIX website:
http://www.denix.osd.mil/edqw/home/
(https://www.denix.osd.mil/edqw/accreditation/accreditedlabs/index.html)

A list of DoD-ELAP laboratories that are currently accredited to perform analysis of drinking water samples can be generated by performing a method search for the analytical method (e.g., EPA 537.1). To determine the version of EPA Method the laboratory is accredited for, the laboratory's DoD-ELAP Scope of Accreditation Certificate must be reviewed.

PFAS sampling protocols have stringent requirements, very low detection levels, and cross contamination is a concern. It is recommended that an experienced environmental professional, particularly those in the environmental remediation and site assessment industry, should collect samples and interpret results. Please consult your environmental professional on disposal facilities that will accept PFAS-impacted media. See below and Table 1 for PFAS testing methods.

- Drinking Water: Both EPA Method 533, which analyzes for 25 PFAS Compounds, and EPA Method 537.1, which analyzes for an additional 4 PFAS compounds, should be used to sample drinking water ONLY.

- **All other media (to include Soil or groundwater): EPA Method 1633, which analyzes for 40 different PFAS compounds, is currently the only DoD approved method for PFAS testing in media other than drinking water.**

- Regardless of the media analyzed, the most up-to-date, DoD-approved method should be utilized and performed by an appropriate DoD-ELAP accredited laboratory.

POL impacted wastes are typically tested using TPH-GRO and TPH-DRO (Method 8015C) and RCRA 9 Metals (Method SW846-6010B/7000).

Media impacted with contaminants other than PFAS or Petroleum should be characterized through Toxicity Characteristic Leaching Procedure (TCLP) analyses listed in Table 1. Note: If you are unsure what the most appropriate method is, contact the IR Program.

Table 1 – Summary of Applicable Sampling Methods

METHOD	Contaminant Family	Media Matrix
Method 8015	Petroleum Organics	water, aqueous wastes, extracts
Method 6010	Metals	groundwater, digested aqueous and solid matrices
Method 7000	Metals	groundwater, aqueous samples, soils, sludges, sediments
Method 1010	Ignitability	petroleum products, biodiesel
Method 9040	Corrosivity	aqueous wastes, multiphase wastes
Method 8081	Pesticides	solid matrices, liquid matrices
Method 8082	PCBs	solid matrices, aqueous matrices, tissue, oils, wipe samples
Method 8151	Herbicides	water, soils, wastes
Method 8260	VOCs	ground and surface water, aqueous sludges, soils, and sediments
Method 827O	SVOCs	solid waste matrices, soils, air sampling media, water samples
Method 9012	reactive cyanide	wastes, leachates
Method 9034	reactive sulfide	sample extracts
Method 1633	PFAS	media other than drinking water
Method 537.1	PFAS	drinking water ONLY
Method 533	PFAS	drinking water ONLY

RECORD RETENTION: Copies of soil screening documentation/ certification shall be maintained in accordance with Navy Document retention policies (reference SECNAV M5210.1), shall be kept on-site through the duration of the construction project, and shall be made available for inspection upon request. Copies of all waste manifests, including those for soil going to the base landfill, shall be maintained by the EMD RCRS/CHRIMP for at least 30 years after the calendar year in which they are created.

REGULATORY CITATION:

MCO 5090.2
BO5090.12
OPNAVINST 8020.15B-MCO 8020.13A
MCO 8020.10
MCIEAST-MCB CAMLEJO 5090.10
MCO 8023.3B
DDESB TP-18
SECNAV M5210.1
RCRA, 42 USC 6901
CERCLA of 1980, 42 U.S.C. 9601 and Superfund Amendments and Reauthorization Act (SARA) of 1986
MCIEAST-MCB CAMLEJ Decision Memorandum ER13-321 (dtd 24 Oct 2013)
OPSNOTE 2021-001

TRAINING:

"3R" UXO Safety Training, available through the ROICC, OICC, EMD, or following website:

https://www.lejeune.marines.mil/Offices-Staff/Environmental-Mgmt/Training-Video/

REFERENCES:

CH2M, 2023. *Investigation and Remediation Waste Management Plan Marine Corps Base Camp Lejeune and Marine Corps Air Station New River, North Carolina.*

[1] DASN (E) POLICY MEMO, "ADDITIONAL AQUEOUS FILM FORMING FOAM CONTROL, REMOVAL, AND DISPOSAL REQUIREMENTS," 6 MARCH 2018

[2] BASED ON DISCUSSIONS WITH NCDEQ AND MCIEAST ON DISPOSAL OF PFAS CONTAINING SOILS.

[3] DISCUSSION WITH PWO CDR CAMPBELL AND E-MAIL FROM B. WOODALL DATED 5 OCTOBER 2021.

ENCLOSURES:

(1) NCDEQ's Maximum Soil Contaminant Concentration Levels (MSCCs)

Acronyms:

CERCLA Comprehensive Environmental Response, Compensation, and Liability
CHRIMP Consolidated Hazardous Material Reutilization and Inventory Control Program
CY Cubic Yards
DENIX DoD Environment, Safety & Occupational Health Network and Information Exchange
DM Decision Memorandum
DoD Department of Defense
DRO Diesel Range Organics
ELAP Environmental Laboratory Accreditation Program
EMD Environmental Management Division
EOD Explosives Ordnance Disposal
EPA US Environmental Protections Agency
ESO Explosive Safety Officer
ESOP Environmental Standard Operating Procedure
GRO Gasoline Range Organics
IR Installation Restoration
MCAS NR Marine Corps Air Station New River
MCB CAMLEJ Marine Corps Base Camp Lejeune
MCIEAST-MCB CAMLEJ Marine Corps Installations East-Marine Corps Base Camp Lejeune
MCO Marine Corps Order
MEC Munitions and Explosives of Concern
MPPEH Material Potentially Presenting an Explosive Hazard
MRP Munitions Response Program
MSCCs Maximum Soil Contaminant Concentrations
NCDEQ North Carolina Department of Environmental Quality
NEPA National Environmental Policy Act
PFAS Per- and Polyfluoroalkyl Substances
PFHxS Perfluorohexanesulfonic acid
PFNA Perfluorononanoic acid
PFHpA Perfluoroheptanoic acid
PFDA Perfluorodecanoic acid
PFBS Perfluorobutanesulfonic Acid
PFOA Perfluorooctanoic Acid
PFOS Perfluorooctanesulfonic Acid
POC Point of Contact
PPE Personal Protective Equipment
PWD Public Works Division
QC Quality Control
RCRA Resource Conservation and Recovery Act
RCRS Resource Conservation and Recovery Section
REIR Request for Environmental Impact Review
ROICC Resident Officer in Charge of Construction

STG	Soil to Groundwater
SVOC	Semi-Volatile Organic Carbons
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbon
UXO	UneXploded Ordnance
VOC	Volatile Organic Carbons

Appendix A – Contact information:

IR Program:
Thomas Richard, thomas.richard@usmc.mil, (910)451-9641
Laura Spung, laura.spung@usmc.mil, (910)451-9610

POL/UST Program:
Jessica Pierson, jessica.pierson@usmc.mil, (910)451-5878

Water Quality Program:
Travis Voorhees, travis.voorhees@usmc.mil (910)451-9518
Daniel Straub, daniel.straub@usmc.mil (910)451-9122

NEPA Program:
Jessi Baker, jessi.baker@usmc.mil, (910)451-4542
Brent Sayler, brent.sayler@usmc.mil, (910)451-9454

RCRS (Camp Lejeune Waste Manifesting):
Felicia Padilla, felicia.padilla@usmc.mil, (910)451-5256/1482
Jeff Zahniser, jeffrey.zahniser@usmc.mil,(910)451-5306/1482

CHRIMP (New River Waste Manifesting):
Greg Ottey, gregory.r.ottey.civ@usmc.mil, (910)449-6143

G-3/5 Project Development Specialist:
(910) 451-1379

Base Landfill:
Steven Beckner, steven.beckner@usmc.mil, (910)451-8666