

20-0062, Construct Bulk Head, Bldg AS903, MCASNR

CONTRACT N40085-20-B-0062
NAVFAC SPECIFICATION
NO. 20-0062

CONSTRUCT BULK HEAD, BLDG AS903, MCASNR

AT THE

MARINE CORPS AIR STATION, NEW RIVER, NORTH CAROLINA

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

JACKSONVILLE, NORTH CAROLINA

DESIGN BY:

Avolis Engineering, PA
New Bern, North Carolina

A/E Contract: 20042

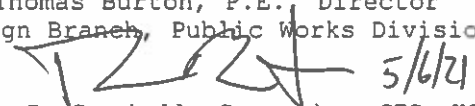
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Date: March 16, 2021

SPECIFICATION APPROVED BY:

Thomas Burton, P.E., Director
Design Branch, Public Works Division

 5/6/21
Ross B. Campbell, Commander, CEC, USN
for Commander, Naval Facilities Engineering

20-0062

FINAL SUBMITTAL

DEPARTMENT OF THE NAVY

ATLANTIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

**CONSTRUCT BULKHEAD, BUILDING AS903
MCAS NEW RIVER**

PROJECT: N40085-20-B-0062

DESIGNED BY:

AVOLIS ENGINEERING, P.A.
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LICENSE NO. C-0706

SPECIFICATION PREPARED BY:

J. KEVIN AVOLIS, PE

SPECIFICATION APPROVED BY:

Design Director: _____

THOMAS BURTON, PE



Date: _____

5/6/21

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SECTION 01 11 00

SUMMARY OF WORK

08/15

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The work includes the installation of a steel bulkhead for shoreline stabilization and other related work as indicated.

1.1.2 Location

The work is located at the MCAS New River, approximately as indicated. The exact location will be shown by the Contracting Officer.

1.2 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 must be in a condition equal to or better than that which existed before new work started.

1.3 LOCATION OF UNDERGROUND UTILITIES

It shall be the responsibility of the contractor to locate all existing underground utilities that are within the limits of work, prior to any excavation activities. These include but are not limited to the following buried utilities: electrical ducts and direct buried conductors, fire alarm and telecommunication cabling. The contractor shall employ the services of a qualified Utility locating company to locate, identify, and mark all underground utilities. The entire construction limits shall be thoroughly scanned and researched to determine existing utility locations. Any existing utilities that are indicated on the project drawings shall be considered for reference use by the locating company and shall be verified. All underground utilities shall be clearly marked with flags, paint or stakes prior to any digging operation except that required to determine exact utility location and depth. CAUTION shall be used when trenching or excavating around or near buried utilities. The contractor shall be responsible for the timely repair and/or replacement of direct and collateral damage on any and all underground utilities that are severed, crushed, broken, displaced or otherwise disturbed by the construction operation. The Government shall not incur any additional cost for such repair or replacement. The contractor shall notify the FEAD a minimum of three working days prior to utility location. Do not continue with excavation or installation of new work without resolving elevation discrepancies and conflicts.

1.3.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work.

Location and protection of underground utilities shall be the responsibility of the Contactor. Where existing-to-remain piping, utilities, and underground obstructions of any type are indicated 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 as-built drawings will be available in the ROICC/PWD office for review to assist the locator.
- b. It is mandatory that the Contractor also contact the Base Telephone Office (910-451-2531/3100) 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 Public Works Outside Plumbing (910-451-7190) prior to accomplishing any digging at Camp Lejeune, to ensure that all buried water and sanitary lines are identified.
- d. 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. Nick Brown at 910-376-1785 for assistance.
- e. 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. Work requests may also be submitted online at www.nc811.org.

1.4 GOVERNMENT-FURNISHED MATERIAL AND EQUIPMENT

1.4.1 Delivery Schedule

Materials and equipment will be available on or after 30 calendar days after the award of contract.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 12 00

CUTTING AND PATCHING

01/07

PART 1 GENERAL

1.1 CUTTING

Shall be done by sawing along straight lines. The amount cut out shall be the minimum necessary to accommodate the new work. No flame cutting will be permitted without written permission of the Officer in Charge of Construction.

1.2 HOLES

Shall be rotary drilled. The size shall be the minimum necessary to accommodate the new work.

1.3 PATCHING

Shall be done with materials which match the existing in color, quality and surface texture when finished.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 13 00

TRAFFIC SAFETY

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 basic designation only.

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2009) Manual of Uniform Traffic Control Devices

1.2 MAINTENANCE FOR TRAFFIC

The existing road or an approved bypass shall be kept open to all traffic while undergoing improvements. The Contractor shall furnish, erect, light, and maintain barricades, warning and informational signs, delineators, and flagmen in accordance MUTCD.

1.2.1 TEMPORARY APPROACHES

Temporary approaches or crossings and intersections with trails, roads, streets, residences, and parking lots shall be maintained in a safely passable condition.

1.3 PUBLIC CONVENIENCE AND SAFETY

The Contractor shall at all times so conduct his work as to assure the safety and convenience of the users and of those along the streets and roads and to assure the protection of persons and property.

1.4 WARNING SIGNS

Warning signs shall be erected in advance of any place on the project where operations may interfere with the use of the road by traffic, and at all intermediate points where the new work crosses or coincides with an existing road.

1.4.1 INFORMATIONAL SIGNS

The Contractor shall furnish, erect, maintain, and remove, when directed, any informational identification indicated.

1.4.2 CONSTRUCTION WARNING SIGNS

Construction warning signs shall be displayed only when a crew is actually working at the site. "Men Working" or "Flagman" signs shall be removed from view of traffic when not needed.

1.5 TRAFFIC REROUTING PLANS

Traffic rerouting plans shall be submitted for approval seven calendar days before the anticipated rerouting, and shall not be implemented before approval. The Contractor shall erect and remove all detour signs.

1.6 PAINTING -- TEMPORARY AND PERMANENT

Painting on each street or roadway shall begin within 48 hours after pavement is placed and shall be placed continuously during daylight hours, except during rain, until completion. Painting interrupted for rain shall restart during daylight as soon as pavement is dry. Provide temporary painting on all roadways and stress, except where permanent markings can be placed within 48 hours after pavement is placed.

PART 2 PRODUCTS

2.1 Traffic Control Devices

MUTCD.

PART 3 EXECUTION

Not Used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

11/11

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. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work.
- b. The airfield will remain in operation during the entire construction period. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of the activity. Coordination with Air Ops will be necessary to avoid possible conflicts that are not known at this time.
- c. Coordinate with Air Ops, routes for emergency vehicles to enter and exit the located construction area.
- d. Permission to interrupt any Activity roads, railroads, or utility service must be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.
- e. The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the construction schedule each factor which constitutes a potential interruption to operations.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

DBIDS has gone live at MCB Camp Lejeune. In order to reduce wait time when exchanging your RapidGate credential, it is highly recommended each applicant pre-register at <https://dbids-global.dmdc.mil/enroll#!/>

Non-DoD cardholding visitors to Marine Corps Installations with a driver's license or ID issued by a state that is not compliant with the Real ID Act of 2005 will now need to provide an alternate form of acceptable identification to gain entry, or be escorted by an authorized patron of the air station.

North Carolina now issues REAL ID compliant drivers licenses, but many drivers have yet to be issued the new license. Drivers may get a North Carolina REAL ID driver's license at any NCDMV driver's license office.

The Act established minimum security standards for license issuance and production and prohibits Federal agencies from accepting driver's licenses and identification cards from states not meeting the Act's minimum

standards.

In absence of a compliant state issued driver's license or ID, one of the following federally approved forms of identification must also be provided in addition to the non-compliant driver's license or ID:

1. U.S. Passport
2. U.S. Passport Card
3. U.S. Coast Guard Merchant Mariner Card
4. Personal Identity Verification (PIV) Card
5. Personal Identity Verification - Interoperable (PIV-I)
6. U.S. State Department Driver's License
7. Veteran's Health Identification Card (Issued by the U.S. Department of Veterans Affairs)
8. U.S. Permanent Resident Card (Form I-551)
9. U.S. Certificate of Naturalization or Certificate of Citizenship (Form N-550)
10. Department of Homeland Security Employment Authorization Document (Form I-766)

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 hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

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

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. Provide a letter of authorization on company letterhead referencing the applicable contract(s) and identifying individual as an authorized

employee of the awarded company along with the employee's required access days and times.

- b. Present two (2) valid forms of identification, such as a passport or Real ID Act-compliant state driver's license. All documents must be originals/certified.
- 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.cnmc.navy.mil/om/dbids.html>.
- d. Provide vehicle registration and insurance. Contractors driving aboard the installation must provide an original vehicle registration document. Copies of registration are only accepted for company-owned fleet vehicles. Proof of insurance is also required. A declaration page is required for insurance originating outside the state of North Carolina. Out of state insurance must meet North Carolina minimums of \$30,000/person, \$60,000/accident, and \$25,000/property damage.
- e. Upon successful completion of the background check, the Government will complete the DBIDS enrollment process, which includes Contractor employee photo, finger prints, base restriction and several other assessments.
- f. 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 DBIDS.

1.3.1.3 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.

1.3.2 Working Hours

Regular working hours must consist of an 8 1/2 hour period, anytime between 7:00 a.m. and 5:00 p.m., Monday through Friday, excluding Government holidays.

1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 15 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Contracting Officer. Make utility cutovers after normal working hours or on Saturdays, Sundays, and Government holidays unless directed otherwise.

1.4 SECURITY REQUIREMENTS

1.4.1 Station Regulations

No employee or representative of the contractor will be admitted to the work site without an Identification Badge or is specifically authorized admittance to the work site by the FEAD, Facilities Engineering & Acquisition Division.

IMPORTANT NOTE: FEAD personnel (Construction Managers, Engineers/Architects, Engineering Technicians, Contract Specialists, or Contract Surveillance Representatives) will not receive, process, re-transmit or otherwise handle IN ANY WAY Personally Identifiable Information (PII) related to the badging process. Do NOT forward any of this information to the FEAD.

1.4.2 Contractor Access to MCAS Cherry Point and Outlying Areas

1. Documentation requirements for granting access to MCAS Cherry Point for commercial and contract employers and employees. This document is an aid in meeting ASO 5560.6A requirements and is not a substitute for the order.

2. The Pass & Identification Office at Building 251 will issue credentials to authorized contractors. Sub-Contractors and suppliers must coordinate through the Prime-Contractor:

3. Criminal Activity. In accordance with ASO 5560.6A, the below list of criminal activities within an applicant's record are considered not in the best interest of the Marine Corps and will be grounds for automatic denial of access aboard the Installation:

- a. Conviction of any felony offense.
- b. Conviction of any misdemeanor offense, which was the result of a plea bargain of a felony offense.
- c. Conviction of any offense involving a weapon.
- d. Conviction of any drug offense involving manufacturing or trafficking.
- e. More than one misdemeanor conviction of drug related offenses over the applicant's lifetime or one misdemeanor drug related offense within the last five years.
- f. Conviction of any assault charge.
- g. Conviction of any offense involving theft or larceny.
- h. Conviction of any offense of domestic violence.
- i. Conviction of any offense related to the abuse/neglect of a child.
- j. Conviction of any sexual in nature related offense or registration as a sex offender.
- k. Commission of any grievous criminal offense/misconduct while aboard any Federal installation, including blatant disregard for rules and regulations of the Installation, but excluding minor traffic offenses.
- l. Other than Honorable, Bad Conduct, and Dishonorable discharges from the U.S. Military.
- m. Those identified as undocumented citizens.
- n. Those on the National Terrorist Watch List.
- o. Any individual who attempts to hide or purposely fails to disclose all past criminal history during the vetting process.
- p. Any individual that the Provost Marshal's Office determines to present a risk to the security and safety of the Installation and whose access is deemed not in the best interest of the Marine Corps.
- q. Any individual who has been debarred from the Installation by the Installation Commander or is currently listed as debarred from any other Federal installation.

r. Any individual with an outstanding warrant for their arrest or apprehension.

s. Any individual with a pending criminal court case that, if convicted, would result in access denial in accordance with the criteria listed above.

1.4.3 FLIGHTLINE SECURITY REQUIREMENTS

Work involved under this contract is in the Flightline Security Area. No employee or representative of the Contractor will be admitted to the work site unless they (1) are specifically authorized admittance by the FEAD, and (2) have a security badge. The Contractor shall obtain clearance and flightline security badges for all personnel required to be on the project site prior to performing any work. The Contractor shall submit a written request for security badges to the FEAD and to Pass & ID. Each employee will be required to go to PASS & ID at Building 251 to obtain his security badge with flightline access. A limited number of Contractor vehicles will be allowed access to the site of work subject to meeting regular Station access requirements. No personal vehicles will be allowed behind the security fence. Parking of vehicles shall be restricted to the immediate project site as determined by the FEAD. The security badges issued under this contract are valid for this specific project and are not transferable to another project.

1.4.4 Staging Area

The Contractor staging area will be at or near the project site and must be coordinated with the Contracting Officer. Amount of material on site shall be kept to a minimum and shall only be material that is pertinent to the work currently being performed. All stockpiling of equipment and materials shall be closely coordinated with the Government and shall not disrupt activities at the site.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

04/12

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. ARMY CORPS OF ENGINEERS (USACE)

EP-1110-1-8 (2009) 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

1.3 SCHEDULE OF PRICES

1.3.1 Data Required

Within 15 calendar days of notice of award, prepare and deliver to Contracting Officer a schedule of prices (construction contract) on the forms furnished by the Government. 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 Schedule Instructions

Payments will not be made until the schedule of prices has been submitted to and approved by the Contracting Officer. Identify the cost for site work, and include incidental work to the 5 foot line. Identify costs for the building(s), and include work out to the 5 foot line. Work out to the 5 foot line shall include construction encompassed within a theoretical line 5 feet from the face of exterior walls and shall include attendant construction, such as cooling towers, placed beyond 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, equipment use rates shall be based upon the applicable provisions

of the EP-1110-1-8.

1.5 CONTRACTOR'S PAYMENT REQUEST

1.5.1 Proper Payment Request

A proper request for payment/invoice shall comply with all requirements specified in this Section and the contract payment clauses. If any invoice does not comply with these requirements, it shall be returned with a statement of the reasons why it was not a proper invoice. A proper payment request/invoice includes the following information, completed forms, and number of copies indicated. Upon request, the Contracting Officer will furnish copies of Government forms.

- a. Contractor's Invoice on NAVFAC Form 7300/30, which shall show the basis for arriving at the amount of the invoice. Submit one original and two copies.
- b. Contractor's Monthly Estimate for Voucher (LANTNAVFACENGCOM Form 4-4330/110. Submit original and two copies.
- c. Payment Certification. Furnish as specified in "FAR Clause 52.232-5 (c) Payments under Fixed-Price Construction Contracts." Submit one original.
- d. QC Invoice Certification. Furnish as specified in Section 01 45 10, "Quality Control." Submit one original.

1.5.1.1 Progress Payments

In addition to the requirements stated in Paragraph 1.5.1, "Proper Payment Request" above, the Contractor's request for progress payments shall include the following:

- a. Updated Progress Schedule: Furnish an updated progress schedule as specified in contract clause FAR 52.236-15 "Schedules for Construction Contracts" and Section 01 32 16, "Construction Progress Documentation." Submit one copy.

1.5.1.2 Final Payments

The request for final payment is submitted after completion and acceptance of all work and all other requirements of the contract. Before submitting the final invoice the Contractor shall meet with the appropriate Government representatives to determine the final invoice amount, including the assessment of liquidated damages, if any, and to make sure the final release is complete and accurate. In addition to the requirements in Paragraph 1.5.1, "Proper Payment Request" above, the Contractor's request for final payment shall include the following:

- a. A final release executed on the standard form provided by the Contracting Officer. Submit two originals with final payment request.
- b. NC Tax certified statement and report for the prime and each subcontractor (FAR 52.229-7). Submit two copies.
- c. As-built drawings (if applicable).

- d. Warranties (if applicable).
- e. O&M manuals (if applicable).
- f. Final payrolls (FAR 52.222-6).
- g. A release for an assignment of claims (if applicable). Submit three originals.

1.5.2 Procedures for Submitting Payment Request

- a. The Contractor may submit only one invoice for payment each month as the work progresses.
- b. The invoice shall be delivered to the ROICC Office, Administrative Branch, between five calendar days before and five calendar days after the contract award date. Invoices received outside this schedule shall be returned to the Contractor unprocessed. The Contractor will have to wait until the following month to submit their next invoice.
- c. Invoices shall be delivered during normal work hours from 7:30 AM up to 4:00 PM (EST), Monday through Friday, excluding holidays.

1.6 PAYMENTS TO THE CONTRACTOR

Payments will be made on submission of a proper payment request/invoice by 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 the following:

- a. Reasonable retention and/or deductions due to defects in material or workmanship; potential liquidated damages; and/or failure to comply with any other requirements of the contract.
- b. Claims which the Government may have against the Contractor under or in connection with this contract; and
- c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor.
- d. Failure to provide up to date record drawings not current as stated in Contract Clause "FAC 5252.236-9310, Record Drawings"; NC State tax certified statement and report in accordance with FAR 52.229-2; labor payrolls in accordance with FAR 52.222-6; as-built drawings in accordance with Section 01 45 10, "Quality Control"; warranties and O&M manuals; and any other requirements in the contract.

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 shall 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 considerations 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 no 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 shall be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Earned Value Report requirement of this contract. Requests for progress payment considerations for such items shall be supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 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 shall be stored in the Continental United States.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

02/13

PART 1 GENERAL

1.1 SUBMITTALS

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

SD-01 Preconstruction Submittals

List of contact personnel

1.2 MINIMUM INSURANCE REQUIREMENTS

Procure and maintain during the entire period of performance under this contract the following minimum insurance coverage:

- a. Comprehensive general liability: \$500,000 per occurrence
- b. Automobile liability: \$200,000 per person, \$500,000 per occurrence, \$20,000 per occurrence for property damage
- c. Workmen's compensation as required by Federal and State workers' compensation and occupational disease laws,
- d. Employer's liability coverage of \$100,000, except in States where workers compensation may not be written by private carriers,
- e. Others as required by State law.

1.3 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.

1.4 CONTRACTOR PERSONNEL REQUIREMENTS

1.4.1 Subcontractors and Personnel

Furnish 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.

1.4.2 Identification Badges

Identification badges will be furnished without charge. Application for and use of badges will be as directed below. Immediately report instances of lost or stolen badges to the Contracting Officer. Employees are required to resubmit a complete 50 state criminal records check in order to renew their contractor badge.

1.4.3 Business Access Security Requirements

1.4.3.1 Business Access Definition

Contractor/subcontractor employees requiring installation access to MCB, Camp Lejeune or MCAS New River, N.C. must obtain a Business Access Identification Badge for that particular installation. Regularly scheduled delivery personnel, to include FEDEX, UPS, Pick-up and deliveries, should, also, follow the Business Access guidelines described below. Personnel requiring Business Access Identification Badges shall submit all documentation listed below. Badges are not required if the contracted position requires the employee to obtain a Common Access Card (CAC) which will be identified separately within the Government contract.

1.4.3.2 Installation Security Access Requirements

Contractor shall accomplish the security requirements below within 10 days after award or prior to performance under the contract.

1.4.3.3 Business Access Identification Badge Requirement

In order to obtain a Business Access Identification Badge for access to MCB, Camp Lejeune, and satellite activities, or MCAS New River, NC, all personnel providing services under this contract shall be required to present the documentation below to the following offices, as applicable:

MCB, Camp Lejeune, NC and its satellite activities. Report as follows:

1. Identification Card Center, 60 Molly Pitcher Road for badge (910-450-8444).

MCAS New River, NC. Report as follows:

1. Pass and Identification Office, Bldg AS-187 for badge (910-449-7695) and vehicle pass (910-449-5513).

1.4.3.4 Proof of Employee Citizenship or Legal Alien Status

Employers may participate in the E-verify program (1-888-464-4218, www.DHS.gov/e-verify) allowing U.S. employers to verify name, DOB, and SSN

along with immigration information for non-citizens, against federal databases in order to verify the employment eligibility of both citizens and non-citizen new hires.

1.4.3.5 Proof of Criminal Records Check

Commercial and contract employees must provide proof a complete 50 state criminal records check on an annual basis. The record check may be obtained from any of the following Internet investigative services: Kroll (former Infolink Screening Services) at www.kroll.com, Castle Branch at www.castlebranch.com, or any other investigative services company that provides records checks for all 50 states. These services also validate social security card numbers. All criminal history checks must be completed no more than 30 days prior to start date of contract. (Note: These Internet screening services are listed as possible sources for obtaining a criminal background check. The United States government and the United States Marine Corps do not endorse nor are they affiliated with any of these services).

1.4.3.6 Letter Provided By Contracting Officer Indicating Contract

Letter provided by Contracting Officer indicating contract, contract period and prime contractor. Proof of employment on a valid Government contract (e.g., a letter on company letterhead from the prime contractor including contract number and term).

1.4.3.7 Photo ID

Valid state or federal issued picture identification card. Acceptable documents include state drivers license, DMV issued photo identification, or alien registration card.

1.4.3.8 National Crime Investigation Center (NCIC) Check

Provost Marshals are authorized to conduct a national crime information center (NCIC) check of all persons entering the installation, if/where applicable, the NCIC check may include drivers's license query, wants and warrants, and criminal history.

1.4.4 Denial of Access

Installation access shall be denied if it is determined that an employee:

- a. Is on the National Terrorist Watch List
- b. Is illegally present in the United States.
- c. Is subject to an outstanding warrant.
- d. Has knowingly submitted an employment questionnaire with false or fraudulent information.
- e. Has been issued a debarment order and is currently banned from military installations.
- f. Is a Registered Sexual Offender.
- g. Has been convicted of a felony or a drug crime within the past five years.

- h. Individuals who have received a DUI/DWI in the last year may be allowed access to the installation, but will not be permitted to drive on the installation.
- i. Any reason the Installation Commander deems reasonable for the good order and discipline.

1.4.5 Appeal Process

All appeals should be directed to the Base Inspector's Office for any individual that has been denied access to the Base.

1.4.6 Display of Badges

Contractors/subcontractors shall prominently display their badges on their person at all times. Upon completion/termination of this contract or an individual's employment, the Contractor shall collect and turn in to the Pass & ID Office all badges. If the Contractor fails to obtain the employee's badge, the Pass & ID Office will be notified within 24 hours. Immediately report instances of lost or stolen badges to the Contracting Officer.

1.4.7 Contractor and Subcontractor Vehicle Requirements

Each vehicle to be used in contract performance shall show the Contractor's or subcontractor's name so that it is clearly visible and shall always display a valid state license plate and safety inspection sticker. To obtain a vehicle decal, which will be valid for one year or contract period, whichever is shorter, Contractor or subcontractor vehicle operators shall provide to the Vehicle Registration Office, 60 Molly Pitcher Road (910-451-1158) or to MCAS, Building AS-187 (910-449-5513) for vehicle decal:

- a. An installation sponsor request forwarded to provost Marshall office
- b. A valid form of Federal or state government I.D.
- c. If driving a motor vehicle, a valid driver's license, vehicle registration and proof of insurance

Upon completion/termination of this contract or an individual's employment, the Contractor shall collect and turn in to Vehicle Registration all Government vehicle decals. If any are not collected, the Contractor shall notify the Vehicle Registration Office within 24 hours.

1.4.8 Security Checks

Contractor personnel and vehicles shall only be present in locations relevant to contract performance. All Contractor personnel entering the base shall conform to all Government regulations and are subject to such checks as may be deemed necessary to ensure that violations do not occur. Employees shall not be permitted on base when such a check reveals that their presence would be detrimental to the security of the base. Subject to security regulations, the Government will allow access to an area for servicing equipment and/or performing required services. Upon request, the Contractor shall submit to the Contracting Officer questionnaires and other forms as may be required for security purposes.

1.4.9 Subcontractor Special Requirements

1.4.9.1 Space Temperature Control, HVAC TAB, and Apparatus Inspection

All contract requirements shall be accomplished directly by a first tier subcontractor. No work shall be accomplished by a second tier subcontractor.

1.4.9.2 Telecommunication and High Voltage Work

When telecommunications and high voltage work is required, all work associated with telecommunications and high voltage shall be accomplished by a first tier subcontractor. The contractor must possess a valid North Carolina Public Utility - Electrical, contractor's license and be insured to do such work in the State of North Carolina.

1.4.9.3 Paving Associated with Utility Cuts

All pavement repairs associated with utility cuts shall be completed within 14 days of completing work within paved area.

1.5 DISCLOSURE OF INFORMATION

Contractor shall comply as follows:

- (a) The Contractor shall not release to anyone outside the Contractor's organization any unclassified information, regardless of medium (e.g., film, tape, document), pertaining to any part of this contract or any program related to this contract, unless -

- (1) The Contracting Officer has given prior written approval; or

- (2) The information is otherwise in the public domain before the date of release.

- (b) Requests for approval shall identify the specific information to be released, the medium to be used, and the purpose for the release. The Contractor shall submit its request to the Contracting Officer at least 45 days before the proposed date for release.

- (c) The Contractor agrees to include a similar requirement in each subcontract under this contract. Subcontractors shall submit requests for authorization to release through the prime contractor to the Contracting Officer.

1.6 SUPERVISION

Have at least one qualified supervisor capable of reading, writing, and conversing fluently in the English language on the job site during working hours. In addition, if a Quality Control (CQ) representative is required on the contract, then that individual shall also have fluent English communication skills.

NOTE: If training and experience requirements of Section 01 45 10, "Quality Control" and 01 35 29, "Safety and Occupational Health Requirements" have been met the supervisor may also serve as QC Manager and Site Safety and Health Officer (SSHO).

1.7 PRECONSTRUCTION CONFERENCE

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices, shop drawings, and other submittals, scheduling programming, and prosecution of the work. Major subcontractors who will engage in the work shall also attend.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 31 50

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

01/07

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 21 days after receipt of the Notice of Award, prepare and submit to the Contracting Officer for approval a Critical Path Method (CPM), Network Schedule in accordance with the terms in Contract Clause "FAR 52.236-15, Schedules for Construction Contracts," except as modified in this contract. Primavera P6 will be utilized to produce and update all progress schedules.

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 Contractor shall use the critical path method (CPM) to schedule and control construction activities. The Network shall have a minimum of 25

activities and a maximum of 50 activities. The schedule shall identify as a minimum:

- a. Construction time for all major systems and components;
- b. Manpower requirements for each activity;
- c. Major submittals and submittal processing time; and
- d. 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. Project schedules shall be prepared and maintained using Primavera P6, Primavera SureTrak or current mandated scheduling program. Save files in Concentric P6 or current mandated scheduling program file format, compatible with the Governments version of the scheduling program. 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

05/13

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

Certificates of insurance

Surety bonds

List of proposed subcontractors

List of proposed products

Construction Progress Schedule

Submittal schedule

Schedule of values

Health and safety plan

Work plan

Quality control 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-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

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. (Testing must have been within three years of date of contract award for the project.)

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

Report which 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 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.

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SD-11 Closeout Submittals

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

As-built drawings

Special warranties

Posted operating instructions

Training plan

1.2.4 Approving Authority

Person authorized to approve submittal.

1.2.5 Work

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

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 Section 01 45 10, "Quality Control" and Section 01 32 16, "Construction Progress Documentation." 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.

1.5 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 N40085-20-B-0037, 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:

Avolis Engineering, PA
P.O. Box 15564
New Bern, NC 28561

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 29

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

07/14

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 SANITARY ENGINEERING (ASSE)

ASSE/SAFE Z359.1 (2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B30.22 (2010) Articulating Boom Cranes

ASME B30.3 (2009) Tower Cranes

ASME B30.5 (2007) Mobile and Locomotive Cranes

ASME B30.8 (2010) Floating Cranes and Floating Derricks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10 (2010) Standard for Portable Fire Extinguishers

NFPA 241 (2009) Standard for Safeguarding Construction, Alteration, and Demolition Operations

NFPA 51B (2009; TIA 09-1) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

NFPA 70 (2019; TIA 19-1; TIA 19-2; TIA 19-3; TIA 19-4; ERTA 1 2019) National Electrical Code

NFPA 70E (2018; TIA 18-1; TIA 81-2) Standard for Electrical Safety in the Workplace

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)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.94	Ventilation
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1919	Gear Certification
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection

1.2 SUBMITTALS

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

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP)
Activity Hazard Analysis (AHA)
Crane Critical Lift Plan
Crane Work Plan
Proof of qualifications for Crane Operators

SD-06 Test Reports

Reports
Submit reports as their incidence occurs, in accordance with the
requirements of the paragraph entitled, "Reports."
Accident Reports
Monthly Exposure Reports
Regulatory Citations and Violations
Crane Reports

SD-07 Certificates

Confined Space Entry Permit
Certificate of Compliance (Crane)
Third Party Certification of Barge-Mounted Mobile Cranes

Submit one copy of each permit/certificate attached to each Daily Report.

1.3 DEFINITIONS

- a. Associate Safety Professional (ASP). An individual who is currently certified by the Board of Certified Safety Professionals.
- b. Certified Construction Health & Safety Technician (CHST). An individual who is currently certified as a CHST by the Board of Certified Safety Professionals.
- c. Certified Industrial Hygienist (CIH). An individual who is currently certified as a CIH by the American Board of Industrial Hygiene.
- d. Certified Safety Professional (CSP). An individual who is currently certified as a CSP by the Board of Certified Safety Professionals.
- e. Certified Safety Trained Supervisor (STS). An individual who is currently certified as an STS by the Board of Certified Safety Professionals.
- f. Competent Person for Fall Protection. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.
- g. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.
- h. Low-slope roof. A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).
- i. Medical Treatment. 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 though provided by a physician or registered personnel.
- j. Multi-Employer Work Site (MEWS). A multi-employer work site, as defined by OSHA, is one in which many employers occupy the same site. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors.
- k. Operating Envelope. The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).
- l. Qualified Person for Fall Protection. A person with a recognized degree or professional certification, extensive knowledge, training and experience in the field of fall protection who is capable of performing design, analysis, and evaluation of fall protection systems and equipment.
- m. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

- (1) Death, regardless of the time between the injury and death, or the length of the illness;
- (2) Days away from work;
- (3) Restricted work;
- (4) Transfer to another job;
- (5) Medical treatment beyond first aid;
- (6) Loss of consciousness; or
- (7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

n. Site Safety and Health Officer (SSHO). The superintendent or other qualified or competent person who is responsible for the on-site safety and health required for the project.

o. Steep roof. A roof having a slope greater than 4 in 12 (vertical to horizontal).

p. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

q. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six 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; and collision, including unplanned contact between the load, crane, and/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, roll over, etc.).

1.4 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction conference. The checklist will be completed monthly by the Contractor and submitted 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, will result in a retention of up to 10 percent of the voucher.

1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, and the following 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 shall apply.

1.6 DRUG PREVENTION PROGRAM

Conduct a proactive drug and alcohol use prevention program for all workers, prime and subcontractor, on the site. Ensure that no employee uses illegal drugs or consumes alcohol during work hours. Ensure there are no employees under the influence of drugs or alcohol during work hours. After accidents, collect blood, urine, or saliva specimens and test the injured and involved employees for the influence of drugs and alcohol. A copy of the test shall be made available to the Contracting Officer upon request.

1.7 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.7.1 Personnel Qualifications

Work performed under this contract shall meet Level 2.

1.7.1.1 Site Safety and Health Officer (SSHO)

Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The SSHO shall meet the following requirements:

Level 1:

- Worked on similar projects.
- 10-hour OSHA construction safety class or equivalent within last 3 years.
- Competent person training as needed.

Level 2:

- A minimum of 3 years safety work on similar project.
- 30-hour OSHA construction safety class or equivalent within last 3 years.
- Competent person training as needed.

Level 3:

- A minimum of 5 years safety work on similar projects.
- 30-hour OSHA construction safety class or equivalent within the last 5 years.
- An average of at least 24 hours of formal safety training each year for the past 5 years.
- Competent person training as needed.

Level 4:

- A minimum of 10 years safety work of a progressive nature with at least 5 years of experience on similar projects.
- 30-hour OSHA construction safety class or equivalent within the last 5 years.
- An average of at least 24 hours of formal safety training each year for the past 5 years with training for competent person status for at least the following areas of competency: Excavation; Scaffolding; Fall protection; Hazardous energy; Confined space; Health hazard recognition, evaluation and control of chemical, physical and biological agents; Personal protective equipment and clothing to include selection, use and maintenance.

Level 5:

Provide an Associate Safety Professional (ASP); Certified Safety Trained Supervisor (STS); and/or Construction Health & Safety Technician (CHST) at the work site to perform safety management, surveillance, inspections, and safety enforcement for the Contractor to meet the designated safety level in paragraph 1.7. The ASP, STS, and/or CHST shall be the safety and occupational health "competent person" as defined by USACE EM 385-1-1. The ASP, STS, and/or CHST shall be at the work site at all times whenever work or testing is being performed and shall conduct and document daily safety inspections. The ASP, STS, and/or CHST shall have no other duties other than safety and occupational health management, inspections, and enforcement on this contract. A minimum of 10 years safety work of a progressive nature with at least 5 years of experience on similar projects. 30-hour OSHA construction safety class or equivalent within the last 5 years.

An average of at least 24 hours of formal safety training each year for the past 5 years with training for competent person status for at least the following areas of competency: Excavation; Scaffolding; Fall protection; Hazardous energy; Confined space; Health hazard recognition, evaluation and control of chemical, physical and biological agents; Personal protective equipment and clothing to include selection, use and maintenance.

Level 6:

Provide a Certified Safety Professional (CSP) and/or Certified Industrial Hygienist (CIH) at the work site to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The CSP and/or CIH shall be the safety and occupational health "competent person" as defined by USACE EM 385-1-1. The CSP and/or CIH shall have no other duties than safety and occupational health management, inspections, and/or industrial hygiene.

A minimum of 10 years safety work of a progressive nature with at least 5 years of experience on similar projects.

30-hour OSHA construction safety class or equivalent within the last 5 years.

An average of at least 24 hours of formal safety training each year for the past 5 years with training for competent person status for at least the following areas of competency: Excavation; Scaffolding; Fall protection; Hazardous energy; Confined space; Health hazard recognition, evaluation and control of chemical, physical and biological agents; Personal protective equipment and clothing to include selection, use and maintenance.

1.7.1.2 Competent Person for Confined Space Entry

Provide a competent person meeting the requirements of EM 385-1-1 who is assigned in writing by the Designated Authority to assess confined spaces and who possesses demonstrated knowledge, skill and ability to:

- a. Identify the structure, location, and designation of confined and permit-required confined spaces where work is done;
- b. Calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;

- c. Perform all required tests and inspections specified in 29 CFR 1910.146 and 29 CFR 1915 Subpart B;
- d. Assess hazardous conditions including atmospheric hazards in confined space and adjacent spaces and specify the necessary protection and precautions to be taken;
- e. Determine ventilation requirements for confined space entries and operations;
- f. Assess hazards associated with hot work in confined and adjacent space and determine fire watch requirements; and,
- g. Maintain records required.

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

1.7.1.3 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.

1.7.1.4 Crane Operators

Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, crane operators shall be designated as qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Proof of current qualifications shall be provided.

1.7.2 Personnel Duties

1.7.2.1 Site Safety and Health Officer (SSHO)/Superintendent

- 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. Safety inspection logs shall be attached to the Contractors' daily report.
- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.
- c. Maintain applicable safety reference material on the job site.

- d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and AHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.
- g. Ensure sub-contractor compliance with safety and health requirements.
- h. Ensure an approved "Special Permission Energized Electrical Work Permit" prior to starting any activity on energized electrical systems.

Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

1.7.2.2 Certified Safety Professional (CSP), Certified Industrial Hygienist (CIH), Associate Safety Professional (ASP), Certified Safety Trained Supervisor (STS), and/or Certified Construction Health & Safety Technician (CHST)

- a. Perform safety and occupational health management, surveillance, inspections, and safety enforcement for the project.
- b. Perform as the safety and occupational health "competent person" as defined by USACE EM 385-1-1.
- c. Be on site whenever work or testing is being performed.
- d. Conduct and document safety inspections.
- e. Shall have no other duties other than safety and occupational health management, inspections, and enforcement on this contract.

If the CSP, CIH, ASP, STS, CHST is appointed as the SSHO all duties of that position shall also be performed.

1.7.3 Meetings

1.7.3.1 Preconstruction Conference

- a. The Contractor will be informed, in writing, of the date of the preconstruction conference. The purpose of the preconstruction conference is for the Contractor and the Contracting Officer's representatives to become acquainted and explain the functions and operating procedures of their respective organizations and to reach mutual understanding relative to the administration of the overall project's Accident Prevention Plan (APP) before the initiation of work.
- b. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, 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).

c. The Contractor shall 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 at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

d. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

e. The functions of a Preconstruction conference may take place at the Post-Award Kickoff meeting for Design Build Contracts.

1.7.3.2 Weekly Safety Meetings

Conduct weekly safety meetings at the project site for all employees. The Contracting Officer will be informed of the meeting in advance and be allowed attendance. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily report.

1.7.3.3 Work Phase Meetings

The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection. The analysis should be used during daily inspections to ensure the implementation and effectiveness of safety and health controls.

1.8 TRAINING

1.8.1 New Employee Indoctrination

New employees (prime and sub-contractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

1.8.2 Periodic Training

Provide Safety and Health Training in accordance with USACE EM 385-1-1 and the accepted APP. Ensure all required training has been accomplished for all onsite employees.

1.8.3 Training on Activity Hazard Analysis (AHA)

Prior to beginning a new phase, training will be provided to all affected employees to include a review of the AHA to be implemented.

1.9 ACCIDENT PREVENTION PLAN (APP)

The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Preparation of Accident Prevention Plan". Where a paragraph or subparagraph element is not applicable to the work to be performed indicate "Not Applicable" next to the heading. Specific requirements for some of the APP elements are described below at paragraph 1.8.1. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. 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 shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. The Contracting Officer reviews and comments on the Contractor's submitted APP and accepts it when it meets the requirements of the contract provisions.

Once 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 will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any unforeseen hazard become evident during the performance of work, the project superintendent shall inform the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, all necessary action shall be taken by the Contractor to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment.

Copies of the accepted plan will be maintained at the resident engineer's office and at the job site. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

1.9.1 EM 385-1-1 Contents

In addition to the requirements outlines in Appendix A of USACE EM 385-1-1, the following is required:

a. Names and qualifications (resumes including education, training, experience and certifications) of all 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 such as CSPs, CIHs, STSS, CHSTs. The duties of each position shall be specified.

b. Qualifications of competent and of qualified persons. As a minimum, competent persons shall be designated and qualifications submitted 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; personal protective equipment and clothing to include selection, use and maintenance.

c. Confined Space Entry Plan. Develop a confined space entry plan in accordance with USACE EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, 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.)

d. Health Hazard Control Program. The Contractor shall designate a competent and qualified person to establish and oversee a Health Hazard Control Program in accordance with USACE EM 385-1-1, Section 6. The program shall ensure that employees, on-site Government representatives, and others, are not adversely exposed to chemical, physical and biological agents and that necessary controls and protective actions are instituted to ensure health.

e. Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving more than rigging or operation, sensitive equipment, or unusual safety risks. The plan shall be submitted 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.c.18. and the following:

(1) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926.500(g).

(2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.

f. Alcohol and Drug Abuse Plan

(1) Describe plan for random checks and testing with pre-employment screening in accordance with the DFAR Clause subpart 252.223-7004, "Drug Free Work Force."

(2) Description of the on-site prevention program

g. Fall Protection and Prevention (FP&P) Plan. The plan shall be site specific and address all fall hazards in the work place and during different phases of construction. It shall address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 1.8 m (6 feet). A qualified person for fall protection shall prepare and sign the plan. The plan shall include fall protection and prevention systems, equipment and methods employed for every phase of work, responsibilities, assisted rescue self-rescue and evacuation procedures, training requirements, and monitoring methods. Fall Protection and Prevention Plan shall be revised every six months for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. The accepted Fall Protection and Prevention Plan shall be kept and maintained at the job site for the duration of the project. The Fall Protection Plan shall be included in the Accident Prevention Plan (APP)

h. Training Records and Requirements. List of mandatory training and certifications which are applicable to this project (e.g. explosive actuated tools, confined space entry, fall protection, crane operation, vehicle operator, forklift operators, personal protective equipment); list of requirements for periodic retraining/certification; outline requirements for supervisory and employee safety meetings.

i. Occupant Protection Plan. The safety and health aspects of lead-based paint removal, prepared in accordance with Section 02 83 19.00 10 Lead Based Paint Hazard Abatement, Target Housing & Child Occupied Facilities, 02 82 33.13 20 Removal/Control and Disposal of Lead Containig Paint.

j. Lead Compliance Plan. The safety and health aspects of lead work, prepared in accordance with Section 02 83 13.00 20 Lead in Construction.

k. Asbestos Hazard Abatement Plan. The safety and health aspects of asbestos work, prepared in accordance with Section 02 2 16.00, "Engineering Control of Asbestos Containing Materials"

l. Site Safety and Health Plan. The safety and health aspects prepared in accordance with this section.

m. PCB Plan. The safety and health aspects of Polychlorinated Biphenyls work, prepared 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)".

n. Site Demolition Plan. The safety and health aspects prepared in accordance with Section 02 41 00.00 40, Demolition" and referenced sources. Include engineering survey as applicable.

o. Excavation Plan. The safety and health aspects prepared in accordance with Section 3100, Earthwork.

p. Crane Work Plan. The contractor shall provide a crane work plan to the Contracting Officer for acceptance. The crane work plan shall include the specific model of each crane and a drawing identifying their locations (exact), the dimensions, wheel sizes, number of

wheels, wheel spacing, tire pressure(s), number of axles, axle spacing, minimum wheel load to be exerted during operations and maximum outrigger load to be exerted during operations. The Contractor shall allow at least 10 working days for acceptance/non-acceptance of the crane work plan. No crane operations shall begin prior to written acceptance of the crane plan by the Government. ROICC shall be the government approving authority.

1.10 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHA as amendments to the APP. An AHA will be developed by the Contractor for every operation involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform work. The analysis must identify and evaluate hazards and outline the proposed methods and techniques for the safe completion of each phase of work. At a minimum, define activity being performed, sequence of work, specific safety and health hazards anticipated, control measures (to include personal protective equipment) to eliminate or reduce each hazard to acceptable levels, equipment to be used, inspection requirements, training requirements for all involved, and the competent person in charge of that phase of work. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall protection methods used. For work with materials handling equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include requirements for safeguarding excavations. An activity requiring an AHA shall not proceed until the AHA has been accepted by the Contracting Officer's representative and a meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activity, including on-site Government representatives. The Contractor shall document meeting attendance at the preparatory, initial, and follow-up phases of quality control inspection. The AHA shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

Activity hazard analyses shall be updated as necessary to provide an effective response to changing work conditions and activities. The on-site superintendent, site safety and health officer and competent persons used to develop the AHAs, including updates, shall sign and date the AHAs before they are implemented.

The activity hazard analyses shall be developed using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the Contracting Officer.

1.11 DISPLAY OF SAFETY INFORMATION

Within 1 calendar days after commencement of work, erect a safety bulletin board at the job site. The following information shall be displayed on

the safety bulletin board in clear view of the on-site construction personnel, maintained current, and protected against the elements and unauthorized removal:

- a. Map denoting the route to the nearest emergency care facility.
- b. Emergency phone numbers.
- c. Copy of the most up-to-date APP.
- d. Current AHA(s).
- e. OSHA 300A Form.
- f. OSHA Safety and Health Protection-On-The-Job Poster.
- g. Confined space entry permit.
- h. Hot work permit.
- i. A sign indicating the number of hours worked since last lost workday accident.
- j. Safety and Health Warning Posters.

1.12 SITE SAFETY REFERENCE MATERIALS

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

1.13 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.14 REPORTS

1.14.1 Accident Reports

a. For recordable injuries and illnesses, and property damage accidents resulting in at least \$2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the Navy Contractor Significant Incident Report (CSIR) form or USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 1 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

b. For a weight handling equipment accident (including rigging gear accidents) the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the WHE Accident Report (Crane and Rigging Gear) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Crane operations shall not proceed 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.

1.14.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident. Information shall include contractor name; contract 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 (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on site and Government investigation is conducted.

1.14.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.

1.14.4 Regulatory Citations and Violations

Contact the Contracting Officer immediately of any OSHA or other regulatory agency inspection or visit, and provide the Contracting Officer with a copy of each citation, report, and contractor response. Correct violations and citations promptly and provide written corrective actions to the Contracting Officer.

1.14.5 Crane Reports

Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix H and as specified herein with Daily Reports of Inspections.

1.14.6 Certificate of Compliance

The Contractor shall provide a Certificate of Compliance for each crane entering an activity under this contract (see Contracting Officer for a blank certificate). Certificate shall state that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926 and USACE EM 385-1-1 section 16 and Appendix H. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. For cranes at DOD activities in foreign countries, the Contractor shall certify that the crane and rigging gear conform to the appropriate host country safety standards. The Contractor shall also certify that all of its crane operators working on the DOD activity have been trained in the proper use of all safety devices (e.g., anti-two block devices). These certifications shall be posted on the crane.

1.14.7 Third Party Certification of Barge-Mounted Mobile Cranes

Barge-mounted mobile cranes shall be certified in accordance with 29 CFR 1919 by an OSHA accredited person.

1.15 HOT WORK

Prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, a written permit shall be requested from the Fire Division. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, 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 shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.

- a. Oil painting materials (paint, brushes, empty paint cans, etc.), and all flammable liquids shall be removed from the facility at quitting time. All painting materials and flammable liquids shall be stored outside in a suitable metal locker or box and will require re-submittal with non-hazardous materials.
- b. Accumulation of trays, paper, shavings, sawdust, boxes and other packing materials shall be removed from the facility at the close of each workday and such material disposed of in the proper containers located away from the facility.
- c. The storage of combustible supplies shall be a safe distance from structures.
- d. Area outside the facility undergoing work shall be cleaned of trash, paper, or other discarded combustibles at the close of each workday.
- e. All portable electric devices (saws, sanders, compressors, extension chord, lights, etc.) shall be disconnected at the close of each workday. When possible, the main electric switch in the facility shall be deactivated.
- f. When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency phone number 911. ANY FIRE, NO MATTER HOW SMALL, SHALL BE REPORTED IMMEDIATELY.
- g. Obtain services from the FIRE DIVISION for "HOT WORK" within or around flammable materials (such as fuel systems, welding/cutting on fuel pipes) or confined spaces (such as sewer wet wells, manholes, vaults, etc.) that have the potential for flammable or explosive atmospheres.

PART 2 PRODUCTS

2.1 CONFINED SPACE SIGNAGE

The Contractor shall provide permanent signs integral to or securely attached to access covers for all required confined spaces. Signs wording: "DANGER--PERMIT-REQUIRED CONFINED SPACE - DO NOT ENTER -" in bold letters a minimum of 25 mm(one inch) in height and constructed to be clearly legible with all paint removed. The signal word "DANGER" shall be

red and readable from 1.52 m(5 feet).

2.2 FALL PROTECTION ANCHORAGE

Fall protection anchorage, conforming to ASSE/SAFE Z359.1, installed under the supervision of a qualified person in fall protection, shall be left in place for continued customer use and so identified by signage stating the capacity of the anchorage (strength and number of persons who may be tied-off to it at any one time).

PART 3 EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

The Contractor shall comply with USACE EM 385-1-1, NFPA 241, the APP, the AHA, Federal and/or State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard shall prevail.

3.1.1 Hazardous Material Use

Each hazardous material must receive approval 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. Any work or storage involving hazardous chemicals or materials must be done in a manner that will not expose Government or Contractor employees to any unsafe or unhealthful conditions. Adequate protective measures must be taken to prevent Government or Contractor employees from being exposed to any hazardous condition that could result from the work or storage. The Prime Contractor shall keep a complete inventory of hazardous materials brought onto the work-site. Approval by the Contracting Officer of protective measures and storage area is required prior to the start of the work.

3.1.2 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 USACE 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 are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

3.1.3 Unforeseen Hazardous Material

The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos. If additional material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, 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 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting with the Contracting Officer to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 FALL HAZARD PROTECTION AND PREVENTION

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and escape procedures.

3.3.1 Training

The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, section 21.A.16.

3.3.2 Fall Protection Equipment

The Contractor shall enforce use of the fall protection equipment designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is on a surface 1.8 m(6 feet) or more above lower levels. Fall protection systems such as guardrails, personnel fall arrest system, safety nets, etc., are required when working within 1.8m (6 feet) of any leading edge. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.I. and 05.J. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems may be required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M and USACE EM 385-1-1.

3.3.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest device. Body belts may only be used as a positioning device system (for

uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall 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. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3.3.3 Fall Protection for Roofing Work

Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.

a. Low Sloped Roofs:

(1) For work within 1.8 m (6 feet) of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets. A safety monitoring system is not adequate fall protection and is not authorized.

(2) For work greater than 1.8 m (6 feet) from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.

b. Steep Roofs: Work on steep roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

3.3.4 Safety Nets

If safety nets are used as the selected fall protection system on the project, they shall be provided at unguarded workplaces, leading edge work or when working over water, machinery, dangerous operations and or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, fall arrest systems or restraint/positioning systems are impractical. Safety nets shall be tested immediately after installation with a drop test of 181.4 kg (400 pounds) dropped from the same elevation a person might fall, and every six months thereafter.

3.3.5 Existing Anchorage

Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ASSE/SAFE Z359.1. Existing horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

3.3.6 Horizontal Lifelines

Horizontal lifelines shall 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).

3.3.7 Guardrail Systems

Guardrails shall consist of top and mid-rails, post and toe boards. The top edge height of standard railing must be 42 inches plus or minus 3 inches above the walking/working level. When mid-rails are used, they must be installed at a height midway between the top edge of the guardrail system and the walking/working level. Posts shall be placed no more than 8 feet apart (29 CFR 1926.500 and USACE EM 385-1-1).

3.3.8 Rescue and Evacuation Procedures

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the contractor and 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. The Rescue and Evaluation Plan shall be included in 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).

3.4 PERSONAL PROTECTIVE EQUIPMENT

All personnel who enter a construction site area shall wear Personal Protective Equipment (PPE) at all times as outlined in the EM 385 1-1. In addition to the requirements of the EM 385 1-1, Safety Glasses (ANSI Z87.1) will be worn at all times on construction sites. Hearing protection is required in noise hazard areas or when performing noise hazard tasks. Mandatory PPE on all construction sites includes:

- a. Hard Hats
- b. Safety Glasses
- c. Safety-Toed Shoes or Boots

3.5 SCAFFOLDING

Employees shall be provided 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. Access to scaffold platforms greater than 6 m (20 feet) in height shall be accessed by use of a scaffold stair system. Vertical ladders commonly provided by scaffold system manufacturers shall not be used for accessing scaffold platforms greater than 6 m (20 feet) in height. The use of an adequate gate is required. Contractor shall ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Special care shall be given to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Work platforms shall

be placed on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.5.1 Stilts

The use of stilts for gaining additional height in construction, renovation, repair or maintenance work is prohibited.

3.6 EQUIPMENT

3.6.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

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

3.6.2 Weight Handling Equipment

a. Cranes must be equipped with:

(1) Load indicating devices (LIDs) and a boom angle or radius indicator,

(2) or load moment indicating devices (LMIs).

(3) Anti-two block prevention devices.

(4) Boom hoist hydraulic relief valve, disconnect, or shutoff (stops hoist when boom reaches a predetermined high angle).

(5) Boom length indicator (for telescoping booms).

(6) Device to prevent uncontrolled lowering of a telescoping hydraulic boom.

(7) Device to prevent uncontrolled retraction of a telescoping hydraulic boom.

b. The Contractor shall notify the Contracting Officer 15 days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.

c. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the

manufacturer's recommended procedures.

d. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

e. The presence of Government personnel does not relieve the Contractor of an obligation to comply with all applicable safety regulations. The Government will investigate all complaints of unsafe or unhealthful working conditions received in writing from contractor employees, federal civilian employees, or military personnel.

f. Each load shall be rigged/attached independently to the hook/master-link in such a fashion that the load cannot slide or otherwise become detached. Christmas-tree lifting (multiple rigged materials) is not allowed.

g. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.

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

i. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.

j. A fire extinguisher having a minimum rating of 10BC and a minimum nominal capacity of 5lb of extinguishing agent shall be available at all operator stations or crane cabs. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.

k. All employees shall be kept clear of loads about to be lifted and of suspended loads.

l. A weight handling equipment operator shall not leave his position at the controls while aloft is suspended.

m. The Contractor shall use cribbing when performing lifts on outriggers.

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

o. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

p. A substantial and durable rating chart containing legible letters and figures shall be provided with each crane and securely mounted onto the crane cab in a location allowing easy reading by the operator while seated in the control station.

q. Certification records which include the date of inspection,

signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

r. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.

s. The Contractor shall certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

3.6.3 Equipment and Mechanized Equipment

a. Equipment shall be operated by designated qualified operators. Proof of qualifications shall be kept on the project site for review.

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

c. Equipment and mechanized equipment shall be inspected in accordance with manufacturer's recommendations for safe operation by a competent person prior to being placed into use.

d. Daily checks or tests shall be conducted and documented on equipment and mechanized equipment by designated competent persons.

3.7 EXCAVATIONS

The competent person for excavations performed as a result of contract work shall be on-site when excavation work is being performed, and shall inspect, and document the excavations daily prior to entry by workers. The competent person must evaluate all hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly. The competent person shall perform soil classification in accordance with 29 CFR 1926.

3.7.1 Utility Locations

All underground utilities in the work area must be positively identified by a third party, independent, private utility locating company in addition to any station locating service and coordinated with the station utility department. Any markings made during the utility investigation must be maintained throughout the Contract. If the underground utility cannot be confirmed, the Contractor shall pot-hole area until piping location is verified. Dowsing or any other type of divination method is not considered an acceptable practice for locating utilities on board MCB Camp Lejeune.

3.7.2 Utility Location Verification

The Contractor must 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 three feet of the underground system. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall

be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 100 feet if parallel within 5 feet of the excavation.

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

Utilities located within concrete slabs or pier decks, 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 shall 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.

3.7.4 Shoring Systems

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

3.7.5 Trenching Machinery

Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Documentation of the training shall be kept on file at the project site.

3.8 ELECTRICAL

3.8.1 Conduct of Electrical Work

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. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. 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 will be 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 shall

be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may be required, depending on the specific job and as delineated in the Contractor's AHA.

3.8.2 Arc Flash Risk/Hazard Analysis

Contractor shall provide an Arc Flash Risk/Hazard Analysis in accordance with NFPA 70E for all locations where workers may be exposed to arc flash hazard (work on energized electrical equipment). The Arc Flash Risk/Hazard Analysis shall be sealed and signed by a qualified professional engineer.

3.8.3 Arc Flash Risk/Hazard Analysis Qualifications

Contractor shall engage the services of a qualified organization to provide Arc Flash Risk/Hazard Analysis of the electrical distribution system. Organization shall be independent of the supplier, manufacturer, and installer of the equipment. The organization shall be a first tier subcontractor. This work shall not be performed by a second tier subcontractor.

- a. Submit name and qualifications of organization. Organization shall have been regularly engaged in providing Arc Flash Risk/Hazard Analysis for a minimum of 5 years.
- b. Submit name and qualifications of the professional engineer performing the analysis. Include a list of three comparable jobs performed by the engineer with specific names and telephone numbers for reference.

3.8.4 Special Permission Energized Electrical Work Permit

All work on energized electrical systems, including high voltage, must have an approved "Special Permission Energized Electrical Work Permit." The results of a Arc Flash Risk/Hazard Analysis, per NFPA 70E, shall be included in the "Special Permission Energized Electrical Work Permit" request. Flame-resistant (FR) clothing and personal protective equipment (PPE) shall be rated for a minimum of 8 calories per square centimeter even if the flash hazard analysis indicates a lower value. A blank copy of the permit request is attached. An editable version may be obtained from the Contracting Officer.

3.8.5 Portable Extension Cords

Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70.

3.9 WORK IN CONFINED SPACES

The Contractor shall comply with the requirements in Section 06.I of USACE EM 385-1-1 and OSHA 29 CFR 1910.146. Any potential for a hazard in the

confined space requires a permit system to be used.

- a. 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. (See Section 06.I.05 of USACE EM 385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.
- b. 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.
- c. Ensure the use of rescue and retrieval devices in confined spaces greater than 1.5 m (5 feet) in depth. Conform to Sections 06.I.09, 06.I.10 and 06.I.11 of USACE EM 385-1-1.
- d. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.
- e. Include training information for employees who will be involved as entrants and attendants for the work. Conform to Section 06.I.06 of USACE EM 385-1-1.
- f. Daily Entry Permit. Post the permit in a conspicuous place close to the confined space entrance.

3.10 CRYSTALLINE SILICA

Grinding, abrasive blasting, and foundry operations of construction materials containing crystalline silica, shall comply with OSHA regulations, such as 29 CFR 1910.94, and USACE EM 385-1-1, Appendix C. The Contractor shall develop and implement effective exposure control and elimination procedures to include dust control systems, engineering controls, and establishment of work area boundaries, as well as medical surveillance, training, air monitoring, and personal protective equipment.

3.11 HOUSEKEEPING

3.11.1 Clean-Up

All debris in work areas shall be cleaned up daily or more frequently if necessary. Construction debris may be temporarily located in an approved location, however garbage accumulation must be removed each day.

3.11.2 Falling Object Protection

All areas must be barricaded to safeguard employees. When working overhead, barricade the area below to prevent entry by unauthorized employees. Construction warning tape and signs shall be posted so they are clearly visible from all possible access points. When employees are working overhead all tools and equipment shall be secured so that they will not fall. When using guardrail as falling object protection, all openings shall be small enough to prevent passage of potential falling objects.

-- 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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aaashto.org
Internet: <https://www.transportation.org/>

AMERICAN CONCRETE INSTITUTE (ACI)
38800 Country Club Drive
Farmington Hills, MI 48331-3439
Ph: 248-848-3700
Fax: 248-848-3701
Internet: <https://www.concrete.org/>

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
130 East Randolph, Suite 2000
Chicago, IL 60601
Ph: 312-670-5444
Fax: 312-670-5403
Steel Solutions Center: 866-275-2472
E-mail: solutions@aisc.org
Internet: <https://www.aisc.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 SOCIETY OF SANITARY ENGINEERING (ASSE)
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448
Ph: 708-995-3019
Fax: 708-479-6139
Internet: <http://www.asse-plumbing.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/>

AMERICAN WELDING SOCIETY (AWS)
8669 NW 36 Street, #130
Miami, FL 33166-6672
Ph: 800-443-9353
Internet: <https://www.aws.org/>

APA - THE ENGINEERED WOOD ASSOCIATION (APA)
7011 South 19th St.
Tacoma, WA 98466-5333
Ph: 253-565-6600
Fax: 253-565-7265
Internet: <https://www.apawood.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/>

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
933 North Plum Grove Road
Schaumburg, IL 60173-4758
Ph: 847-517-1200
Fax: 847-517-1206
Internet: <http://www.crsi.org/>

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH
(FCCCHR)
USC Foundation Office
Research Annex 219
Los Angeles, CA 90089-7700
Ph: 866-545-6340
Fax: 213-740-8399
E-mail: fccchr@usc.edu

Internet: <https://fccchr.usc.edu/>

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)
ISO Central Secretariat
BIBC II
Chemin de Blandonnet 8
CP 401 - 1214 Vernier, Geneva
Switzerland
Ph: 41-22-749-01-11
E-mail: central@iso.ch
Internet: <https://www.iso.org>

NACE INTERNATIONAL (NACE)
15835 Park Ten Place
Houston, TX 77084
Ph: 281-228-6200
Fax: 281-228-6300
E-mail: firstservice@nace.org
Internet: <https://www.nace.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>

POST-TENSIONING INSTITUTE (PTI)
38800 Country Club Drive
Farmington Hills, MI 48331
Ph: 248-848-3180
Bookstore: 248-848-3182
E-mail: technical.inquiries@post-tensioning.org
Internet: <https://www.post-tensioning.org/>

SOCIETY FOR PROTECTIVE COATINGS (SSPC)
800 Trumbull Drive
Pittsburgh, PA 15205
Ph: 877-281-7772 or 412-281-2331
Fax: 412-444-3591
E-mail: customerservice@sspc.org
Internet: <http://www.sspc.org>

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)
400 Commonwealth Drive
Warrendale, PA 15096
Ph: 877-606-7323 or 724-776-4841
Fax: 724-776-0790
E-mail: customerservice@sae.org
Internet: <https://www.sae.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. ENVIRONMENTAL PROTECTION AGENCY (EPA)

1200 Pennsylvania Avenue, N.W.

Washington, DC 20004

Ph: 202-564-4700

Internet: <https://www.epa.gov>

--- Some EPA documents are available only from:

National Technical Information Service (NTIS)

5301 Shawnee Road

Alexandria, VA 22312

Ph: 703-605-6060 or 1-800-363-2068

Fax: 703-605-6880

TDD: 703-487-4639

E-mail: info@ntis.gov

Internet: <https://www.ntis.gov/>

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

Order for sale 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/>

Order free documents from:

U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591
Ph: 866-835-5322
Internet: <https://www.faa.gov/>

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)
1200 New Jersey Ave., SE
Washington, DC 20590
Ph: 202-366-4000
E-mail: ExecSecretariat.FHWA@dot.gov
Internet: <https://www.fhwa.dot.gov/>
Order 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/>

U.S. GENERAL SERVICES ADMINISTRATION (GSA)
General Services Administration
1800 F Street, NW
Washington, DC 20405
Ph: 1-844-472-4111
Internet: <https://www.gsaelibrary.gsa.gov/ElibMain/home.do>
Obtain documents from:
Acquisition Streamlining and Standardization Information System
(ASSIST)
Internet: <https://assist.dla.mil/online/start/>; account
registration required

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

09/01

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	(2010c) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM D 3666	(2009a) Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D 3740	(2010) Minimum Requirements for 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	(2009) Standard Practice for Agencies Performing Non-Destructive 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 working 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 performed;
- 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 meeting, 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, superintendent, inspector, QC Manager, project manager, or construction manager on similar size construction contracts which included the major trades that are part of this Contract.

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 sponsored 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 meeting. 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 documentation 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 "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 qualified 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 Procedures", 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 FACILITIES AND CONTROLS

05/13

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 (2007) Standard for Reduced-Pressure
Principle Backflow Prevention Assembly

FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH
(FCCCHR)

FCCCHR List (continuously updated) List of Approved
Backflow Prevention Assemblies

FCCCHR Manual (10th Edition) Manual of Cross-Connection
Control

1.2 SUBMITTALS

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

SD-01 Preconstruction Submittals

Traffic control plan

SD-03 Product Data

Backflow preventers

SD-06 Test Reports

Backflow Preventer Tests

SD-07 Certificates

Backflow Tester Certifications

Backflow Preventers Certificate of Full Approval

1.3 BACKFLOW TESTER CERTIFICATIONS

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 Preventers Certificate

The Contractor shall submit a certificate recognized by the State or local authority that states the Contractor has completed at least 10 hours or training in backflow preventer installations. The certificate must be current.

1.4 TEMPORARY UTILITIES

1.4.1 Availability of Utility Services

- 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.

1.4.2 Trailers

Electrical service will be supplied by the Government, when available, except at Tarawa Terrace where Carolina Power and Light Company will be the supplier.

1.4.3 Energy and Utilities 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.

1.4.4 Location of Underground Utilities

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. If the underground utility cannot be confirmed, the Contractor shall pot-hole area until piping location is verified. Dowsing or any other type of divination method is not considered an acceptable practice for locating utilities on board MCB Camp

Lejeune.

- 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. Work requests may also be submitted online at www.nc811.org.

1.4.4.1 The Locations of Underground Utilities

The locations of underground utilities shown at only approximate and the information provided may be incomplete. Contractor shall attempt to ascertain locations of existing underground utilities prior to and during digging operations.

1.4.4.2 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.

1.5 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.

1.5.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions shall include, but are not limited to, closing openings;

removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

1.5.1.1 Hurricane Conditions of Readiness

Unless directed otherwise, comply with:

- a. Condition FIVE: Normal weather conditions are expected for the foreseeable future. No action is required.
- b. Condition FOUR (Sustained winds of 74 mph or greater expected within 72 hours): Contractors shall continue normal daily clean up and good house keeping 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. Stack lumber in neat piles less than 4 feet high. Prepare to remove or secure all debris, trash, or stored materials that could become missile hazards during high wind conditions. Meetings should be held on-site with all subcontractors to review the measures that are going to need to be taken should the base go to a higher readiness condition. Contact the ROICC for any additional updates and upon completion of all required actions.
- c. Condition THREE (Sustained winds of 74 mph or greater expected within 48 hours): Once Condition 3 is set, contractors shall shift their focus from their normal activities to taking the actions that are required to prepare the job site for the potential of destructive weather. All debris and rubbish shall be removed from the site at the end of the workday. All stored materials shall either be removed from the job site or secured (metal straps or heavy lines/ropes). All tools, equipment and gear shall be secured at the end of the workday. Begin preparations to adequately secure the facility (windows boarded up, etc.). Meetings should be held on-site with all subcontractors to review the measures that are going to be taken should base go to a higher readiness condition. Contract the ROICC for any additional updates and upon completion of all required actions.
- d. Condition TWO (Sustained winds of 74 mph or greater expected within 24 hours): Cease all normal activities until the job-site is completely prepared for the onslaught of destructive weather. The job site should be completely free of debris, rubbish and scrap materials. The facility being worked on should be made weather-tight. All scaffolding planking shall be removed. All formwork and free standing structural steel shall be braced. All machinery, tools, equipment and materials shall be properly secured or removed from the job-site. Expend every effort to clear all missiles hazards and loose equipment from the job site. When the contractor secures for the day the job site should be left in a condition that is ready for the storm and the contractor should assume that they will not be allowed to return to their job site until after the storm passes and the base is reopened. Contact ROICC for additional updates and upon completion of required actions.
- e. Condition ONE (Sustained winds of 74 mph or greater expected

within 12 hours): If still on the job site, the contractor will be required to immediately leave the base until the storm passes and the base is reopened.

1.6 STORAGE AREAS

The Contract Clause entitled "FAR 52.236-10, Operations and Storage Areas" and the following apply:

1.6.1 Storage Size and Location

The open site available for storage shall be confined to the indicated operations area.

1.7 TEMPORARY SANITARY FACILITIES

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. The waste from chemical toilets or comparably effective units shall be transported to a commercial facility off-Government property. Include provisions for pest control and elimination of odors.

1.8 TEMPORARY BUILDINGS

Locate these where directed and within the indicated operations area.

1.8.1 Maintenance of Temporary Facilities

Suitably paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

1.8.2 Trailers or Storage Buildings

Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Contracting Officer. The trailers or buildings 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 or local standards for anchoring mobile trailers.

PART 2 PRODUCTS

2.1 Backflow Preventers

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged cast iron mounted gate valve and strainer, 304 stainless steel or bronze, internal parts. The particular make, model/design, and size of backflow preventers to be installed shall be included in the latest edition of the

List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and shall be accompanied by a Certificate of Full Approval from FCCCHR List.

PART 3 EXECUTION

3.1 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.

A certified tester(s) shall perform testing of backflow preventer(s) for proper installation and operation and provide subsequent tagging. Backflow preventer tests shall be performed 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) and quarterly thereafter. Tag shall 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.

Not used.

-- End of Section --

SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

09/14

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	(2007; Rev F) Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-462	(Rev D; Notice 4) Electromagnetic Interference Characteristics

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 832-R-92-005	(1992) Storm Water Management for Construction Activities Developing Pollution Preventions and Plans and Best Management Practices
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for 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 Table, Special
Provisions, Hazardous Materials
Communications, Emergency Response
Information, and Training Requirements

49 CFR 178

Specifications for Packagings

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

Preconstruction survey report

Permit for storm water discharge

Notice of Intent

Notice of Termination

Pollution Prevention Plan

SD-11 Closeout Submittals

Solid waste disposal permit

Disposal permit for hazardous waste

Environmental training documentation

Permit to transport hazardous waste

Hazardous waste certification

Erosion and sediment control inspection reports

Environmental Plan Review

Annual Report of Products Containing Recovered Materials

1.4.1 Solid Waste Disposal Permit

Submit one copy of a State and local permit or license for the solid waste disposal facility.

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.

1.4.5 Erosion and Sediment Control Inspection Reports

Submit to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch of rain.

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 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

ENVIRONMENTAL PROTECTION PLAN

Contractor Organization
Address and Phone Numbers

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.

1.6.4 Preconstruction Survey

Perform a preconstruction survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site.

1.7 STORMWATER POLLUTION PREVENTION PLAN

40 CFR 122.26, EPA 832-R-92-005. Provide "Stormwater Pollution Prevention Plan."

- a. Identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharge from the site.
- b. Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge associated with industrial activity at the construction site.
- c. Ensure compliance with terms of EPA general permit for storm water discharge.
- d. Select applicable management practices from EPA 832-R-92-005.
- e. Provide completed copy of Notice of Intent and Notice of Termination except for effective date.

1.7.1 Notice of Intent

The Contractor shall prepare a completed Notice of Intent (NOI) form in accordance with the requirements of the State's general permit for storm water discharges from construction sites. Submit NOI, and the appropriate permit fee to the Contracting Office a minimum of 14 days prior to start of construction.

The Contractor shall keep a copy of the approved permit on site at the Contractor's trailer at all times.

1.7.2 Class I and II ODS Prohibition

Class I ODS as defined and identified herein shall not be used in the performance of this contract, nor be provided as part of the equipment. This prohibition shall be considered to prevail over any other provision, specification, drawing, or referenced documents.

1.8 ADMINISTRATIVE REQUIREMENTS

1.8.1 Licenses and Permits

Obtain licenses and permits pursuant to "FAR 52.236-7, Permits and Responsibilities" except for those permits which will be obtained by the Contracting Officer as follows:

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.

1.9 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."

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. In areas where frequent crossings are required, install temporary culverts or bridges. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition or as indicated.

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-16165 for 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 EROSION AND SEDIMENT CONTROL MEASURES

3.5.1 Local Erosion and Sediment Control Plan

Follow the approved storm water management, erosion and sediment control plan.

3.5.2 Burnoff

Burnoff of the ground cover is not permitted.

3.5.3 Borrow Pit Areas

Manage and control borrow pit areas to prevent sediment from entering nearby streams or lakes. Restore areas, including those outside the borrow pit, disturbed by borrow and haul operations. Restoration includes grading, replacement of topsoil, and establishment of a permanent vegetative cover. Uniformly grade side slopes of borrow pit to not more than a slope of 1 part vertical to 2 parts horizontal. Uniformly grade the bottom of the borrow pits to provide a flat bottom and drain by outfall ditches or other suitable means. Stockpile topsoil removed during the borrow pit operation, and use as part of restoring the borrow pit area.

3.5.4 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect side and back slopes upon completion of

rough grading. Plan and conduct earthwork to minimize duration of exposure of unprotected soils.

3.5.5 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

3.5.5.1 Mechanical Retardation and Control of Runoff

Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and strawbales to retard and divert runoff to protected drainage courses.

3.5.5.2 Sediment Basins

Trap sediment in temporary sediment basins. Pump dry and remove accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs.

3.5.5.3 Borrow

Permit only in areas where suitable environmental controls are possible.

3.5.5.4 Vegetation and Mulch

Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.

- a. Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish a suitable stand of grass.

3.6 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.

3.6.1 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.

3.6.2 Disposal of Rubbish and Debris

Rubbish and debris shall be taken off-base for disposal, unless specifically directed otherwise.

Metals shall be taken to the DRMO disposal area at Lot 203, as specified.

3.6.3 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

3.7 CONTROL AND DISPOSAL OF HAZARDOUS WASTE

3.7.1 Hazardous Waste Generation

Handle generated hazardous waste in accordance with 40 CFR 262.

3.7.2 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.

3.7.3 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.

3.7.4 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.

3.7.5 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.

3.7.6 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.

3.7.7 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.

3.8 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.

3.8.1 Abrasive Blasting

3.8.1.1 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.

3.8.1.2 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.

3.9 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

Page 1 of 3

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. <u>Insulation</u>			
1. Loose fill	Ft3		
2. Blanket or batt	Ft2		
3. Board	Ft2		
4. Spray-in-place	m3		
5. Other			
B. <u>Cement and Concrete</u>	yd3		
C. <u>Paper and Paper Products</u>			
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 PROCEDURES

05/13

PART 1 GENERAL

1.1 SUBMITTALS

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

SD-10, Operation and Maintenance Data

Equipment/product warranty list

Submit Data Package 1 in accordance with Section 01 78 23, "Operation and Maintenance Data."

SD-11 Closeout Submittals

As-built drawings

Record of materials

Complete Submittal Package 2 CD/DVD's

Equipment/product warranty tag

1.2 PROJECT RECORD DOCUMENTS

As-Built Drawings will be submitted as specified in 1.2.1 along with GIS Deliverables which will be created and submitted as specified in Section 01 78 30.00 22, DIGITAL DATA DELIVERABLES (GIS).

1.2.1 As-Built Drawings

"FAC 5252.236-9310, Record Drawings." As-built drawings will be submitted in redline mark-up format.

1.2.2 As-Built Record of Materials

Furnish a record of materials.

Where several manufacturers' brands, types, or classes of the item listed have been used in the project, designate specific areas where each item was used. Designations shall be keyed to the areas and spaces depicted on the contract drawing. Furnish the record of materials used in the following format:

MATERIALS DESIGNATION	SPECIFICATION	MANUFACTURER	MATERIALS USED (MANUFACTURER'S DESIGNATION)	WHERE USED
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MATERIALS DESIGNATION	SPECIFICATION	MANUFACTURER	MATERIALS USED (MANUFACTURER'S DESIGNATION)	WHERE USED
--------------------------	---------------	--------------	---	---------------

1.3 EQUIPMENT/PRODUCT WARRANTIES

1.3.1 Equipment/Product Warranty List

Furnish to the Contracting Officer a bound and indexed notebook containing written warranties for equipment/products that have extended warranties (warranty periods exceeding the standard one-year warranty) furnished under the contract, and prepare a complete listing of such equipment/products. The equipment/products list shall state the specification section applicable to the equipment/product, duration of the warranty therefor, start date of the warranty, ending date of the warranty, and the point of contact for fulfillment of the warranty. The warranty period shall begin on the same date as project acceptance and shall continue for the full product warranty period. Execute the full list and deliver to the Contracting Officer prior to final acceptance of the facility.

1.3.2 Equipment Warranty Tags and Guarantor's Local Representative

Furnish with each warranty the name, address, and telephone number of the guarantor's representative nearest to the location where the equipment and appliances are installed. The guarantor's representative, upon request of the station representative, shall honor the warranty during the warranty period, and shall provide the services prescribed by the terms of the warranty. At the time of installation, tag each item of warranted equipment with a durable, oil- and water-resistant tag approved by the Contracting Officer. Attach tag with copper wire and spray with a clear silicone waterproof coating. Leave the date of acceptance and QC's signature blank until project is accepted for beneficial occupancy. Tag shall show the following information:

EQUIPMENT/PRODUCT WARRANTY TAG

Type of Equipment/Product _____
 Warranty Period _____ From _____ To _____
 Contract No. _____
 Inspector's Signature _____ Date Accepted _____

Construction Contractor:

Name: _____
 Address: _____
 Telephone: _____

Warranty Contact: _____

Name: _____
 Address: _____
 Telephone: _____

STATION PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE

1.4 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 #_____. "

1.5 CLEANUP

Leave premises "broom clean." 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. Clean filters of operating equipment. 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.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

07/06

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) Stewardship for the Cleaning of Commercial and Institutional Buildings
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1.2 SUBMISSION OF OPERATION AND MAINTENANCE DATA

Submit Operation and Maintenance (O&M) Data specifically applicable to this contract and a complete and concise depiction of the provided equipment, product, or system, stressing and enhancing the importance of system interactions, troubleshooting, and long-term preventative maintenance and operation. The subcontractors must compile and prepare data and deliver to the Contractor prior to the training of Government personnel. The Contractor must compile and prepare aggregate O&M data including 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.

1.2.1 Package Quality

Documents must be fully legible. Poor quality copies and material with hole punches obliterating the text or drawings will not be accepted.

1.2.2 Package Content

Data package content shall be as shown in the paragraph titled "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. Commissioned items without a specified data package requirement in the individual technical sections must use Data Package 3. Commissioned items with a Data Package 1 or 2 requirement must use instead Data Package 3.

1.2.3 Changes to Submittals

Manufacturer-originated changes or revisions to submitted data must be furnished by the Contractor 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.

1.2.4 Review and Approval

The Contractor's Commissioning Authority (CA) must review the commissioned systems and equipment submittals for completeness and applicability. The CA must verify 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 CA must communicate deficiencies to the Contracting Officer. Upon a successful review of the corrections, the CA must recommend approval and acceptance of these O&M manuals to the Contracting Officer. This work is in addition to the normal review procedures for O&M data.

1.2.5 O&M Database

Develop a database from the O&M manuals that contains the information required to start a preventative maintenance program.

1.3 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

1.3.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation for the installed model and features of each system:

1.3.1.1 Safety Precautions and Hazards

List personnel hazards and equipment or product safety precautions for all operating conditions.

1.3.1.2 Operator Prestart

Include procedures required to install, set up, and prepare each system for use.

1.3.1.3 Startup, Shutdown, and Post-Shutdown Procedures

Provide narrative description for Startup, Shutdown and Post-shutdown operating procedures including the control sequence for each procedure.

1.3.1.4 Normal Operations

Provide narrative description of Normal Operating Procedures. Include Control Diagrams with data to explain operation and control of systems and specific equipment.

1.3.1.5 Emergency Operations

Include 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. Include Emergency Shutdown Instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance and procedures for emergency operation of all utility systems including required valve positions, valve locations and zones or portions of systems controlled.

1.3.1.6 Operator Service Requirements

Include instructions for services to be performed by the operator such as lubrication, adjustment, inspection, and recording gage readings.

1.3.1.7 Environmental Conditions

Include 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.

1.3.1.8 Operating Log

Provide forms, sample logs, and instructions for maintaining necessary operating records.

1.3.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair for the installed model and features of each system. Include potential environmental and indoor air quality impacts of recommended maintenance procedures and materials.

1.3.2.1 Lubrication Data

Include preventative maintenance lubrication data, in addition to instructions for lubrication provided under paragraph titled "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.

1.3.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance. 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.

1.3.2.3 Cleaning Recommendations

Provide environmentally preferable cleaning recommendations in accordance with ASTM E1971.

1.3.3 Corrective Maintenance (Repair)

Include 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.

1.3.3.1 Troubleshooting Guides and Diagnostic Techniques

Include 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.

1.3.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be 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.

1.3.3.3 Maintenance and Repair Procedures

Include instructions and a list of tools required to repair or restore the product or equipment to proper condition or operating standards.

1.3.3.4 Removal and Replacement Instructions

Include step-by-step procedures and a list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

1.3.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and 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.

1.3.4 Corrective Maintenance Work-Hours

Include manufacturer's projection of corrective maintenance work-hours including requirements by type of craft. Corrective maintenance that requires completion or participation of the equipment manufacturer shall be identified and tabulated separately.

1.3.5 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:

1.3.5.1 Product Submittal Data

Provide a copy of all SD-03 Product Data submittals required in the applicable technical sections.

1.3.5.2 Manufacturer's Instructions

Provide a copy of all SD-08 Manufacturer's Instructions submittals required in the applicable technical sections.

1.3.5.3 O&M Submittal Data

Provide a copy of all SD-10 Operation and Maintenance Data submittals required in the applicable technical sections.

1.3.5.4 Parts Identification

Provide identification and coverage for all 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 shall show the index, reference, or key number that will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped 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

1.3.5.5 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 such as the compressor of air conditioning system.

1.3.5.6 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 all specific operation and maintenance procedures that must be performed to keep the warranty valid.

1.3.5.7 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.

1.3.5.8 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.

1.3.5.9 Testing and Performance Data

Include completed prefunctional checklists, functional performance test forms, and monitoring reports. Include recommended schedule for retesting and blank test forms.

1.3.5.10 Field Test Reports

Provide Field Test Reports (SD-06) that apply to equipment associated with the system.

1.3.5.11 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.

1.4 TYPES OF INFORMATION REQUIRED IN CONTROLS O&M DATA PACKAGES

Include Data Package 5 and the following for control systems:

- a. Narrative description on how to perform and apply all 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 all checkout tests and calibrations performed by the Contractor (not Cx tests).
- d. Full points list. A listing of rooms shall be provided 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 and/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. Electronic File:
 - (1) Assemble each manual into a composite electronically indexed file in PDF format. Provide HDD's, DVD's or CD's as appropriate, so that each one contains all maintenance and record files, and also the Project Record Documents and Training Videos, of the entire program for this facility.
 - (2) Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - (3) Link the index to separate files within the composite of files. Book mark maintenance and record files, that have a Table of Contents, according to the Table of Contents
- h. Marking of all system sensors and thermostats on the as-built floor plan and mechanical drawings with their control system designations.

1.5 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

1.5.1 Data Package 1

- a. Safety precautions
- b. Cleaning recommendations
- c. Maintenance and repair procedures
- d. Warranty information
- e. Contractor information
- f. Spare parts and supply list

1.5.2 Data Package 2

- a. Safety precautions
- b. Normal operations
- c. Environmental conditions
- d. Lubrication data
- e. Preventive maintenance plan and schedule
- 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. Contractor information

1.5.3 Data Package 3

- a. Safety precautions
- b. Operator prestart
- c. Startup, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Emergency operations
- f. Environmental conditions
- g. Lubrication data
- h. Preventive maintenance plan and schedule
- i. Cleaning recommendations
- j. Troubleshooting guides and diagnostic techniques
- k. Wiring diagrams and control diagrams
- l. Maintenance and repair procedures
- m. Removal and replacement instructions
- n. Spare parts and supply list
- o. Product submittal data
- p. O&M submittal data
- q. Parts identification
- r. Warranty information
- s. Testing equipment and special tool information
- t. Testing and performance data
- u. Contractor information

1.5.4 Data Package 4

- a. Safety precautions
- b. Operator prestart
- c. Startup, shutdown, and post-shutdown procedures

- d. Normal operations
- e. Emergency operations
- f. Operator service requirements
- g. Environmental conditions
- h. Lubrication data
- i. Preventive maintenance plan and schedule
- 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. Corrective maintenance man-hours
- q. Product submittal data
- r. O&M submittal data
- s. Parts identification
- t. Warranty information
- u. Personnel training requirements
- v. Testing equipment and special tool information
- w. Testing and performance data
- x. Contractor information

1.5.5 Data Package 5

- a. Safety precautions
- b. Operator prestart
- c. Start-up, shutdown, and post-shutdown procedures
- d. Normal operations
- e. Environmental conditions
- f. Preventive maintenance plan and schedule
- 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. Testing and performance data
- s. Contractor information

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 78 30.00 22

GIS DATA DELIVERABLES

07/20

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:

Resident Officer In Charge Of Construction	Public Works Division
Construction Manager (CM)	GIS Data Manager
1005 Michael Drive	1005 Michael Road
Camp Lejeune, NC 28547-2521	Camp Lejeune, NC 28547-2521
(910) 451-2581	(910) 451-5507 ext 3264

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 AND SCHEMA

1. The IGI&S repository model schema is based on the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) GEOFidelis Data Model with recurring business driven modifications and or adaptations.
 - a. Data will be created and delivered by developing an ARCGIS Personal GEODatabase using ArcGIS 10.1 or higher if a higher version is being utilized by the Government at the time the deliverable is being developed.
 - b. Request the existing GIS Data, Schema and Domain Properties by means of a Data Request Package (DRP). Receipt of request will include Geospatial Database table structure, schema, Domain

configuration, Attribute text format, i.e., case size as well as Meta Data information.

- c. The DRP should be submitted prior to the start of data collection efforts and again every 6 months for the duration of the contract. Ensure that all GIS data has been created and delivered utilizing the most up to date IGI&S GEODatabase schema at the time of delivery. Please be on notice that the schema for the GIS deliverable may change prior to delivery.
 - d. In order to to comply with the above section, it is necessary to verify the schema, via the CM and the PWD GIS Office. All GIS DATA DELIVERABLES will be created in accordance with the current schema at the time of deliverable. Contractor redline drawings must be submitted in PDF format with the GIS Deliverable package.
2. Submit a request for a Geospatial DRP to the CM or the Project Manager.
 - a. Request to be completely filled out and include all the information as instructed on the data request form.
 - b. Request only GIS data and or schema for feature classes that are relevant to the contract and within the boundary of project area.
 - c. Attach Scope of Work, which is defined by this GIS DATA DELIVERABLES section for each project request.
 - d. Return the DRP to the CM or Project Manager for sponsorship and submittal to the Installation Geospatial Information & Services (IGI&S) Office.
 - e. Incomplete forms may delay receipt of the requested GIS data and Schema.

1.3.1 Global Positioning System (GPS) and Spatial Reference Properties

GPS data shall be completed in accordance with the GPS Data Collection and Documentation Standards, Version 4 (or higher version if available at the time of this project) as prepared by Geographic Information Coordinating Council (GICC) Statewide Mapping Advisory Committee (SMAC) and adopted by the North Carolina Geographic Information Coordinating Council.

1. Prior to GPS efforts, ALL underground utilities are to be located utilizing a utility locating service in order to verify and obtain accurate feature locations.
2. Only bench marks included in the North Carolina Geodetic Survey Base Station Network are to be used for GPS data collection.
3. Mission planning is essential. Utilize the best Position Dilution of Precision (PDOP) values for data accuracy.
4. 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.
5. Infrastructure data, as identified in paragraph "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" will be collected utilizing Sub-Foot or better GPS data collection methods.

- a. Spatial accuracy requirements for Survey and Sub-Foot grade data collection are as follows:
 - i. Sub-Foot requirements:
 - 1) All points shall be within + 12 inches
 - 2) 95 percent accuracy rate for all points.
 - ii. Survey Grade requirements:
 - 1) All points shall be within + 1 centimeter
 - 2) 98 percent accuracy rate for all points
- 6. Make every effort to capture feature locations without using offsets. All Offsets will be noted in the Final Report for each feature.
- 7. Excessive offsets included in the Final Data, which will be referenced in the Final Report, will be reviewed for quality control.
 - a. Resubmittal of data will be required if PDOP planning was not observed per this specification.

The following GEODatabase Coordinate Systems and Spatial Reference Properties should be utilized for Camp Lejeune:

- 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

1.3.2 Demolished and Abandoned in Place (AIP) Features

Reference all Demolished and or AIP features in the data delivered. Should the current feature data class attributes and or domains not reference AIP or demolished features, the Contractor will be responsible for appropriately delivering these features by creating an associated "Demolished" or AIP feature class for all point and polyline data, i.e., CLJN.CL.WastewaterUtilitySegment and CLJN.CL.WateUtilNode_wHydrant, etc.

- 1. Utilize a blank schema for the associated feature class.
- 2. Rename associated feature class and add DEMO or AIP as a prefix, i.e., DEMO.CLJN.CL.WastewaterUtilitySegment, AIP.CLJN.CL.WastewaterUtilitySegment.
- 3. All demolished and or AIP features should provide existing spatial and non-spatial data which may be copied from existing data.
- 4. Update attributes appropriately to include the following:

- a. Contract Number.
- b. Drawing Number.
- c. isDemolished.
- d. dateDemolished or dateAIP.
- e. Status.

1.3.3 Creating a New Feature Class

Should a new feature class be required that is not readily available in the current GIS schema provided by the Government. Contact the CM or Project Manager for guidance and schema format.

1.3.4 GIS Topology Rules

All data must be created using GIS topology rules for polygons, points and lines, such as, but not limited to the following examples:

1. Polygons, Polylines and points rules; please reference illustrating topology rules in ArcGIS at www.esri.com.
2. Polygons must not have slivers.
3. All utility or infrastructure system data, which is, but is not limited to, transportation system and electrical, water, steam 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.
4. Features will be snapped to the appropriate item.
5. Data will be created to represent the real world, for example, water, sewer, and transportations systems, etc. will be drawn and or created in the direction of flow.
6. Utility and transportation systems will be created from source to sink, etc.
7. Abandoned In Place (AIP) utility lines will be located and updated in the current feature data set and identified as AIP in the attribute table or provide in a feature data set as specified in paragraph "Demolished and Abandoned in Place (AIP) Features" with CM approval.

1.3.5 Creation of Geographic Data Documentation (METADATA)

For each digital file delivered containing geographic information, provide documentation consistent with the Federal Geographic Data Committee (FGDC) Content Standards for Digital Geospatial Metadata (CSDGM).

Metadata generation tools included in the ArcGIS suite of software (or equivalent technology) will be used in the production of the required metadata in XML format. Regardless of the tools used for metadata creation, must ensure that the metadata is delivered in XML format and can be easily imported into the IGI&S GEODatabase.

(NOTE: The metadata should be formatted from the Government perspective,

not the Contractor project perspective. Therefore such items as Point of Contact (POC) should be the POC currently associated with the data and NOT the Contractor's Project Manager. Use language and format consistent with existing metadata.)

1.3.6 GIS Submittals Guidelines

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 data deliverables.

1. Prior to any database 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 to designing and developing the database.
2. All attributes will be populated in accordance with the "ATTRIBUTE DATA COLLECTION AND GPS REQUIREMENTS FOR SPECIFIC FEATURES" and will be obtained via contract specifications, plans and record drawings.
3. Research may be required to be conducted to collect data and make copies of reports and studies as necessary to verify existing and/or record drawing data. Record drawing data and closed contracts can be located in the Technical Records Section in the Public Works Department which is located at 1005 Michael Street, MCB Camp Lejeune.
4. Raw GPS data and collection data files will be included with every phase of delivery.
5. Actual spatial and non-spatial conditions in the field always supersede drawings. Locate and field verify all features to ensure attribute data and location is correctly recorded.
6. Submit a preliminary review of data at 25 percent contract completion to ensure specifications compliance.
7. 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.
 - a. All maps of GIS DATA DELIVERABLES will be ANSI C size and include a project title, contract number, scale, legend, standard symbology, attributes, i.e., building numbers, road names, segment diameters, etc. Also provide a PDF copy of all maps.
8. When required, provide a technical consultant to meet on site.
9. 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.
10. When projects are constructed in phases, deliver GIS Data at the end of each phase for all Phased Projects and Construction projects.
11. It is the Contractor's responsibility to perform quality assurance for all data and related materials required in the section prior to submitting product to the Government.

12. The data will be analyzed for discrepancies in subject content, correct format in accordance with this statement of work, and compatibility with the existing GIS system as well as all other specifications in this section.

1.3.7 Formats, Versions and Guidelines

All data deliverables will be in the following formats and/or versions.

1. GIS data will be provided in an ArcGIS 10.1 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.
2. Microsoft Windows 10 operating system, unless otherwise approved by the Government.
3. All reports and maps will be delivered as a hard copy and in a searchable Adobe Portable Document Format (PDF).
4. All text, spreadsheet, database files, reports, and maps will be delivered on Digital Versatile Disc read - only memory (DVD-ROM).
5. Verify required version(s) of software and schema, via the CM or PM.
6. Map submittals will accompany each geospatial deliverable.
 - a. Include ANSI C map for each project/area.
 - b. Data should be labeled and attributed per specification.
 - c. All maps should include the date, a legend, scale, contract title, and number.
 - d. Each map should be exported on a .pdf and delivered electronically with the project.

1.3.8 Final Report Requirements with additional Guidelines

Follow the following:

1. Specific procedures and list of equipment, software and versions that were utilized for the GPS data collection and creation of geospatial data.
2. Submit all GPS data files.
3. Provide the date(s) the IGI&S schema and geospatial data was received.
4. Provide details on any offsets to include justification as to why offsets were utilized and on which features and or points offsets were used.
5. Describe all modifications to the geodatabase to include the name of all new features classes, i.e., new, demolished or AIP.
6. Provide the source that was utilized for required attributes.

- a. Include an ANSI C size copy of all design drawings that were referenced in the attribute data. This information should be included in all phases of delivery to include draft and final reviews.
 - b. Provide the overall utility site plan drawing(s) with each submittal.
 - c. Provide a separate map for communication which includes infrastructure in PDF format.
7. Specify Deliverable "Draft #" or "Final Submittal" when data is submitted to the CM or PM for review.
 8. Provide the name and contact information for the GIS Technical Point of Contact who can answer questions regarding the data deliverable.
 9. GIS DATA DELIVERABLES must be provided in a format that does not require translation or pre/post processing prior to being loaded into the IGI&S GEODatabase.
 10. Provide any miscellaneous information that is deemed significant.
 11. Provide the current version of the GIS DATA DELIVERABLES specification utilized for this contract submittal.

1.3.9 Ownership

All digital files, final 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 SPECIFIC FEATURES

GPS and collect attribute data as specified for each feature listed with (GPS) accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties". 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.

1.4.1 **CLJN.CL.Common**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." 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.

1.4.2 **CLJN.CL.EMERGENCY_SERVICES**

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties". 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.RoadCenterline

The center of the road area

- a) roadClass - Major Roads/Local Roads/etc.
- b) trackOrLaneCount
- c) speedLimit
- d) isPaved - YES / NO
- e) oneWayDirection
- f) fullStreetName
- g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- h) contractNumber
- i) isTankTrail - YES / NO
- j) isLighted - Yes / No
- k) routeMinTravelledWayWidth
- l) routeMinTravelledWayWidthUOM
- m) routeTotalUsableWidth
- n) routeTotalUsableWidthUOM
- o) supportedByBridgeSpan - Yes / No

1.4.3 CLJN.CL.REAL.PROPERTY

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." 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.

GPS and collect the following attributes:

CLJN.CL.Building

A roofed, floored and walled structure that is completely enclosed

- a) facilityNumber
- b) builtDate
- c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- d) contractNumber
- e) sdsFeatureDescription - General Description of Building's Purpose
- f) floorCount
- g) material - Exterior material such as Brick, Concrete, etc.
- h) operationalStatus - inService, abandoned, etc.

CLJN.CL.Disposal_RealProperty

Real property demolished structures

- a) sdsFeatureDescription
- b) sdsFeatureName
- c) facilityNumber
- d) contractNumber
- e) disposalDate

CLJN.CL.DocksAndWharfs

A manmade water-land interface structure often for access to boats or ships

- a) PurposeType - Fishing, Mooring, etc.
- b) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- c) contractNumber
- d) Facility Number - Structure Number
- e) sdsFeatureDescription - Pier, boat ramp, dock, etc.
- f) natureOfConstruction - concrete, earthen, steel

CLJN.CL.Fence

A freestanding structure designed to restrict or prevent movement across a boundary

- a) facilityIDFK - Structure Number
- b) fenceType - metal, wood, etc.
- c) fenceUse - agriculture, boundary, etc.
- d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- e) contractNumber
- f) sdsFeatureName - Fence or Gate
- g) sdsFeatureDescription

CLJN.CL.PavementSectionParkingArea

A vehicle parking area is an area used for parking vehicles not including residential streets and driveways.

- a) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- b) operationalStatus - inService, abandoned, etc.
- c) pavementSectionType - parking, slab, driveway, etc.
- d) sdsFeatureDescription - Dumpster, Driveway, Transformer, Parking, etc.
- e) sdsFeatureName - Pad, Slab, Parking, etc.
- f) facilityNumber
- g) builtDate
- h) contractNumber
- i) isLighted

CLJN.CL.PavementSectionRoadway

The surface area that comprise a road area, upon which vehicles drive and park.

- a) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- b) operationalStatus - inService, abandoned, etc.
- c) pavementSectionType - curb, roadway, etc.
- d) facCode - Surfaced or Unsurfaced
- e) divided - Yes / No
- f) featureCode
- g) oneWay - Yes / No
- h) routeSurfaceComposition - concrete, asphalt, etc.
- i) builtDate
- j) contractNumber
- k) isLighted - Yes / No
- l) isTankTrail - Yes / No

CLJN.CL.PavementSectionSidewalk

The paved pedestrian walkway prepared to facilitate travel on foot. It may or may not be adjacent to a street/road.

- a) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- b) operationalStatus - inService, abandoned, etc.
- c) pavementSectionType - Sidewalks
- d) sdsFeatureDescription - Named Area
- e) routeSurfaceComposition - Concrete, Asphalt, etc.
- f) builtDate
- g) contractNumber
- h) installationCode - M67001
- i) isLighted - Yes / No

CLJN.CL.StructureArea

A facility classified as other than a building or linear asset

- a) facilityNumber - Structure Number
- b) builtDate
- c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- d) contractNumber
- e) sdsFeatureName - Name of structure according to contract
- f) sdsFeatureDescription - Description of item
- g) heightAboveSurfaceLevel
- h) heightAboveSurfaceLevelUOM - foot, inch, meter, etc.

CLJN.CL.StructurePoint

Example: Flag poles; Point of Information Signs (POI) etc

- a) facilityNumber - Structure Number
- b) builtDate
- c) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- d) contractNumber
- e) sdsFeatureName - POI, Sign, Flagpole, bleacher, etc.
- f) sdsFeatureDescription - Specific type of feature

CLJN.CL.Tower

A vertical projection, higher than its diameter, generally used for observation, storage, or electronic transmission

- a) towerUseType - communication, observation, etc.
- b) heightMax
- c) heightUOM - foot, inch, meter, etc.
- d) contractNumber
- e) towerType - Observation Tower, Guard Tower, etc.
- f) facilityNumber - Structure number
- g) sdsFeatureDescription
- h) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- i) towerMaterial - wood, concrete, steel, etc.

CLJN.CL.Wall

A linear feature used for separation of facilities, ornamental decoration, or structural reinforcement (retaining wall)

- a) wallType - brick, timber, stone, concrete, etc.
- b) wallHeight
- c) wallHeightUOM - foot, inch, meter, etc.
- d) dateConstructed
- e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- f) contractNumber
- g) sdsFeatureName
- h) sdsFeatureDescription - Dumpster enclosure, Utility Enclosure, Blast Protection, etc.

1.4.4 CLJN.CL.COMMUNICATIONS RESTRICTED

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." 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.

GPS and collect the following attributes:

CLJN.CL.CommCartographicFeatureArea

Graphic features that aid in visually associating CommAnnotation features to the appropriate communication infrastructure feature.

- a) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- b) sdsFeatureName
- c) sdsFeatureDescription
- d) commProjectName - Contract Number
- e) operationalStatus - In service, Removed, Abandon in Place, etc.

CLJN.CL.CommCartographicFeatureLine

Graphic features that aid in visually associating CommAnnotation features to the appropriate communication infrastructure feature.

- a) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- b) sdsFeatureName
- c) sdsFeatureDescription
- d) commProjectName - Contract Number
- e) operationalStatus - In service, Removed, Abandon in Place, etc.

CLJN.CL.CommCartographicFeaturePoint

Graphic features that aid in visually associating CommAnnotation features to the appropriate communication infrastructure feature.

- a) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- b) sdsFeatureName
- c) sdsFeatureDescription
- d) commProjectName - Contract Number

- e) operationalStatus - In service, Removed, Abandon in Place, etc.

CLJN.CL.CommUtilityNode

A subdivision of a communications network, particularly an asset that participates in the transmission of a signal but that is not a cable.

- a) commUtilityNodeIDPK - Structure Number
- b) commNodeType - connection or two or more sheaths, Devise Used to detect & measure various environmental conditions, Devise converts electrical signal in to sound, etc.
- c) operatingSpectrum
- d) transmissionPower
- e) powerUOM
- f) operationalStatus - In service, Removed, Abandon in Place, etc.
- g) commProjectName - Contract Number
- h) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- i) sdsFeatureName - MNS - Big Voice, MNS - Little Voice, MSN - Control Station, etc.
- j) sdsFeatureDescription - MNS - Big Voice, Field Antenna, Antenna Communication, etc.

CLJN.CL.CommUtilitySegment

A subdivision of a communications network, particularly a cable for the transmission of a signal.

- a) cableMaterial - Fiber Optical, PB, CU, Steel, ABS, etc.
- b) cableSheathing - PE, XLPE, Cross Ply, etc.
- c) availableFibers -
- d) usedFibers
- e) numberOfMultiModeFibers
- f) numberOfPairs
- g) numberOfSingleModeFibers
- h) installationTypeCode - Underground, above ground, etc.
- i) operationalStatus - In service, Removed, Abandon in Place, etc.
- j) cableInstaller -
- k) cableRoute -
- l) cableCount -
- m) numberOfStrands -
- n) wireGauge -
- o) commProjectName - Contract Number
- p) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- q) sdsFeatureName - Non-direct Buried Lines, Direct Buried Lines, etc.
- r) sdsFeatureDescription - communications line, etc.

CLJN.CL.UtilityFeature_cDuctBank

One or more ducts routed in parallel between two nodes.

- a) networkType - A network used for the transmission of a signal.
- b) networkSubType - The communication network subtype.
- c) utilityFeatureType - One or more ducts routed in parallel between two nodes. (L), etc.

- d) diameter
- e) diameterUOM - Inches, Feet, meters, etc.
- f) ductDepth
- g) ductDepthUOM - Inches, Feet, meters, etc.
- h) interDuctDiameter
- i) interDuctDiameterUOM - Inches, Feet, meters, etc.
- j) isEncased - Yes or No
- k) numberOfDucts
- l) numberOfInserts
- m) operationalStatus - In service, Removed, Abandon in Place, etc.
- n) commProjectName - Contract Number
- o) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.

CLJN.CL.UtilityFeature_cManhole

An enclosed structure (manhole, or handhole)

- a) utilityFeatureIDPK - MH Number - See project Manager
- b) networkType - Network used for transmission of signal,
- c) networkSubType - Communication network subtype
- d) utilityFeatureType - Manhole, hand hole, etc.
- e) cManholeType - T, R2A, L, j4, JC9C, etc.
- f) cManholeMaterial - steel, plastic, aluminum, fiberglass, etc.
- g) isHandhole - Yes or No
- h) widthValue
- i) widthUOM - Inches, Feet, meters, etc.
- j) lengthValue
- k) lengthUOM - Inches, Feet, meters, etc.
- l) heightValue
- m) heightUOM - Inches, Feet, meters, etc.
- n) diameter
- o) diameterUOM - Inches, Feet, meters, etc.
- p) cManholeDepth
- q) cManholeDepthUOM - Inches, Feet, meters, etc.
- r) operationalStatus - In service, Removed, Abandon in Place, etc.
- s) commProjectName - Contract Number
- t) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.

CLJN.CL.UtilityFeature_cPedestal

An above-ground enclosed structure that provides access to buried plant and a place to house splices, terminals, etc.

- a) networkType - A network used for the transmission of a signal.
- b) networkSubType - The communication network subtype.
- c) utilityFeatureType - above-ground enclosed structure that provides access to buried plant and a place to house splices, terminal, etc.
- d) pedestalType - rectangular box type, etc.
- e) operationalStatus - In service, Removed, Abandon in Place, etc.
- f) commProjectName - Add Contract Number
- g) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- h) sdsFeatureDescription

CLJN.CL.UtilityFeature_cVault

An enclosed structure in a facility used for cable entrance.

- a) utilityFeatureType
- b) networkType - A network used for the transmission of a signal.
- c) networkSubType - The communication network subtype.
- d) heightValue
- e) heightUOM - Inches, Feet, meters, etc.
- f) widthValue
- g) widthUOM - Inches, Feet, meters, etc.
- h) vaultDepth
- i) vaultDepthUOM - Inches, Feet, meters, etc.
- j) diameter
- k) diameterUOM - Inches, Feet, meters, etc.
- l) operationalStatus - In service, Removed, Abandon in Place, etc.
- m) commProjectName - Contract Number
- n) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- o) sdsFeatureDescription

1.4.5 CLJN.CL.UTILITIES ELECTRICAL

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System (GPS) and Spatial Reference Properties." 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.

GPS and collect the following attributes:

CLJN.CL.ElecUtilNode_eExteriorLight

Exterior lighting is supplied by local distribution systems and is generally the only service for which the electric utility installs, operates and maintains utilization equipment

- a) electricalUtilityNodeIDPK
- b) exteriorLightType - streetLight, parkingLotLight, etc.
- c) electricalNodeType - eExteriorLight
- d) operationalStatus - inservice, abandoned, etc.
- e) bulbType LED, INCA, etc.
- f) circuitID - This available from CM or PM
- g) hasSensor - YES / NO
- h) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- i) contractNumber
- j) dateInService
- k) sdsFeatureName
- l) Voltage
- m) Wattage

CLJN.CL.ElecUtilNode_eGenerator

Generator is a power source for providing electricity. Generators may be primary or standby power sources

- a) FacilityNumber - structure number

- b) electricalNodeType - eGenerator
- c) operationalStatus - inservice, abandoned, etc.
- d) voltage
- e) kvaRate
- f) circuitID - List is available from CM or PM
- g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- h) contractNumber
- i) dateInService
- j) sdsFeatureName - Manufacturer
- k) generatorType - Primary, backup, emergency, etc.

CLJN.CL.ElecUtilNode_eMeterPoint

A electrical meter point represents the location of the metering device

- a) electricalNodeType - Description
- b) operationalStatus - inservice, abandoned, etc.
- c) circuitID - List is available from CM or PM
- d) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- e) contractNumber
- f) dateInService
- g) sdsFeatureName
- h) sdsFeatureDescription -
- i) mountingType
- j) utilityOwner
- k) voltage - 208Y-120V, 480Y-277V, etc.

CLJN.CL.ElecUtilNode_eSwitch

Electrical Switches are installed at strategic locations throughout distribution feeder circuits

- a) electricalNodeType
- b) switchPosition - closed, open, etc.
- c) operationalStatus - inservice, abandoned, etc.
- d) electricalSwitchType - switches
- e) circuitID - List is available from CM or PM
- f) numberOfPhases single, three, two
- g) switchPosition - Open, closed, etc.
- h) voltage - 208Y-120V, 480Y-277V, etc.
- i) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- j) contractNumber

CLJN.CL.ElecUtilNode_eTransformer

The Transformer feature class captures information about distribution and power transformers

- a) electricalNodeType - Transformer
- b) transformerType - stepdown, step up, etc.
- c) mountingType - pool or pad
- d) numberOfPhases - 1, 2, 3, etc.
- e) primaryVoltage - 208Y-120V, 480Y-277V, etc.
- f) secondaryVoltage - 208Y-120V, 480Y-277V, etc.
- g) totalKVA
- h) circuitID - List is available from CM or PM
- i) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- j) contractNumber
- k) sdsFeatureName - Manufacturer

- 1) operationalStatus - inservice, abandoned, etc.

CLJN.CL.ElecUtilNode_eVoltageRegulator

Voltage regulators vary the ac supply or source voltage to the customer to maintain the voltage within desired limits

- a) electricalNodeType - VoltageRegulator
- b) operationalStatus - inservice, abandoned, etc.
- c) primaryVoltage - 208Y-120V, 480Y-277V, etc.
- d) secondaryVoltage - 208Y-120V, 480Y-277V, etc.
- e) numberOfPhases - 1, 2, 3,
- f) circuitID - This available from CM or PM
- g) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- h) contractNumber

CLJN.CL.UtilFeat_eSupportStructure

A structure that supports electric devices

- a) utilityFeatureType - Utility, Guy, Poles, etc.
- b) networkType - electrical
- c) heightValue -
- d) heightUOM - foot, inch, meter, etc.
- e) utilityOwner
- f) operationalStatus - inservice, abandoned, etc.
- g) cableCircuitName - List is available from CM or PM
- h) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- i) contractNumber
- j) sdsFeatureName - Utility Pole, etc
- k) sdsFeatureDescription - Number of circuits attached to pole

CLJN.CL.UtilFeat_eUndergroundStructure

Underground Structure is a simple junction feature that includes vaults and manholes that house and protect electrical equipment

- a) utilityFeatureIDPK - Structure Number
- b) utilityFeatureType - Underground, surface structure, etc
- c) networkType - electrical
- d) operationalStatus - inservice, abandoned, etc.
- e) electricalJunctionType - Manhole, Junction Box, Handhole, etc.
- f) numberOfCables -
- g) rimElevation -
- h) rimElevationUOM - foot, inch, meter, etc.
- i) cableCircuitName - List is available from CM or PM
- j) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- k) contractNumber

CLJN.CL.ElecUtilSegment

A subdivision of an electrical distribution network, particularly a line for the transmission of electricity

- a) electricalSegmentType - OH Primary, UG Primary, OH Secondary, UG Secondary, etc.
- b) cableMaterial - AL, copper, etc.
- c) location - aboveground, underground, etc.

- e) voltage - 208Y-120V, 480Y-277V, etc.
- f) utilityOwner -
- g) operationalStatus - inservice, abandoned, etc.
- h) insulationMaterial - polyCross, none, etc.
- i) conductorSize -
- j) neutralSize -
- k) numberOfConduct -
- l) numberOfNeutral -
- m) numberOfPhases - 1, 2, 3, etc.
- n) circuitID - List is available from CM or PM
- o) mediaID - GIS Collection Method - CAD, Survey Grade GPS, etc.
- p) contractNumber -
- q) dateInService -
- r) sdsFeatureName - Electrical Distribution, exterior lighting, etc.
- s) sdsFeatureDescription - Armless mount, cross arm, etc.

CLJN.CL.UtilFeat_eElecFacilitySite

Polygon feature class to define boundaries of electrical facility stations

- a) utilityFeatureType - Electrical Facility station
- b) operationalStatus - inservice, abandoned, etc.
- c) numberOfCircuits
- d) numberOfSpareBays
- e) numberOfTransformers
- f) voltageIn - 208Y-120V, 480Y-277V, etc.
- g) utilityOwner
- h) gisFeatureCollectionMethod - - CAD, Survey Grade GPS, etc.
- i) contractNumber
- j) equipmentInstallationDate
- k) sdsFeatureDescription - Location of substation
- l) facilityIDFK - structure number

1.4.6 CLJN.CL.UTILITIES_STORMWATER

GPS and collect attribute data as specified for each feature listed with GPS accuracy as described in paragraph "Global Positioning System GPS and Spatial Reference Properties." 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.

GPS and collect the following attributes:

CLJN.CL.StormwaterUtilityNode_swInlet

The location at which stormwater is collected/received into the stormwater network

- a) stormwaterUtilityNodeIDPK - Structure ID
- b) stormwaterNodeType - swInlet description
- c) networkSubType - stormWater
- d) stormwaterInletType - Inlet, Headwall, etc.
- e) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- f) contractNumber
- g) equipmentInstallationDate
- h) sdsFeatureDescription -

- i) operationalStatus inservice, abandoned, etc.

CLJN.CL.StormwaterUtilitySegment

A subdivision of a stormwater network, particularly a pipeline or drainage ditch for the transport of stormwater, between the source, holding facilities, and/or treatment facilities

- a) diameter
- b) diameterUOM - inch
- c) pipeMaterial - cement, plastic, etc.
- d) isLined - YES / NO
- e) downstreamInvertElevation
- f) upstreamInvertElevation
- g) gisFeatureCollectionMethod - - CAD, Survey Grade GPS, etc.
- h) contractNumber
- i) equipmentInstallationDate
- j) sdsFeatureName - Stormwater pipe, Open Ditch, etc.
- k) sdsFeatureDescription
- l) operationalStatus - inservice, abandoned, etc.
- m) stormwaterPipeStyle
- n) stormwaterSegmentType - open ditch, closed under other feature type, etc.

CLJN.CL.StorUtilNode_swManhole

A storm water manhole is an underground concrete structure with a top opening used for collecting and routing storm water runoff through underground pipes

- a) stormwaterNodeType
- b) stormwaterUtilityNodeIDPK - Structure Number
- c) numberOfPipes
- d) operationalStatus - inservice, abandoned, etc.
- e) stormwaterBasinIDFK - Basin id
- f) gisFeatureCollectionMethod - CAD, Survey Grade GPS, etc.
- g) contractNumber
- h) equipmentInstallationDate
- i) sdsFeatureName
- j) sdsFeatureDescription

1.4.7 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

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 SAFETY PROFESSIONALS (ASSP)

ASSP A10.6 (2006) Safety & Health Program
Requirements for Demolition Operations -
American National Standard for
Construction and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (2016; Rev L; Change 2) Obstruction
Marking and Lighting

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 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/Deconstruction 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, coordination with other work in progress, a detailed

description of methods and equipment to be used for each operation and of the sequence of operations.

1.2.3 General Requirements

Do not begin demolition until authorization is received from the Contracting Officer. Remove rubbish and debris from the project site; do not allow accumulations outside on airfield pavements. 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. Do not overload pavements to remain.

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 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 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor.

1.3.3 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. 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 all submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan
Existing Conditions

SD-07 Certificates

Notification

SD-11 Closeout Submittals

Receipts
Receipts and bills of lading, as specified.

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 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 on airfield pavements 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 or aircraft 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.

Provide a minimum of 2 FAA type L-810 steady burning red obstruction lights on temporary structures (including cranes) over 100 feet, but less than 200 ft, above ground level. The use of LED based obstruction lights are not permitted. For temporary structures (including cranes) over 200 ft above ground level provide obstruction lighting in accordance with FAA AC 70/7460-1. Light construction and installation shall comply with FAA AC 70/7460-1. Lights shall be operational during periods of reduced visibility, darkness, and as directed by the Contracting Officer. Maintain the temporary services during the period of construction and remove only after permanent services have been installed and tested and are in operation.

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 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.

1.9 EXISTING CONDITIONS

Before beginning any demolition 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

Not used.

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

3.1.1 Utilities and Related Equipment

3.1.1.1 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 Paving and Slabs

Remove concrete and asphaltic concrete paving and slabs including aggregate base as indicated. Provide neat sawcuts at limits of pavement removal as indicated.

3.1.3 Concrete

Saw concrete along straight lines to a depth as indicated. 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.

3.1.4 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: Completely fill holes and depressions, caused by previous physical damage or left as a result of removals in existing concrete to remain.

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 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable combustible material 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 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 02 82 30

RE-ESTABLISHING VEGETATION

03/12

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

The work covered by this section consists of preparing seedbeds; furnishing and placing limestone, fertilizer, and sod; compacting seedbeds; mowing; and other operations necessary for the permanent establishment of grasses.

Sodding shall be performed on all earth areas disturbed by construction. The Contractor shall adapt his operations to variations in weather or soil conditions as necessary for the successful establishment and growth.

The quantity of mowing to be performed will be affected by the actual conditions which occur during the construction of the project. The quantity of mowing may be increased, decreased, or eliminated entirely at the direction of the Contracting Officer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

PART 2 PRODUCTS

2.1 FERTILIZER

The quality of all fertilizer and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Fertilizer Law and with the rules and regulations, adopted by the North Carolina Board of Agriculture in accordance with the provisions of said law, in effect at the time of sampling. Fertilizer shall be 10-10-10. Dry fertilizer shall have been manufactured from cured stock. Liquid fertilizer shall be stored and cared for after manufacture in a manner that will prevent loss of plant food values.

2.2 LIMESTONE

The quality of all limestone and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Lime Law and with the rules and regulations adopted by the North Carolina Board of. Limestone shall be agricultural grade ground Dolomitic limestone. All limestone shall contain not less than 90 percent calcium carbonate equivalents. Dolomitic limestone shall contain not less than 10 percent of magnesium. Dolomitic limestone shall be so graded that at least 90 percent will pass through a U.S. Standard 20 mesh screen, and at least 35 percent will pass through a U.S. Standard 100 mesh screen.

2.3 SOD

Sod shall consist of a live, dense, well rooted growth of centipede grass free from an excessive amount of restricted noxious weeds as defined by the North Carolina Board of Agriculture. The area from which sod is to be

obtained shall have been mowed to a height of not less than 2 inches. Sod shall be cut into rectangular sections of sizes convenient for handling without breaking or loss of soil. It shall be cut with a sod cutter or other acceptable means to a depth that will retain in the sod practically all of the dense root system of the grass. During wet weather the sod shall be allowed to dry sufficiently before lifting to prevent tearing during handling and placing, and during extremely dry weather it shall be watered before lifting if such watering is necessary to insure its vitality and to prevent loss of soil during handling.

2.4 WATER

Water used in the planting or care of vegetation shall meet the requirements of Class C fresh waters as defined in 15 NAC 2B.0200.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The work shall be performed immediately upon completion of earthwork areas. No exception will be made to this requirement unless otherwise permitted in writing by the Contracting Officer. Upon failure or neglect on the part of the Contractor to coordinate his grading with seeding and mulching operations and diligently pursue the control of erosion and siltation, the Contracting Officer may suspend the Contractor's operations until such time as the work is coordinated in a manner acceptable to the Contracting Officer.

3.2 SEEDBED PREPARATION

The Contractor shall cut and satisfactorily dispose of weeds or other unacceptable growth on the areas to be sodded. The soil shall then be scarified or otherwise loosened to a depth of not less than 3 inches except as otherwise provided below or otherwise directed by the Contracting Officer. Clods shall be broken and the top 2 to 3 inches of soil shall be worked into an acceptable seedbed by the use of soil pulverizers, drags, or harrows; or by other methods approved by the Contracting Officer. All rock and debris 3 inches or larger shall be removed prior to the application of seed and fertilizer. On cut slopes that are 2:1 and steeper, both the depth of preparation and the degree of smoothness of the seedbed may be reduced as permitted by the Contracting Officer, but in all cases the slope surface shall be scarified, grooved, trenched, or punctured so as to provide pockets, ridges, or trenches in which the seeding materials can lodge. On cut slopes that are either 2:1 or steeper, the Contracting Officer may permit the preparation of a partial or complete seedbed during the initial grading of the slope. If at the time of final sodding operations such initial preparation is still in a condition acceptable to the Contracting Officer, additional seedbed preparation may be reduced or eliminated. Seedbed preparation within 2 feet of the edge of any pavement shall be limited to a depth of 2 to 3 inches. The preparation of seedbeds shall not be done when the soil is frozen, extremely wet, or when the Contracting Officer determines that it is an otherwise unfavorable working condition.

3.3 LIMESTONE AND FERTILIZER

Limestone may be applied as a part of the seedbed preparation, provided it is immediately worked into the soil. If not so applied, limestone and fertilizer shall be distributed uniformly over the prepared seedbed and

then harrowed, raked, or otherwise thoroughly worked into the seedbed. Apply fertilizer at the rate as specified on the plans. Apply lime at the rate as specified on the plans. Application equipment for liquid fertilizer, other than a hydraulic seeder, shall be calibrated to ensure that the required rate of fertilizer is applied uniformly.

3.4 SODDING

Extreme care shall be exercised to prevent breaking the sod sections and to prevent the sod from drying out. Any sod that is torn, broken, or too dry will be rejected. Torn or broken sod, if kept moist, may be used for filling unavoidable small gaps in sod cover as permitted by the Contracting Officer. Sod shall be placed on the designated areas within 24 hours after being cut. The area to be sodded shall be brought to a firm uniform surface. The limestone and fertilizer shall be distributed uniformly over the area. The area shall be roughened by means of picks, rakes, or other approved means to a depth of not less than 2 inches without distorting the uniformity of the surface. The finished surface shall be moistened with water prior to placing the sod. Within 24 hours after soil preparation has been completed, place the sod. Each piece of sod shall be packed tightly against the edge of adjacent pieces so that the fewest possible gaps will be left between the pieces. Unavoidable gaps shall be closed with small pieces of sod. Sod shall be placed beginning at either the top or the toe of the slope. Sod shall be placed with the long edge horizontal and with staggered vertical joints. The edge of the sod shall be turned slightly into the ground at the top of a slope and a layer of earth placed over it and tamped as to conduct the surface water over and onto the top of the sod. On all slopes 2:1 or steeper, in drainage channels, and on any areas that are in such condition that there is danger of sod slipping, sod shall be stapled in place by driving staples flush with the sod. Stapling shall be done concurrently with sod placement and prior to tamping. Use wire staples, per Section 2.6.3. The number of staples shall be sufficient to prevent slipping or displacement of the sod. Staples shall be driven perpendicular to the slope. Where backfill is necessary on cut slopes to obtain a uniform sodding area, staples shall be of sufficient length to reach a minimum of 3 inches into the solid earth underneath the backfill. Sod shall not be placed when the atmospheric temperature is below 32 degrees F. Frozen sod shall not be used. After sod has been placed and tamped, it shall be carefully and thoroughly watered as required to maintain the sod in a healthy condition. Watering shall be conducted until final acceptance. Application of water may be made by the use of hydraulic seeding equipment, farm type irrigation equipment, or by other acceptable means.

-- End of Section --

SECTION 03 30 53

MISCELLANEOUS CAST-IN-PLACE CONCRETE (SIDEWALKS ONLY)
05/14

PART 1 GENERAL

1.1 SUMMARY

Perform all work in accordance with ACI 318.

1.2 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 CONCRETE INSTITUTE (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 301	(2016) Specifications for Structural Concrete
ACI 304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305R	(2010) Guide to Hot Weather Concreting
ACI 306R	(2016) Guide to Cold Weather Concreting
ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)
ACI 347R	(2014; Errata 1 2017) Guide to Formwork for Concrete
ACI SP-66	(2004) ACI Detailing Manual

ASTM INTERNATIONAL (ASTM)

ASTM A615/A615M	(2020) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A1064/A1064M	(2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31/C31M	(2019a) Standard Practice for Making and Curing Concrete Test Specimens in the Field

ASTM C33/C33M	(2018) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2020) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94/C94M	(2020) Standard Specification for Ready-Mixed Concrete
ASTM C143/C143M	(2020) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2020) Standard Specification for Portland Cement
ASTM C172/C172M	(2017) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2016) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231/C231M	(2017a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C494/C494M	(2019) Standard Specification for Chemical Admixtures for Concrete
ASTM C618	(2019) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C685/C685M	(2017) Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C1064/C1064M	(2017) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1602/C1602M	(2018) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D1752	(2018) Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM E96/E96M	(2016) Standard Test Methods for Water Vapor Transmission of Materials

ASTM E1745 (2017) Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

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

40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

1.3 SUBMITTALS

Government approval is required for ALL submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Air-Entraining Admixture
Water-Reducing or Retarding Admixture
Curing Materials
Expansion Joint Filler Strips, Premolded
Conveying and Placing Concrete
Formwork
Mix Design Data
Ready-Mix Concrete
Mechanical Reinforcing Bar Connectors
Air Entraining Mixture
Fly ash

SD-06 Test Reports

Aggregates
Concrete Mixture Proportions
Compressive Strength Testing
Slump
Air Content
Water

SD-07 Certificates

Cementitious Materials
Pozzolan
Aggregates
Delivery Tickets

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

The Government retains the option to sample and test aggregates and concrete to determine compliance with the specifications. Provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Obtain samples of aggregates at the point of batching in accordance with ASTM D75/D75M. Sample concrete in accordance with ASTM C172/C172M. Determine slump and air content in accordance with ASTM C143/C143M and ASTM C231/C231M, respectively, when cylinders are molded. Prepare, cure, and transport compression test specimens in accordance with ASTM C31/C31M. Test compression test specimens in accordance with ASTM C39/C39M. Take samples

for strength tests not less than once each shift in which concrete is produced. Provide a minimum of five specimens from each sample; two to be tested at 28 days (90 days if pozzolan is used) for acceptance, two will be tested at 7 days for information and one held in reserve.

2.1.1 Strength

Acceptance test results are the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete is considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'_c , but not more than 20 percent, and no individual acceptance test result falls below f'_c by more than 500 psi.

2.1.2 Construction Tolerances

Apply a Class "C" finish to all surfaces except those specified to receive a Class "D" finish. Apply a Class "D" finish to all post-construction surfaces which will be permanently concealed. Surface requirements for the classes of finish required are as specified in ACI 117.

2.1.3 Concrete Mixture Proportions

Concrete mixture proportions are the responsibility of the Contractor. Mixture proportions must include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per yard of concrete. Provide materials included in the mixture proportions of the same type and from the same source as will be used on the project. The specified compressive strength f'_c is 3,000 psi at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate is 3/4 inch, in accordance with ACI 304R. The air content must be between 4.5 and 7.5 percent with a slump between 2 and 5 inches. The maximum water-cementitious material ratio is 0.50. Submit the applicable test reports and mixture proportions that will produce concrete of the quality required, ten days prior to placement of concrete.

2.2 MATERIALS

Submit manufacturer's literature from suppliers which demonstrates compliance with applicable specifications for the specified materials.

2.2.1 Cementitious Materials

Submit Manufacturer's certificates of compliance, accompanied by mill test reports, attesting that the concrete materials meet the requirements of the specifications in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Also, certificates for all material conforming to EPA's Comprehensive Procurement Guidelines (CPG), in accordance with 40 CFR 247. Provide cementitious materials that conform to the appropriate specifications listed:

2.2.1.1 Portland Cement

ASTM C150/C150M, Type I, including false set requirements with tri-calcium aluminates (C3A) content less than 10 percent and a maximum cement-alkali content of 0.80 percent Na_2Oe (sodium oxide) equivalent.

2.2.1.2 Pozzolan

Provide pozzolan that conforms to ASTM C618, Class F, including requirements of Tables 1A and 2A.

2.2.2 Aggregates

For fine and coarse aggregates meet the quality and grading requirements of ASTM C33/C33M, Class Designations 4M or better. Submit certificates of compliance and test reports for aggregates showing the material(s) meets the quality and grading requirements of the specifications under which it is furnished.

2.2.3 Admixtures

Provide admixtures, when required or approved, in compliance with the appropriate specification listed. Retest chemical admixtures that have been in storage at the project site, for longer than 6 months or that have been subjected to freezing, at the expense of the Contractor at the request of the Contracting Officer and will be rejected if test results are not satisfactory.

2.2.3.1 Air-Entraining Admixture

Provide air-entraining admixture that meets the requirements of ASTM C260/C260M.

2.2.3.2 Water-Reducing or Retarding Admixture

Provide water-reducing or retarding admixture meeting the requirements of ASTM C494/C494M, Type A, B, or D.

2.2.4 Water

Mixing and curing water in compliance with the requirements of ASTM C1602/C1602M; free of injurious amounts of oil, acid, salt, or alkali. Submit test report showing water complies with ASTM C1602/C1602M.

2.2.5 Reinforcing Steel

Provide reinforcing bars conforming to the requirements of ASTM A615/A615M, Grade 60, deformed. Provide welded steel wire reinforcement conforming to the requirements of ASTM A1064/A1064M. Detail reinforcement not indicated in accordance with ACI 301 and ACI SP-66. Provide mechanical reinforcing bar connectors in accordance with ACI 301 and provide 125 percent minimum yield strength of the reinforcement bar.

2.2.6 Expansion Joint Filler Strips, Premolded

Expansion joint filler strips, premolded of sponge rubber conforming to ASTM D1752, Type I.

2.2.7 Formwork

Design and engineer the formwork as well as its construction in accordance with ACI 301 Section 2 and 5 and ACI 347R. Fabricate of wood, steel, or other approved material.

2.2.8 Form Coatings

Provide form coating in accordance with ACI 301.

2.2.9 Vapor Barrier

ASTM E1745 Class A polyethylene sheeting, minimum 10 mil thickness or other equivalent material with a maximum permeance rating of 0.04 perms per ASTM E96/E96M.

Consider plastic vapor retarders and adhesives with a high recycled content, low toxicity low VOC (Volatile Organic Compounds) levels.

2.2.10 Curing Materials

Provide curing materials in accordance with ACI 301, Section 5.

2.3 READY-MIX CONCRETE

Provide ready-mix concrete with mix design data conforming to ACI 301 Part 2. Submit delivery tickets in accordance with ASTM C94/C94M for each ready-mix concrete delivery, include the following additional information: .

- a. Type and brand cement
- b. Cement content in 94-pound bags per cubic yard of concrete
- c. Maximum size of aggregate
- d. Amount and brand name of admixture
- e. Total water content expressed by water cementitious material ratio

PART 3 EXECUTION

3.1 PREPARATION

Prepare construction joints to expose coarse aggregate. The surface must be clean, damp, and free of laitance. Construct ramps and walkways, as necessary, to allow safe and expeditious access for concrete and workmen. Remove snow, ice, standing or flowing water, loose particles, debris, and foreign matter. Satisfactorily compact earth foundations. Make spare vibrators available. Placement cannot begin until the entire preparation has been accepted by the Government.

3.1.1 Embedded Items

Secure reinforcement in place after joints, anchors, and other embedded items have been positioned. Arrange internal ties so that when the forms are removed the metal part of the tie is not less than 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Prepare embedded items so they are free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. Provide all equipment needed to place, consolidate, protect, and cure the concrete at the placement site and in good operating condition.

3.1.2 Formwork Installation

Forms must be properly aligned, adequately supported, and mortar-tight. Provide smooth form surfaces, free from irregularities, dents, sags, or holes when used for permanently exposed faces. Chamfer all exposed joints and edges , unless otherwise indicated.

3.1.3 Production of Concrete

3.1.3.1 Ready-Mixed Concrete

Provide ready-mixed concrete conforming to ASTM C94/C94M except as otherwise specified.

3.1.3.2 Concrete Made by Volumetric Batching and Continuous Mixing

Conform to ASTM C685/C685M.

3.2 CONVEYING AND PLACING CONCRETE

Convey and place concrete in accordance with ACI 301, Section 5.

3.2.1 Cold-Weather Requirements

Place concrete in cold weather in accordance with ACI 306R

3.2.2 Hot-Weather Requirements

Place concrete in hot weather in accordance with ACI 305R

3.3 FINISHING

3.3.1 Temperature Requirement

Do not finish or repair concrete when either the concrete or the ambient temperature is below 50 degrees F.

3.3.2 Finishing Unformed Surfaces

3.3.2.1 Expansion and Contraction Joints

Provide 1/2 inch thick transverse expansion joints where new work abuts an existing concrete. Provide expansion joints at a maximum spacing of 30 feet on center in sidewalks, unless otherwise indicated. Provide contraction joints at a maximum spacing of 5 linear feet in sidewalks, unless otherwise indicated. Cut contraction joints at a minimum of 1 inch(es) deep with a jointing tool after the surface has been finished.

3.4 CURING AND PROTECTION

Cure and protect in accordance with ACI 301, Section 5.

3.5 FORM WORK

Provide form work in accordance with ACI 301, Section 2 and Section 5.

3.5.1 Removal of Forms

Remove forms in accordance with ACI 301, Section 2.

3.6 STEEL REINFORCING

Reinforcement must be free from loose, flaky rust and scale, and free from oil, grease, or other coating which might destroy or reduce the reinforcement's bond with the concrete.

3.6.1 Fabrication

Shop fabricate steel reinforcement in accordance with ACI 318 and ACI SP-66. Provide shop details and bending in accordance with ACI 318 and ACI SP-66.

3.6.2 Splicing

Perform splices in accordance with ACI 318 and ACI SP-66.

3.6.3 Supports

Secure reinforcement in place by the use of metal or concrete supports, spacers, or ties.

3.7 EMBEDDED ITEMS

Before placing concrete, take care to determine that all embedded items are firmly and securely fastened in place. Provide embedded items free of oil and other foreign matter, such as loose coatings of rust, paint and scale. Embedding of wood in concrete is permitted only when specifically authorized or directed.

3.8 TESTING AND INSPECTING

Report the results of all tests and inspections conducted at the project site informally at the end of each shift. Submit written reports weekly. Deliver within three days after the end of each weekly reporting period. See Section 01 45 10 QUALITY CONTROL.

3.8.1 Field Testing Technicians

The individuals who sample and test concrete must have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.8.2 Preparations for Placing

Inspect foundation or construction joints, forms, and embedded items in sufficient time prior to each concrete placement to certify that it is ready to receive concrete.

3.8.3 Sampling and Testing

- a. Obtain samples and test concrete for quality control during placement. Sample fresh concrete for testing in accordance with ASTM C172/C172M. Make six test cylinders.
- b. Test concrete for compressive strength at 7 and 28 days for each design mix and for every 100 cubic yards of concrete. Test two cylinders at 7 days; two cylinders at 28 days; and hold two cylinders in reserve. Conform test specimens to ASTM C31/C31M. Perform

compressive strength testing conforming to ASTM C39/C39M.

- c. Test slump at the site of discharge for each design mix in accordance with ASTM C143/C143M. Check slump twice during each shift that concrete is produced for each strength of concrete required.
- d. Test air content for air-entrained concrete in accordance with ASTM C231/C231M. Test concrete using lightweight or extremely porous aggregates in accordance with ASTM C173/C173M. Check air content at least twice during each shift that concrete is placed for each strength of concrete required.
- e. Determine temperature of concrete at time of placement in accordance with ASTM C1064/C1064M. Check concrete temperature at least twice during each shift that concrete is placed for each strength of concrete required.

3.8.4 Action Required

3.8.4.1 Placing

Do not begin placement until the availability of an adequate number of acceptable vibrators, which are in working order and have competent operators, has been verified. Discontinue placing if any lift is inadequately consolidated.

3.8.4.2 Air Content

Whenever an air content test result is outside the specification limits, adjust the dosage of the air-entrainment admixture prior to delivery of concrete to forms.

3.8.4.3 Slump

Whenever a slump test result is outside the specification limits, adjust the batch weights of water and fine aggregate prior to delivery of concrete to the forms. Make the adjustments so that the water-cementitious material ratio does not exceed that specified in the submitted concrete mixture proportion and the required concrete strength is still met.

-- End of Section --

SECTION 03 31 30

MARINE CONCRETE

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 182	(2005; R 2017) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats
AASHTO R 80	(2017) Standard Practice for Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction
AASHTO T 358	(2017) Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 121R	(2008) Guide for Concrete Construction Quality Systems in Conformance with ISO 9001
ACI 201.2R	(2016) Guide to Durable Concrete
ACI 211.1	(1991; R 2009) Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 214R	(2011) Evaluation of Strength Test Results of Concrete
ACI 301	(2016) Specifications for Structural Concrete
ACI 304.2R	(2017) Guide to Placing Concrete by Pumping Methods
ACI 304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete

ACI 305R	(2010) Guide to Hot Weather Concreting
ACI 306R	(2016) Guide to Cold Weather Concreting
ACI 308.1	(2011) Specification for Curing Concrete
ACI 309R	(2005) Guide for Consolidation of Concrete
ACI 311.4R	(2005) Guide for Concrete Inspection
ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)
ACI 347R	(2014; Errata 1 2017) Guide to Formwork for Concrete
ACI SP-2	(2007; Abstract: 10th Edition) ACI Manual of Concrete Inspection
ACI SP-15	(2011) Field Reference Manual: Standard Specifications for Structural Concrete ACI 301-05 with Selected ACI References
ACI SP-66	(2004) ACI Detailing Manual
AMERICAN WELDING SOCIETY (AWS)	
AWS D1.4/D1.4M	(2011) Structural Welding Code - Reinforcing Steel
APA - THE ENGINEERED WOOD ASSOCIATION (APA)	
APA PS 1	(2009) Structural Plywood (with Typical APA Trademarks)
ASTM INTERNATIONAL (ASTM)	
ASTM A615/A615M	(2020) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A934/A934M	(2016) Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A1064/A1064M	(2017) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31/C31M	(2019a) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2018) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2020) Standard Test Method for

	Compressive Strength of Cylindrical Concrete Specimens
ASTM C42/C42M	(2020) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C78/C78M	(2018) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C94/C94M	(2020) Standard Specification for Ready-Mixed Concrete
ASTM C138/C138M	(2017a) Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C143/C143M	(2020) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2020) Standard Specification for Portland Cement
ASTM C157/C157M	(2017) Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C171	(2016) Standard Specification for Sheet Materials for Curing Concrete
ASTM C172/C172M	(2017) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2016) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C192/C192M	(2019) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2017a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C294	(2012; R 2017) Standard Descriptive Nomenclature for Constituents of Concrete Aggregates
ASTM C295/C295M	(2019) Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C311/C311M	(2018) Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
ASTM C457/C457M	(2016) Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete
ASTM C494/C494M	(2019) Standard Specification for Chemical Admixtures for Concrete
ASTM C496/C496M	(2017) Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C595/C595M	(2020) Standard Specification for Blended Hydraulic Cements
ASTM C618	(2019) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C666/C666M	(2015) Resistance of Concrete to Rapid Freezing and Thawing
ASTM C805/C805M	(2018) Standard Test Method for Rebound Number of Hardened Concrete
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM C989/C989M	(2018a) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1017/C1017M	(2013; E 2015) Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064/C1064M	(2017) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	(2017) Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1107/C1107M	(2020) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1152/C1152M	(2020) Standard Test Method for Acid-Soluble Chloride in Mortar and Concrete
ASTM C1157/C1157M	(2020) Standard Performance Specification for Hydraulic Cement
ASTM C1202	(2019) Standard Test Method for Electrical

	Indication of Concrete's Ability to Resist Chloride Ion Penetration
ASTM C1231/C1231M	(2015) Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders
ASTM C1240	(2020) Standard Specification for Silica Fume Used in Cementitious Mixtures
ASTM C1260	(2014) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602/C1602M	(2018) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C1610/C1610M	(2017) Standard Test Method for Static Segregation of Self-Consolidating Concrete Using Column Technique
ASTM C1611/C1611M	(2014) Standard Test Method for Slump Flow of Self-Consolidating Concrete
ASTM C1621/C1621M	(2017) Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D512	(2012) Chloride Ion in Water
ASTM D516	(2016) Standard Test Method for Sulfate Ion in Water
ASTM D1179	(2016) Standard Test Methods for Fluoride Ion in Water
ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2018) Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D3867	(2016) Standard Test Methods for Nitrite-Nitrate in Water

ASTM D6690 (2015) Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

ASTM E329 (2020) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 10MSP (2018) Manual of Standard Practice

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS SS-S-200 (Rev E; Am 1; Notice 1) Sealant, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement

1.2 DEFINITIONS

- a. "Atmospheric zone" is any portion of the waterfront structure above the splash zone.
- b. "Buried zone" is any portion of the structure permanently buried in soil.
- c. "Cementitious material" as used herein shall include portland cement and any pozzolanic material such as fly ash, natural pozzolans, ground granulated blast-furnace slag and silica fume.
- d. "Concrete System" is the term describing a structural element comprised of concrete, reinforcing steel and concrete cover.
- e. "Design strength" (f'_c) is the specified compressive strength of concrete at time(s) specified by Contracting Officer to meet structural design criteria. Typical duration is 28 days; however, the Contracting Officer and Engineer of Record are encouraged to consider specifying strength at 56 or 90 days. For concrete mixtures containing 35 percent fly ash or more, the duration shall be a minimum of 56 days.
- f. "Field test strength" (f_{cr}) is the required compressive strength of concrete to meet structural and durability criteria. Determine (f_{cr}) during mixture proportioning process.
- g. "High-volume fly ash concrete" has a minimum of 35 percent Class F fly ash as a partial replacement to portland cement.
- h. "Marine concrete" is all concrete that will be in contact with seawater or brackish water, tidal variations, splash, or spray from water in navigable waterways. Piles driven on land that extend below the water table that contains saltwater or brackish water shall be designed as marine concrete. Components of a marine structure that are permanently buried in soil shall be considered marine concrete. In addition, structures may need to be designed using these criteria even though they are not adjacent to the waterfront. For example, structures located several hundred yards from the waterfront often

deteriorate prematurely due to salt spray and salt fog brought to the structure by prevailing winds. An assessment of existing structures near the construction site can be an excellent indicator for the Engineer of Record and Owner to decide if the proposed structure should follow the guidelines for marine concrete.

- i. "Mass Concrete" is any concrete system that approaches a maximum temperature of 158 degrees F within the first 72 hours of placement. In addition, it includes all concrete elements with a section thickness of 3 feet or more regardless of temperature.
- j. "Mixture proportioning" is the process of designing concrete mixture proportions to enable it to meet the strength, durability and constructability requirements and of the project while minimizing the initial and life-cycle cost.
- k. "Mixture proportions" are the masses or volumes of individual ingredients used to make a unit measure (cubic yard or meter) of concrete.
- l. "Pozzolan" is a siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.
- m. "Process control sampling" is sampling and testing conducted by the Contractor to monitor the quality of materials or processes. Process control sampling is intended to indicate the quality of materials at critical steps in production that allow intervention prior to using a material on the project.
- n. "Quality Acceptance Limit" (QAL) is the limiting value of a test result that indicates acceptable material quality. Quality acceptance limits are based on design criteria that may be either upper-bound limits where smaller values indicate acceptable material, such as D_{oh} ; or lower-bound limits where larger values indicate acceptable material, such as compressive strength.
- o. "Quality acceptance sampling" is sampling and testing conducted by the Contractor, or an independent testing agency, to evaluate the quality of materials used on the project. Quality acceptance sampling is conducted at regular intervals identified as "lots" to represent the quality of that portion of the material used in the project.
- p. "Required compressive strength" ($f'c$) is the mean compressive strength of concrete required to meet structural criteria. The required strength is the mean concrete strength for tests of properly batched concrete at the age specified herein.
- q. "Service life" is the Owner's stated expectation for the number of years that the structure will function without needing major concrete rehabilitation. A service life of 75 years for pile supported piers, wharves and bridges is a reasonable objective. Service life is defined as the number of years before major restoration is necessary given minimal maintenance to the structure during its life. Major restoration is defined as extensive areas that require extensive repairs using a jack hammer or other destructive means to prepare the concrete for rehabilitation. Service life is further defined as the

summation of the corrosion initiation period (T_i) and the corrosion propagation period (T_p) for a given concrete system.

- r. "Service Life Modeling" in the context of this document refers to a methodology to predict the length of time in service at which a defined level of deterioration will occur. Service life modeling is not required in this specification.
- s. "Splash zone" is the portion of the structure just above the tidal zone. This portion of the structure is predominantly dry, but is likely to intermittently wet by wave action and wind driven spray. For the purposes of this specification, the splash zone is defined as follows:
 - (1) for locations protected by seawalls or otherwise sheltered from open-ocean waves, the 6 feet area just above the tidal zone;
 - (2) for unprotected locations, the 20 feet area just above the tidal zone.
- t. "Submerged zone" is defined as the submerged portion of the structure. For the purposes of this specification, any element or portion thereof that is located below Mean Lower Low Water (MLLW). In areas with minimal tides, it would be defined as that portion of the element below Mean Sea Level (MSL).
- u. "Supplemental Corrosion Protection" includes (but is not limited to) fusion-bonded epoxy-coated steel reinforcing, galvanized steel reinforcing, stainless reinforcing, corrosion inhibitors, barrier coatings to the concrete surface, and cathodic protection.
- v. "Supplementary cementing materials" (SCM) include coal fly ash, granulated blast-furnace slag, natural or calcined pozzolans, and ultra-fine coal ash when used in such proportions to replace the portland cement that result in considerable improvement to sustainability, durability and in some cases a reduction in initial cost.
- w. "Test Section" is a slab or wall separate from the main structure and constructed prior to main construction as an all inclusive demonstration of methods and materials. The adequacy of the Test Section must be approved by the owner's representative prior to construction of the project.
- x. "Tidal zone" is defined as the portion of the structure regularly wetted by wave action. For the purposes of this specification, any element or portion thereof that is located between Mean Lower Low Water (MLLW) and Mean Higher High Water (MHHW) is in the tidal zone. In areas with minimal tides, this would be defined as the area located between Mean Sea Level (MSL) and Mean High Water (MHW).

1.3 SUBMITTALS

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

SD-01 Preconstruction Submittals

Concrete Curing Plan

- Concrete Qualification Program
- Concrete Quality Control Program
- Concrete Placement and Compaction
- Concrete Pumping
- Curing Concrete Elements
- Laboratory Qualifications
- Quality Control Personnel Qualifications

SD-02 Shop Drawings

- Construction and Expansion Joints
- Reinforcing Steel

Reproductions of contract drawings are unacceptable.

SD-03 Product Data

- Admixtures
- Air Entraining
- Aggregates
- Corrosion Inhibitors
- Joint Filler
- Joint Sealants
- Materials for Curing Concrete
- Material Safety Data Sheets
- Non-Shrink Grout
- Preformed Joint Filler
- Reinforcing Bars
- Reinforcement and Protective Coating
- Reinforcement Supports
- Welded Wire Fabric

SD-05 Design Data

- Concrete Mixture Requirements
- Mixture Designs

SD-06 Test Reports

Air Entraining

Aggregates

Admixtures

Cement

Concrete Mixture Proportions

Concrete Test Reports

Fresh Concrete Properties

Hardened Concrete Properties

Reinforcing Bars

Reinforcement and Protective Coating

Silica Fume

Supplementary Cementing Materials

Water

SD-07 Certificates

Admixtures

Cementitious Materials

Cementitious Material Mill Certificates

Field Testing Technician and Testing Agency

SD-11 Closeout Submittals

Aggregate Moisture Content

Aggregate Sampling

Concrete Test Reports

Quality Control Charts

Daily Inspection Reports

Quality Team Meetings

Sampling Logs

1.4 MODIFICATION OF REFERENCES

Accomplish work in accordance with ACI publications except as modified herein. Consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may," wherever they appear. Interpret reference to the

"Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Contracting Officer.

1.5 DELIVERY, PLACING, STORAGE, AND HANDLING OF CONCRETE

Follow ACI 301, ACI 304R, and ASTM A934/A934M requirements and recommendations. Do not deliver concrete until vapor barrier, forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed.

1.6 CONCRETE QUALITY CONTROL

The objective of the concrete quality control program is for the Contractor to outline the procedures that will be used to construct a structure that will meet the project criteria. The Contractor shall develop and submit for approval a concrete quality control program in accordance with the guidelines of ACI 121R and as specified herein. The plan shall include approved laboratories. The Contractor shall provide direct oversight for the concrete qualification program inclusive of associated sampling and testing. If concrete cylinders tested during production indicate inadequate strength, excessive chloride ion penetration, or inadequate mixing, then the owner may require the Contractor to extract concrete core samples from the hardened concrete for analysis at Contractor's expense to assure that the quality of the concrete as placed and cured will satisfy the project criteria.

Develop and submit for approval a concrete quality control program in accordance with the guidelines of ACI 121R. Maintain a copy of ACI SP-15 and CRSI 10MSP at the project site.

1.6.1 Quality Control Personnel

The contractor shall submit for approval an organizational chart defining the quality control hierarchy, the responsibilities of the various positions, including the names and qualifications of the individuals in those positions.

Submit American Concrete Institute certification for the following:

- a. CQC personnel responsible for inspection of concrete operations.
- b. Lead Foreman or Journeyman of the Concrete Placing, Finishing, and Curing Crews.
- c. Field Testing Technicians: ACI Concrete Field Testing Technician, Grade I.
- d. Laboratory Testing Technicians: ACI Concrete Strength Testing Technician and Laboratory Testing Technician, Grade I or II.
- e. Petrographer: Bachelor of Science degree in geology or petrography, trained in petrographic examination of concrete aggregate according to ASTM C294 and ASTM C295/C295M and trained in identification of the specific deleterious processes and tests identified in this specification. Resume shall detail the education, training and experience related to the project-specific test methods and

deleterious materials and shall be submitted at least 20 days before petrographic and deleterious materials examination is to commence.

- f. Concrete Batch Plant Operator: National Ready Mix Concrete Association (NRMCA) Plant Manager Certification at the Plant Manager level.

1.6.1.1 Quality Manager Qualifications

The quality manager shall hold a current license as a professional engineer in a U.S. state or territory with experience on at least five similar projects. Evidence of extraordinary proven experience may be considered by the Contracting Officer as sufficient to act as the Quality Manager.

1.6.1.2 Field Testing Technician and Testing Agency

Submit data on qualifications of proposed testing agency and technicians for approval by the Contracting Officer prior to performing testing on concrete.

- a. Work on concrete under this contract shall be performed by an ACI Concrete Field Testing Technician Grade 1 qualified in accordance with ACI SP-2 or equivalent. Equivalent certification programs shall include requirements for written and performance examinations as stipulated in ACI SP-2.
- b. Testing agencies that perform testing services on reinforcing steel shall meet the requirements of ASTM E329.
- c. Testing agencies that perform testing services on concrete materials shall meet the requirements of ASTM C1077.

1.6.2 Laboratory Qualifications for Concrete Qualification Testing

The concrete testing laboratory shall have the necessary equipment and experience to accomplish required testing. The laboratory shall meet the requirements of ASTM C1077, and be Cement and Concrete Reference Laboratory (CCRL) inspected.

1.6.3 Laboratory Accreditation

Laboratory and testing facilities shall be provided by and at the expense of the Contractor. The laboratories performing the tests shall be accredited in accordance with ASTM C1077, including ASTM C78/C78M and ASTM C1260. The accreditation shall be current and shall include the required test methods, as specified.

- a. Aggregate Testing and Mix Proportioning: Aggregate testing and mixture proportioning studies shall be performed by an accredited laboratory and under the direction of a licensed/registered civil engineer in a U.S. state or territory, who shall sign all reports and designs.
- b. Acceptance Testing: Furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory. Furnish and maintain boxes or other facilities suitable for storing and curing the specimens at the site while in the mold within the temperature range stipulated by ASTM C31/C31M.

- c. Contractor Quality Control: All sampling and testing shall be performed by an approved, onsite, independent, accredited laboratory.

1.7 CONCRETE DURABILITY

1.7.1 Concrete Mixture Proportions

At least 60 days prior to concrete placement, submit concrete mixture proportions, ingredient material certificates and test data, and trial batch test data for each class of concrete proposed for use on the project. Submittal shall clearly indicate where each mixture will be used when more than one mixture design is submitted. Obtain approval from Contracting Officer prior to placement.

1.7.2 Concrete Design Requirements

Proportion concrete mixtures to meet the requirements listed in Table 1 in accordance with the procedures outlined in ACI 201.2R and ACI 211.1.

The mixture proportions for concrete shall be developed by the Contractor to produce the required compressive strength (f'c), drying shrinkage, durability, and constructability. The amount of cementitious material in the mixture can be minimized as long as the concrete still meets the mixture design requirements for durability and strength.

The mixture proportions and Water-Cementitious Materials Ratio for marine concrete shall be developed by the Contractor to produce the design strength (f'c) and to provide durability, workability, and mixture consistency to facilitate placement, compaction into the forms and around reinforcement without segregation or bleeding. The requirements for durability specified in Table 1 and Table 2 below shall be incorporated in the mixture proportions.

The use of silica fume is discouraged. Silica fume shall only be used for OCONUS (outside continental United States) projects where Class F fly ash and ground granulated blast furnace (GGBF) slag are not available, and when approved by the Contracting Officer. If needed, the mixture may contain a maximum of 7 percent silica fume by mass of total cementing material. Concrete mixtures containing any percentage of silica fume shall be evaluated at every 100 cubic yards) of concrete for the first 500 cubic yards), then every 500 cubic yards) thereafter to ensure that the silica fume is properly dispersed in hardened concrete samples. A qualified laboratory shall microscopically examine a sectioned sample and document the results. Provide at the Contractor's expense the services of a manufacturer's technical representative, experienced in mixing, proportioning, placement procedures, and curing of concrete containing silica fume.

The concrete mixture shall contain one of the CCM/SCM listed in Table 3, or a linear combination thereof. The minimum amount of portland cement is 50 percent of the total mass of cementitious material.

Air content: Concrete shall be air entrained and shall conform to the air limits specified in ACI 301 for exposure and the aggregate size used and tested in accordance with ASTM C231/C231M. The average spacing factor for three consecutive tests shall not exceed 0.008 in with no individual test exceeding 0.010 in as determined by ASTM C457/C457M. Variations outside the limits specified shall not be reason to reject the concrete in locations not subject to freeze-thaw conditions.

Slump: The concrete mixture shall be proportioned to have, at the point of deposit, a maximum slump of 4 inches as determined by ASTM C143/C143M when admixtures that affect slump are not used. Where an ASTM C494/C494M, Type F or G admixture is used, the slump after the addition of the admixture shall not exceed 8 inches. Slump tolerances shall comply with the requirements of ACI 117.

Table 1 - Concrete Design Requirements		
Prescriptive requirements	Minimum	Maximum
ASTM C666/C666M Method A Durability Factor at 300 cycles	90	--
Concrete ASTM C157/C157M Drying Shrinkage percent, at 28 days except for high volume fly ash (HVFA) at 56 days.	--	0.05 percent
Initial acid-soluble chloride content in cast-in-place concrete per ASTM C1152/C1152M, percent/cement	--	0.10
Initial acid-soluble chloride content in prestressed concrete determined following ASTM C1152/C1152M, percent/cement	--	0.08
Average spacing factor for three specimen following ASTM C457/C457M inch	--	0.008 with no value greater than 0.010
Chloride ion penetrability ASTM C1202 at 56 days, Coulombs	--	1000
Alternatively to ASTM C1202, the concrete surface resistivity AASHTO T 358 at 56 days can be measured, kohm-cm	20	--

Table 2 - Concrete Quality Requirements		
Zone	Exposure Condition	Maximum W/CM
Submerged zone, Tidal Splash Zone	(a) Directly exposed to salt water	0.40
	(b) Subject to severe abrasion	0.40
Atmospheric Zone	(a) Directly exposed to marine atmosphere	0.40
	(b) Protected from direct exposure to marine atmosphere	0.45

Table 2 - Concrete Quality Requirements		
Buried Zone	(a) Permanently buried in soil	0.40

Table 3 - Supplementary Cementing Material Requirements	
SCM	Minimum Content
Class N Pozzolan or Class F Fly Ash SiO ₂ plus Al ₂ O ₃ plus Fe ₂ O ₃ > 65 percent or where exposed to sulphates as defined in ACI 318 Table 4.2.1	30 percent
Class N Pozzolan or Class F Fly Ash SiO ₂ plus Al ₂ O ₃ plus Fe ₂ O ₃ greater than 70 percent	25 percent
Class N Pozzolan or Class F Fly Ash SiO ₂ plus Al ₂ O ₃ plus Fe ₂ O ₃ greater than 80 percent	20 percent
Class N Pozzolan or Class F Fly Ash SiO ₂ plus Al ₂ O ₃ plus Fe ₂ O ₃ greater than 90 percent	15 percent
Ultra fine fly ash/Pozzolan	7 percent
Ground granulated blast-furnace slag	40 percent

1.7.3 Concrete Mixture Qualifications

1.7.3.1 Previously Approved Concrete Mixtures

For identical concrete mixtures previously approved for use within the past 18 months, the previous mixture qualification submittal may be re-submitted without further trial batch testing if accompanied by:

- A copy of the prior approvals indicating the project name, project number, and location.
- Ingredient material test data conducted within 12 months of the submittal date.
- Copies of the previously approved trial batch test data.
- A log containing at least 15 sequential test results with the calculated mean and standard deviation of the production concrete for air content, and compressive strength.

If the Contractor changes material type, class, sources, or suppliers; chemical composition; and/or mix proportions, the Contractor shall provide a written opinion of the significance of the change(s). The change(s) may require additional testing at the discretion of the Contracting Officer in consultation with the agency's Subject Matter Expert in Concrete Materials.

1.7.3.2 New Concrete Mixtures

- Submit complete ingredient material test data, including applicable reference specifications. Submit additional data regarding concrete aggregates if the source of aggregate changes.

- b. Submit copies of test reports by independent test lab conforming to ASTM C1077 showing that the mixture has been successfully tested to produce concrete with the properties specified and that mixture will be suitable for the job conditions as described. Test reports shall be submitted along with the concrete mixture proportions. Obtain approval before concrete placement.
- c. Test a minimum of one trial batch of production concrete. If batching facilities are located such that the haul-time will exceed 30 minutes, a simulated haul time shall be included in the trial batch.
 - (1) Test and report fresh concrete property tests of each trial batch as follows:
 - (a) Slump in accordance with ASTM C143/C143M.
 - (b) Air content in accordance with ASTM C231/C231M or ASTM C173/C173M.
 - (c) Unit weight in accordance with ASTM C138/C138M.
 - (d) Temperature in accordance with ASTM C1064/C1064M.
 - (2) Cast specimens, test, and report hardened concrete property tests of each trial batch as follows:
 - (a) Compressive strength at 3, 7, 28, 56 and 90 days in accordance with ASTM C39/C39M. Use of unbonded caps in accordance with ASTM C1231/C1231M is permitted.
 - (b) Drying shrinkage.
 - (c) Tensile strength (if required).
 - (d) Freeze-thaw durability factor (if required) shall be determined as the mean of six test specimens comprised of at least two specimens cast from each batch.
 - (e) Initial chloride ion content.
 - (f) Spacing factor in accordance with ASTM C457/C457M.
 - (g) Chloride ion penetrability in accordance with ASTM C1202.
 - (3) Moist cure concrete intended for cast-in-place applications in accordance with the standard moist curing conditions described in ASTM C192/C192M unless otherwise specified. Moist cure concrete intended for precast applications in the manner proposed for use on the project.
- d. For concrete mixtures that are proposed to contain corrosion inhibitors, the Contractor shall submit the chloride ion penetration values from at least one batch of the mixture with and without the admixture making appropriate adjustments to maintain constant water to cementitious materials ratio. The purpose is to establish a correlation with respect to an adjusted value for production chloride ion penetration.

1.7.4 Concrete Qualification Program

1.7.4.1 Fresh Concrete Properties

- a. Air Content: The mixture shall be proportioned and tested for qualification.
- b. Slump: The mixture shall be proportioned and tested for qualification.
- c. Self-Consolidating Concrete: When self-consolidating concrete is proposed for use, the mixture shall be proportioned and tested for qualification using:
 - (1) ASTM C1611/C1611M slump flow shall not be greater than 24 inches, with visual stability index not greater than 1.
 - (2) ASTM C1621/C1621M Passing ability using the J-ring. Spread within 1 inch less than the slump flow.
 - (3) Passing ability using the L-Box between 4 and 8 seconds
 - (4) ASTM C1610/C1610M, static segregation shall be less than 4.0 percent.

For process control sampling, the slump flow limit as determined by ASTM C1611/C1611M shall be no greater than 24 inches and the visual stability index limit shall be no greater than 1.0.

1.7.4.2 Hardened Concrete Properties

- a. Compressive Strength: Provide a design mix to produce a minimum compressive strength(f'_c)of 5,000 psi at 56 days. Determine compressive strength (f'_{cr}) for qualification of concrete mixtures and for quality acceptance testing. A compressive strength test result is defined as the mean of three properly conducted tests on 4 by 8 inch cylinders in accordance with ASTM C39/C39M. Alternatively and for concrete mixtures containing a maximum size aggregate greater than 1 inch, a strength test result shall be defined as the mean of two properly conducted 28-day tests on 6 by 12 inch cylindrical specimens in accordance with ASTM C39/C39M. In addition:
 - (1) Specified Compressive Strength: For structural concrete elements exposed in a marine environment, the minimum specified 56 day design strength is denoted as (f'_c). Strength of concrete containing 35 percent or more fly ash shall be specified at a minimum of 56 days.
 - (2) Required Average Strength: The concrete shall be proportioned such that the minimum required average compressive strength (f'_{cr}) exceeds the specified design strength (f'_c) as per ACI 301.
 - (3) The average compressive strength may not exceed the specified strength at the same age by more than 20 percent unless approved by the Engineer of Record.
 - (4) Strength of any individual concrete placement shall be considered satisfactory if both the following requirements are met:
 - (a) The arithmetic mean of any three consecutive lot strength

tests is between 1.0 and 1.2 f'c, and;

(b) No individual strength test result is less than 0.90 f'c.

(5) In the event that a placement is represented by single sampling lot, strength shall be considered satisfactory if either:

(a) The mean of the initial test is between 1.0 and 1.2 f'c, or;

(b) The mean of the initial test and retest is between 1.0 and 1.2 f'c, and neither strength test result is less than 0.90 f'c.

- b. Drying Shrinkage: Determine drying shrinkage for qualification of concrete mixtures prior to the fabrication of the Test Section and from samples made during the fabrication of the Test Section (see the paragraph TEST SECTION). No test results shall exceed the limits in Table 1. A drying shrinkage test result shall be the mean value from three or more individual specimens constituting a test set. If an individual specimen's measurements deviate from the mean value by more than 0.009 percent length change, the specimen's measurements shall be discarded and a new average established. Casting more than three specimens for each set is permitted. Test procedures and test specimens shall conform to the following:

Drying shrinkage specimens, typically 3 by 3 by 11.25 inch prisms for 1 inch maximum size aggregate or smaller, shall be fabricated, cured, dried, and measured at 28 days in the manner delineated in ASTM C157/C157M. Mixtures containing 50 percent or more supplementary cementing materials shall meet the shrinkage criteria at 56 days.

- c. Tensile strength: Determine splitting-tensile strength of concrete only for qualification of concrete mixtures. Determine and report the splitting-tensile strength result of each class of concrete in accordance with ASTM C496/C496M as the mean of three properly conducted tests at the age specified for f'c and again at 90-days age for information only.
- d. Freeze-thaw durability: Determine the freeze-thaw durability factor of concrete for qualification of concrete mixtures, if required by environmental conditions. Determine and report the freeze-thaw durability factor of each class of concrete in accordance with ASTM C666/C666M Method-A. Start testing after 28 days of moist curing. The minimum acceptable durability factor shall be as per Table 1.
- e. Acid Soluble Chloride Ion Content: Determine the chloride ion content only for qualification of concrete mixtures. Determine acid soluble chloride ion content in accordance with ASTM C1152/C1152M. The limits for allowable acid-soluble chloride ion concentrations in hardened concrete are listed in Table 1.
- f. Chloride Ion Penetrability: Determine the resistance of concrete to the penetration of chloride ions in accordance with ASTM C1202 during the prequalification phase. The average of three samples shall meet the limit specified Table 1.

1.7.4.3 Supplemental Corrosion Protection

Requirements for the use of supplemental corrosion protection, if any,

shall be indicated on the plans.

1.8 CONCRETE

1.8.1 Drawings

Fabrication Drawings for concrete reinforcement.

1.8.1.1 Reinforcing Steel

ACI SP-66. Provide bending and cutting diagrams, assembly diagrams, splicing placement and laps of bars, shapes, dimensions, and details of bar reinforcing, accessories, and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing bars. Only complete drawings will be accepted.

1.8.1.2 Joints

Submit a plan indicating the type and location of each construction joint. Final joint locations are subject to Government approval.

1.8.2 Pre-Construction Submittals

1.8.2.1 Curing Concrete Elements

Submit proposed materials and methods for curing concrete elements.

1.8.2.2 Concrete Curing Plan

Submit proposed materials, methods, and duration for curing and cooling concrete elements in accordance with ACI 308.1.

Minimum moist curing duration shall be seven days.

Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing are subject to approval by the Contracting Officer.

1.8.2.3 Concrete Placement and Compaction

- a. Submit technical literature for equipment and methods proposed for use in placing concrete. Include concrete pumping or conveying equipment including type, size and material for pipe, valve characteristics, and the maximum length and height concrete will be pumped. No adjustments shall be made to the mixture design to facilitate pumping.
- b. Submit technical literature for equipment and methods proposed for vibrating and compacting concrete. Submittal shall include technical literature describing the equipment including vibrator diameter, length, frequency, amplitude, centrifugal force, and manufacturer's description of the radius of influence under load. Where flat work is to be cast, provide similar information relative to the proposed compacting screed or other method to ensure dense placement.

1.8.2.4 Concrete Report

Provide a Report inclusive of materials and methods used, test results, and the field test strength (fcr) for concrete that shows compliance with the structural and durability requirements.

1.8.2.5 Preconstruction Testing of Materials

All sampling and testing shall be performed by, and at the expense of, the Contractor. Use an approved commercial laboratory or, for cementitious materials and chemical admixtures, a laboratory maintained by the manufacturer of the material. No material shall be used until notice of acceptance has been given. The Contractor will not be entitled to any additional payment or extension of time due to failure of any material to meet project requirements, or for any additional sampling or testing required. Additional tests may be performed by the Government at the discretion of the Contracting Officer; such Government testing will not relieve the Contractor of any testing responsibilities.

1.8.2.6 Material Safety Data Sheets

Submit Material Safety Data Sheets (SDS) for all materials that are regulated for hazardous health effects. Prominently post the SDS at the construction site.

1.8.2.7 Mixture Designs

Provide a detailed report of materials and methods used, test results, and the field test strength (fcr) for marine concrete required to meet structural and durability requirements.

1.8.3 Sampling

The Contractor shall be responsible for conducting concrete production process control sampling and testing in compliance with this specification.

1.8.3.1 Ingredient Material Sampling

- a. Cementitious material mill certificates and test reports shall be provided for each shipment. Record the date delivered and quantity of material represented by the certificate.
- b. Conduct and log aggregate moisture content at a minimum frequency of twice daily for each day's production. Use of moisture sensors in storage bins is recommended practice, but does not satisfy this requirement.
- c. Aggregate sampling for gradation and dry-rodded unit weight shall be conducted for each 100 tons delivered for use on the project, or portion thereof.

1.8.4 Reporting

1.8.4.1 Daily Inspection Reports

Contractor shall prepare daily inspection reports for all inspection activities such as base preparation, formwork preparation, reinforcement installation, concrete placement log, and temperature control activities. Submit sample forms and describe the procedure used to organize, archive,

and retrieve inspection records in the Quality Program submittal.

1.8.4.2 Sampling Logs

Contractor shall maintain a concrete placement log as an electronic spreadsheet or database identifying each placement date, placement location, volume of concrete, batch ticket numbers, lot identification code, fresh concrete properties, compressive strength results, transport properties, inspection comments, and acceptance status. Contractor shall provide/transmit the concrete testing log to the Contracting Officer weekly. The Contractor shall provide copies of supporting documents for any placement requested by the Contracting Officer immediately upon request.

1.8.4.3 Quality Control Data

The Contractor shall prepare, maintain, and report separate quality control charts illustrating the slump, temperature, plastic air content, compressive strength, and chloride ion penetration test results for each lot of each concrete mixture used on the project.

1.8.4.4 Quality Team Meetings

The contractor shall conduct regular quality control team meetings to review plans for future placements, review test results, and discuss dispensation of non-conforming materials. The quality team shall include the Contractor's quality manager, the project manager, the project superintendent, the Contracting Officer, and representatives of the testing agency and concrete producer, or approved substitutes. It is recommended that the meetings be held on a weekly or bi-weekly basis during the service life modeling submittal phases and then monthly, as the construction progresses. The transition from the weekly or bi-weekly meetings to the monthly meetings shall be with the Contracting Officer's approval.

The Contractor shall prepare quality control team meeting minutes for each meeting. The minutes shall include the date of each meeting, attendees, key discussion points, findings, recommendations, assigned tasks, assigned personnel, task completion dates, and status of each task.

1.8.4.5 Non-conforming materials

The exact location of non-conforming concrete as placed shall be identified and the Contracting Officer and Engineer of Record shall be notified immediately. There are numerous possible indicators that the as-placed concrete is non-conforming including (but not limited to) excessive compressive strength, inadequate compressive strength, excessive slump, chloride ions penetration out of limits, excessive voids and honeycombing, and concrete delivery records that indicate excessive time between mixing and placement and/or excessive water was added to the mixture during delivery and placement. Any of these indicators alone are sufficient reason for the Contracting Officer to request additional sampling, testing, and service life modeling to quantify the concrete properties. If justified, cores may be extracted for testing, and an investigation into the cause for non-conformance shall be conducted. The investigation may include statistical analysis of the test data collected to date; appropriateness of the pre-defined QAL based on statistical analysis of production data; the impact of the non-conforming material on the structure strength and/or service life; and recommendations for

concrete production process improvements, mitigation, or remediation, as appropriate.

Investigations into non-conforming materials shall be conducted at the Contractor's expense. The Contractor shall be responsible for the investigation and shall make written recommendations to adequately mitigate or remediate the non-conforming material. The Contracting Officer may accept, accept with reduced payment, require mitigation, or require removal and replacement of non-conforming material at no additional cost to the Government.

1.8.5 Test Reports

Concrete Test Reports shall be identified by a sequential report identification code. Each report shall identify the placement date, placement location, weather, name of testing technician, time of sampling, batch ticket number, fresh concrete test results, and hardened concrete test results.

1.8.5.1 Concrete Mixture Requirements

- a. Submit copies of test reports conforming to ASTM C1077 showing that the mixture has been successfully tested to produce concrete with the properties specified and that mixture will be suitable for the job conditions. Test reports shall be submitted along with the concrete mixture proportions. Obtain approval before concrete placement.
- b. Fully describe the processes and methodology whereby mixture proportions were developed and tested and how proportions will be adjusted during progress of the work to achieve, as closely as possible, the designated levels of relevant properties.

1.8.5.2 Supplementary Cementing Materials

Submit test results in accordance with ASTM C618 and the physical and chemical analysis in accordance with applicable ASTM standards such as ASTM C311/C311M for fly ash. Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the supplementary cementing materials used on the projects meets the ASTM criteria and the report on file is never older than 6 months.

1.8.5.2.1 Ground Granulated Blast-Furnace Slag

Submit test results in accordance with ASTM C989/C989M for ground granulated blast-furnace slag. Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the report on file is never older than 6 months.

1.8.5.2.2 Ultra Fine Fly Ash or Pozzolan

Submit test results in accordance with ASTM C618 as a Class F fly ash or Class N pozzolan with the following additional requirements:

- a. The strength activity index at 28 days shall be at least 95 percent of the control.
- b. The average particle size shall not exceed 6 microns.

c. The sum SiO_2 plus Al_2O_3 plus Fe_2O_3 shall be greater than 77 percent.

Submit test results performed within 6 months of submittal date. Update this report during construction as necessary to assure that the report on file is never older than 6 months.

1.8.5.3 Silica Fume

Submit test results in accordance with ASTM C1240 for silica fume. Data shall be based upon tests performed within 6 months of submittal. Update this report during construction as necessary to assure that the report on file is never older than 6 months.

1.8.5.4 Aggregates

Aggregate samples shall be obtained in accordance with ASTM D75/D75M and shall be representative of the materials to be used for the project. Submit test results for aggregate quality in accordance with ASTM C33/C33M, and the combined gradation curve proposed for use in the work and used in the mixture qualification, and ASTM C295/C295M for results of petrographic examination. Confirm that the potential for alkali-silica reaction are within allowable limits by conducting tests in accordance with ASTM C1260. Submit results of all tests during progress of the work in tabular and graphical form as noted above, describing the cumulative combined aggregate grading and the percent of the combined aggregate retained on each sieve. Submit test results performed within 12 months of submittal date.

1.8.5.5 Admixtures

Submit test results in accordance with ASTM C494/C494M and ASTM C1017/C1017M for concrete admixtures, ASTM C260/C260M for air-entraining admixture, and manufacturer's literature and test reports for corrosion inhibitors and anti-washout admixture. Submitted data shall be based upon tests performed within 6 months of submittal. Submit certified copies of test results for the specific lots or batches to be used on the project. Test results shall be not more than 6 months old prior to use in the work. Chemical admixtures that have been in storage at the project site for longer than 6 months or that has been subjected to freezing will be retested at the expense of the Contractor.

1.8.5.6 Portland Cement

Portland cement, ground granulated blast furnace (GGBF) slag, and pozzolan will be accepted on the basis of manufacturer's certification of compliance, accompanied by mill test reports showing that the material in each shipment meets the requirements of the specification under which it is furnished. Mill test reports shall be no more than 1 month old, prior to use in the work. No cementitious material shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious material may be subjected to check testing by the Government from samples obtained at the mill, at transfer points, or at the project site. If tests prove that a cementitious material that has been delivered is unsatisfactory, it shall be promptly removed at Contractor's expense from the site of the work. Cementitious material that has not been used within 6 months after testing shall be retested at the Contractor's expense and shall be rejected if test results are not satisfactory. Submit test results in accordance with ASTM C150/C150M portland cement and/or ASTM C595/C595M and ASTM C1157/C1157M for blended cement.

1.8.5.7 Testing During Construction

During construction, the Contractor is responsible for sampling and testing aggregates, cementitious materials, and concrete as specified herein. The Government will sample and test concrete and ingredient materials as considered appropriate. Provide facilities and labor as may be necessary for procurement of representative test samples. Testing by the Government will in no way relieve the Contractor of the specified testing requirements.

1.8.5.8 Acceptability of Work

The materials and the structure itself will be accepted on the basis of tests made by the Contractor and shall be in compliance with the criteria herein. The Government may make check tests at its expense to validate the results of the Contractor's testing. Testing performed by the Government will in no way relieve the Contractor from the specified testing requirements.

PART 2 PRODUCTS

2.1 CEMENTITIOUS MATERIALS

Cementitious materials shall be portland cement or cement blended with supplementary cementing materials. New submittals are required when the cementitious materials change sources or types.

The Contractor shall provide cementitious materials meeting the requirements of the applicable specification, and as modified herein. Provide mill certificates and test results conducted within six-months of the submittal date as part of the concrete mixture qualification submittal.

Provide a single manufacturer of cementitious material for each type of cement and supplementary cementing materials supplied to the project.

2.1.1 Portland Cement

Provide portland cement conforming to ASTM C150/C150M, Type II, low alkali with tri-calcium aluminates (C3A) content less than 10 percent and a maximum cement-alkali content of 0.80 percent Na₂O_e (sodium oxide equivalent). Type III cement shall be used only with concurrence of the agency's Subject Matter Expert in Concrete Materials. When HVFA mixtures are specified, they should be blended with Type II portland cement. HVFA is required instead of using Type V cement in high-sulfate areas. Low alkali cement may be required if the proposed aggregates are found to be expansive.

ASTM C150/C150M cements shall be combined with supplementary cementing materials in the concrete mixture.

2.1.2 Blended Cements

Blended cement shall conform to ASTM C595/C595M, Type IP or IS, including the optional requirement for mortar expansion and sulfate soundness and consist of a mixture of ASTM C150/C150M Type I, or Type II cement and a supplementary cementing material. The slag added to the Type IS blend shall be ASTM C989/C989M ground granulated blast-furnace slag. The pozzolan added to the Type IP blend shall be ASTM C618 Class F and shall

be interground with the cement clinker. The manufacturer shall state in writing that the amount of pozzolan in the finished cement will not vary more than plus or minus 5 mass percent of the finished cement from lot-to-lot or within a lot. The percentage and type of mineral admixture used in the blend shall not change from that submitted for the aggregate evaluation and mixture proportioning.

2.1.3 Pozzolan

2.1.3.1 Fly Ash

Fly ash shall conform to ASTM C618, Class F, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 6 percent. Class F fly ash for use in mitigating Alkali-Silica Reactivity shall have a Calcium Oxide (CaO) content of less than 8 percent and a total equivalent alkali content less than 1.5 percent. Add with cement.

2.1.3.2 Raw or Calcined Natural Pozzolan

Natural pozzolan shall be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 3 percent. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a Calcium Oxide (CaO) content of less than 13 percent and total equivalent alkali content less than 3 percent.

2.1.3.3 Ultra Fine Fly Ash and Ultra Fine Pozzolan

Ultra Fine Fly Ash (UFFA) and Ultra Fine Pozzolan (UFP) shall conform to ASTM C618, Class F or N, and the following additional requirements:

- a. The strength activity index at 28 days of age shall be at least 95 percent of the control specimens.
- b. The average particle size shall not exceed 6 microns.
- c. The sum of $\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$ shall be greater than 77 percent.

2.1.4 Ground Granulated Blast-Furnace (GGBF) Slag

Ground Granulated Blast-Furnace Slag shall conform to ASTM C989/C989M, Grade 100 or Grade 120. Add with cement.

2.1.5 Silica Fume

Silica fume shall conform to ASTM C1240, including the optional limits on reactivity with cement alkalis. Silica fume may be furnished as a dry, densified material or as slurry. Proper mixing is essential to accomplish proper distribution of the silica fume and avoid agglomerated silica fume, which can react with the alkali in the cement resulting in premature and extensive concrete damage. Supervision at the batch plant, finishing, and curing is essential. Provide at the Contractor's expense the services of a manufacturer's technical representative, experienced in mixing, proportioning, placement procedures, and curing of concrete containing silica fume. This representative must be present on the project prior to and during at least the first 4 days of concrete production and placement using silica fume. A High Range Water Reducer (HRWR) shall be used with silica fume. Finishing may be more difficult. Proper curing is essential.

because there is a tendency for plastic shrinkage cracking.

2.1.6 Supplementary Cementitious Materials (SCM) Content

The concrete mix shall always contain supplementary cementing materials whether or not the aggregates are found to be reactive in accordance with the paragraph AGGREGATES. Concrete mixtures shall be designed and proportioned to meet the requirements for strength, constructability, shrinkage, and durability.

2.2 AGGREGATES

Comply with ASTM C33/C33M Class 4S, except as modified herein.

The quantities to be retained on each sieve may be adjusted only where available aggregates are elongated or slivered and cause interference with mix mobility, or available aggregate gradations do not comply with the 18-8 requirement. When necessary to satisfy local conditions and when permitted, the combined aggregate percentages may be changed to not more than 22 percent nor less than 6 percent retained on any individual sieve. The combined aggregates in the mixture (coarse, intermediate, and fine) shall be well graded with no more than 18 percent nor less than 8 percent of the combined aggregate retained on any individual sieve, unless satisfactory performance can be demonstrated. The No. 50 sieve may have less than 8 percent retained; sieves finer than No. 50 shall have less than 8 percent retained, and the coarsest sieve may have less than 8 percent retained. Use intermediate sizes for blending where necessary, to provide a well graded combined aggregate.

- a. Provide gradation of individual aggregate sizes using standard concrete aggregate sieves including 1-1/2 inches, one inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, and No. 100.
- b. Provide aggregates for exposed concrete from one source. Aggregate reactivity shall be limited per the paragraph AGGREGATES. Provide aggregate containing no deleterious material properties as identified by ASTM C295/C295M.
- c. Where a size designation is indicated, that designation indicates the nominal maximum size of the coarse aggregate.
- d. Aggregate tests shall be conducted within 6 months from the date of concrete mixture submittal.
- e. Provide ASTM C1260 or ASTM C1567 test results conducted with 6 months of the submittal date showing the proposed coarse and fine aggregates are either: innocuous to alkali silica reaction; or that reactivity has been mitigated by the proposed cementitious materials as modified herein. Maximum allowable expansion is 0.08 percent at 14 days per ASTM C1260. If this is not met, then maximum allowable expansion for the proposed concrete mixture/s shall be 0.08 percent at 14 days per ASTM C1567. All aggregate sources shall be tested. Also, provide documentation that the aggregate has no history of chemical deterioration in concrete. Fine and coarse aggregates to be used in all concrete shall be evaluated and tested for alkali-aggregate reactivity. Both coarse aggregate size groups shall be tested.
- f. Should the test data indicate a potential risk of alkali-aggregate reaction, the aggregate(s) shall be rejected or procedures from

AASHTO R 80 shall be followed.

2.3 WATER

Water shall comply with the requirements of ASTM C94/C94M and ASTM C1602/C1602M, except that the chloride and sulfate limits as tested in accordance with ASTM D512 and ASTM D516 shall not exceed 500 parts per million chloride ion and not more than 1000 parts per million of sulfate ion as SO₄. Water shall be free from injurious amounts of oils, acids, alkalis, salts, and organic materials. Where non-potable water or water from reprocessed concrete is proposed for use in the work, submit results of tests in accordance with ASTM C1602/C1602M. Submit test results in accordance with ASTM D512 and ASTM D516.

2.4 ADMIXTURES

- a. Provide certifications that chemical admixtures comply with the requirements shown in Table 4 and are compatible with each other. Use admixtures in accordance with manufacturer's recommendations, as appropriate for the climatic conditions and construction needs.
- b. Do not use calcium chloride or admixtures containing chloride ion content in more than trace amounts from impurities in admixture ingredients or potable water. Provide maximum concentrations of corrosion-inducing chemicals as shown in Table 4. For concrete that may be in contact with prestressing steel tendons, the concentration shall not exceed 60 percent of the limits given in Table 4. For the concentration in grout for prestressing ducts, do not exceed 25 percent of the limits in Table 4.

Table 4 - Limits on Corrosion-Inducing Chemicals		
Chemical*	Limits, Percent**	Test Method
Chlorides	0.10	ASTM D512
Fluorides	0.10	ASTM D1179
Nitrates	0.17	ASTM D3867
* Limits refer to water-soluble chemicals		
** Limits are expressed as a percentage of the mass of the total cementitious materials.		

- c. The total alkali contribution of chemical admixtures shall not increase the total sodium-oxide equivalent content of the concrete mixture by more than 0.5 lb/yd³.

2.4.1 Air Entraining

Provide air entraining admixtures conforming to ASTM C260/C260M

2.4.2 Accelerating

ASTM C494/C494M, Type C.

2.4.3 Retarding

ASTM C494/C494M, Type B, D, or G.

2.4.4 Water Reducing

ASTM C494/C494M, Type A, E, or F.

High Range Water Reducer (HRWR) shall be ASTM C494/C494M, Type F and ASTM C1017/C1017M.

2.4.5 Corrosion Inhibitors

Corrosion inhibitors are considered "supplemental corrosion protection". If used, adjust the quantity of concrete mixing water for the mass of water in the admixture. Accelerating and set adjusted versions are acceptable. Concrete setting time and mixture workability shall be evaluated.

2.5 NON-SHRINK GROUT

ASTM C1107/C1107M.

2.6 MATERIALS FOR FORMS

Provide wood, plywood, or steel. Use plywood or steel forms where a smooth form finish is required. Lumber shall be square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects.

Plywood: APA PS 1, B-B concrete form panels or better. Steel form surfaces shall not contain irregularities, dents, or sags.

2.6.1 Form Ties and Form-Facing Material

- a. Provide a form tie system that does not leave mild steel after break-off or removal any closer than 2 inches from the exposed surface. Do not use wire alone. Form ties and accessories shall not reduce the effective cover of the reinforcement.
- b. Form-facing material shall be structural plywood or other material that can absorb air and some of the high water-cementitious materials ratio surface paste that may be trapped in pockets between the form and the concrete. Maximum reuse is three times. Provide forms with a form treatment to prevent bond of the concrete to the forms. Use a controlled permeability form liner in strict accordance with the manufacturer's recommendations.

2.7 REINFORCEMENT

2.7.1 Reinforcing Bars

ACI 301 unless otherwise specified and shall meet the design yield strength and ductility requirements. Deformed reinforcing bars meeting the requirements of ASTM A615/A615M with the bars marked A, Grade 60.

The reinforcing selected shall match the structural properties of the reinforcing specified. Alternative reinforcing bars shall have similar structural properties to the specified reinforcing and may be used with

the Contracting Officer's approval.

2.7.1.1 Reinforcement and Protective Coating

If applicable, provide coating manufacturer's and coating applicator's test data sheets certifying that applied coating meets the requirements of the concrete system specified on the Plans.

2.7.2 Welded Wire Fabric

Comply with ASTM A1064/A1064M carbon steel. Provide flat sheets of welded wire fabric for slabs and toppings.

2.7.3 Wire

Comply with ASTM A1064/A1064M carbon steel.

2.8 ACCESSORY MATERIALS

2.8.1 Materials for Curing Concrete

2.8.1.1 Impervious Sheeting

ASTM C171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.

2.8.1.2 Pervious Sheeting

AASHTO M 182 or carpet covering the free surface and kept continuously wet throughout the curing period.

2.8.1.3 Liquid Membrane-Forming Compound

Comply with ASTM C309, white-pigmented, Type 2, Class B.

2.8.2 Expansion/Contraction Joint Filler

Comply with ASTM D1751 or ASTM D1752, 1/2 inch thick unless otherwise indicated.

2.8.3 Joint Sealants

2.8.3.1 Horizontal Surfaces

Horizontal surfaces are defined as all surfaces with a 3 percent maximum slope. ASTM D6690 or ASTM C920, Type M, Class 25, Use T.

2.8.3.2 Vertical Surfaces

Vertical surfaces are defined as all surfaces with a slope greater than 3 percent. ASTM C920, Type M, Grade NS, Class 25, Use T. FS SS-S-200, no sag.

PART 3 EXECUTION

3.1 FORMS

- a. Provide formwork with clean-out openings to permit inspection and removal of debris. Formwork shall be gasketed or otherwise rendered

sufficiently tight to prevent leakage of paste or grout under heavy, high-frequency vibration. Use a release agent that does not cause surface dusting. Limit reuse of plywood to no more than three times. Reuse may be further limited by the Contracting Officer if it is found that the pores of the plywood are clogged with paste so that the wood does not absorb air and some of the high water-cementitious materials ratio paste that may be trapped in pockets between the form and the concrete.

- b. Comply with ACI 301. Set forms rigidly, mortar-tight, and true to line and grade. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch unless otherwise indicated. Forms submerged in water shall be watertight.
- c. Patch form tie holes with a non-shrink patching material in accordance with the manufacturer's recommendations and subject to approval.

3.1.1 Coating

Before concrete placement, coat the contact surfaces of forms with a no staining mineral oil, no staining form coating compound, or two coats of nitrocellulose lacquer. Do not use mineral oil on forms for surfaces to which adhesive, paint, or other finish material is to be applied.

3.1.2 Removal of Forms and Supports

After placing concrete, forms shall remain in place for the time periods specified in ACI 347R, except for concrete placed underwater, forms shall remain in place a minimum of 48 hours. Prevent concrete damage during form removal.

3.1.2.1 Special Requirements for Reduced Time Period

Forms may be removed earlier than specified if ASTM C39/C39M test results of field-cured samples from a representative portion of the structure or other approved and calibrated non-destructive testing techniques show that the concrete has reached a minimum of 85 percent of the design strength.

3.1.3 Reshoring

Do not allow construction loads to exceed the superimposed load that the structural member, with necessary supplemental support, is capable of carrying safely and without damage. Reshore concrete elements where forms are removed prior to the specified time period. Do not permit elements to deflect or accept loads during form stripping or reshoring. Forms on columns, walls, or other load-bearing members may be stripped after 2 days if loads are not applied to the members. After forms are removed, slabs and beams over 10 feet in span and cantilevers over 4 feet shall be reshored for the remainder of the specified time period in accordance with paragraph REMOVAL OF FORMS AND SUPPORTS. Perform reshoring operations to prevent subjecting concrete members to overloads, eccentric loading, or reverse bending. Reshoring elements shall have the same load-carry capabilities as original shoring and shall be spaced similar to original shoring. Firmly secure and brace reshoring elements to provide solid bearing and support.

3.2 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

ACI 301. Remove rust, scale, oil, grease, clay, or foreign substances

from reinforcing that would reduce the epoxy coating bond from reinforcing. Do not tack weld. Inspect and verify proper reinforcement grade, quantity, spacing, and clearance requirements prior to concrete placement. Inspect placed steel reinforcing for coating damage prior to placing concrete. Repair all visible damage.

3.2.1 Coated Reinforcing

If coated reinforcement is used, record coating lot on each shipping notice and carefully identify and retag bar bundles from bending plant. Provide systems for handling coated bars that have padded contact areas, nylon slings, etc., to keep bars free of dirt and grit. Carefully handle and install bars to minimize job site patching including lifting and supporting bundled coated bars with strong back, multiple supports, or platform bridge to prevent sagging and abrasion. When possible, assemble reinforcement as tied cages prior to final placement into the forms. Bundling bands shall be padded where in contact with bars. Do not drop or drag bars or bundles. Store coated bars both in shop and in field, aboveground, on wooden or padded cribbing with adequate protective blocking between layers. Schedule deliveries of coated bars to the job site to avoid the need for long term storage. Protect from direct sunlight and weather. Bars to be stored longer than 12 hours at the job site shall be covered with opaque polyethylene sheeting or other suitable equivalent protective material.

Inspect for defects and provide required repairs prior to assembly. After assembly, reinspect and provide final repairs. Excessive nicks and scrapes that expose steel shall be cause for rejection.

- a. Immediately prior to application of the patching material, any rust and debonded coating shall be manually removed from the reinforcement by suitable techniques employing devices such as wire brushes and emery paper. Care shall be exercised during this surface preparation so that the damaged areas are not enlarged more than necessary to accomplish the repair. Damaged areas shall be clean of dirt, debris, oil, and similar materials prior to application of the patching material.
- b. Repair and patching shall be done in accordance with the patching material manufacturer's recommendations. These recommendations, including cure times, shall be available at the job site at all times.
- c. Allow adequate time for the patching materials to cure in accordance with the manufacturer's recommendation prior to concrete placement.
- d. Rinse placed reinforcing bars with ASTM C1602/C1602M compliant water to remove chloride contamination prior to placing concrete.

3.2.2 Reinforcement Supports

Place reinforcement and secure with non-corrodible chairs, spacers, and hangers. Metal hangers may be used, but shall be of similar material to the reinforcing. Support reinforcement on the ground with concrete or other non-corrodible material, having a compressive strength equal to or greater than the concrete being placed and having permeability equal or less than the concrete being placed.

Coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other

acceptable material. Wire bar supports shall be coated with dielectric material, compatible with concrete, for a minimum distance of 2 inches from the point of contact with the coated reinforcing bars. Reinforcing bars used as support bars shall be coated with the same material as the reinforcing. Spreader bars, where used, shall be coated. Non-coated combination bar clips and spreaders used in construction with coated reinforcing bars shall be made corrosion resistant or coated with dielectric material. Coated bars shall be tied with plastic-coated tie wire or other materials acceptable to the Contracting Officer.

3.2.3 Splicing

As indicated. For splices not indicated, comply with ACI 301. Do not splice at points of maximum stress. Overlap welded wire fabric the spacing of the cross wires, plus 2 inches. Welded splices shall comply with AWS D1.4/D1.4M and be approved prior to use.

3.2.4 Cover

Provide concrete cover thickness as shown on the Plans. If no concrete cover is specified, as a minimum, comply with ACI 318 for concrete cover over the steel reinforcement. Use ACI 117 to determine allowable tolerances for the placement of the steel.

3.2.5 Setting Miscellaneous Material

Place and secure anchors, bolts, pipe sleeves, conduits, and other such items in position before concrete placement. Plumb anchor bolts and check location and elevation. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete. Electrically isolate exposed steel work and its anchor systems from the primary steel reinforcement with at least 2 inches of concrete. Coat exposed steel work to reduce corrosion. Take particular care to ensure against corrosion on edges and horizontal surfaces. Use epoxy coatings for protection of carbon steel plates and fittings.

3.2.6 Construction Joints

Locate joints to least impair strength. Continue reinforcement across joints unless otherwise indicated. Final joint locations are subject to Government approval or substantiating calculations from the Contractor.

3.2.7 Expansion Joints and Contraction Joints

Provide expansion joint at edges of interior floor slabs on grade abutting vertical surfaces, and as indicated. Make expansion joints 1/2 inch wide unless indicated otherwise. Fill expansion joints not exposed to weather with preformed joint filler material. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joint unless an expansion sleeve is used. Place contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Sawed joints shall be completed within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

3.3 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

ASTM C94/C94M, ACI 301, and ACI 304R, except as modified herein. Batching

equipment shall be such that the concrete ingredients are consistently measured within the following tolerances: 1 percent for cement and water, 2 percent for aggregate, and 3 percent for admixtures. Furnish mandatory batch tickets imprinted with mix identification, batch size, batch design and measured weights, moisture in the aggregates, and time batched for each load of ready mix concrete. When a pozzolan is batched cumulatively with the cement, it shall be batched after the cement has entered the weight hopper.

3.3.1 Measuring

Make measurements at intervals as specified in paragraphs SAMPLING and TESTING.

Adjust batch proportions to replicate the mixture design using methods provided in the approved quality assurance plan. Base the adjustments on results of tests of materials at the batch plant for use in the work. Maintain a full record of adjustments and the basis for each.

3.3.2 Mixing

Comply with ASTM C94/C94M and ACI 301. If time of discharge exceeds time required by ASTM C94/C94M, submit a request along with description of precautions to be taken.

3.3.3 Transporting

Comply with ACI 304R.

3.4 PLACING CONCRETE

Comply with ACI 304R and ACI 304.2R. Place concrete as soon as practicable after the forms and the reinforcement have been inspected and approved. Do not place concrete when weather conditions prevent proper placement and consolidation; in uncovered areas during periods of precipitation; or in standing water. Prior to placing concrete, remove dirt, construction debris, water, snow, and ice from within the forms. Deposit concrete as close as practicable to the final position in the forms. Do not exceed a free vertical drop of 3 feet from the point of discharge. Place concrete in one continuous operation from one end of the structure towards the other or lifts for vertical construction. Position grade stakes on 20 foot centers maximum for exterior slabs.

3.4.1 Vibration

Comply with the requirements of ACI 309R using vibrators with a minimum frequency of 9000 vibrations per minute (VPM). Use only high cycle or high frequency vibrators. Motor-in-head 60 cycle vibrators may not be used. For walls and deep beams, use a minimum of two vibrators with the first to melt down the mixture and the second to thoroughly consolidate the mass. Provide a spare vibrator at the casting site whenever concrete is placed. Place concrete in 18 inch maximum vertical lifts. Insert and withdraw vibrators approximately 18 inches apart. Penetrate at least 8 inches into the previously placed lift with the vibrator when more than one lift is required. Extract the vibrator using a series of up and down motions to drive the trapped air out of the concrete and from between the concrete and the forms.

3.4.2 Cold Weather

Comply with ACI 306R. Do not allow concrete temperature to decrease below 50 degrees F. Obtain approval prior to placing concrete when ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Placement of concrete shall be halted whenever the ambient temperature drops below 40 degrees F. When the ambient temperature is less than 50 degrees F the temperature of the concrete when placed shall be not less than 50 degrees F or more than 75 degrees F. Heating of the mixing water or aggregates may be necessary to regulate the concrete placing temperature. An accelerating admixture may be used when the ambient temperature is below 50 degrees F. Covering and other means shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 7 days after placing, and at a temperature above freezing for the remainder of the curing period.

3.4.3 Hot Weather

Comply with ACI 305R. Maintain required concrete temperature using Figure 2.1.5, "Effect of Concrete Temperatures, Relative Humidity, and Wind Velocity on the Rate of Evaporation of Surface Moisture From Concrete" in ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. If necessary, cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. If the evaporation rate exceeds 0.1 pound of water per square foot per hour, fog spray the exposed concrete surfaces until active moist curing is applied. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.4.4 Prevention of Plastic Shrinkage Cracking

During weather with low humidity, and particularly with high temperature and appreciable wind, develop and institute measures to prevent plastic shrinkage cracks from developing. If plastic shrinkage cracking occurs, halt further placement of concrete until protective measures are in place to prevent further cracking. Periods of high potential for plastic shrinkage cracking can be anticipated by use of Figure 2.1.5 of ACI 305R. In addition to the protective measures concrete placement shall be further protected by erecting shades and windbreaks and by applying fog sprays of water, the addition of monomolecular films, or wet covering. When such water treatment is stopped, curing procedures shall be immediately commenced. The methods and materials to remove or repair areas affected by plastic shrinkage cracks shall be suggested by the Contractor, reviewed by the agency's Subject Matter Expert in Concrete Materials, and approved by the Contracting Officer. Cracks shall never be troweled over or filled with cement slurry.

3.4.5 Mass Concrete

All mass concrete elements shall be placed per the requirements of the Mass Concrete Temperature Control Plan.

3.5 SURFACE FINISHES EXCEPT FLOOR, SLAB, AND PAVEMENT

3.5.1 Defects

Repair formed surfaces by removing minor honeycombs, pits greater than one square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with non-shrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects that affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete shall not vary more than the allowable tolerances of ACI 347R. Exposed surfaces shall be uniform in appearance and finished to a smooth form finish unless otherwise indicated.

3.5.2 Formed Surfaces

3.5.2.1 Tolerances

Comply with ACI 117 and as indicated.

3.5.2.2 As-Cast Rough Form

Provide for surfaces not exposed to public view. Patch holes and defects and level abrupt irregularities. Remove or rub off fins and other projections exceeding 0.25 inch in height.

3.5.2.3 As-Cast Form

Provide form facing material producing a smooth, hard, uniform texture on the concrete. Arrange facing material in an orderly and symmetrical manner and keep seams to a practical minimum. Support forms as necessary to meet required tolerances. Material with raised grain, torn surfaces, worn edges, patches, dents, or other defects that will impair the texture of the concrete surface shall not be used. Patch tie holes and defects and completely remove fins.

3.6 FINISHES FOR HORIZONTAL CONCRETE SURFACES

3.6.1 Finish

Comply with ACI 301. Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleedwater appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleedwater is present prior to floating the surface, drag excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleedwater.

3.6.1.1 Floated

Exterior slabs where not otherwise specified. After the concrete has been

placed, consolidated, struck off, and leveled, do not work the concrete further, until ready for floating. Whether floating with a wood, magnesium, or composite hand float, with a bladed power trowel equipped with float shoes, or with a powered disc, float shall begin when the surface has stiffened sufficiently to permit the operation.

3.6.1.2 Broomed

Perform a floated finish, then draw a broom or burlap belt across the surface to produce a coarse scored texture. Permit surface to harden sufficiently to retain the scoring or ridges. Broom transverse to traffic or at right angles to the slope of the slab.

3.7 CURING AND PROTECTION

Comply with ACI 301 and ACI 308.1 unless otherwise specified. Prevent concrete from drying by misting surface of concrete. Begin curing immediately following final set. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, by rain or running water, adverse weather conditions, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period. Do not use membrane-forming compound on surfaces where appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete, or on concrete to which other concrete is to be bonded. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period. Provide moist curing for those areas receiving liquid chemical sealer-hardener or epoxy coating.

Furnish ASTM C39/C39M test results to verify the anticipated rate of strength development for the proposed concrete design mixture. Submit an increased curing period and minimum time to strip formwork based upon the reduced rate of strength development.

3.7.1 Wet Curing

Wet cure marine concrete using ASTM C1602/C1602M compliant water for a minimum of 7 days. Do not allow construction loads to exceed the superimposed load that the structural member, with necessary supplemental support, is capable of carrying in current condition safely and without damage.

Leaving the forms in place for seven days is a suitable alternative to wet curing.

3.7.1.1 Ponding or Immersion

Continually immerse the concrete throughout the seven-day curing period. Water shall not be 20 degrees F less than the temperature of the concrete. For temperatures between 40 and 50 degrees F, increase the curing period by 50 percent.

3.7.1.2 Fog Spraying or Sprinkling

Apply water uniformly and continuously throughout the curing period. For

temperatures between 40 and 50 degrees F, increase the curing period by 50 percent.

3.7.1.3 Pervious Sheeting

Completely cover surface and edges of the concrete with two thicknesses of wet sheeting. Overlap sheeting 6 inches over adjacent sheeting. Sheeting shall be at least as long as the width of the surface to be cured. During application, do not drag the sheeting over the finished concrete or over sheeting already placed. Wet sheeting thoroughly and keep continuously wet throughout the curing period.

3.7.1.4 Impervious Sheeting

Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 12 inches minimum. Provide sheeting not less than 18 inches wider than the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing.

3.7.2 Curing Periods

Moist cure concrete using ASTM C1602/C1602M compliant water for a minimum of 7 days. Continue additional curing for a total period of 21 days. Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval by the Contracting Officer.

3.8 FIELD QUALITY CONTROL

3.8.1 Fresh Concrete Properties

For each concrete mixture, the Contractor shall take samples in accordance with ASTM C172/C172M, test and record the slump, and temperature. If the slump deviates from the previous batch by more than 1 inch, air content shall also be determined. Adjustment of air content and/or slump with chemical admixture is permitted provided the water to cementitious material ratio is not exceeded.

3.8.1.1 Slump Tests

ASTM C143/C143M. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved high range water reducing (HRWR) admixture provided that the water-cementitious ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 50 cubic yards (maximum) of concrete. If concrete does not pass slump test, adjust using a HRWR and test every concrete batch until two consecutive batches meet slump without adjustment.

3.8.1.2 Temperature Tests

- a. Test the concrete delivered and the concrete in the forms. Perform tests in hot or cold weather conditions below 50 degrees F and above 80 degrees F for each batch (minimum) or every 50 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.
- b. Determine temperature of each concrete sample in accordance with ASTM C1064/C1064M. Temperatures must comply with the Concrete Temperature Control Plans.

3.8.1.3 Air Content Tests

ASTM C231/C231M or ASTM C173/C173M. Perform tests at commencement of concrete placement each day, when test cylinders are made, and if slump test varies by more than 1 inch from previous results or concrete does not pass slump test.

3.8.1.4 Unit Weight Test

ASTM C138/C138M. Take concrete samples during concrete placement. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 50 cubic yards (maximum) of concrete.

3.8.2 Hardened Concrete Properties

Sample and test each lot at 100 cubic yards for the first 500 cubic yards, then every 500 cubic yards thereafter.

Cast and cure specimens in accordance with ASTM C172/C172M, ASTM C31/C31M, and applicable requirements of ACI 305R and ACI 306R.

For each lot, record the date and time sampled, the batch ticket code, cylinder ID code the location of placement, total volume of concrete represented by the sample, and fresh concrete properties; ASTM C143/C143M for slump or ASTM C1611/C1611M for slump flow and visual stability index (VSI), ASTM C231/C231M for air content, ASTM C1064/C1064M for temperature, and ASTM C138/C138M unit weight.

For each lot sample, cast twelve 6 by 12 inch cylinder specimens for strength and three 4 by 8 inch cylinder specimens for chloride ion penetration testing. These cylinders shall be wrapped completely with slightly dampened paper towels with water only. The wrapped cylinders shall be placed in either a vacuum package or double layers of sealed plastic bags. Package cylinders to prevent damage and ship to the approved testing laboratory.

In the event quality acceptance test results and retest results fail to meet the quality acceptance criteria, the entire lot shall be considered non-conforming material, refer to the paragraph REPAIR, REHABILITATION and REMOVAL.

3.8.2.1 Compressive Strength Tests

ACI 214R tests for strength - conduct strength tests of concrete during construction in accordance with the following procedures:

- a. Test cylinders in accordance with ASTM C39/C39M. Test three cylinders at 3 days, three cylinders at 7 days, and three cylinders at the age when the compressive strength requirement was specified. Hold the remaining three cylinders in storage. If one specimen in a test shows evidence of improper sampling, molding or testing, discard the specimen and consider the strength of the remaining cylinder to be the test result. If more than one specimen shows excess defects, the Contracting Officer may allow the entire test to be discarded. Test results shall not exceed the specified compressive strength by more than 20 percent for the age specified.
- b. If the average strength test results are less than the specified strength (f'_c) extract three core samples from the structure in accordance with ASTM C42/C42M, from the area that correlates to the low test results. These extracted cores shall not contain steel reinforcing. Repair core holes with non-shrink grout. Match color and finish of adjacent concrete. For concrete not meeting strength criteria, the Contractor shall prepare a remediation strategy for the review by the Contracting Officer.
- c. Strength test reports shall be provided within 7 days of test completion.

3.8.2.2 Chloride Ion Penetration Test

Test cylinder concrete for chloride ion penetration at 56 days. Concrete representative of the tested concrete with values greater than the quality acceptance values determined in Table 1, will require retesting using spare samples. If the retest exceeds the quality acceptance limit, this shall be grounds to stop concrete placement and to review quality control issues.

3.8.2.3 Chloride Ion Concentration

Comply with Table 1. Determine water soluble chloride ion concentration. Perform test once for each mix design.

3.8.2.4 Non-Destructive Tests

Use of a rebound hammer to obtain data on the strength of the concrete surface shall be in accordance with ASTM C805/C805M. Test results from the rebound hammer and other non-destructive testing may be helpful in selecting areas to extract concrete cores for destructive testing.

3.8.3 Core Samples and Compressive Strength Testing

Obtain and test cores in accordance with ASTM C42/C42M.

If concrete in the structure is dry under service conditions, air dry cores (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for 7 days before testing and test dry. Otherwise, test the cores, after moisture conditioning, in accordance with ASTM C42/C42M.

Acceptance criteria for cylinder compressive strength are provided in paragraph ACCEPTANCE OF CONCRETE STRENGTH.

Take at least three representative cores from each member or area of concrete in place that is considered potentially strength deficient. Impair the strength of the structure as little as possible. If, before

testing, extracted cores show evidence of having been damaged subsequent to or during removal from the structure, take replacement cores.

Fill core holes with low slump concrete or mortar of a strength equal to or greater than the original concrete.

The Contracting Officer will evaluate and validate core tests in accordance with the specified procedures.

3.8.4 Acceptance of Concrete Strength

3.8.4.1 Standard Molded and Cured Strength Specimens

The acceptance of concrete strengths shall be based on averages of results from three consecutive compressive strength tests. When the averages of all sets of three consecutive compressive strength test results are between 1.0 and 1.2 times the field test strength (fcr), and no individual strength test falls below fcr by more than 500 psi, the strength of the concrete is satisfactory. These criteria also apply when accelerated strength testing is specified unless another basis for acceptance is specified.

3.8.4.2 Non-Destructive Tests

Non-destructive tests may be used when permitted to evaluate concrete where standard molded and cured cylinders have yielded results not meeting the criteria.

3.8.4.3 Extracted Core Tests

When the average compressive strengths of the representative cores are between 0.85 fcr and 1.2 fcr and if no single core is less than 0.75 fcr, the strength of concrete is satisfactory.

3.8.5 Inspection

ACI 311.4R. Inspect concrete placed under water with qualified divers.

3.9 REPAIR, REHABILITATION AND REMOVAL

Before the Owner accepts the structure and final payment is made the Contractor shall inspect the structure for cracks, damage, and substandard concrete placements that may adversely affect the service life of the structure. A report documenting these defects shall be prepared that includes recommendations for repair, removal and/or remediation which, will be reviewed by the agency's Subject Matter Expert in Concrete Materials and submitted to the Contracting Officer for approval before any corrective work is accomplished.

3.9.1 Crack Repair

Prior to final acceptance, all cracks in excess of 0.02 inches wide shall be documented and repaired. The proposed method and materials to repair the cracks shall be submitted to the Contracting Officer for approval. The proposal shall address the amount of movement expected in the crack due to temperature changes and loading.

3.9.2 Repair of Weak Surfaces

Weak surfaces are defined as mortar-rich, rain-damaged, uncured, or containing exposed voids or deleterious materials. Concrete surfaces with weak surfaces less than 1/4 inch thick shall be diamond ground to remove the weak surface. Surfaces containing weak surfaces greater than 1/4 inch thick shall be removed and replaced or mitigated in a manner acceptable to the Contracting Officer.

3.9.3 Failure of Quality Assurance Test Results

Proposed mitigation efforts by the Contractor to restore the original design intent shall be reviewed by the agency's Subject Matter Expert in Concrete Materials and approved by the Contracting Officer prior to proceeding.

-- End of Section --

SECTION 09 97 13.26

COATING OF STEEL WATERFRONT STRUCTURES, ZERO VOC, (SZC) SPLASH ZONE COATING
02/16

PART 1 GENERAL

1.1 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 A36/A36M	(2019) Standard Specification for Carbon Structural Steel
ASTM B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM D56	(2016a) Standard Test Method for Flash Point by Tag Closed Cup Tester
ASTM D93	(2019) Standard Test Methods for Flash-Point by Pensky-Martens Closed Cup Tester
ASTM D512	(2012) Chloride Ion in Water
ASTM D522	(1993a; R 2008) Mandrel Bend Test of Attached Organic Coatings
ASTM D523	(2014; R 2018) Standard Test Method for Specular Gloss
ASTM D575	(1991; R 2012) Rubber Properties in Compression
ASTM D610	(2008; R 2019) Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
ASTM D714	(2002; R 2017) Standard Test Method for Evaluating Degree of Blistering of Paints
ASTM D1475	(2013) Standard Test Method for Density of Liquid Coatings, Inks, and Related Products
ASTM D1640	(2003; R 2009) Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
ASTM D1654	(2008; R 2016; E 2017) Standard Test Method for Evaluation of Painted or Coated

Specimens Subjected to Corrosive
Environments

ASTM D2240	(2015; E 2017) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D2369	(2010; R 2015; E 2015) Volatile Content of Coatings
ASTM D2370	(1998; R 2010) Tensile Properties of Organic Coatings
ASTM D2698	(2005) Standard Test Method for Determination of the Pigment Content of Solvent-Reducible Paints by High-Speed Centrifuging
ASTM D2794	(1993; R 2019) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D2805	(2011) Standard Test Method for Hiding Power of Paints by Reflectometry
ASTM D3276	(2015; E 2016) Standard Guide for Painting Inspectors (Metal Substrates)
ASTM D3278	(1996; R 2011) Flash Point of Liquids by Small Scale Closed-Cup Apparatus
ASTM D3335	(1985a; R 2020) Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
ASTM D3718	(1985a; R 2015) Low Concentrations of Chromium in Paint by Atomic Absorption Spectroscopy
ASTM D3925	(2002; R 2015) Sampling Liquid Paints and Related Pigmented Coatings
ASTM D3960	(2005; R 2013) Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
ASTM D4060	(2019) Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM D4285	(1983; R 2012) Indicating Oil or Water in Compressed Air
ASTM D4400	(1999; E 2012; R 2012) Sag Resistance of Paints Using a Multinotch Applicator
ASTM D4541	(2017) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM D4940	(2015) Standard Test Method for

Conductimetric Analysis of Water Soluble
Ionic Contamination of Blast Cleaning
Abrasives

ASTM D6944	(2015) Standard Practice for Determining the Resistance of Cured Coatings to Thermal Cycling
ASTM D7091	(2013) Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nondestructive Coatings Applied to Non-Ferrous Metals
ASTM D7588	(2011) Standard Guide for FT-IR Fingerprinting of a Non-Aqueous Liquid Paint as Supplied in the Manufacturer's Container

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9001	(2008; Corr 1 2009) Quality Management Systems- Requirements
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NACE INTERNATIONAL (NACE)

NACE WJ-1	(2012) Waterjet Cleaning of Metals-Clean to Bare Substrate
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SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4	(2007; E 2004) Brush-Off Blast Cleaning
SSPC AB 1	(2015; E 2017) Mineral and Slag Abrasives
SSPC AB 2	(2015; E 2016) Cleanliness of Recycled Ferrous Metallic Abrasive
SSPC AB 3	(2003; E 2004) Ferrous Metallic Abrasive
SSPC Guide 6	(2015) Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations
SSPC Guide 10	(1994; E 2001) Guide to Specifying Coatings Conforming to Volatile Organic Compound (VOC) Content Requirements
SSPC Guide 12	(1998; E 2004) Guide for Illumination of Industrial Painting Projects
SSPC Guide 15	(2013) Field Methods for Extraction and Analysis of Soluble Salts on Steel and Other Nonporous Substrates
SSPC PA 1	(2016) Shop, Field, and Maintenance Coating of Metals

SSPC PA 2	(2015; E 2018) Procedure for Determining Conformance to Dry Coating Thickness Requirements
SSPC PA 17	(2012; E 2012) Procedure for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements
SSPC QP 1	(2019) Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Industrial Structures)
SSPC QP 2	(2009; E 2013) Standard for Evaluating Painting Contractors (Removal of Hazardous Coatings from Industrial/Marine Structures)
SSPC QP 3	(2010) Standard Procedure for Evaluating Qualifications of Shop Painting Applicators
SSPC QP 5	(2012) Standard Procedure for Evaluating the Qualifications of Coating and Lining Inspection Companies
SSPC QS 1	(2015) Standard Procedure for Evaluating a Contractor's Advanced Quality Management System
SSPC SP 1	(2015) Solvent Cleaning
SSPC SP 5/NACE No. 1	(2007) White Metal Blast Cleaning
SSPC SP 6/NACE No.3	(2007) Commercial Blast Cleaning
SSPC SP 10/NACE No. 2	(2007) Near-White Blast Cleaning
SSPC SP COM	(2016; E 2017) Surface Preparation Commentary for Steel and Concrete Substrates
SSPC VIS 1	(2002; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS-STD-595A	(2017) Colors used in Government Procurement
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U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1689	(Rev B) Tape, Pressure-Sensitive Adhesive, (Plastic Film)
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U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134	Respiratory Protection
29 CFR 1910.1000	Air Contaminants

29 CFR 1926.59

Hazard Communication

1.2 1.2 DEFINITIONS

Definitions are provided throughout this Section, generally in the paragraph where used, and denoted by capital letters.

1.3 1.3 SUBMITTALS

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

SD-05 Design Data

Containment System

SD-06 Test Reports

Coatings Qualification Test Reports

Non-metallic Abrasive Qualification Test Reports; G

Metallic Abrasive Qualification Test Reports

Coating Sample Test Reports

Abrasive Sample Test Reports

Inspection Report Forms

Daily Inspection Reports

Recycled Metallic Abrasive Field Test Reports (Daily and Weekly)

SD-07 Certificates

Contract Errors, Omissions, and Other Discrepancies

Corrective Action Procedures

Implement Corrective Action

Coating Work Plan

Coating Materials

Non-metallic Abrasive

Metallic Abrasive

Qualifications of Certified Industrial Hygienist (CIH)

Qualifications Of Individuals Performing Abrasive Blasting

Qualifications of Certified Protective Coatings Specialist (PCS)

Qualifications of Individuals Applying Coatings

Qualifications of Individuals Operating Plural Component Equipment

Qualifications of Coating Inspection Company

Qualifications of QC Specialist Coating Inspector

Qualifications of Testing Laboratory for Coatings

Qualifications of Testing Laboratory for Abrasive Media

Qualifications of Coating Contractors or Shop

Joint Sealant Materials

Pre-Application Meeting

SD-08 Manufacturer's Instructions

Joint Sealant Instructions

Coating System Instructions

SD-11 Closeout Submittals

Disposal of Used Abrasive

Inspection Logbook

1.4 QUALITY ASSURANCE

1.4.1 Contract Errors, Omissions, and Other Discrepancies

Submit all errors, omissions, and other discrepancies in contract documents the Contracting Officer within 30 days of contract award for all work covered in this Section, other than the work that will not be uncovered until a later date. All such discrepancies must be addressed and resolved, and the Coating Work Plan modified, prior to beginning the Initial and Follow-Up phases of work. Discrepancies that become apparent only after work is uncovered must be identified at the earliest discoverable time and submitted for resolution. Schedule time (Float) should be built into the project schedule at those points where old work is to be uncovered or where access is not available during the first 30 days after award, to allow for resolution of contract discrepancies.

1.4.2 Corrective Action (CA)

CA must be included in the Quality Control Plan.

1.4.2.1 Corrective Action Procedures

Develop procedures for determining the root cause of each non-compliance, developing a plan to eliminate the root cause so that the non-compliance does not recur, and following up to ensure that the root cause was eliminated. Develop Corrective Action Request (CAR) forms for initiating CA, and for tracking and documenting each step.

1.4.2.2 Implement Corrective Action

The Contractor must take action to identify and eliminate the root cause of each non-compliance so as to prevent recurrence. These procedures must

apply to non-compliance in the work, and to non-compliance in the QC System. Corrective actions must be appropriate to the effects of the non-compliance encountered. Each CAR must be serialized, tracked in a Log to completion and acceptance by the Contracting Officer, and retained in project records. The Corrective Action Log, showing status of each CAR, must be submitted to the Contracting Officer monthly. A CAR may be initiated by either the Contractor or the Contracting Officer. The Contracting Officer must approve each CAR at the root cause identification stage, the plan for elimination stage, and the close out stage after verification that the root cause has been eliminated.

1.4.3 Coating Work Plan

- a. This work plan must be considered as part of the Quality Control Plan.
- b. Provide procedures for reviewing contract documents immediately after award to identify errors, omissions, and discrepancies so that any such issues can be resolved prior to project planning and development of detailed procedures.
- c. Provide procedures for verification of key processes during Initial Phase to ensure that contract requirements can be met. Key processes must include surface preparation, coating application and curing, inspection, and documentation, and any other process that might adversely impact orderly progression of work.
- d. Provide procedures for all phases of coating operations, including planned work, rework, repair, inspection, and documentation. Address mobilization and setup, surface preparation, coating application, coating initial cure, tracking and correction of non-compliant work, and demobilization. Coordinate work processes with health and safety plans and confined space entry plans. For each process, provide procedures that include appropriate work instructions, material and equipment requirements, personnel qualifications, controls, and process verification procedures. Provide procedures for inspecting work to verify and document compliance with contract requirements, including inspection forms and checklists, and acceptance and rejection criteria.
- e. Provide procedures for determining the existing surface profile under paint, and procedures for ensuring that the profile is not increased beyond the maximum profile specified herein.
- f. Provide procedures for correcting non-compliant work. Detailed procedures are required in advance to avoid delays in meeting overcoat windows as well as to avoid delays in production. Provide procedures for repairing defects in the coating film, such as runs, drips, sags, holidays, overspray, as well as how to correct coating thickness non-compliance, any other areas of repair or rework that might be adversely affected by delays in preparing and approving new procedures.
- g. If a procedure is based on a proposed or approved request for deviation, the deviation must be referenced. Changes to procedures must be noted by submittal number and date approved, clearly delineating old requirements and new requirements, so that the records provide a continuous log of requirements and procedures.

1.4.4 Design Data

1.4.4.1 1.4.4.1 Containment System

Submit complete design drawings and calculations for the scaffolding and containment system, including an analysis of the loads which will be added to the structure by the containment system and waste materials. A registered engineer must approve calculations and scaffold system design.

1.4.5 Test Reports

1.4.5.1 Coatings Qualification Test Reports

Submit test results from independent laboratory of representative samples of each coating material. U.S. Department of Defense laboratories are considered to be independent laboratories for purposes of compliance with "QUALIFICATION INSPECTION" requirements herein. Samples must have been tested within the last two years. Submit results for SZC material as required in Table II, COATING QUALIFICATION INSPECTION REQUIREMENTS/COATING QUALIFICATION INSPECTION REQUIREMENTS TEST PANEL PREPARATION AND TEST and as revised by paragraph COATING SYSTEM herein. Note that requirements for QUALIFICATION INSPECTION is a pre-qualification requirement, and involves the same testing required for listing as an approved source for these respective materials.

1.4.5.2 Metallic Abrasive Qualification Test Reports

Submit results for abrasive as required in paragraph 4 REQUIREMENTS of SSPC AB 3. Submit test results from independent laboratory of representative samples of each abrasive to be used on the jobsite. Samples must have been tested within the last three years. Note that this testing is for the purpose of prequalifying the abrasive.

1.4.5.3 Recycled Metallic Abrasive Field Test Reports (Daily and Weekly)

Submit test results from independent laboratory of daily and weekly Quality Control testing required by SSPC AB 2, as modified in paragraph ABRASIVE.

1.4.5.4 Non-metallic Abrasive Qualification Test Reports

Submit results for abrasive as required in paragraph 4 REQUIREMENTS of SSPC AB 1. Submit test results from independent laboratory of representative samples of each abrasive to be used on the jobsite. Samples must have been tested within the last three years. Note that this testing is for the purpose of prequalifying the abrasive.

1.4.6 Qualifications

1.4.6.1 Qualifications of Certified Industrial Hygienist (CIH)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party CIH. Submit documentation that hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification. Provide evidence of experience with hazards involved in industrial coating application work.

1.4.6.2 Qualifications of Certified Protective Coatings Specialist (PCS)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party PCS. Submit documentation that specialist is certified by SSPC: The Society for Protective Coatings (SSPC) as a PCS, including certification number and date of certification/recertification. If the PCS is employed by the same coating inspection company to which the coating inspector is employed, this does not violate the independent third-party requirements. The PCS must remain certified during the entire project, and the Contracting Officer must be notified of any change in certification status within 10 days of the change. The PCS must not be the designated coating inspector.

1.4.6.3 Qualifications of Coating Inspection Company

Submit documentation that the coating inspection company performing all coating inspection functions is certified by SSPC to the requirements of SSPC QP 5 prior to contract award. The coating inspection company submitted and approved must remain and not changed through completion of the contract. The coating inspection company must remain so certified for the duration of the project. If a coating inspection company's certification expires, the firm will not be allowed to perform any inspection functions, and all surface preparation and coating application work must stop, until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in coating inspection company certification status. Notify the Contracting Officer of all scheduled and unannounced on site inspections from SSPC and furnish a copy of all inspection reports.

1.4.6.4 Qualifications of QC Specialist Coating Inspector

Submit documentation that each coating inspector is employed, and qualified to SSPC QP 5, Level III, by the selected coating inspection company. Each inspector must remain employed by the coating inspection company while performing any coating inspection functions. In addition to the handwritten records, the inspector must employ the electronic reporting program TruQC or equivalent as outlined in Table III. The Administrator must be the designated Government Representative for the project.

1.4.6.5 Qualifications Of Individuals Performing Abrasive Blasting

Submit name, address, and telephone number of each person that will be performing abrasive blasting. Submit documentation that each blaster is qualified by SSPC to the SSPC C 7 Abrasive Blaster or the SSPC CAS Coating Application Specialist Level 2 Certification Program (Interim Status). Each blaster must remain certified during the entire period of abrasive blasting, and the Contracting Officer must be notified of any change in qualification status.

1.4.6.6 Qualifications of Individuals Applying Coatings

Submit name, address, telephone number, of each person that will be operating plural component equipment. Submit documentation that each operator is qualified by SSPC to the SSPC C 12 Spray Application Certification meeting the NAVSEA 009-32 requirements or the SSPC CAS Coating Application Specialist Level 2 Certification Program (Interim

Status). Each operator must remain certified during the entire period of coating application and the Contracting Officer must be notified of any change in qualification status.

1.4.6.7 Qualifications of Individuals Operating Plural Component Equipment

Submit name, address, telephone number, of each person that will be operating plural component equipment. Submit documentation that each operator is qualified by SSPC to the SSPC C 14 Marine Plural Component Program(MPCAC-C14). Each operator must remain certified during the entire period of coating application and the Contracting Officer must be notified of any change in qualification status.

1.4.6.8 Qualifications of Testing Laboratory for Coatings

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of coating samples for compliance with specification requirements. Submit documentation that laboratory is regularly engaged in testing of paint samples for conformance with specifications, and that persons performing analyses are qualified.

1.4.6.9 Qualifications of Testing Laboratory for Abrasive Media

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of abrasive for compliance with specification requirements. Submit documentation that laboratory has experience in testing samples of abrasive for conformance with specifications, and that persons performing analyses are qualified.

1.4.6.10 Qualifications of Coating Contractors or Shop

All Contractors and Subcontractors that perform surface preparation or coating application must be certified to SSPC QP 1 and SSPC QS 1 for field application and SSPC QP 3 and SSPC QS 1 for shop applications, prior to contract award and must remain certified while accomplishing any surface preparation or coating application. The painting Contractors, painting Subcontractors or Shop must remain so certified for the duration of the project. If a Contractor's, Subcontractor's or Shop's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in Contractor or Shop certification status. Notify the Contracting Officer of all scheduled and unannounced on site audits from SSPC and furnish a copy of all audit reports.

1.4.6.11 Joint Sealant Materials

Provide manufacturer's certification of conformance to contract requirements.

1.4.6.12 Coating Materials

Provide manufacturer's certification of conformance to contract requirements.

1.4.6.13 Non-metallic Abrasive

Provide manufacturer's certification that the materials are currently approved by the Naval Sea Systems Command and listed on the Qualified Products Lists (QPL) for the specified materials.

1.4.6.14 Metallic Abrasive

Provide manufacturer's certification of conformance to contract requirements and provide copies of test results.

1.4.7 Protective Coating Specialist (PCS)

The PCS must be considered a QC Specialist and must report to the QC Manager, as specified in Section 01 45 10 QUALITY CONTROL. The PCS must approve all submittals prior to submission to the QC Manager for approval or submission to the government for approval.

1.4.8 Pre-Application Meeting

After approval of submittals but prior to the initiation of coating work, Contractor representatives, including at a minimum, project superintendent and QC manager, paint foreman, coating inspector, and PCS must have a pre-application coating preparatory meeting. This meeting must be in addition to the pre-construction conference. Specific items addressed must include: corrective action requirements and procedures, coating work plan, safety plan, coordination with other Sections, inspection standards, inspection requirements and tools, test procedures, environmental control system, and test logs. Notify Contracting Officer at least ten days prior to meeting.

1.5 PRODUCT DATA

1.5.1 Joint Sealant Instructions

Submit manufacturer's printed instructions including detailed application procedures, minimum and maximum application temperatures, and curing procedures. Include Safety Data Sheets (SDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.

1.5.2 Coating System Instructions

Submit manufacturer's printed instructions including detailed mixing and application procedures, number and types of coats required, minimum and maximum application temperatures, and curing procedures. Include Safety Data Sheets (SDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.

1.6 DELIVERY AND STORAGE

Ship, store, and handle materials in accordance with SSPC PA 1, and as modified in this Section. Maintain temperature in storage spaces between 40 and 100 degrees F, and air temperature more than 5 degrees F above the dew-point at all times. Inspect materials for damage prior to use and return non-compliant materials to manufacturer. Remove materials with expired shelf life from government property immediately and notify the Contracting Officer.

If materials are approaching shelf life expiration and an extension is

desired, samples may be sent to the manufacturer, along with complete records of storage conditions, with a request for shelf life extension. If the manufacturer finds the samples and storage data suitable for shelf life extension, the manufacturer may issue an extension, referencing the product evaluation and the review of storage records. Products may not be extended longer than allowed in the product specification.

1.7 COATING HAZARDS

Ensure that employees are trained in all aspects of the safety plan. Specified coatings may have potential health hazards if ingested or improperly handled. The coating manufacturer's written safety precautions must be followed throughout mixing, application, and curing of the coatings. During all cleaning, cleanup, surface preparation, and paint application phases, ensure that employees are protected from toxic and hazardous chemical agents which exceed concentrations in 29 CFR 1910.1000. Comply with respiratory protection requirements in 29 CFR 1910.134. The CIH must approve work procedures and personal protective equipment.

1.8 JOB SITE REFERENCES

Make available to the Contracting Officer at least one copy each of ASTM D3276, ASTM D3925, ASTM D4285, ASTM D7091, SAE AMS-STD-595A, ISO 9001, SSPC AB 2, SSPC AB 3, SSPC Guide 6, SSPC Guide 10, SSPC Guide 12, SSPC Guide 15, SSPC PA 1, SSPC PA 2, SSPC PA 17, SSPC QP 1, SSPC QP 2, SSPC QP 3, SSPC QP 5, SSPC QS 1, SSPC SP COM, SSPC SP 1, SSPC SP 6/NACE No.3, SSPC 7/NACE No.4, SSPC SP 10/NACE No. 2, NACE WJ-1, SSPC VIS 1, and an SSPC Certified Contractor Evaluation Form at the job site.

PART 2 PRODUCTS

2.1 JOINT SEALANT

ASTM C920, Type M, Grade NS, Class 25, Use NT, I, M, G, A, O. Must be manufactured or supported by the coating system manufacturer.

2.2 COATING SYSTEM

Alternate systems or products will not be considered. All SZC materials must be supplied by one supplier. The entire SZC system is intended to be applied in the field for in-situ maintenance. Alternatively, on new construction projects, surface preparation and coating application may be accomplished in a SSPC QP 3 shop, following all temperature, humidity, preparation, application of the coating system and testing requirements listed herein. Upon completion of installation in the field all damaged surfaces must be inspected and repaired. Remove all damaged surfaces by means of the specified surface preparation followed by re-application of the SZC system. The final surface of any repairs must meet all requirements of the specifications and the manufacturer.

The specification material in this Section require approval prior to contract award. Testing of products by an Independent laboratory to the QUALIFICATION INSPECTION REQUIREMENTS of Table II prior to contract award or must be listed as an approved material herein. See specific submittal requirements in paragraph QUALITY ASSURANCE.

2.2.1 Self-Priming SZC Coating Material

2.2.1.1 Chevron Phillips Chemical Co. TZ 904

2.2.1.2 PolySpec LPE 5100

2.2.1.3 Premier Coating Systems, Inc. PCS 1200 TA

2.3 COATING SAMPLE COLLECTION

Provide 2 kits that contains one quart can for the base and activator of each SZC material, an appropriately sized can for each activator, dipping cups for each component to be sampled, a shipping box sized for the samples to to be shipped, and packing material. Extract 2 samples of each component, mark cans for the appropriate components including manufacturers name, address, batch numbers, batch size shipped to the project sight and date of manufacture. Store in QC Manager's office until completion of project. If unforeseen coating issues arise ship 1 complete sample (including base and activator) with all batch information to the pre-chosen approved Independent laboratory for evaluation. Include all pertinent information from the project. The QC Manager is to arrange pick-up and shipping to the approved coating testing laboratory.

2.4 ABRASIVE SAMPLE COLLECTION AND SHIPPING KIT

Provide a kit that contains one suitable plastic bag or container for each sample to be collected. Mark containers for the appropriate component. Provide shipping documents, including either pre-paid shipping or a shipper number that can be used by the QC Manager to arrange pickup, addressed to the approved coating testing laboratory.

2.5 TEST KITS

2.5.1 Test Kit for Measuring Chloride, Sulfate and Nitrate Ions on Steel and Coated Surfaces

Provide test kits called CHLOR*TEST CSN Salts, as manufactured by CHLOR*RID International Inc. of Chandler, Arizona (www.chlor-rid.com) or equal. An "equal" test kit must meet the following requirements:

- a. Kit contains all materials, supplies, tools and instructions for field testing and on-site quantitative evaluation of chloride, sulfate and nitrate ions;
- b. Kit extract solution is acidic, factory pre-measured, pre-packaged, and of uniform concentration;
- c. Kit components and solutions are mercury free and environmentally friendly;
- d. Kit contains new materials and solutions for each test extraction;
- e. Extraction test container (vessel or sleeve or cell) creates a sealed, encapsulated environment during salt ion extraction;
- f. Test extract container is suitable for testing the following steel surfaces: horizontal (up/down configuration), vertical, flat, curved, smooth, pitted, and rough;

- g. All salt ion concentrations are directly measured in micrograms per square centimeter.

2.5.2 Test Kit for Measuring Chlorides in Abrasives

Provide test kits called CHLOR*TEST-A, as manufactured by CHLOR*RID International Inc. of Chandler, Arizona (www.chlor-rid.com), or equal. To be considered for approval as an "equal" test kit, each proposed test kit must:

- a. Be a completely self-contained test kit with all materials, supplies, tools and instructions to take tests and identify results;
- b. Use identifiable, consistent, factory pre-measured test extract solution;
- c. Provide for testing equal volumes of abrasive and test solution;
- d. Provide for taking direct measurements of the chloride ion in parts per million (PPM), without using conversion charts or tables;
- e. Provide all new components for extraction and titration for each test;
- f. Provide a factory sealed titration device for each test;
- g. Use the extract sampling container as the titration container.

2.6 ABRASIVE

The referenced abrasive specifications have maximum limits for soluble salts contamination, however, this maximum level of contamination does not guarantee that contamination will not be transferred to the steel surface during abrasive blasting. Other factors such as on-site handling and recycling can allow contamination of abrasive. Contractors are cautioned to verify that the chosen abrasive, along with work and storage processes, allow the final surface cleanliness requirements to be achieved. Successful testing of chlorides in abrasive does not negate the final acceptance testing of steel surfaces.

2.6.1 Non-metallic Abrasive

Conform to SSPC AB 1, Class A except that:

- a. The maximum allowable chloride content is 7 parts per million (ppm) as measured with the test kit described in the paragraph TEST KIT FOR MEASURING CHLORIDES IN ABRASIVES. Modify the requirements of SSPC AB 2 to substitute requirement for one chloride test for each "WATER SOLUBLE CONTAMINANTS" test required.
- b. The maximum allowable Chromium and Cadmium content of the work mix must be less than 0.1 percent by wt. when tested in accordance with ASTM D3718 for Chromium and ASTM D3335 for Cadmium. Modify the requirements of SSPC AB 2 to add requirement for one Chromate test and one Cadmium test for each "LEAD" test required.

Use abrasive that is specifically selected and graded to provide a sharp, angular profile to the specified depth. Do not use ungraded abrasive. Make adjustments to processes or abrasive gradation to achieve specified

surface profile. Recycled non-metallic abrasive must meet all requirements of the specification each time that it is placed in the blast pot.

2.6.2 Metallic Abrasive

2.6.2.1 New and Remanufactured Steel Grit

Conform to the chemical and physical properties of SSPC AB 3 Class 1 (Steel) only. Class 2 (Iron) abrasive must not be used.

To develop a suitable work mix from new steel abrasive, a minimum of 200 - 400 recycles is required, therefore, it is advantageous for a Contractor to use remanufactured steel grit or grit reclaimed from a previous project. Such grit must be considered to conform if it can be traced to new grit conforming to SSPC AB 3 Class 1 and it meets all cleanliness requirements of SSPC AB 3 Class 1 when brought to the current jobsite. Submit one representative sample of this work mix to the laboratory for testing, along with samples of new material. Acceptance and use of this work mix must not be used to justify any deviation from surface preparation requirements.

2.6.2.2 Recycled Steel Grit

Abrasive media must conform to the chemical and physical properties of SSPC AB 2 except that:

- a. The maximum allowable chloride content is 7 parts per million (ppm) as measured with the test kit described in the paragraph TEST KIT FOR MEASURING CHLORIDES IN ABRASIVES. Modify the requirements of SSPC AB 2 to substitute requirement for one chloride test for each "WATER SOLUBLE CONTAMINANTS" test required.
- b. The maximum allowable Chromium and Cadmium content of the work mix must be 0.1 percent by wt. when tested in accordance with ASTM D3718 for Chromium and ASTM D3335 for Cadmium. Modify the requirements of SSPC AB 2 to add requirement for one Chromate test and one Cadmium test for each "LEAD" test required.

PART 3 EXECUTION

Perform all work, rework, and repair in accordance with approved procedures in the Coating Work Plan.

3.1 COATING AND ABRASIVE SAMPLE COLLECTION AND TESTING

Sample and test materials delivered to the jobsite. Notify Contracting Officer three days in advance of sampling. The QC Manager and either the PCS or coating inspector must witness all sampling.

3.1.1 Coating Sample Collection

Provide 2 sample collection kits as required in paragraph COATING SAMPLE COLLECTION AND SHIPPING KIT. From each lot, obtain 2 one quart sample of each base material, and proportional samples of each activator based on mix ratio, by random selection from sealed containers in accordance with ASTM D3925. Prior to sampling, mix contents of each sealed container to ensure uniformity. As an alternative to collecting small samples from kits, entire kits may be randomly selected and held if the need to ship to

laboratory arises, observing all requirements for witnessing and traceability. For purposes of quality conformance inspection, a lot is defined as that quantity of materials from a single, uniform batch produced and offered for delivery at one time. A batch is defined as that quantity of material processed by the manufacturer at one time and identified by number on the label. Identify samples by designated name, specification number, batch number, project contract number, sample date, intended use, and quantity involved. The QC manager will take possession of the packaged samples and hold until instructed to contact a shipping company to arrange for pickup, and relinquish the samples only to the shipping representative for shipment to the approved laboratory for testing as required by paragraph COATING SAMPLE TEST REPORTS.

3.1.2 Abrasive Sample Collection

Provide a sample collection kit as required in paragraph ABRASIVE SAMPLE COLLECTION AND SHIPPING KIT. For purposes of quality conformance inspection, a lot must consist of all abrasive materials of the same type from a single, uniform batch produced and offered for delivery at one time. Obtain samples of each abrasive lot using the sampling techniques and schedule of the relevant SSPC AB standard reference. The addition of any substance to a batch must constitute a new lot. Identify samples by designated name, specification number, lot number, project contract number, sample date, intended use, and quantity involved. The QC manager will take possession of the packaged samples, contact the shipping company to arrange for pickup, and relinquish the samples only to the shipping representative for shipment to the approved laboratory for testing as required by the paragraph ABRASIVE SAMPLE TEST REPORTS.

3.1.3 Coating Sample Test Reports

Submit test results for each lot of coating material delivered to the jobsite. Test samples of prime, and topcoat materials for compliance with requirements of Table I. Reject entire lot represented by samples that fail one or more tests, select new lots, and test samples.

3.1.4 Abrasive Sample Test Reports

Submit test results for each lot of abrasive delivered to the jobsite. Test samples of metallic abrasive to the requirements of paragraph REQUIREMENTS of SSPC AB 3, except paragraph 4.1.5 DURABILITY. Test samples of non-metallic abrasive to the requirements of paragraph REQUIREMENTS of SSPC AB 1. Reject entire lot represented by samples that fail one or more tests, select new lots, and test samples.

3.2 SURFACES TO BE COATED

Coat both sides of entire new steel waterfront structure including joints, lap joints and any other appurtenances.

3.3 LIGHTING

Provide lighting for all work areas as prescribed in SSPC Guide 12.

3.4 ENVIRONMENTAL CONDITIONS

3.4.1 Containment

Design and provide a containment system for the capture, containment,

collection, storage and disposal of the waste materials generated by the work under this Section, to meet the requirements of SSPC Guide 6, Class 3. Vapor concentrations must be kept at or below 10 percent of Lower Explosive Limit (LEL) at all times. Containment may be designed as fixed containment for complete structure or portable containment for sections of structure, however, containment must remain in any one place from beginning of abrasive blasting through initial cure of coating. Waste materials covered by this paragraph must not include any material or residue from removal of coatings containing lead, chromium, cadmium, PCB, or any other hazardous material.

It is the Contractors responsibility to insure the feasibility and workability of the containment system. The Contractor must perform his operations and work schedule in a manner as to minimize leakage of the containment system. The containment system must be properly maintained and must not deviate from the approved drawings. If the containment system fails to function satisfactorily, the Contractor must suspend all operations, except those required to minimize adverse impact on the environment or government property. Operations must not resume until modifications have been made to correct the cause of the failure.

3.4.2 Automated Monitoring Requirements, Field and Shop Applications

Provide continuous monitoring of temperature, relative humidity, and dew point data at pertinent points on the structure substrate, during surface preparation, coating application, and initial cure. Locate sensors to provide pertinent data for the surface preparation and coat application being performed. Monitor any heating, cooling, or dehumidification equipment used. Make data available to the Contracting Officer through Internet access. Provide monitoring equipment to perform as follows:

- a. Data is collected in the field unit or shop unit in one minute increments, and available for download (on-site) in a standard format. Contractor must collect this data and make available to the Contracting Officer;
- b. Monitoring equipment must have backup power such that data collection and transmission to web server will be uninterrupted during the entire period of the dehumidification requirement;
- c. Monitoring equipment must have capability to measure surface temperatures at a minimum of four locations;
- d. Monitoring equipment must have capability to measure dry bulb temperature (DB), relative humidity (RH), and dewpoint temperature (DP);
- e. Data must be available continuously through secure Internet connection, using widely available web browsers;
- f. Internet accessible data must be collected and stored in maximum 15 minute increments, and lag time between data collection and online availability must be no greater than 70 minutes;
- g. Internet accessible data must be available for viewing online in tabular format, and graphical format using selected data;
- h. Internet accessible data must be available for download in user-defined segments, or entire project to date, in a standard format

usable by Microsoft Excel and other spreadsheet programs.

- i. Internet-based controls must provide alerts to pre-designated parties through email messaging;
- j. Internet-based controls must monitor data uploads from field unit or shop unit and issue alert if data not initiated within 60 minutes of last upload;
- k. Internet-based controls must monitor operation of DH equipment and issues alert when power remains off for more than 15 seconds, or if pre-determined temperature, RH, or DP conditions are exceeded;

There is no requirement for connectivity of the monitoring system to control the DH equipment, therefore, any combination of equipment having the required functionality will be accepted.

3.5 SURFACE PREPARATION

3.5.1 Abrasive Blasting and Waterjetting Equipment

Use abrasive blasting equipment of conventional air, force-feed, or pressure type. Maintain a minimum pressure of 95 psig at nozzle. Confirm that air supply for abrasive blasting is free of oil and moisture when tested in accordance with ASTM D4285. Test air quality at each startup, but in no case less often than every five operating hours.

Use waterjetting equipment capable of Low-Pressure Water Cleaning (LP WC) at pressures up to 5,000 psi, High-Pressure Waterjetting (HP WJ) at pressures between 10,000 and 30,000 psi and Ultrahigh-Pressure Waterjetting (UHP WJ) at pressures greater than 30,000 psi.

3.5.2 Operational Evaluation of Abrasive

Test abrasive for salt contamination and oil contamination as required by the appropriate abrasive specification daily at startup and every five operating hours thereafter.

3.5.3 Surface Standard

Inspect surfaces to be coated, and select plate with similar properties and surface characteristics for use as a surface standard. Blast clean one or more 1 foot square steel panels as specified in paragraph SURFACE PREPARATION. Record blast nozzle type and size, air pressure at nozzle and compressor, distance of nozzle from panel, and angle of blast to establish procedures for blast cleaning. Measure surface profile in accordance with SSPC PA 17 using Rmax as the measure of profile height. When the surface standard complies with all specified requirements, seal with a clearcoat protectant. Use the surface standard for comparison to abrasive blasted surfaces throughout the course of work.

3.5.4 Pre-Preparation Testing for Surface Contamination

Perform testing, water jetting, abrasive blasting, and testing in the prescribed order.

3.5.4.1 Pre-Preparation Testing for Oil and Grease Contamination

Inspect all surfaces for oil and grease contamination using two or more of

the following inspection techniques: 1) Visual inspection, 2) WATER BREAK TEST, 3) CLOTH RUB TEST. Reject oil or grease contaminated surfaces, clean in accordance with SSPC SP 1, and recheck for contamination until surfaces are free of oil and grease.

WATER BREAK TEST - Spray atomized mist of distilled water onto surface, and observe for water beading. If water "wets" surface rather than beading up, surface can be considered free of oil or grease contamination. Beading of water (water forms droplets) is evidence of oil or grease contamination.

CLOTH RUB TEST - Rub a clean, white, lint free, cotton cloth onto surface and observe for discoloration. To confirm oil or grease contamination in lightly stained areas, a non-staining solvent may be used to aid in oil or grease extraction. Any visible discoloration is evidence of oil or grease contamination.

3.5.4.2 Pre-Preparation Testing for Soluble Salts Contamination

Test surfaces for soluble salts, and wash as required, prior to abrasive blasting. Soluble salt testing is also required in paragraph PRE-APPLICATION TESTING FOR SOLUBLE SALTS CONTAMINATION as a final acceptance test of prepared surfaces after abrasive blasting, and successful completion of this phase does not negate that requirement. This phase is recommended since pre-preparation testing and washing are generally more advantageous than attempting to remove soluble salt contamination after abrasive blasting. Effective removal of soluble salts will require removal of any barrier to the steel surface, including rust. This procedure may necessitate combinations of wet abrasive blasting, high pressure water rinsing, and cleaning using a solution of water washing and soluble salts remover. The soluble salts remover must be acidic, biodegradable, nontoxic, noncorrosive, and after application, will not interfere with primer adhesion. Delays between testing and preparation, or testing and coating application, may allow for the formation of new contamination. Use potable water, or potable water modified with soluble salt remover, for all washing or wet abrasive blasting. Test methods and equipment used in this phase are selected at the Contractor's discretion.

3.5.5 Water Jetting and Abrasive Blasting

On previously coated and prepared surfaces Waterjet all steel surfaces to a NACE WJ-1(< 33 percent rust staining), NV-3 (<50 µg/cm² chlorides) condition employing Ultrahigh-Pressure Waterjetting (UHP WJ) at more than 30,000 psi. If mutually agreed upon by the government and contractor at the pre-application meeting, waterjetting must be followed by abrasive blasting the steel surfaces to near-white metal in accordance with SSPC SP 10/NACE No. 2. Provide a 3 to 8 mil surface profile. Reject profile greater than 8 mils, discontinue abrasive blasting, and modify processes and materials to provide the specified profile. Prepared surfaces must conform to SSPC VIS 1 and must match the prepared test-panels. Measure surface profile in accordance with SSPC PA 17, using Rmax as the measure of profile height. Record all measurements required in this standard. Measure profile at rate of three test areas for the first 1000 square feet plus one test area for each additional 1000 square feet or part thereof. Provide two additional measurements for each non-compliant measurement. When surfaces are reblasted for any reason, retest profile as specified. Following abrasive blasting, remove dust and debris by vacuum cleaning. Do not attempt to wipe surface clean.

On in shop applications or field applications of new surfaces provide a 3 to 5 mil surface profile. Reject profile greater than 5 mils, discontinue abrasive blasting, and modify processes and materials to provide the specified profile. Prepared surfaces must conform to SSPC VIS 1 and must match the prepared test-panels. Measure surface profile in accordance with SSPC PA 17, using Rmax as the measure of profile height. Record all measurements required in this standard. Measure profile at rate of three test areas for the first 1000 square feet plus one test area for each additional 1000 square feet or part thereof. Provide two additional measurements for each non-compliant measurement. When surfaces are reblasted for any reason, retest profile as specified. Following abrasive blasting, remove dust and debris by vacuum cleaning. Do not attempt to wipe surface clean.

3.5.6 Disposal of Used Abrasive

Dispose of used abrasive off Government property in accordance with Federal, State, and Local mandated regulations.

3.5.7 Pre-Application Testing For Surface Contamination

3.5.7.1 Pre-Application Testing for Oil and Grease Contamination

Ensure surfaces are free of contamination as described in paragraph PRE-PREPARATION TESTING FOR OIL AND GREASE CONTAMINATION, except that only questionable areas need be checked for beading of water misted onto surface.

3.5.7.2 Pre-Application Testing for Soluble Salts Contamination

Test surfaces for chloride contamination using the Test Kit described in TEST KIT FOR MEASURING CHLORIDE, SULFATE AND NITRATE IONS ON STEEL AND COATED SURFACES. Test all surfaces at rate of three tests for the first 1000 square feet plus one test for each additional 2000 square feet or part thereof. Concentrate testing of bare steel at areas of coating failure to bare steel and areas of corrosion pitting. Perform 30 percent of tests on bare steel at welds, divided equally between horizontal and vertical welds. One or more readings greater than 3 micrograms per square centimeter of chlorides or 10 micrograms per square centimeter of sulfates or 5 micrograms per square centimeter of nitrates is evidence of soluble salt contamination. Reject contaminated surfaces, wash as discussed in paragraph PRE-PREPARATION TESTING FOR SOLUBLE SALTS CONTAMINATION, allow to dry, and re-test until all required tests show allowable results. Reblast tested and cleaned areas as required. Label all test tubes and retain for test verification.

3.5.7.3 Pre-Application Testing for Surface Cleanliness

Apply coatings to dust free surfaces. To test surfaces, apply strip of clear adhesive tape to surface and rub onto surface with finger. When removed, the tape should show little or no dust, blast abrasive, or other contaminant. Reject contaminated surfaces and retest. Test surfaces at rate of three tests for the first 1000 square feet plus one test for each additional 1000 square feet or part thereof. Provide two additional tests for each failed test or questionable test. Attach test tapes to Daily Inspection Reports.

3.6 MIXING AND APPLICATION OF SEALANT AND COATING SYSTEM

3.6.1 Preparation of Coating Materials for Application

Each of the SZC materials are a two-component material supplied in separate containers.

3.6.1.1 Mixing Materials

Self Priming SZC Coatings are designed for Plural Component application. Mix in accordance with manufacturer's instructions, which may differ for each product and manufacturer. Do not mix partial kits, or alter mix ratios. Mix materials in same temperature and humidity conditions specified in paragraph DELIVERY AND STORAGE. DO NOT ADD SOLVENT without specific written recommendation from the manufacturer.

3.6.1.2 Pot Life

Self Priming SZC Coatings have very short pot life. For small touch-ups apply mixed products within stated pot life for each product manufacturer. Stop applying when material becomes difficult to apply in a smooth, uniform wet film.

3.6.1.3 Application Conditions and Recoat Windows

The application condition requirements for the SZC system are intended to avoid the delamination problems frequently found on industrial structures. Plan coating application to ensure that specified temperature, humidity, and condensation conditions are met. If conditions do not allow for orderly application of the coating system use appropriate means of controlling air and surface temperatures, as required. Partial or total enclosures, insulation, heating or cooling, or other appropriate measures may be required to control conditions to allow for orderly application of all required coats.

Maintain air and steel surface temperature between 50 and 100 degrees F during application and the first 30 minutes of cure. Maintain steel surface temperature more than 5 degrees F above the dew-point of the ambient air for the same period with relative humidity at a maximum of 60 percent at anytime during application. If coating is not applied during these surface temperatures and conditions, or if surface temperature exceeds 120 degrees F before cure, provide TOTAL REMOVAL AND RE-APPLY.

3.6.2 Application of SZC System, Joint Sealant and Stripe Coat

Apply SZC in accordance with SSPC PA 1 and as specified herein. Apply SZC to surfaces that meet all stated surface preparation requirements.

Prior to application SZC perform testing prescribed in paragraph PRE-APPLICATION TESTING FOR SURFACE CONTAMINATION, as necessary, to ensure minimal contamination. If contamination is found, revert to the specified testing rate. Such atmospheric events as a coastal storm blowing onshore can bring unusual chloride contamination. Concern for contamination should be continually prevalent, and spot testing should be accomplished to verify satisfactory conditions. Where visual examination or spot testing indicates contamination, perform sufficient testing to verify non-contamination, or to define extent of contamination for appropriate treatment.

Apply SZC in a consistent wet film in a continuous half lapped spray coat, overlapping 50 percent of the previous spray pass. In multiply coats applications apply two coats at 90 degree application patterns. Ensure that "cold joints" are no less than six inches from welds. Apply stripe coat by brush. For convenience, stripe coat material may be delivered by spray if followed immediately with brush-out and approved procedures include appropriate controls on thickness. Apply all other coats by spray application. Use appropriate controls to prevent airborne coating fog from drifting beyond 10 feet from the structure or containment perimeter. Cover or protect all surfaces that will not be coated. The cleanliness, temperature, recoat windows, and airborne paint containment requirements may necessitate the use of enclosures, portable shelters, or other appropriate controls.

Apply SZC at the following specified thickness:

Coat	Min. DFT (Mils)	Ideal DFT (Mils)	Max. DFT (Mils)
PolySpec LPE 5100	60	80 - 100	120
Chevron Phillips TZ 904	60	80 - 100	120
Premier Coating Systems PCS 1200 TA	60	80 - 100	120

3.6.2.1 Application of SZC Coating Material

Apply all field applications of SZC materials in accordance with manufacturer's printed instructions and literature for one coat application. Field Applications should be applied in one continuous half lapped spray coat, overlapping 50 percent of the previous spray pass to the "Ideal DFT" mils thickness. Test in accordance with SSPC PA 2, Appendix 1 and 3 for conformance.

Apply all shop applications of SZC materials in accordance with manufacturer's printed instructions and literature for two coat application. Shop Applications should be applied in continuous half lapped spray coats, overlapping 50 percent of the previous spray pass to approximately one half (40-50 mils) of the "Ideal DFT" mils thickness for each coat. Shop Application requires the second coat to be applied at 90 degree application to the first coat. Test all DFT in accordance with SSPC PA 2, Appendix 1 and 3 for conformance.

3.6.2.2 Application of Joint Sealant

Apply joint sealant to back-to-back steel joints that are more than 3/8 inches wide, deep pitted areas, gouges in the steel surface and penetrations. Some penetrations may require backfill. Consult manufacturer for recommendations of backfill material. Apply sealant within 24 hours of application of the SZC, and touch-up with SZC after appropriate cure of the sealant.

3.6.2.3 Application of Stripe Coat

Apply stripe coat of SZC to back-to-back steel joints that are seal welded. Apply stripe coat of SZC to top and bottom, or each side, of narrow joints. Apply by brush, working material into corners, crevices, angles, and welds, and onto outside corners and angles. Apply stripe coat within 24 hours of application of the SZC final coat.

3.6.2.4 Procedure for Holiday and Spot Repairs of Newly Applied Coating

Repair coating film defects at the earliest practicable time, preferably before application of the succeeding coat. Observe all requirements for soluble salts contamination, cleanliness between coats, and application conditions. Prepare defective area in accordance with SSPC SP 10/NACE No. 2, and feather coating as required to leave 6 inches of the SZC feathered and abraded. Protect adjacent areas from damage and overspray. Remove dust and solvent wipe the prepared area plus an additional 6 inches beyond the prepared area with clean denatured alcohol. Prepare repairs and apply SZC within 48 hours of the general application coat of SZC. Apply each repair coat to approximate thickness of surrounding SZC material.

3.7 PROJECT IDENTIFICATION

At the completion of the work, attach a prepared panel with the following information on the structure in 3/4 inch to 1 inch Helvetica style letters:

Date Coated:
Project Number:
Contractor:
Address:
SZC Material and Manufacturer
Surface Prep: SSPC SP ____ Profile: ____
Joint Sealant Manufacturer: ____
SZC Average Application Thickness: ____

3.8 FIELD QUALITY CONTROL

For marking of surfaces, use chalk for marking bare steel, and water based markers for marking coated surfaces, and remove marks prior to coating. Do not use any wax or grease based markers, or any other markers that leave a residue or stain.

3.8.1 Coating Inspector

The coating inspector must be considered a QC Specialist and must report to the QC Manager, as specified in Section 01 45 10 QUALITY CONTROL. The Coating Inspector must be present during all pre-preparation testing, surface preparation, coating application, initial cure of the coating system, during all coating repair work, and during completion activities as specified in Section 01 45 10 QUALITY CONTROL. The Coating Inspector must provide complete documentation of conditions and occurrences on the job site, and be aware of conditions and occurrences that are potentially detrimental to the coating system. The requirements for inspection listed in this Section are in addition to the QC inspection and reporting requirements specified in Section 01 45 10 QUALITY CONTROL.

3.8.2 Field Inspection

3.8.2.1 Inspection and Documentation Requirements

- a. Perform field inspection in accordance with ASTM D3276 and the approved Coating Work Plan. Document Contractor's compliance with the approved Coating Work Plan.
- b. Provide all tools and instruments required to perform the required testing, as well as any tools or instruments that the inspector

considers necessary to perform the required inspections and tests. Document each inspection and test, including required hold points and other required inspections and tests, as well as those inspections and tests deemed prudent from on-site evaluation to document a particular process or condition, as follows:

- (1) Location or area;
- (2) Purpose (required or special);
- (3) Method;
- (4) Criteria for evaluation;
- (5) Results;
- (6) Determination of compliance;
- (7) List of required rework;
- (8) Observations.

- c. Collect and record Environmental Conditions as described in ASTM D3276 on a 24 hour basis, as follows:

- (1) During surface preparation, every hour or when changes occur;
- (2) During coating application and the first four days of initial cure, every hour or when changes occur;
- (3) Note location, time, and temperature of the highest and lowest surface temperatures each day;
- (4) Use a non-contact thermometer to locate temperature extremes, then verify with contact thermometers.

- d. NOTE: Data collected on Environmental conditions in paragraph AUTOMATED MONITORING REQUIREMENTS may be used for overnight data, however, the data must be constantly verified as to location of sensors and validity of data with respect to the coating work being accomplished.

- e. Document all equipment used in inspections and testing, including manufacturer, model number, serial number, last calibration date and future calibration date, and results of on-site calibration performed. Work documented using data from equipment found to be out of calibration must be considered as non-compliant since last calibration or calibration check, as required.

3.8.2.2 Inspection Report Forms

Develop project-specific report forms as required to report measurement and test results and observations being complete and compliant with contract requirements. This includes all direct requirements of the contract documents and indirect requirements of referenced documents. Show acceptance criteria with each requirement and indication of compliance of each inspected item. Annotation of non-compliance must be conspicuous so as to facilitate identification and transfer to the Rework Log. Report forms must include requirements and acceptance and rejection criteria, and must be legible and presented so that entered data can be quickly compared to the appropriate requirement.

3.8.2.3 Daily Inspection Reports

Submit one copy of daily inspection report completed each day when performing work under this Section, to the Contracting Officer. Note all non-compliance issues, and all issues that were reported for rework in accordance with QC procedures of Section 01 45 10 QUALITY CONTROL. Each report must be signed by the coating inspector and the QC Manager. Submit

report within 24 hours of date recorded on the report.

3.8.2.4 Inspection Logbook

A continuous record of all activity related to this Section must employ the electronic reporting program TruQC or equivalent as outlined in Table III and be maintained on a daily basis. The computer / software package must be used to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information including photo documentation where appropriate. The designated Government Representative for the project is assigned the highest level Administrator privileges and only the Administrator must be able to modify reports.

In areas where photography is not allowed the computer must come with verification that the camera / photo capability has been removed. Alternatively, a continuous record of all activity related to this Section must be maintained in an Inspection Logbook on a daily basis. The logbook must be hard or spiral bound with consecutively numbered pages, and must be used to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information. The Coating Inspector's Logbook that is sold by NACE is satisfactory. Submit the original Inspection Logbook to the Contracting Officer upon completion of the project and prior to final payment.

3.8.2.5 Inspection Equipment

All equipment must be in good condition, operational within its design range, and calibrated as required by the specified standard for use of each device.

3.8.2.6 Black Light

Use a black light having a 365 nanometer intensity of 4,000 microwatts per square centimeter minimum at 15 inches. The Spectroline BIB-150P from Spectronics Corporation satisfies this requirement.

3.9 FINAL CLEANUP

Following completion of the work, remove debris, equipment, and materials from the site. Remove temporary connections to Government or Contractor furnished water and electrical services. Restore existing facilities in and around the work areas to their original condition.

TABLE I						
COATING QUALITY CONFORMANCE INSPECTION REQUIREMENTS						
<u>Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating</u>						
<u>Test</u>	<u>Component A</u>		<u>Component B</u>		<u>Mixed</u>	
	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>
Solids, by weight (ASTM D2369), Method E					98 per cent	
Weight ASTM D1475						
Kilograms / liter	1.14	1.26	0.96	1.43	0.96	1.43
Pounds / gallon	9.50	10.50	8.00	12.00	8.00	12.00
Dry Time (ASTM D1640), at 23 degrees C 73 degrees F						
Set to touch, hours	---	---	---	---	---	1.5
Dry-hard time, hours	---	---	---	---	---	2
Sag resistance (ASTM D4400)						
Micrometers	---	---	---	---	2540	---
Mils	---	---	---	---	100	---
Pot life, minutes 600 grams at 73 degrees F (via x2 viscosity)	---	---	---	---	20	---
Approximate SAE AMS-STD-595A White or Off White, no darker than #27778 Gray, no darker than color #26493 Green, no darker than color #24518	---	---	---	---	Conform	
Contrast ratio, Off White --- --- --- --- 0.95 --- (ASTM D2805) at 254 micrometers, 10 mils DFT	---	---	---	---	0.95	---
DFT Gloss, (ASTM D523) 60 degree specular	---	---	---	---	50	---

TABLE I						
COATING QUALITY CONFORMANCE INSPECTION REQUIREMENTS						
<u>Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating</u>						
<u>Test</u>	<u>Component A</u>		<u>Component B</u>		<u>Mixed</u>	
	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>
VOC * (ASTM D3960)						
Grams / liter	---	---	---	---	< 70	
Pounds / gallon	---	---	---	---	<.58	
Total Lead & Cadmium (ASTM D3335)	---	---	---	---	<.0006 percent	
Total Chromium (ASTM D3718)	---	---	---	---	<.0006 percent	
Fourier transform infrared spectroscopy (FTIR)					Conform +/- 10 percent	
Match Manufacturer's Qualification FTIR test scans to Component "A" Liquid (ASTM D7588) Component "B" Liquid (ASTM D7588)						

Table II	
COATING QUALIFICATION INSPECTION REQUIREMENTS	
<u>Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating</u>	
<u>Physical Properties</u>	<u>Acceptance Criteria</u>
Solids, by weight (ASTM D2369), Method E	>98 percent
Mix Ratio (by volume) (Components A and B)	1:1
Pigment content, percent wt (ASTM D2698)	
Component A, Resin	20.0 max.
Component B, Cure	25.0 min.
Total Components A and B	20.0 min.
Volatiles, percent wt (ASTM D2369)	
Component A, Resin	2.0 max.
Component B, Cure	5.0 max.
Mixed	0.4 max.
Mixed	5.0 max.
Non-volatile vehicle, percent wt	
Component A, Resin	53.0 min. 83.0 max.
Component B, Cure	70.0 min. 100.0 max.
Pot Life (600 grams at 73 degrees F), Minimum (via x2 viscosity)	20 minutes
Sag resistance, minimum (ASTM D4400)	
Micrometers	2540 min.
Mils	100 min.

Table II	
COATING QUALIFICATION INSPECTION REQUIREMENTS	
<u>Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating</u>	
<u>Physical Properties</u>	<u>Acceptance Criteria</u>
Color of dry film Approximate SAE AMS-STD-595A White or Off White, no darker than color No. 27778; Gray, no darker than color No. 26493; Green, no darker than color No. 24518	Conform
Contrast ratio, Off White (ASTM D2805) at 254 micrometers, 10 mils	0.95 min.
DFT Gloss, (ASTM D523) at 127 micrometers, 5 mils DFT	50 min.
Flash Point, Components A & B, Degrees F, (Degrees C), by one of the following methods: (ASTM D3278), (ASTM D93) or (ASTM D56)	>200(93.3)
VOC * (ASTM D3960)	
Grams / liter	< 70 max.
Pounds / gallon	<.58 max.
Total Lead & Cadmium (ASTM D3335)	<.0006 percent
Total Chromium (ASTM D3718)	<.0006 percent
Weight (ASTM D1475)	
Component A, Kilograms / liter	1.14 min. 1.26 max.
Component B, Kilograms / liter	0.96 min. 1.43 max.
Mixed, Kilograms / liter	0.96 min. 1.43 max.
Component A, Pounds per gallon	9.50 min. 10.50 max.
Component B Pounds per gallon	8.00 min. 12.00 max.
Mixed, Pounds per gallon	8.00 min. 12.00 max.
Dry Time, (ASTM D1640), at 23 degrees C, 73 degrees F	

Table II	
COATING QUALIFICATION INSPECTION REQUIREMENTS	
<u>Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating</u>	
<u>Physical Properties</u>	<u>Acceptance Criteria</u>
Set to touch, hours	1.5 max.
Dry-hard time, hours	2 max.
Tensile Strength (psi) (ASTM D2370)	> 400
Elongation at break (ASTM D2370)	> 30
Hardness (Shore D), 14 Days Cure (ASTM D2240)	> 45
Adhesion, Steel (ASTM D4541), Test Method E, psi	> 1,700
Cohesive Failure, psi (min.)	> 1,200
Flexibility, (ASTM D522), 0.125 inch Mandrel Bend	Pass
Compression Strength, psi (ASTM D575)	>9,000
Direct Impact Resistance, in/lbs (ASTM D2794)	> 100
Cured Spray Appearance, Free from Bubbles, Runs & other Defects	Conforms
Test No. 1 through No. 4	Conforms
Test No. 5 - FTIR - upon confirmation of product conformity to requirements, produce a set of three FTIR scans to be used to assess conformity of all subsequent batches of this material, as follows: (1) Component A Liquid, (ASTM D7588) (2) Component B Liquid, (ASTM D7588) (3) Mixed (Components A and B) Dry Film (0.01 - 0.03g coating in 0.5 g KBr)	

COATING QUALIFICATION INSPECTION REQUIREMENTS
TEST PANEL PREPARATION AND TEST

The Principal Testing Firm performing the testing must be responsible for application of protective coatings to test panels. The final report must include testing results for all samples, panels, or tests performed. The final report must be certified by the Testing Firm and kept by the manufacturer as proof of testing and conformance. Include all of the laboratory testing requirements.

Test Panel Requirements for Test (Applicable to Test Nos. 1 through 4)

All steel test panels, except Test No. 3 panels, must be ASTM A36/A36M, hot-rolled steel or equivalent with dimensions (in mm) as shown below. Certified mill test reports must be provided as prepared by the steel manufacturer or testing laboratory for all Grade 36 steel identifying actual physical and chemical analysis of the material. Test panels for Test No. 2 must be standard Taber panels, meeting the requirements of ASTM D4060.

Test Panel Dimensions (in mm)

Test	Width	Length	Thickness
1,2,3,4	100	150	6

Three test panels must be prepared for each complete system for each test. Test 4 requires three additional test panels to be prepared with the primer only. Control panels must be coated in bulk lots by a single applicator for use by all selected laboratories. The location and date of application must be reported. All control panels utilized during the testing evaluation of a system must be from the same lot. During transportation and storage, control panels must be protected such that coating damage will not occur. Beyond 30 days, the storage temperature and relative humidity for these panels must be 25 plus or minus 5 degrees C and 50 plus or minus 20 percent.

Suggested Acceptance Criteria-Two of three panels must pass for the complete system to pass. Acceptance criteria are included for interpreting data reported.

The panels must be cleaned in accordance with SSPC SP 5/NACE No. 1 using recyclable metallic abrasives in accordance with SSPC AB 3. The abrasives must have a maximum chloride content of 15 ppm determined in accordance with ASTM D512 and a maximum conductivity of 150 micromhos per cm determined in accordance with ASTM D4940. The abrasive mixture must be approximately 60 percent SAE shot number S230 and 40 percent SAE grit number G40. Both the shot and grit must have a Rockwell hardness of C45 plus or minus 3. The surface profile of the cleaned panels must be 50.8 to 76.2 micrometers (2 to 3 mils) when determined in accordance with SSPC PA 17. The profile must be clean, sharp and free of embedded friable material, with adequate roughness to insure effective adhesion of the applied primer.

Note: The SSPC SP 5/NACE No. 1 is required rather than SSPC SP 10/NACE No. 2 only for the convenience of the laboratory in order to guarantee that all panels are prepared identically and to assure comparative testing results. Steel surfaces prepared to a lesser degree may not yield the same performance.

COATING QUALIFICATION INSPECTION REQUIREMENTS
TEST PANEL PREPARATION AND TEST

Each coating must be applied within the dry film thickness range recommended by the manufacturer. All products must be applied using proper airless equipment except when this method is specifically not allowed by the paint manufacturer. All paints must be applied to panels mounted vertically at a distance 530 mm (21 in.) from the tip of the spray gun. The equipment must be capable of developing sufficient pressure to properly atomize the coating. Orifice size, application pressure, pump type and ratio, hose size and length, and any atypical application requirements must be recorded. If the pressure used varies by more than 10 percent from the suggested pressure listed in the manufacturer's application data information, the actual pressure used and a statement explaining the deviation must be provided in the final report.

For testing purposes the color of the Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating must conform to SAE AMS-STD-595A, no darker than Color Chip No. 27778 (Off White).

Each sample or panel must be marked and identified by an assigned system code number. The identification code number must be placed on the back of each panel with permanent yellow paint stick. It will also be typed and placed in front of the corresponding panel when photographs are taken. The number will have a minimum height of 10 mm and will identify the following information, which will be part of the final report:

1. Test number being performed. (i.e., Salt No. 1, Abrasion No. 2).
2. Replica test being performed (i.e., Salt Replica 3, Abrasion Replica 2).
3. Date of panel preparation.
4. Date that the test evaluation was performed.

Test panels coated with the Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating only at the minimum recoat time frame stated in the product data sheet. Curing of the coated test panels, including control panels for the complete system, must be a minimum of 7 days and no more than 10 days. The curing climate must be at 25 plus or minus 2 degrees C and 65 plus or minus 5 percent relative humidity. The back of all test panels must be coated with 75 to 100 micrometers of a high-quality epoxy or urethane barrier coat.

After preparation of the test panels with the coating system to be evaluated the edges must be sealed and protected by applying vinyl tape around the entire outside edge. The vinyl tape must extend 5 mm onto the coated surface from the edge of the panel and must be applied after the coating has cured. The vinyl tape must meet the requirements of CID A-A-1689 and have an approximate vinyl thickness of 110 micrometers with an approximate neoprene adhesive thickness of 25 micrometers.

Test panels must be scribed in accordance with ASTM D1654 with a single "X" mark centered on the panel. The rectangular dimensions of the scribes must have a top width of 50 mm and a height of 100 mm. The scribing tool must be a straight-shank tungsten carbide tip, lathe cutting tool (ANSI B94.50, Style E). The scribe cut must expose the steel substrate as verified with a microscope.

COATING QUALIFICATION INSPECTION REQUIREMENTS
TEST PANEL PREPARATION AND TEST

Photographic Requirements (Applicable to Test Nos. 1 through 4).
Color photographs of each sample or panel must be taken as follows:

1. All photographs must include the code identification number for each sample or panel and the number of hours.
2. A photograph of the coated surface of each sample or panel must be taken after the application of the entire system to be evaluated.

Test No. 1:

1. Each time frame designated.
2. Once blistering or rusting is observed, the panel must be photographed and its condition documented at the end of each 1,000 hours for ASTM B117 Salt Fog Resistance Test.
3. Rust creepage evaluation: (1) after washing and prior to stripping of the scribe, and (2) after stripping of the scribe.

Test Nos. 2, 3, and 4. At the completion of each test. Measurement of Surface Profile and Dry Film Paint Thickness (Applicable to Test Nos. 1 through 4).

1. Surface Profile-Measure total surface profile in accordance with SSPC PA 17 using Rmax as the measure of profile height.
2. Dry Film Paint Thickness-The dry film paint thickness must be taken in accordance with ASTM D7091, with the following exception:

A.) Measure the dry film paint thickness on each test panel utilizing a Type II dry film thickness gage calibrated according to SSPC PA 2 as follows:

a.) Take two gage readings from the top third, the middle third, and the bottom third of the test panel. Readings should be taken at least 25 mm from any edge. To facilitate consistent measurements at fixed positions on the panel, the laboratory must use a template, providing six fixed locations on the panels. Discard any gage reading that cannot be repeated consistently. The average of the acceptable gage readings must be no less than the manufacturer's recommended minimum thickness. No single gage reading must be less than 80 percent of the manufacturer's recommended minimum. The average of the acceptable gage readings must be no more than the manufacturer's recommended maximum thickness. No single gage reading must be more than 120 percent of the manufacturer's recommended maximum. Recommended maximum dry film thickness must be detailed on the manufacturer's product bulletin of each product.

TESTS TO BE PERFORMED

Test No. 1 ASTM B117 Salt Fog Resistance Test

A salt fog resistance test must be performed in accordance with ASTM B117. The complete system must be exposed for durations of 4,000 and 5,000 hours. Evaluation-Full visual evaluations must be performed at the intermediate and final hours shown above. Rust creepage at the scribe and percent rusting at the scribed edges must be evaluated at intermediate hours and after scraping at 5,000 hours in accordance with ASTM D1654, Method 2, Scraping, (where applicable after cleaning). Blistering, rust creepage at the scribe, percent rusting at the scribed edges and a description of rusting in the scribe must be reported in table format. Test values must not exceed the Test Acceptance Criteria listed below, except percent rusting at the scribed edges, which

COATING QUALIFICATION INSPECTION REQUIREMENTS
TEST PANEL PREPARATION AND TEST

will be reported for information only.

Blistering must be evaluated in accordance with ASTM D714. Blister size and frequency must be converted to a numerical value using Table A.

Table A Blister Value Conversion Table

(No blisters, equals a conversion number of 10.)

Blister Size	Few*	Medium	Med Dense	Frequency Dense
No. 8	9	8	7	6
No. 6	8	7	6	5
No. 4	7	6	5	4
No. 2	6	5	4	3
No. 1	5	4	3	2

*Adjustment Values for "Few" Blister Frequency

Number of Blisters	Value
1	x.8
2	x.6
3	x.4
4	x.2
5 or more	x.0

If a specific number of blisters are reported under the frequency "Few" then add the appropriate decimal "Value" provided above.

Example: A report of two No. 6 blisters converts to a value of 8.6.

Rust Creepage at the Scribe

Rust creepage (a.k.a. cutback, undercut, loss of adhesion, deterioration, disbondment) must be measured perpendicular from the center of the scribe to the furthest point of cutback. Cutback must be measured in millimeters to the nearest 0.5 mm. For both intermediate and final evaluations, the maximum cutback must be measured at 5 mm intervals along the scribe on each side of the scribe. (For a 50 x 100 mm X-scribe, 23 measurements are required for each side of each leg of the X-scribe). Report the average and maximum cutback measurements. Defects at the scribe having the appearance of a "blister" will be defined to be rust creepage (cutback).

Percent Rusting at the Scribed Edges

The length of individual areas of rust creepage along both edges of the scribe measured in Rust Creepage at the Scribe (above) must be added together to achieve an aggregate length of rust creepage. This length of rusting must be divided by the total length of the scribe on both sides to yield a percent of rusting at the scribed edges. e.g., (length of rust along both sides of scribe), (total length of scribe, which is 2 x 2 x 111.8 mm equaling 447.2 mm) = (percent rusting at the scribed edges).

Rusting in the Scribe

In addition to the measurement of Rust Creepage at the Scribe (above) and Percent Rusting at the Scribed Edges (above) a general description of rusting in the scribe itself will also be reported. This description will state whether the scribe is "clean, partially rusted, or completely rusted."

COATING QUALIFICATION INSPECTION REQUIREMENTS
TEST PANEL PREPARATION AND TEST

Acceptance Criteria

After the designated hours of exposure, the coating must exhibit no spontaneous delamination (evaluated subjectively). Percent rusting at the scribe must be reported as information only. Blistering, and both average and maximum rust creepage at the scribe, must not exceed the following acceptance levels:

Test Acceptance Criteria					
Blister Criteria			Rust Criteria		
			Conversion		
Acceptance	Hours	Size/Freq.	Value	Hours	Creepage
Coating System	4000	No. 6 Medium	> 7	5000	Max Avg. < 5 mm

Panel Corrosion, outside scribe, max. 0.05 percent, ASTM D610

Test No. 2 ASTM D4060 Abrasion Resistance Test

A test for abrasion resistance must be performed in accordance with ASTM D4060 using a CS-17 wheel and 1 kg weight for 1,000 cycles. The test must be performed on panels coated with the full system to be tested (i.e., 40 mils, 60 mils, 100 mils, 125 mils). The hardness of the abrasive wheel must be checked in accordance with ASTM D2240 for each test performed.

Acceptance Criteria

The system must be tested to identify its "weight loss" in milligrams.

Acceptance: < 30 mg

Test No. 3 ASTM D4541 Adhesion Test

A test for adhesion must be performed in accordance with ASTM D4541, Test Method D, using apparatus under Appendix D. The adhesive used to perform this test must be a two-component epoxy, containing no solvents (e.g., 100 percent solids). The test must be performed on panels having the primer coat only and on panels having the complete system. A minimum of four tests must be performed on each panel.

Acceptance Criteria

1. System with Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating must meet a minimum value of 11.72 Mpa (1,700 psi).

-OR-

2. System with Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating must meet a minimum cohesive failure value of 8.27 Mpa (1,200 psi).

Test No. 4 ASTM D6944 Freeze Thaw Stability

The test must be performed on panels coated with the full system to be tested. Prepared panels must be exposed to a 30-day freeze/thaw/immersion cycle ASTM D6944, Test Method A. One 24-hour cycle must consist of 16 hours at approximately minus 30 degrees plus or minus 5 degrees C followed by four hours of thawing at 50 degrees plus or minus 5 degrees C and four hours tap water immersion at 25 degrees plus or minus 2 degrees C. This work is done with the panels remaining in the freezer mode on weekends and holidays. Upon completion of the test, adhesion tests must be performed as required in Test No. 3.

COATING QUALIFICATION INSPECTION REQUIREMENTS
TEST PANEL PREPARATION AND TEST

Acceptance Criteria

Tests must indicate that there has been no loss in the adhesion values, when compared with those obtained in Test No. 3, for the complete system, which exceeds the test variation allowed by ASTM D4541.

Test No. 5 ASTM D7588 Coating Identification Tests.

An analysis of vehicle solids by Fourier transform infrared (FT/IR) spectroscopy consisting of 16 scans minimum per sample must be performed as follows:

1. For the Self Priming SZC Modified Epoxy, Low VOC, Barrier Coating, infrared spectrum (2.5 to 15 micrometers) of each liquid vehicle component via the potassium bromide sandwich technique.
2. For the mixed and dried components in appropriate mixing ratios (dried film) via the potassium bromide single-pellet technique, or alternately by the IR card sampling technique, which is called the polymer-coated fiberglass screen or transparent film (PTFE) technique.

The Volatile Organic Compound (VOC) content must be determined in accordance with ASTM D3960. Multi-component coatings will be blended together in the specified mixing ratios prior to testing.

Any products may be qualified by providing independent testing results to the requirements in this table. Coating Systems that currently meet these requirements and do not require COATING QUALIFICATION INSPECTION testing until June 01, 2017 include the following products only:

Chevron Philips Chemical Co. (800)858-4327, Technical(832-813-4862
TZ-904 Performance Coating

ITW / PolySpec Thiokol (888)797-0033, (281)397-0033
LPE-5100 Flexible Epoxy Novolac Splash Zone

Premier Coating Systems, Inc (904)824-1799, (904)403-6113
PCS-No. 1200TA Reinforced Modified Epoxy Surface Tolerant Coating

TABLE III
Reporting Program Requirements QA/QC

Administrative Controls:

Administrators must be able to turn on and off unique access to specific jobs and contracts.

Administrators must be able to remotely enable/ disable access for users.

All enabled users must view the same active report in real time. There must be no opportunity for multiple versions of the same report to exist.

Administrators must be able to setup unique approval processes for each project and promote or remove unique people from this process at any time.

Administrators must be able to associate contract specific documents and specification limits quickly and easily.

Administrators must be able to associate PDS, SDS, blueprints, scope of work and contracts uniquely to each job.

Objectivity Controls:

Data Entry fields must be by multi-selectable choices, numeric keypads, pickers and skip logic to ensure repeatable data entry in a way that makes running analytics and metrics easy and objective.

The program / hardware package must be able to communicate with inspection devices that provide (batch) data export capability such as Elcometer and Defelsko gages.

Must automatically time, date and GPS stamp all reports without input or interference from the inspector.

Real Time Syncing:

Forms must be available for approved associates to view at all times.

Retrievable storage must be provided for all job related reports and documents for a minimum time of 5 years from completion of the job or project. Archiving of the documents after 5 years will be the responsibility of the Government.

Document Library:

All reports must be in searchable and annotatable PDF format.

The Administrator must be able to upload and annotate job specific reports in real time. Examples include but not limited to Safety Data Sheets, Product Data Sheets and Blueprints.

Annotations / modifications must be locked and associated with the document. Only the Administrator has rights to modify or delete annotations or allow modifications to the document library especially all related inspection reports.

TABLE III
Reporting Program Requirements QA/QC

Customization:

The program must be capable of being customized to specific jobs, contracts or specifications.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING
11/18

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Tree Wound Paint

SD-04 Samples

Tree Wood Paint

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Tree Wound Paint

Use bituminous based paint from standard manufacture specially formulated for tree wounds.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

3.1.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.1.2 Trees, Shrubs, and Existing Facilities

Protect trees and vegetation to be left standing from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

3.1.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor is responsible for the repair of damage to existing utility lines that are indicated or made

known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, notify the Contracting Officer in ample time to minimize interruption of the service. Refer to Section 01 30 00 ADMINISTRATIVE REQUIREMENTS and Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS for additional utility protection.

3.2 CLEARING

Clearing consists of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing also includes the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work. Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except such trees and vegetation as may be indicated or directed to be left standing.

3.2.1 Tree Removal

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work includes the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Dispose of trees as specified in paragraph DISPOSAL OF MATERIALS.

3.2.2 Pruning

Trim trees designated to be left standing within the cleared areas of dead branches 1-1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 1-1/4 inches in diameter with an approved tree wound paint.

3.2.3 Grubbing

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Remove material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Fill depressions made by grubbing with suitable material and compact to make the surface conform with the original adjacent surface of the ground.

3.3 DISPOSAL OF MATERIALS

Dispose of excess materials in accordance with the approved solid waste management permit and include those materials in the solid waste management report.

All wood or wood like materials, except for salable timber, remaining from clearing, pruning or grubbing such as limbs, tree tops, roots, stumps, logs, rotten wood, and other similiar materials shall become the property of the Contractor and disposed of as specified. All non-saleable timber and wood or wood like materials remaining from timber harvesting such as

limbs, tree tops, roots, stumps, logs, rotten wood, and other similiar materials shall become the property of the Contractor and disposed as specified.

-- End of Section --

SECTION 31 23 00.00 20

EXCAVATION AND FILL

02/11

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 WATER WORKS ASSOCIATION (AWWA)

AWWA C600 (2017) Installation of Ductile-Iron Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM C136/C136M (2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM D1140 (2017) Standard Test Methods for Determining the Amount of Material Finer than 75- μ m (No. 200) Sieve in Soils by Washing

ASTM D1557 (2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2700 kN-m/m³)

ASTM D2321 (2018) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

ASTM D2487 (2011) Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D3786/D3786M (2013) Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

ASTM D4318 (2017) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM D4533/D4533M (2015) Standard Test Method for Trapezoid Tearing Strength of Geotextiles

ASTM D4632/D4632M (2015a) Grab Breaking Load and Elongation of Geotextiles

ASTM D4759 (2011; R 2018) Standard Practice for Determining the Specification Conformance of Geosynthetics

ASTM D4833/D4833M (2007; E 2013; R 2013) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

ASTM D698 (2012; E 2014; E 2015) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846.3-3 (1999, Third Edition, Update III-A) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

1.2 DEFINITIONS

1.2.1 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D1557, for general soil types, abbreviated as percent laboratory maximum density.

1.2.2 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.3 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.3 SUBMITTALS

Government approval is required for all submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shoring and Sheet Piling Plan

Submit 15 days prior to starting work.

SD-03 Product Data

Product Data

Filter Fabric

SD-06 Test Reports

Borrow Site Testing

Select material test

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

SD-07 Certificates

Rip Rap

Filter Fabric

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

- a. Surface elevations are as indicated.
- b. Pipes or other artificial obstructions, except those indicated, will not be encountered.
- c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.
- d. Material character is indicated by the boring logs.
- e. Hard materials and rock will not be encountered.
- f. Borrow material in the quantities required is not available on Government property.
- g. Blasting will not be permitted. Remove material in an approved manner.

1.6 REQUIREMENTS FOR OFF SITE SOIL

Soils brought in from off site for use as backfill shall be tested for petroleum hydrocarbons, BTEX, PCBs and HW characteristics (including toxicity, ignitability, corrosivity, and reactivity). Backfill shall not contain concentrations of these analytes above the appropriate State and/or EPA criteria, and shall pass the tests for HW characteristics. Determine petroleum hydrocarbon concentrations by using appropriate State

protocols. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5035/8260B. Perform complete TCLP in accordance with EPA SW-846.3-3 Method 1311. Perform HW characteristic tests for ignitability, corrosivity, and reactivity in accordance with accepted standard methods. Perform PCB testing in accordance with accepted standard methods for sampling and analysis of bulk solid samples. Provide borrow site testing for petroleum hydrocarbons and BTEX from a grab sample of material from the area most likely to be contaminated at the borrow site (as indicated by visual or olfactory evidence), with at least one test from each borrow site. For each borrow site, provide borrow site testing for HW characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

1.7 QUALITY ASSURANCE

1.7.1 Shoring and Sheet Piling Plan

Submit drawings and calculations, certified by a registered professional engineer, describing the methods for shoring and sheet piling of excavations. Drawings shall include material sizes and types, arrangement of members, and the sequence and method of installation and removal. Calculations shall include data and references used.

The Contractor is required to hire a Professional Geotechnical Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer shall be responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer shall update the excavation, sheet piling and dewatering plans as construction progresses to reflect changing conditions and shall submit an updated plan if necessary. A written report shall be submitted, at least monthly, informing the Contractor and Contracting Officer of the status of the plan and an accounting of the Contractor's adherence to the plan addressing any present or potential problems. The Geotechnical Engineer shall be available to meet with the Contracting Officer at any time throughout the contract duration.

1.7.2 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within two feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Select Material

Provide materials classified as GW, GP, SW, or SP, by ASTM D2487 where indicated. The liquid limit of such material shall not exceed 35 percent when tested in accordance with ASTM D4318. The plasticity index shall not be greater than 12 percent when tested in accordance with ASTM D4318, and not more than 35 percent by weight shall be finer than No. 200 sieve when tested in accordance with ASTM D1140.

2.1.2 Topsoil

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

2.2 UTILITY BEDDING MATERIAL

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D698 maximum density. Provide ASTM D2321 materials as follows:

- a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

2.3 BORROW

Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property, at Contractor's cost.

2.4 FILTER FABRIC

Provide a pervious sheet of polyester, nylon, glass or polypropylene, filaments woven, spun bonded, fused, or otherwise manufactured into a nonraveling fabric with uniform thickness and strength. Fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D4759:

	<u>Class A</u>
a. Grab tensile strength (ASTM D4632/D4632M) machine and transversed direction	min. 180 500
b. Grab elongation (ASTM D4632/D4632M) machine and transverse direction	min. 15

	<u>Class A</u>
c. Puncture resistance (ASTM D4833/D4833M)	min. {80} <u>195</u>
d. Mullen burst strength (ASTM D3786/D3786M)	min. {290} <u>2,000</u>
e. Trapezoidal Tear (ASTM D4533/D4533M)	min. {50} <u>222</u>

2.5 MATERIAL FOR RIP-RAP

Rock conforming to these requirements for construction indicated.

2.5.1 Rock

Rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Rock fragments shall be free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. The size of the fragments shall be such that no individual fragment exceeds a weight of 150 pounds and that no more than 10 percent of the mixture, by weight, consists of fragments weighing 2 pounds or less each. Specific gravity of the rock shall be a minimum of 2.50. The inclusion of more than trace 1 percent quantities of dirt, sand, clay, and rock fines will not be permitted.

2.6 BURIED WARNING AND IDENTIFICATION TAPE

Polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes	
+Green:	+Sewer Systems

2.6.1 Detectable Warning Tape for Non-Metallic Piping

Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.7 DETECTION WIRE FOR NON-METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Shoring and Sheeting

Provide shoring bracing, cribbing, trench boxes, underpinning and sheeting where indicated or required. In addition to Section 25 A and B of EM 385-1-1, include provisions in the shoring and sheeting plan that will accomplish the following:

- a. Prevent undermining of pavements, foundations and slabs.
- b. Prevent slippage or movement in banks or slopes adjacent to the excavation.
- c. Allow for the abandonment of shoring and sheeting materials in place in critical areas as the work is completed. In these areas, backfill the excavation to within 3 feet of the finished grade and remove the remaining exposed portion of the shoring before completing the backfill.

3.1.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, dikes, swales, and other drainage features and equipment as required to maintain dry soils, prevent erosion and undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.1.2.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is

open, the water level shall be maintained continuously, at least 2 feet below the working level.

3.1.3 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall scan the construction site with electromagnetic and sonic equipment and mark the surface of the ground where existing underground utilities are discovered.

3.1.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations within the clearing limits. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface.

3.2.2 Stripping

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be wasted. Locate topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

3.2.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish in excavations.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with select material and compact to 95 percent of ASTM D698 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with select material and compact to 95 percent of ASTM D698 maximum density. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced with satisfactory

materials to the indicated excavation grade; except as specified for spread footings. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

3.3.1 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement. Tamp if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length. Rock, where encountered, shall be excavated to a depth of at least 6 inches below the bottom of the pipe.

3.3.2 Excavated Materials

Satisfactory excavated material suitable for fill or backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Paragraph "DISPOSITION OF SURPLUS MATERIAL."

3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified herein.

3.5 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.5.1 Select Material Placement

Place in 6 inch lifts. Do not place over wet or frozen areas.

3.5.2 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in 6 inch lifts to top of trench and in 6 inch lifts to one foot over pipe outside structures and paved areas.

3.6 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, approved borrow materials shall be obtained as specified herein.

3.7 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.8 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken, from manhole to manhole. The ends of the wire shall terminate inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. The wire shall remain insulated over its entire length. The wire shall enter manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, the wire shall terminate in the valve pit at the pump station end of the pipe.

3.9 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required. Density requirements specified herein are for cohesionless materials. When cohesive materials are encountered or used, density requirements may be reduced by 5 percent.

3.9.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the paved area or structure to 85 percent of ASTM D698.

3.9.2 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D698.

3.10 RIP-RAP CONSTRUCTION

Construct rip-rap on filter fabric in the areas indicated.

3.10.1 Preparation

Trim and dress indicated areas to conform to cross sections, lines and grades shown within a tolerance of 0.1 foot.

3.10.2 Bedding Placement

Spread filter fabric uniformly on prepared subgrade as indicated.

3.10.3 Stone Placement

Place rock for rip-rap on prepared bedding material to produce a well

graded mass with the minimum practicable percentage of voids in conformance with lines and grades indicated. Distribute larger rock fragments, with dimensions extending the full depth of the rip-rap throughout the entire mass and eliminate "pockets" of small rock fragments. Rearrange individual pieces by mechanical equipment or by hand as necessary to obtain the distribution of fragment sizes specified above.

3.11 FINISH OPERATIONS

3.11.1 Grading

Finish grades as indicated within one-tenth of one foot.

3.11.2 Topsoil and Seed

Scarify existing subgrade. Provide 4 inches of topsoil for newly graded finish earth surfaces and areas disturbed by the Contractor. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading. If there is insufficient on-site topsoil meeting specified requirements for topsoil, provide topsoil required in excess of that available.

Provide mulch and water to establish an acceptable stand of grass.

3.11.3 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.12 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

3.13 FIELD QUALITY CONTROL

3.13.1 Sampling

Take the number and size of samples required to perform the following tests.

3.13.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.13.2.1 Select Material Testing

Test select material in accordance with ASTM C136/C136M for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D1557 for moisture density relations, as applicable.

-- End of Section --

SECTION 31 41 16

METAL SHEET PILING
11/20

PART 1 GENERAL

1.1 DESCRIPTION

Design, furnish, install and test metal sheet piles at the locations indicated on the drawings and specified herein.

1.2 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 WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020) Structural Welding Code - Steel

AWS D1.5M/D1.5 (2020) Bridge Welding Code

ASTM INTERNATIONAL (ASTM)

ASTM A6/A6M (2017a) Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

ASTM A572/A572M (2018) Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

ASTM C1077 (2017) Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

ASTM E329 (2020) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

ASTM E548 (1994; E 1995) Standard Guide for General Criteria Used for Evaluating Laboratory Competence

1.3 BASIS OF BID

1.3.1 Contractor's Geotechnical Consultant

Hire the services of an independent, Registered Professional Geotechnical Engineer, experienced in soil mechanics and Pile Dynamic Analysis, to observe test pile installation and production pile installation as specified herein. The Contractor's Geotechnical Consultant must be independent of the Contractor and must have no employee of employer

relationship which could constitute a conflict of interest.

1.3.2 Lump Sum Payment

Base bids upon providing the number, size, capacity, and length of piles as indicated on the drawings.

Include the cost of all necessary equipment, tools, material, labor, and supervision required to: deliver, handle, install, cut-off, dispose of any cut-offs, pullout, and meet the applicable contract requirements. Include mobilization, pre-drilling, and redriving heaved piles. If, in redriving, it is found that any pile is not of sufficient length to provide the requirements specified, notify the Contracting Officer, who reserves the right to increase or decrease the total length of piles to be provided and installed by changing the pile locations or elevations, requiring the installation of additional piles, or directing the omission of piles from the requirements shown and specified. If total number of piles or number of each length vary from that specified as the basis for bidding, an adjustment in the contract price or time for completion, or both, will be made in accordance with the contract documents. Payment for piles will be based on successfully installing piles to both the minimum tip elevation and satisfying the acceptance criteria identified herein. No additional payment will be made for: damaged, rejected, or misplaced piles; withdrawn piles; any portion of a pile remaining above the cut-off elevation; backdriving; cutting off piles; splicing; build-ups; any cut-off length of piles; or other excesses beyond the assumed pile length indicated for which the Contractor is responsible.

1.4 NAVY PROJECT PRICE AND PAYMENT PROCEDURES

1.4.1 Basis of Bids

Base bids on pile sections and lengths as indicated. Should the total number of piles or the number of each length vary from that specified as the basis for bidding, an adjustment in the contract price and time for completion will be made. No additional payment will be made for withdrawn, damaged, rejected, or misplaced piles; for any portion of a pile remaining above the cut-off elevation; for backdriving; for cutting off piles, or for any cut off length of piles.

1.4.2 Measurement and Payment

1.4.2.1 NAVFAC LANT Projects

Payment will be at the contract unit price per length, multiplied by the total length of acceptable piles actually installed. Base bids on the number of piles with pile length from tip to cutoff, as indicated. Include in bid a unit price per unit length piling based on the quantity indicated. If the Contracting Officer requires an increase or a decrease in length of piles furnished and installed, the contract price will be adjusted in accordance with the Contract Clauses of the contract. The unit price bid will be used for upward or downward adjustment of the quantity subject to provisions of FAR 52.211-18, Variation in Estimated Quantities.

1.5 SUBMITTALS

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

SD-01 Preconstruction Submittals

- Installation Procedures; G

- Contractor's Geotechnical Consultant Documentation; G

- Testing Agency Qualifications

SD-02 Shop Drawings

- Metal Sheet Piling

- Pile Splicing

- Pile Placement

- As-Driven Survey

SD-03 Product Data

- Driving

- Pile Driving Equipment

- Delivery, Storage, and Handling

- Pulling and Redriving

SD-05 Design Data

- Procedure for Insufficient Pile Length; G

SD-06 Test Reports

- Materials Tests

SD-07 Certificates

- Welding Certifications

- Steel Plant Certificate

SD-11 Closeout Submittals

- Pile Driving Record

1.6 DELIVERY, STORAGE, AND HANDLING

Conform all delivery, storage, and handling of materials to the requirements specified herein. Develop and submit plans for the delivery, storage, and handling of piles. Submit delivery, storage, and handling plans for piles at least 30 days prior to delivery of piles to the job site.

1.6.1 Delivery and Storage

Materials delivered to the site must be new and undamaged and must be accompanied by certified test reports. Provide the manufacturer's logo and mill identification mark on the sheet piling as required by the

referenced specifications. Store and handle sheet piling in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks; as a minimum, support on level blocks or racks spaced not more than 10 feet apart and not more than 2 feet from the ends. Storage of sheet piling should also facilitate required inspection activities and prevent damage to coatings and corrosion protection prior to installation.

1.6.2 Handling

Lift piles to ensure that the maximum permissible curvature is not exceeded. Holes may be burned above the cutoff length for lifting piles into the leads. If there is evidence of pile damage during driving due to the holes, Contracting Officer may forbid the burning of holes. Do not damage piles when dragging piles across the ground or barge deck.

Inspect piles for excessive curvature and for damage before transporting them from the storage area to the driving area and immediately prior to placement in the driving leads. Curvature in the pile must be measured with the pile laying on a flat surface and is the distance between the pile at the mid-length of the pile and the flat surface. Straightness of the sections of piles must conform to AWS D1.5M/D1.5, Section 3.5.1.1. Piles having excessive curvature will be rejected.

1.6.3 Damaged Piles

Inspect each pile for straightness and structural damage before transporting them to the project site and immediately prior to placement in the driving leads. Bring any damage to the attention of the Contracting Officer. Piles which are damaged during delivery, storage, or handling to the extent they are rendered unsuitable for the work, in the opinion of the Contracting Officer, will be rejected and removed from the project site, or may be repaired, if approved, at no cost to the Government.

Any pile damaged by reason of internal defects or by improper driving must be corrected by one of the following methods approved by the Engineer for the pile in question:

- a. The pile is withdrawn, if practicable, and replaced by a new and, if necessary, longer pile.
- b. One or more replacement piles are driven adjacent to the defective pile.
- c. A Pile Dynamic Analysis and/or low integrity testing must be performed by the Contractor's Geotechnical Consultant to assess the structural integrity of the driven pile(s).

A pile driven below the specified butt elevation must be corrected by one of the following methods approved by the Engineer:

- a. The pile is spliced (if approved).
- b. A sufficient portion of the cap is extended down to properly embed the pile.

A pile driven out of its proper location or out of plumb as approved by the Engineer, must be corrected by one of the following methods approved

by the engineer:

- a. One or more replacement piles are driven next to the pile in question.
- b. As directed by the structural engineer.

1.7 MATERIAL CERTIFICATES

For each shipment, submit certificates identified with specific lots prior to installing piling. Include in the identification data piling type, dimensions, chemical composition, mechanical properties, section properties, heat number, and mill identification mark.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

Submit detail drawings for sheet piling, including fabricated sections, showing complete piling dimensions and details, driving sequence and location of installed piling.

- a. Include in the drawings details of top protection, special reinforcing tips, tip protection, lagging, splices, fabricated additions to plain piles, cut-off method, corrosion protection, and dimensions of templates and other temporary guide structures for installing piling. Provide details of the method for handling piling to prevent permanent deflection, distortion or damage to piling interlocks.
- b. Metal sheet piling must be hot-rolled steel sections conforming to ASTM A572/A572M, Grade 60, or cold-formed steel sections formed from hot-rolled steel meeting the chemical and mechanical requirements of ASTM A572/A572M, Grade 60.
- c. For protection of sheet piling, coat it in accordance with Section 09 97 13.26 COATING OF STEEL WATERFRONT STRUCTURES, ZERO VOC, (SZC) SPLASH ZONE COATING.

2.1.1 Interlocks

The interlocks of sheet piling must be free-sliding, provide a swing angle suitable for the intended installation but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed.

2.1.2 General Requirements

Provide sheet piles with minimum section modulus, moment of inertia, shape, and size as specified in the drawings. Sheet piling must be full-length sections of the dimensions shown. Provide fabricated sections conforming to the requirement and the piling manufacturer's recommendations for fabricated sections. Provide sheet piling with standard lifting holes.

2.2 APPURTENANT METAL MATERIALS

Provide metal plates, shapes, bolts, nuts, rivets and other appurtenant fabrication and installation materials conforming to manufacturer's standards.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

Provide manufacturer's steel plant certificate for Government review and approval.

2.3.1 Materials Tests

Submit certified materials tests reports showing that sheet piling and appurtenant metal materials meet the specified requirements, for each shipment and identified with specific lots prior to installing materials. Material test reports must meet the requirements of ASTM A6/A6M. Perform materials tests conforming to the following requirements. Sheet piling and appurtenant materials must be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site. Testing of sheet piling for mechanical properties must be performed after the completion of all rolling and forming operations. Testing of sheet piling must meet the requirements of ASTM A6/A6M.

2.4 PILE DRIVING EQUIPMENT

Submit complete descriptions of sheet piling driving equipment including hammers, ractors, protection caps and other installation appurtenances, prior to commencement of work. Descriptive information includes manufacturer's name, model numbers, capacity, rated energy, hammer details, cushion material, helmet, and templates. Provide pile driving equipment conforming to the following requirements. Submit descriptions of pile driving equipment, including hammers, power packs, driving helmets, hammer cushions, pile cushions, leads, extractors, and preboring equipment at least 30 days prior to commencement of work.

2.4.1 Driving Hammers

Hammers must be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type. The driving energy of the hammers must be between 8,750 and 16,000 foot-pounds as recommended by the manufacturer for the piling weights and subsurface materials to be encountered. Repair damage to piling caused by use of a pile hammer with excess delivered force or energy.

2.4.2 Jetting Equipment

Jetting will not be permitted.

PART 3 EXECUTION

3.1 PRELIMINARY WORK

3.1.1 Pile Length Markings

Mark each pile prior to driving with horizontal lines at one foot intervals. Mark the interval number on pile every 5 feet from pile tip.

3.2 EARTHWORK

Perform in accordance with Section 31 23 00.00 20EXCAVATION AND FILL.

3.3 INSTALLATION

3.3.1 Placing and Driving

3.3.1.1 Placing

Submit a written description of the site specific pile installation procedures for Government review and approval. Pile placement installation drawings and details must also be provided.

Any excavation required within the area where sheet pilings are to be installed must be completed prior to placing sheet pilings. Pilings properly placed and driven must be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

- a. Pilings must be carefully located as indicated. Pilings must be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Place the pile so the face will not be more than 6 inches from vertical alignment at any point. Top of pile at elevation of cut-off must be within 1/2 inch horizontally and 2 inches vertically of the location indicated. Manipulation of piles to force them into position will not be permitted. Check all piles for heave. Re-drive all heaved piles to the required tip elevation.
- b. Provide temporary wales, templates, or guide structures to ensure that the pilings are placed and driven to the correct alignment. Use a system of structural framing sufficiently rigid to resist lateral and driving forces and to adequately support the sheet piling until design tip elevation is achieved. Use two templates, at least, when placing each piling not less than 20 feet apart. Templates must not move when supporting sheet piling. Fit templates with wood blocking to bear against the web of each alternate sheet pile and hold the sheet pile at the design location alignment. Provide outer template straps or other restraints as necessary to prevent the sheets from warping or wandering from the alignment. Mark template for the location of the leading edge of each alternate sheet pile. If in view, also mark the second level to assure that the piles are vertical and in position. If two guide marks cannot be seen, other means must be used to keep the sheet pile vertical along its leading edge.

3.3.1.2 Driving

Submit records of the completed sheet piling driving operations, including a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling. Drive pilings with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths.

- a. Maintain driving hammers in proper alignment during driving operations by use of leads or guides attached to the hammer. Caution must be taken in the sustained use of vibratory hammers when a hard driving condition is encountered to avoid interlock-melt or damages. Discontinue the use of vibratory hammers and impact hammers employed when the penetration rate due to vibratory loading is one foot or less per minute.

- b. Employ a protecting cap in driving when using impact hammers to prevent damage to the tops of pilings. Remove and replace pilings damaged during driving or driven out of interlock at the Contractor's expense.
- c. Take adequate precautions to ensure that pilings are driven plumb. Where possible, drive NZ-pile with the ball end leading. If an open socket is leading, a bolt or similar object placed in the bottom of the interlock will minimize packing material into it and ease driving for the next sheet. If at any time the forward or leading edge of the piling wall is found to be out-of-plumb in the plane of the wall the piling being driven must be driven to the required depth and tapered pilings must be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures must be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling must be 1/8 inch per foot of length.
- d. Pilings in each run or continuous length of piling wall must be driven alternately in increments of depth to the required depth or elevation. No piling will be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. Incrementally sequence driving of individual piles such that the tip of any sheet pile must not be more than 4 feet below that of any adjacent sheet pile. When the penetration resistance exceeds five blows per inch, the tip of any sheet pile must not be more than 2 feet below any adjacent sheet pile. If the piling next to the one being driven tends to follow below final elevation it may be pinned to the next adjacent piling.
- e. If obstructions restrict driving a piling to the specified penetration, the obstructions must be removed or penetrated with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical, make changes in the design alignment of the piling structure as directed to ensure the adequacy and stability of the structure. Pilings must be driven to depths shown and must extend up to the elevation indicated for the top of pilings. Pilings must not be driven within 100 feet of concrete less than 7 days old.
- f. Pre-augering or spudding of piles will not be permitted.

3.3.2 Splicing

Pilings driven below the required top elevation and pilings damaged by driving and cut off to permit further driving must be extended as required to reach the top elevation by splicing when directed at no additional cost to the Government. Submit procedure for insufficient pile length. Provide pile splicing information and details for Government review and approval prior to installation in the field.

- a. Pilings adjoining spliced pilings must be full length unless otherwise approved. Splicing of pilings must be as indicated. Ends of pilings to be spliced must be squared before splicing to eliminate dips or camber. Pilings must be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips or camber at the abutting interlocks. Spliced pilings must be free sliding and able to obtain the maximum swing with contiguous pilings. Shop and field welding, qualification of welding procedures, welders, and welding operators must be in accordance with AWS D1.1/D1.1M. Submit

welding certifications for all welders and welding operators for Government review and approval.

- b. The tops of pilings excessively battered during driving must be trimmed when directed, at no cost to the Government. Piling cut-offs will become the property of the Contractor and must be removed from the site.
- c. Cut holes in pilings for bolts, rods, drains or utilities in a neat and workmanlike manner, as shown or as directed. Use a straight edge in cuts made by burning to avoid abrupt nicks. Bolt holes in steel piling must be drilled or may be burned and reamed by approved methods which will not damage the surrounding metal. Holes other than bolt holes must be reasonably smooth and the proper size for rods and other items to be inserted. Do not use explosives for cutting.

3.3.3 Inspection of Driven Piling

Perform continuous inspection during pile driving. Inspect all piles for compliance with tolerance requirements. Bring any unusual problems which may occur to the attention of the Contracting Officer. Inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock must be removed and replaced at the Contractor's expense.

3.3.4 Pulling and Redriving

Submit the proposed method of pulling sheet piling, prior to pulling any piling. Pull, as directed, selected pilings after driving to determine the condition of the underground portions of pilings. Any piling so pulled and found to be damaged, to the extent that its usefulness in the structure is impaired, must be removed and replaced at the Contractor's expense. Pilings pulled and found to be in satisfactory condition must be redriven when directed.

3.3.5 Testing Agency Qualifications

Engage an independent testing agency qualified according to ASTM C1077 and ASTM E329 for testing indicated, as documented according to ASTM E548, and approved by the Contracting Officer.

3.3.6 Survey Data

After the driving of each pile group is complete and before superimposed concrete is placed, provide the Contracting Officer with an as-driven survey showing actual location and top elevation of each pile. Submit an as-driven survey showing actual location and top elevation of each production pile within 7 calendar days of completing the pile installation. Do not proceed with placing concrete until the Contracting Officer has reviewed the survey and verified the safe load for the pile group driven. Present a survey in such form that it gives deviation from plan location in two perpendicular directions and elevations of each pile to nearest half inch. Survey must be prepared and certified by a land surveyor licensed in North Carolina.

3.4 DRAINAGE

Backfill material behind the sheet piling must be free draining and in accordance with Section 31 23 00.00 20 EXCAVATION AND FILL. Install

drainage system and weep holes as shown in the contract drawings.

3.5 ANCHORS

Conform to Section 31 68 13 SOIL AND ROCK ANCHORS.

3.6 REMOVAL

The removal of sheet pilings must consist of pulling, sorting, cleaning the interlocks, inventorying and storing previously installed sheet pilings as shown and directed.

3.6.1 Pulling

The method of pulling piling must be approved. Provide pulling holes in pilings, as required. Extractors must be of suitable type and size. Care shall be exercised during pulling of pilings to avoid damaging piling interlocks and adjacent construction. If the Contracting Officer determines that adjacent permanent construction has been damaged during pulling, the Contractor will be required to repair this construction at no cost to the Government. Pull pilings one sheet at a time. Pilings fused together must be separated prior to pulling, unless the Contractor demonstrates, to the satisfaction of the Contracting Officer, that the pilings cannot be separated. The Contractor will not be paid for the removal of pilings damaged beyond structural use due to proper care not being exercised during pulling.

3.6.2 Sorting, Cleaning, Inventorying and Storing

Pulled pilings must be sorted, cleaned, inventoried and stored by type into groups as:

- a. Piling usable without reconditioning.
- b. Piling requiring reconditioning.
- c. Piling damaged beyond structural use.

3.7 INSTALLATION RECORDS

Maintain a pile driving record for each sheet pile driven. Indicate on the installation record: installation dates and times, type and size of hammer, rate of operation, total driving time, dimensions of driving helmet and cap used, blows required per foot for each foot of penetration, final driving resistance in blows for final 6 inches, pile locations, tip elevations, ground elevations, cut-off elevations, and any reheading or cutting of piles. Record any unusual pile driving problems during driving. Submit complete records to the Contracting Officer.

-- End of Section --

SECTION 31 68 13

EARTH ANCHORS

11/20

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

Prior to commencing any work on the anchors, the Contractor, including all field personnel to be involved in drilling and installation of the anchors, must meet with the Contracting Officer to review the drawings and specifications, work plans, and submittals. Drilling may commence upon approval of the anchor installation plan and procedures described in paragraph SUBMITTALS and after the conduct of the Preparatory Meeting.

1.1.1 General Requirements

Submit drawings and detailed installation procedures and sequences showing complete details of the installation procedure and equipment; anchor fabrication; grouting methods; grout mix designs; anchor and casing placement and installation; corrosion protection for bond length, stressing length and anchorage; anchorage and trumpet; stressing and testing procedures with lengths, forces, deformations, and elongations for the approval by the Contracting Officer. Shop drawings for anchors must include locations and details of the spacers, centralizers, and banding. If different types of anchors are to be installed, each anchor type must be readily identifiable. Once reviewed by the Contracting Officer, no changes or deviation from shop drawings will be permitted without further review by the Contracting Officer. The work includes design, fabrication and installation of the earth anchor system. Install and fabricate the anchors as shown on the drawings. Prepare fabrication and installation drawings and an installation plan for approval. Earth anchors must be threaded bar or strand type.

1.1.2 Scope of Work

Provide the design of the earth anchor system that will be completely the Contractor's responsibility. General design criteria are shown on the drawings and given in paragraph Design Requirements. The materials, design, stressing, load testing, and acceptance must be in accordance with PTI DC35.1 and these specifications.

- a. Earth anchors may be threaded bar or strand type. The Contractor is responsible for the design of the anchor and bearing plate, determining drilling methods, and determining hole diameter and bond length. Submit design computations and data for the earth anchors, bearing plates, and bond zones.
- b. Include computations with drawings, design assumptions, calculations, and other information in sufficient detail to verify the design proposed. The design must be certified by a registered Professional Engineer with proven experience in design of earth anchor components as stated in paragraph Qualifications. Include calculations for the stressing frames.
- c. The Contracting Officer will approve the design calculations. Approval of the design calculations will not relieve the Contractor of

responsibility for unsatisfactory performance of the installed earth anchors. Furnish all design computations at least 30 calendar days prior to the proposed commencement of drilling. The complete design, including design computations, fabrication and installation drawings and installation plan, must be certified by a registered Professional Engineer and must be submitted for approval.

- d. Submit a plan for installing the earth anchors for review and comment. The proposal must describe the sequence for installation and other restrictions as outlined on the drawings or specified. Determine the anchor and casing installation procedures as part of the anchor design. Include the installation plan with descriptions of methods and equipment to be used for alignment checking of anchor holes and casings.

1.1.1.3 Anchor Design

Design the individual earth anchors to meet the following criteria:

Anchor Location	As indicated
Horizontal and Vertical Spacing	{_____} feet minimum, {_____} feet maximum As indicated.
Design Load	{_____}As indicated. kips
Minimum Unbonded Length	{15} {_____} feet As indicated.
Minimum Required Bond Length	{15} {_____} feet As indicated.
Corrosion Protection	Class I, Encapsulated Tendon ; II, Grout Protected Tendons
Angle of Anchor Inclination	{_____} 30 degrees from vertical with a tolerance of + {3} {_____} degrees

1.1.1.3.1 Design Load

The Design Load must not exceed 60 percent of the ultimate strength of the prestressing steel. The Lock-off Load must not exceed 70 percent of the ultimate strength of the prestressing steel. The maximum Test Load must not exceed 80 percent of the ultimate strength of the prestressing steel. The designer should include consideration of group effect of closely spaced anchors when determining design load and minimum spacing. Design the bearing plates so that the bending stresses in the plate do not exceed the yield strength of the steel when a load equal to 95 percent of the minimum specified ultimate tensile strength of the prestressing steel is applied and so that the average bearing stress on the structure does not exceed 3500 psi. Design the anchorage assembly connection to the structure in accordance with AISC 325 and ACI 318.

1.1.1.3.2 Design Schedule

Submit a design schedule for the anchors which includes the following:

- a. Anchor number.
- b. Anchor design load.

- c. Type and size of tendon.
- d. Minimum total anchor length.
- e. Minimum bond length.
- f. Minimum tendon bond length.
- g. Minimum unbonded length.
- h. Details of corrosion protection, including details of anchorage and installation.
- i. Submit the design schedule at least 30 days prior to commencement of work on the anchors covered by the schedule.

1.2 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 CONCRETE INSTITUTE (ACI)

- | | |
|---------|---|
| ACI 301 | (2016) Specifications for Structural Concrete |
| ACI 318 | (2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14) |

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

- | | |
|----------|----------------------------------|
| AISC 325 | (2017) Steel Construction Manual |
|----------|----------------------------------|

ASTM INTERNATIONAL (ASTM)

- | | |
|-----------------|---|
| ASTM A36/A36M | (2019) Standard Specification for Carbon Structural Steel |
| ASTM A53/A53M | (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless |
| ASTM A416/A416M | (2018) Standard Specification for Low-Relaxation, Seven-Wire for Prestressed Concrete |
| ASTM A500/A500M | (2020) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes |
| ASTM A536 | (1984; R 2019; E 2019) Standard Specification for Ductile Iron Castings |
| ASTM A615/A615M | (2020) Standard Specification for Deformed |

	and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A722/A722M	(2015) Standard Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete
ASTM A779/A779M	(2016) Standard Specification for Steel Strand, Seven-Wire, Uncoated, Compacted, Stress-Relieved for Prestressed Concrete
ASTM C33/C33M	(2018) Standard Specification for Concrete Aggregates
ASTM C109/C109M	(2020b) Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens)
ASTM C150/C150M	(2020) Standard Specification for Portland Cement
ASTM C1107/C1107M	(2020) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM D1784	(2020) Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D1785	(2015; E 2018) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120
ASTM D3350	(2012) Polyethylene Plastics Pipe and Fittings Materials
ASTM D4101	(2017) Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials

POST-TENSIONING INSTITUTE (PTI)

PTI DC35.1	(2014) Recommendations for Prestressed Rock and Soil Anchors
PTI TAB.1	(2006) Post-Tensioning Manual

1.3 SITE CONDITIONS

A foundation investigation has been conducted at the site by the government and data is presented on the foundation exploration drawings. Subsurface soil data logs are shown on the drawings. While the foundation information is representative of subsurface conditions at the respective locations, local variations in the characteristics of the subsurface materials may be anticipated. Local variations which may be encountered include, but are not limited to, classification and thickness of rock strata, fractures, and other discontinuities in the rock structure, and variation in the soil classifications. Such variations will not be

considered as differing materially within the purview of the contract clauses, paragraph differing site conditions. The contractor is responsible for verifying the location of all utilities that may be affected by construction or the installation of the anchors.

1.4 BASIS OF BID

1.4.1 Lump Sum Payment

Base bids upon providing the number, size, capacity, and length of anchors as indicated on the drawings. Include the cost of all necessary equipment, tools, material, labor, and supervision required to: deliver, handle, install, grout, test, cut-off, dispose of any cut-offs, and meet the applicable contract requirements. Include mobilization, pre-drilling, and redrilling anchors. If it is found that any anchor is not of sufficient length to provide the capacity specified, notify the Contracting Officer, who reserves the right to increase or decrease the total length of anchors to be provided and installed by changing the anchor locations, requiring the installation of additional anchors, or directing the omission of anchors from the requirements shown and specified. If total number of anchors or number of each length vary from that specified as the basis for bidding, an adjustment in the contract price or time for completion, or both, will be made in accordance with the contract documents. Payment for anchors will be based on successfully installing anchors to satisfy the acceptance criteria. No additional payment will be made for: damaged, rejected, or misplaced anchors; withdrawn anchors; or other excesses beyond the assumed anchor length indicated for which the Contractor is responsible.

1.5 DEFINITIONS

The following definitions are in addition to those given in PTI DC35.1, Section 2.0:

1.5.1 Anchored Structure

The wall, foundation or other structure to which the anchor is to transfer force.

1.5.2 Demonstration Test Anchor

An anchor which is performance tested to verify design assumptions and installation practices.

1.6 SUBMITTALS

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

SD-01 Preconstruction Submittals

Fabricator Qualifications

Installer Qualifications

SD-02 Shop Drawings

Fabrication and Installation Drawings

SD-03 Product Data

Equipment

Designer Qualifications

Installation Plan

SD-05 Design Data

Design Computations

Anchor Design

Design Schedule

SD-06 Test Reports

Prestressing Steel

Cement Grout Mixture Proportions

SD-07 Certificates

Prestressing Steel

Cement

Bearing Plate

Corrosion Inhibiting Compound

SD-11 Closeout Submittals

Driller Logs

Anchor Records

1.7 QUALITY ASSURANCE

Submit anchor designer, fabricator and installer qualifications for approval in accordance with paragraph SUBMITTALS. The submittals must, where applicable, identify individuals who will be working on this contract and their relevant experience. No changes must be made in approved personnel without prior approval of the Contracting Officer.

1.7.1 Designer Qualifications

The anchors must be designed by Professional Engineers who have designed a minimum three earth anchors projects similar in size and scope to this project within the past ten years. The drawings and calculations must be signed by the Professional Engineer.

1.7.2 Fabricator Qualifications

The anchors must be fabricated by a manufacturer that has been in the practice of designing and fabricating earth anchors similar in size and scope to this project for at least ten years.

1.7.3 Installer Qualifications

Submit the qualifications and experience records for approval. In the experience record, identify all the individuals responsible for the anchors and must include a listing of projects of similar scope performed within the specified period along with points of contact. Qualifications prior to the installation of any anchors specified in this section. The anchors must be installed by a firm which is regularly engaged in the installation of earth anchors and has at least ten years experience in the installation of similar anchors. The superintendent must have installed anchors on at least five projects of similar scope and size.

1.8 DELIVERY, STORAGE, AND HANDLING

Materials must be suitably wrapped, packaged or covered at the factory or shop to prevent being affected by dirt, water, oil, grease, and rust. Protect materials against abrasion or damage during shipment and handling. Place materials stored at the site above ground on a well-supported platform and covered with plastic or other approved material. protect materials from adjacent construction operations. Grounding of welding leads to prestressing steel will not be permitted. Reject and remove from the site prestressing steel which is damaged by abrasion, cuts, nicks, heavy corrosions, pitting, excessive heat, welds or weld spatter. Inspect tendons prior to insertion into anchor holes for damage to corrosion protection. Repair any such damage in a manner recommended by the tendon manufacturer and approved by the Contracting Officer. Lifting of pre-grouted tendons must be to manufacturers' recommendations and not cause excessive bending, which can debond the prestressing steel from the surrounding grout.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Prestressing Steel

Submit certified test reports for each heat or lot of prestressing steel with materials delivered to the site. Strands must conform to PTI DC35.1 -14 Section 4.2.1. Submit 5 copies of mill reports and 5 copies of a certificate from the manufacturer stating chemical properties, ultimate strengths, yield strengths, modulus of elasticity, and any other physical properties needed for the required computations, for the type of steel furnished.

2.1.1.1 High-Strength Steel Bars

ASTM A722/A722M, Type I or II, meeting all supplementary requirements.

2.1.1.2 Steel Bar

ASTM A615/A615M.

2.1.1.3 Strand

ASTM A416/A416M, Grade 270, low relaxation strand. Do not weld strand.

2.1.1.4 Compact Strand

ASTM A779/A779M, Type 270, low relaxation strand. Strand shall not be

welded.

2.1.2 Structural Steel

ASTM A36/A36M.

2.1.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B.

2.1.4 Steel Tube

ASTM A500/A500M.

2.1.5 Ductile Iron Castings

ASTM A536.

2.1.6 Polyethylene Tubing

2.1.6.1 Smooth Polyethylene Tubing

ASTM D3350.

2.1.6.2 Corrugated Polyethylene Tubing

PTI DC35.1-14 Section 4.7, with average minimum wall thickness of 0.06 inch.

2.1.7 Smooth Polypropylene Tubing

ASTM D4101, designation PP 210 B5542-11.

2.1.8 Polyvinyl Chloride (PVC) Pipe

ASTM D1785, Schedule 40.

2.1.9 Polyvinyl Chloride (PVC) Tubing

2.1.9.1 Smooth Polyvinyl Chloride (PVC) Tubing

ASTM D1784.

2.1.9.2 Corrugated Polyvinyl Chloride (PVC) Tubing

Manufactured from rigid PVC compounds conforming to ASTM D1784, Class 13464-8 with average minimum wall thickness of 0.04 inch.

2.1.10 Heat Shrinkable Sleeve

Radiation crosslinked polyolefin tube internally coated with an adhesive sealant and conforming to PTI DC35.1-14 Section 4.8.1.

2.1.11 Corrosion Inhibiting Compound

The corrosion inhibiting compound must conform to the requirements of Section 4.6 of PTI DC35.1-14.

2.2 MANUFACTURED UNITS

2.2.1 Anchor Head

Anchor head must consist of steel bearing plate with wedge plate and wedges for strand anchors or steel bearing plate with nut for bar anchors, trumpet and corrosion protection. Submit bearing plate material and details.

Anchorage devices must be capable of developing 95 percent of the guaranteed ultimate strength of prestressing steel. The anchorage devices must conform to the static strength requirements of Section 3.1.6 (1) and Section 3.1.8 (1) and (2) of PTI TAB.1. Wedges must be designed to not cause premature failure of the prestressing steel due to notching or pinching. Fabricate the trumpet used to provide a transition from the anchorage to the unbonded length corrosion protection from steel pipe or steel tube. The minimum wall thickness must be 0.125 inch for diameters up to 4 inches and 0.20 inch for larger diameters. Weld the trumpet to the bearing plate.

2.2.2 Prestressing Steel Couplers

Prestressing steel couplers for bars must be capable of developing 100 percent of the minimum specified ultimate tensile strength of the prestressing steel. Splicing of strand will not be permitted.

2.2.3 Centralizers and Spacers

Fabricate centralizers and spacers from plastic, steel or other approved material which is nondetrimental to the prestressing steel. Do not use wood. The centralizer must be able to support the tendon in the drill hole and position the tendon so a minimum of 0.5 inch of grout cover is provided. Centralizers and spacers must permit grout to freely flow up the drill hole.

2.2.4 Casing

Casing must be steel pipe or steel tube selected and sized by the Contractor where required. Casing must be the necessary type and size to permit proper drilling of anchor holes and placing of anchors as specified herein and shown on the drawings. Straightening of casings and machining of joints may be necessary in order to meet specified alignment tolerances.

2.2.5 Anchorage Covers

Fabricate anchorage covers from steel or plastic. The material used must not be subject to attack by cement, corrosion-inhibiting greases or the environment. If plastic is used, it must not be susceptible to ultraviolet light degradation. Securely attach the cover to the bearing plate. If the cover is to be grease filled, the cover must form a permanent watertight enclosure for the anchorage device.

2.3 EQUIPMENT

The Contractor's Quality Control manager must verify that the equipment used on site is the same as the equipment submitted for approval. Submit catalog cuts, brochures, or other descriptive literature describing the equipment to be used for drilling, grouting, handling, and installing the earth anchors. Submit sketches, drawings or details showing the access

and temporary supports where required for the drilling equipment and stressing frames. Provide descriptions of stressing jacks, gages, dynamometers, load cells, or other devices for measuring stressing load, certified calibration records for each set of jacking equipment, and current testing curves for stress measurement gages which show that gages have been calibrated for the jacks for which they are used 30 days prior to the start of the testing operations.

2.3.1 Drilling Equipment

Provide drilling equipment suitable for advancing the drill tools to the depths and at the alignment required.

2.3.2 Grouting Equipment

2.3.2.1 Grout Mixer

Grout mixer must conform to PTI DC35.1-14 Section 7.8.1.

2.3.2.2 Grout Pump

The grout pump must be of the positive displacement type, and must be capable of pumping at all flow rates below 20 gpm, must be capable of pumping at the pressure of at least 50 psi at zero flow rate. For neat cement grout, the pump must have a screen with 0.125 inch maximum clearance to sieve the grout before being introduced into the pump. Screens are not required for shear type mixers. Make available a pump which is capable of pumping both neat cement grout mixes and sanded grout mixes. The pumping equipment must have a pressure gage capable of measuring pressures of at least 150 psi or twice the required grout pressure, whichever is greater.

2.3.3 Stressing Equipment

Stressing equipment must be hydraulically operated and must have a capacity sufficient to stress the anchors to the required Test Loads within the rated capacity in one stroke. Pumps must be capable of applying each load increment in less than 60 seconds and must be capable of maintaining the hydraulic pressure within 50 psi. The equipment must permit stressing of the tendon in increments and raising or lowering the load in the tendon. Stressing equipment for strands must be capable of stressing all elements equally and simultaneously. Calibrate the equipment with an accuracy of ± 2 percent and ensure that the calibration certificate and graphs must be available at the site. The production gage must have graduations of 100 psi or less. Maintain a second certified gage for periodic verification of the production gage. Provide a dial gage or approved device to measure total tendon elongation at each load increment to the nearest 0.001 inch. The dial gage must be capable of measuring the entire anchor movement without being reset. Verify the calibration of gages no more than 30 calendar days prior to commencing work under this contract and at six-month intervals throughout the period of use.

2.3.4 Testing Equipment

Provide testing equipment consisting of a hydraulic jack with calibrated pressure gage for applying the load and a dial gage or vernier scale to measure anchor movement. The ram travel of the stressing equipment must be not less than the theoretical elastic elongation of the total anchor

length at the maximum Test Load. Graduate the pressure gage in 100 psi increments. Calibrate the stressing equipment and pressure gage as a unit no more than 30 calendar days prior to commencing work under this contract and at six-month intervals throughout the period of use. The movement measuring device must have a minimum travel equal to the theoretical elastic elongation of the total anchor length at the maximum Test Load without resetting the device.

2.4 GROUT

2.4.1 Cement

ASTM C150/C150M, Type I, II, III or V.

2.4.2 Water

Provide fresh, clean, potable water free from injurious amounts of sewage, oil, acid, alkali, salts, or organic matter.

2.4.3 Aggregates

Fine aggregate for sand-cement grout must conform to ACI 301 and ASTM C33/C33M for grout for backfilling holes. Aggregates must not contain substances which may be deleteriously reactive with alkalis in the cement.

2.4.4 Admixtures.

Admixtures which control bleed, improve flowability, reduce water content and retard set may be used in the grout subject to the approval of the Contracting Officer. Any admixtures used must be compatible with the prestressing steel and must be mixed in accordance with the manufacturer's recommendations.

2.4.5 Grout for Anchors

2.4.5.1 Cement Grout

Cement grout must conform to PTI DC35.1-14 Section 6.11 and Section 7.8.2.3. Submit cement grout mixture proportions.

2.4.6 Sand-Cement Grout

Grout for waterproofing holes, grouting holes which fail the watertightness test, and for backfilling holes which are abandoned must consist of a mixture of portland cement, fine aggregate and water. The grout mix proportions are the responsibility of the Contractor. Submit the proposed mix design to the Contracting Officer for approval. The water content must be the minimum necessary for proper placement. Base the final proportions of materials on results of tests made on sample mixtures of grout. The minimum compressive strength of two-inch cubes, molded, cured, and tested in accordance with ASTM C109/C109M, shall be 4,000 psi. The Contractor is responsible for taking, curing, and breaking of grout test cubes for determining mix design, and all testing must be done by an independent laboratory approved by the Contracting Officer.

2.4.7 Grout for Anchor Pads

Use nonshrink grout conforming to ASTM C1107/C1107M for leveling bearing

plates.

2.5 TENDON FABRICATION

2.5.1 General

Fabrication of the anchors must be as recommended by the suppliers. Completely assemble anchors with all centralizers, spacers, grout and vent tubes and corrosion protection prior to insertion into the hole. Protect, transport and store fabricated anchors in a manner to prevent contamination or damage to any components.

2.5.2 Tendon

Locate all spacers for multiple element tendons as indicated on the approved shop drawings. Furnish strands full length with no splicing or coupling permitted. Tendon material must be unblemished and free of pitting, nicks, grease, or injurious defects. When required to maintain the tendon location within the hole, provide centralizers at a maximum of 10 foot intervals center-to-center throughout the bond length. The entire bond length of the tendon must be free of dirt, lubricants, loose rust, corrosion-inhibiting coatings or other contaminants.

2.5.3 Bond Breaker

Bond breaker for free stressing length of unbonded anchors must consist of smooth polyethylene tubing, minimum wall thickness 0.04 inch, or smooth PVC tubing, minimum wall thickness 0.04 inch.

2.5.4 Vent Tubes

Vent tubes used during grouting operations, if necessary, must be any appropriate type for the job, as recommended by the supplier of the anchors.

2.5.5 Grout Tubes

Grout tubes must be polyethylene tubing or as recommended by the anchor manufacturer and approved by the Contracting Officer. Inside diameter of grout tubes must be adequate to fully grout the entire hole.

2.5.6 Corrosion Protection

Corrosion protection must be as indicated. Provide corrosion protection for the entire anchor and include anchorages covers and trumpets filled with corrosion inhibiting compound or grout and encapsulation of the free stressing length and bond length.

2.5.6.1 Anchorage Protection

The trumpet must be sealed to the bearing plate and must overlap the free stressing length encapsulation by at least 4 inches. The trumpet and anchorage cover must be completely filled with corrosion inhibiting compound or grout. Compound filled trumpets must have a permanent seal between the trumpet and the free length corrosion protection.

2.5.6.2 Free Stressing Length Encapsulation

Encapsulation for free stressing length must consist of a sheath of smooth

polyethylene tubing, minimum wall thickness 0.06 inch; smooth polypropylene tubing, minimum wall thickness 0.06 inch; smooth PVC tubing, minimum wall thickness 0.04 inch; steel pipe or tube with minimum wall thickness 0.20 inch or corrugated tubing conforming to paragraph Bond Length Encapsulation. Sheath for bars and strands may be heat shrinkable sleeve with a minimum thickness of 0.024 inch. Free stressing length encapsulation must extend at least 4 inches into the trumpet, but must not contact the bearing plate during testing and stressing of the tendon. Where corrugated tubing is used for sheath for unbonded anchors, a separate bond breaker must be provided.

2.5.6.3 Bond Length Encapsulation

Bond length encapsulation must consist of corrugated polyethylene tubing, minimum wall thickness 0.060 inch or corrugated PVC tubing, minimum wall thickness 0.040 inch.

2.6 TESTS, INSPECTIONS, AND VERIFICATIONS

Perform required material tests, on prestressing steel and accessories, by an approved laboratory to demonstrate that the materials are in conformance with the specifications. Test grout in accordance with ASTM C109/C109M. These tests will be at the Contractor's expense. Furnish to the Contracting Officer prestressing steel test results prior to beginning fabrication of any anchors and within 24 hours of testing.

PART 3 EXECUTION

3.1 DRILLING HOLES

3.1.1 General

The top of bond zone elevations and other physical conditions indicated on the drawings are the result of soil sampling. (See also paragraph "PROJECT SITE CONDITIONS"). Drill holes at the locations and inclinations shown and to the depths and diameters determined by the Contractor to provide the design bond length and capacity indicated on the drawings. The locations of the holes may be changed only as approved by the Contracting Officer. Any redesign of the anchored structure due to relocation of anchor holes must be performed by the Contractor. Unless otherwise specified, the Contractor must determine the drilling method to be used. Take care while drilling to avoid damage of any kind to the existing structures. Damages of any nature will be evaluated by the Contracting Officer and repairs or replacements must be made as required. Provide a temporary plug for all holes drilled more than 10 days prior to installation of the anchor. Collect, recycle, or treat waste water from drilling operations; do not discharged directly into the water or on the ground. See also Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS.

3.1.2 Drilling Through Existing Structures

Drill holes through existing structure by any method which does not cause damage to the surrounding structure. The Contractor is advised that foreign material, including metals and other materials remaining from original construction of the existing structure, may be encountered during drilling through existing structures.

3.1.3 Drilling in Soil

Holes in soil may be drilled by rotary drilling, rotary percussive, or vibratory driven casing. Holes in soil must be provided with steel casing where required for support of the surrounding material. Remove casing during anchor grouting. Remove hollow-stem augers which are used for installation of the tendon during anchor grouting. Where soil is susceptible to caving, holes through soil must be drilled by the duplex method using an inner and outer casing with return water flow between the casings.

3.1.4 Casing

Utilize casing for drilling through unstable soil formations. Advance the casing by rotary drilling or driving.

3.1.5 Records

Submit driller logs and records as specified in paragraph Driller Logs. The presence of a Government inspector or the keeping of separate drilling records by the Contracting Officer must not relieve the Contractor of the responsibility for the work specified in this paragraph. Payment will not be made for any work for which the required records have not been furnished by the Contractor.

3.1.6 Alignment

3.1.6.1 Tolerances

The anchor hole must be located within 12 inches of the plan location. The entry angle must be within 3 degrees of the specified inclination. The alignment of the drilled hole must be within 3 degrees of the theoretical alignment. Check tolerance for each anchor hole. If the hole alignment is not within these tolerances, the hole must be backfilled with cement or sand-cement grout and a new hole drilled adjacent to the rejected hole. If tolerances cannot be maintained, then notify Contracting Officer.

3.2 INSTALLATION OF ANCHORS

3.2.1 General

The Contractor is responsible for each drilled hole until the anchor has been installed, grouted, stressed and accepted. Holes in rock and casings must be cleaned by pressurized air and/or water to remove drill cuttings and mud.

3.2.2 Placing

All the equipment used in handling and placing the anchors must be such that it does not damage or deteriorate the prestressing steel, corrosion protection, or the anchorages. Each anchor must be inspected prior to insertion into the hole. Any damage to corrosion protection must be repaired prior to insertion or, if determined by the Contracting Officer to be not repairable, the anchor must be replaced. Insertion of anchors must be in accordance with PTI DC35.1.

3.2.3 Grouting of Earth Anchors

Within the bond length, grout placement must proceed such that the hole is filled in a manner to prevent air voids. The soil anchor hole must be progressively filled with grout and maintained completely full from bottom to top of the zone until the grout has set. Grouting of a soil anchor hole must be performed within 48 hours of the time the hole is drilled. Grouting may be accomplished through the casing pipe, grout tubes, hollow-stem augers or hollow drill rods. The grouting procedure used must provide soil anchors which meet the specified design capacity. Post-grouting will normally result in higher bond values.

3.2.3.1 Pressure Grouting

The method of pressure grouting must be determined by the Contractor and proven in the demonstration anchor. Production anchors must be grouted using the methods and target pressures that were used on the acceptable demonstration anchor. Grouting pressures and pumping rates must be controlled to prevent ground surface heave or fracturing. Grouting pressures must be incrementally increased until a refusal is reached or an acceptable amount of grout is pumped.

3.2.3.2 Post-Grouting

The number of phases of post-grouting must be determined by the Contractor and proven in the demonstration anchor. Production anchors must be grouted using the methods and target pressures that were used on the acceptable demonstration anchor. Grouting pressures and pumping rates must be controlled to prevent ground surface heave or fracturing. Grouting pressures must be incrementally increased until a refusal is reached or an acceptable amount of grout is pumped.

3.2.4 Anchorage Installation

The bearing plate and anchor head nut must be installed perpendicular to the tendon, within 3 degrees, and centered on the tendon without bending of the stressing steel. Wedges, wedge holes and tendons must be free of dirt, grout or other contaminants. Corrosion protection must be maintained intact at the anchorage and any damage must be repaired prior to stressing.

3.3 STRESSING

3.3.1 General Requirements

After the anchor grout in the bond zone has reached sufficient strength in accordance with the Contractor's design the specified strength, as verified by grout cube break, the anchors must be stressed. Prior to stressing, surfaces upon which the stressing equipment is resting must be clean and the stressing equipment must be aligned as nearly with the center of the hole as possible. An Alignment Load of 10 percent of the Design Load must be applied to the anchor prior to setting dial gauges. Stress the anchor in accordance with the anchor manufacturer's recommendation, subject to the approval of the Contracting Officer. Design and Lock-off loads are given on the drawings. Determine the lock-off procedure so that the lift-off results meet the acceptance criteria specified in paragraph Acceptance. The maximum stress must never exceed 80 percent of the guaranteed ultimate strength of anchor steel. The process of stressing the anchors must be so conducted that accurate elongation of the anchor

steel can at all times be recorded and compared with the computations submitted to, and accepted by the Contracting Officer. Stressing elements of strand anchors must be stressed simultaneously. Safety precautions must be taken to prevent workers from being behind or in front of the stressing equipment during stressing. Stressing of the anchors must be performed in a sequence submitted by the Contractor for review by the Contracting Officer. All stressing must be done in the presence of a representative of the Contracting Officer. At no time during the stressing and testing of an anchor will the stressing equipment be disconnected from the temporary stressing head or anchor. Each anchor to be performance tested must be declared acceptable before proceeding with drilling for other anchors within the section represented by that anchor.

3.3.2 Lock-off

After completion of the all required tests, the load must be returned to the Alignment Load and the specified Lock-off Load must be applied to the anchor. A lift-off test must be made to verify the load in the anchor tendon before the tendon is locked-off and the stressing equipment is removed. The lift-off reading must be within five percent of the specified lock-off load. If the lift-off reading is not within five percent of the specified lock-off load, the anchorage will be reset and another lift-off reading must be made. This procedure must be repeated until a satisfactory lift-off reading is obtained. After lock-off, the trumpet must be filled with grout and the anchorage recess must be fully grouted flush with the adjacent surfaces.

3.4 FIELD QUALITY CONTROL

The first anchor must be designated as demonstration test anchor. Designated demonstration test anchors must be used to verify soil quality and the adequacy of the Contractor's anchor design and installation procedures. Demonstration test anchors must pass the performance test prior to placing other anchors within the section represented by the respective demonstration test anchor. All other anchors must be proof tested. During the stressing of each anchor, a record must be kept of gage pressure and of anchor elongation at each stage of stressing to the specified test or Lock-off Load, as applicable. The Test Load must not be exceeded. Provide a qualified engineer to evaluate the anchor test results and determine the acceptability of the anchors in accordance with the criteria indicated hereunder. Final acceptance of each anchor will be made by the Contracting Officer. All tests must be run in the presence of the Contracting Officer or his representative.

3.4.1 Performance Test

Performance test must consist of cyclically and incrementally loading and unloading the anchor, and must be conducted in accordance with PTI DC35.1, Paragraph 8.3.2. During the testing of each anchor, a record must be kept of gage pressure and of anchor elongation at each stage of stressing to each Test Load required by PTI DC35.1. Measurements of the elongation of prestressing steel must be made in accordance with PTI DC35.1. If the total movement at the end of 10 minutes at the Test Load exceeds 0.040 inch, the Test Load will be held an additional 50 minutes and the movement readings will be taken at the interval specified in PTI DC35.1, Paragraph 8.3.2. Test records, including plots and graphical analysis of test data, must be furnished upon acceptance of each performance tested anchor in accordance with paragraph SUBMITTALS.

3.4.2 Proof Test

Proof test must consist of incrementally loading the anchor and will be conducted in accordance with PTI DC35.1, Paragraph 8.3.3. During the testing of each anchor, a record must be kept of gage pressure and of anchor elongation at each stage of stressing to the Test Load required by PTI DC35.1. Measurements of the elongation of prestressing steel must be made in accordance with PTI DC35.1. If the total movement at the end of 10 minutes at the Test Load exceeds 0.040 inch, the Test Load must be held an additional 50 minutes and the movement readings will be taken at the interval specified in PTI DC35.1, Paragraph 8.3.3. Test records, including plots and graphical analysis of test data, must be furnished upon acceptance of each proof tested anchor in accordance with paragraph SUBMITTALS. The proof test results will be compared with similar anchors in which performance tests have been performed. If any significant variation from the proof tests occurs, the Contracting Officer may require additional performance tests.

3.4.3 Supplementary Extended Creep Test

Where specified, anchors must have an extended creep test performed. Creep test must consist of cyclically and incrementally loading and unloading the anchor, and will be conducted in accordance with PTI DC35.1, Paragraph 8.3.4. Each maximum load must be held in accordance with PTI TAB.1, Table 8.3.4. A plot of each family of creep curves must be submitted along with the recorded readings taken at time of the test.

3.4.4 Driller Logs

Submit the original handwritten log and three (3) copies in typed format within two days of the completion of each hole. Keep accurate driller logs and records of all work accomplished under this contract and deliver complete, legible copies of these logs and records to the Contracting Officer upon completion of the work or at such other time or times as he may be directed. All such records must be preserved in good condition and order by the Contractor until they are delivered and accepted, and the Contracting Officer will have the right to examine such records at any time prior to their delivery. Separate logs must be made for each hole. Use DRILLING LOG, ENG FORM 1836 and 1836A or other approved form which provides the required information for his logs. The following information must be included on the logs or in the records for each hole:

- a. Hole number or designation and elevation of top of hole.
- b. Inclination of the hole.
- c. Make and manufacturer's model designation of drilling equipment.
- d. Dates and time when drilling operations were performed.
- e. Time required for drilling each run.
- f. Steel casing seat elevation.
- g. Depths and elevations at which core was recovered or attempts made to core including top and bottom depth of each run.
- h. Geologic classification or description by depths of each stratigraphic unit cored. This classification or description must be made

immediately following the taking of the core.

- i. Percentage of core recovered and rock quality designation per run.
- j. Depth and elevation of rod drops and other unusual occurrences.
- k. Depth and elevation at which groundwater is encountered.
- l. Depths and elevations at which drill water is lost and regained and amounts.
- m. Depth and elevation of bottom of hole, determined by measuring the drill steel length.

3.4.5 Anchor Records

Upon completion of installation of each anchor, the anchor records must be furnished to the Contracting Officer with bond length, free stressing length of anchor, grout mix, grouting pressure, bags of cement injected, and a report of performance test or proof test results, and hole alignment surveys. The performance test, proof test results must include measured lengths of drill holes and anchors, the loads and elongations recorded during testing, monitoring and stressing of the anchors, and graphs of test results as specified in paragraph SUBMITTALS. In addition as-built drawings showing the completed installation of the anchors must be furnished upon completion of installation of all anchors.

3.5 ACCEPTANCE

3.5.1 General

Acceptance of anchors must be determined by the Contracting Officer. The following criteria will be used in determination of the acceptability of each anchor:

3.5.1.1 Creep

Creep movement must not exceed 0.040 inch at maximum Test Load during the first 10 minutes of the performance or proof test. If the creep movement exceeds this limit, it must not exceed 0.080 inch at the maximum Test Load at the end of 60 minutes. If the creep movement exceeds 0.080 inch at the maximum Test Load at the end of 60 minutes, the anchor will be rejected.

3.5.1.2 Movement

Apparent free length must be calculated from the observed elastic movement in accordance with PTI DC35.1, Section 8.6.2.

3.5.1.2.1 Minimum Apparent Free Length

The calculated free length must be not less than 80 percent of the designed free tendon length plus the jack length. If the anchor does not meet this criteria, the anchor must be restressed from the Alignment Load to the Test Load and the apparent free length must be recalculated. If the anchor does not meet this criteria after 3 attempts (original plus 2 restresses), the anchor will be rejected.

3.5.1.2.2 Maximum Apparent Free Length

The calculated free length must be not more than 100 percent of the designed free tendon length plus 50 percent of the bond length plus the jack length. If the anchor does not meet this criteria, and the cause of the behavior is not investigated and explained to the satisfaction of the Contracting Officer, the anchor will be rejected.

3.5.1.3 Initial Lift-Off Reading

The initial lift-off reading must be within 5 percent of the specified Lock-off Load. If the anchor does not meet this criteria, the anchor must be adjusted as necessary and the lift-off reading must be repeated.

3.5.2 Replacement of Rejected Anchors

Any anchor that fails the performance or proof test or is rejected by the Contracting Officer must be replaced. A replacement anchor, including a new anchor hole, shall be provided by the Contractor at no expense to the Government. The location of the replacement anchor will be as determined by the Contractor in accordance with the redesign of the anchored structure. Provide all materials, supplies, equipment, and labor necessary to provide a new anchor assembly to the satisfaction of the Contracting Officer. No drilling will be performed for a replacement anchor until the grouting of all earth anchors within 50 feet of the replacement anchor location has been allowed to set for at least 24 hours. Payment will not be made for rejected or failed anchors. Either remove failed anchors and thoroughly ream and clear the anchor hole or remove the load and cut the anchor and casing flush.

-- End of Section --

SECTION 32 31 13.53

CHAIN LINK FENCES

04/08

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 A116	(2011) Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A153/A153M	(2016) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A392	(2011a; R 2017) Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A702	(2013) Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought
ASTM A780/A780M	(2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A824	(2011; R 2017) Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM F567	(2014a) Standard Practice for Installation of Chain Link Fence
ASTM F626	(2014) Standard Specification for Fence Fittings
ASTM F900	(2011; R 2017) Standard Specification for Industrial and Commercial Swing Gates
ASTM F1043	(2018) Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework
ASTM F1083	(2018) Standard Specification for Pipe, Steel, Hot-Dipped Zinc Coated (Galvanized) Welded, for Fence Structures
ASTM F1184	(2016) Industrial and Commercial Horizontal Slide Gates

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-F-191	(Rev K) Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)
FS RR-F-191/1	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Fabric)
FS RR-F-191/2	(Rev E) Fencing, Wire and Post, Metal (Chain-Link Fence Gates)
FS RR-F-191/3	(Rev E; Am 1) Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces)
FS RR-F-191/4	(Rev F) Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

1.2 SUBMITTALS

Government approval is required for all submittals. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

- Fence Installation
- Installation Drawings
- Location of corner, end, and pull posts
- Turnstiles

SD-03 Product Data

- Fence Installation

SD-06 Test Reports

- zinc coating

SD-07 Certificates

- Chain Link Fence
- Reports
- Zinc Coating
- Fabric
- Stretcher Bars

SD-08 Manufacturer's Instructions

- Fence Installation
- Hardware Assembly
- Accessories

SD-10 Operation and Maintenance Data

- operating and maintenance instructions

1.3 QUALITY ASSURANCE

1.3.1 Required Report Data

Submit reports, signed by an official authorized to certify on behalf of the manufacturer, of chain-link fencing listing and accessories regarding weight in ounces for zinc coating. Submit reports demonstrating full compliance with the following standards: FS RR-F-191, FS RR-F-191/1, FS RR-F-191/2, FS RR-F-191/3, and FS RR-F-191/4

1.3.2 Assembly and Installation Drawings

Submit Manufacturer's instructions and complete Fence Installation Drawings for review and approval by the Contracting Officer prior to shipment. Drawing details shall include, but are not limited to: Fence Installation, Location of corner, end, and pull posts, and Turnstiles.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to site in an undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

PART 2 PRODUCTS

2.1 FENCE FABRIC

2.1.1 General

Provide ASTM A392, Class 1, zinc-coated steel wire with minimum coating weight of 1.2 ounces of zinc per square foot of coated surface. Fabricate fence fabric of 9 gauge wire woven in 2 inch mesh conforming to ASTM A116.

Set fabric height at 4 feet. Fabric shall be selvage and knuckled on the top and bottom selvage. Secure fabric to posts using stretcher bars or ties spaced 15 inches on center, or by integrally weaving to integral fastening loops of end, corner, pull, and gate posts for full length of each post.

2.2 POSTS

2.2.1 Metal Posts for Chain Link Fence

Provide posts conforming to ASTM F1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group II, roll-formed steel sections, meeting the strength and coating requirements of ASTM F1043 and ASTM A702. Provide sizes as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Provide gate post for the gate type specified subject to the limitation specified in ASTM F900 and/or ASTM F1184. Post spacing shall conform to the recommended guidelines as set forth in the CLFMI "Wind Load Guide for the Selection of Line Post Spacing and Size" unless specified to exceed those guidelines.

FS RR-F-191/3 line posts; Class 1, steel pipe, Grade A. End, corner, and pull posts; Class 1, steel pipe, Grade A.

2.2.2 Accessories

- a. Provide accessories conforming to ASTM F626. Ferrous accessories shall be zinc or aluminum coated.
- b. Furnish truss rods for each terminal post. Provide truss rods with turnbuckles or other equivalent provisions for adjustment.
- c. Furnish post caps in accordance with manufacturer's standard accessories.
- d. Provide 9 gauge steel tie wire for attaching fabric to rails, braces, and posts and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A153/A153M unless modified.

2.3 BRACES AND RAILS

ASTM F1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F1043.

Braces, top rail and bottom rail; Class 1, steel pipe, Grade A size as indicated.

2.4 WIRE

2.4.1 Wire Ties

Submit samples as specified. FS RR-F-191/4. Provide wire ties constructed of the same material as the fencing fabric.

2.4.2 Tension Wire

Provide Type I or Type II tension wire, Class 4 coating, in accordance with ASTM A824.

PART 3 EXECUTION

3.1 FENCE INSTALLATION

Perform complete installation conforming to ASTM F567.

3.1.1 Line and Grade

Install fence to the lines and grades indicated. Clear the area on either side of the fence line to the extent indicated. Space line posts equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Provide fabric continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Repair any damage to galvanized surfaces, including welding, with paint containing zinc dust in accordance with ASTM A780/A780M.

3.1.2 Excavation

Clear all post holes of loose material. Spread waste material where directed. Eliminate ground surface irregularities along the fence line to the extent necessary to maintain a 1 inch clearance between the bottom

of the fabric and finish grade.

3.2 POST INSTALLATION

3.2.1 Concrete Walls

Set posts as shown on the project plans.

3.3 RAILS

Bolt bottom rail to double rail ends and securely fasten double rail ends to the posts. Peen bolts to prevent easy removal. Install bottom rail before chain link fabric.

3.4 FABRIC INSTALLATION

- a. Install chain link fabric on the side of the post indicated. Attach fabric to terminal posts with stretcher bars and tension bands. Space bands at approximately 15 inch intervals. Install fabric and pull taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fasten fabric to line posts at approximately 15 inch intervals and fastened to all rails and tension wires at approximately 24 inch intervals.
- b. Cut fabric by untwisting and removing pickets. Accomplish splicing by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 plus or minus 1/2 inch above the ground.
- c. After the fabric installation is complete, exercise the fabric by applying a 50 pound push-pull force at the center of the fabric between posts; the use of a 30 pound pull at the center of the panel shall cause fabric deflection of not more than 2.5 inches when pulling fabric from the post side of the fence; every second fence panel shall meet this requirement; resecure and retest all failed panels at the Contractor's expense.

3.5 GROUNDING

- a. Ground fencing as indicated on drawings.
- b. Provide ground conductor consisting of No. 8 AWG solid copper wire. Clamp ground conductor to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric. Total resistance of the fence to ground shall not be greater than 25 ohms.

3.6 CLEANUP

Remove waste fencing materials and other debris from the work site each workday.

-- End of Section --

ADDRESS VERIFICATION REPORT

=====
This report lists any Reference Organization that appears in a Section
Reference Article without a corresponding listing in either the Sources
for Reference Publications Section (01 42 00, 01420, or 01090) or the
Supplemental Reference List.

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double-clicking a Section number will open the Section in the Editor.
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SECTION REFERENCE ORGANIZATION

ALL REFERENCE ADDRESSES HAVE BEEN VERIFIED

BRACKET VERIFICATION REPORT

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This report lists all brackets remaining in the text.

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SECTION	SUBPART	BRACKETS	EXPLANATORY NOTES
NO BRACKETS FOUND IN TEXT			

REFERENCE VERIFICATION REPORT

Duplicate References

=====

This report lists References that are found in both the Section Reference Article and the Supplemental Reference List.

The Reference descriptions listed are from the Supplemental Reference List.

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SECTION	REFERENCE
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ALL REFERENCES HAVE BEEN VERIFIED

REFERENCE VERIFICATION REPORT

Unresolved References

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This report lists all References that appear in a Section, but that are not listed in either that Section's Reference Article or the Supplemental Reference List.

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SECTION	SUBPART	REFERENCE
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ALL REFERENCES HAVE BEEN VERIFIED

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
CONSTRUCT BULKHEAD, BLDG AS903, MCASNR																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 14 00	SD-01 Preconstruction Submittals														
			List of Contact Personnel	1.3.1.1													
		01 20 00	SD-01 Preconstruction Submittals														
			Schedule of prices	1.3													
		01 30 00	SD-01 Preconstruction Submittals														
			List of contact personnel	1.4.1													
		01 31 50	SD-11 Closeout Submittals														
			Interim DD-1354, Transfer & Acceptance of Military Real Property	1.2													
		01 32 16	SD-01 Preconstruction Submittals														
			Construction schedule	1.2													
			Equipment delivery schedule	1.3													
		01 33 00	SD-11 Closeout Submittals														
			Submittal register	1.4.1													
			Complete Submittal Package	1.6.1													
		01 35 29	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.9													
			Activity Hazard Analysis (AHA)	1.10													
			Crane Critical Lift Plan	1.9.1													
			Crane Work Plan	1.9.1													
			Crane Operators	1.7.1.4													
			SD-06 Test Reports														
			Reports	1.14													
			Accident Reports	1.14.1													
			Monthly Exposure Reports	1.14.3													

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

CONSTRUCT BULKHEAD, BLDG AS903, MCASNR

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		DATE FWD TO APPR AUTH/	APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 29	Regulatory Citations and Violations	1.14.4													
			Crane Reports	1.14.5													
			SD-07 Certificates														
			Confined Space Entry Permit	1.11													
			Certificate of Compliance	1.14.6													
			Third Party Certification of Barge-Mounted Mobile Cranes	1.14.7													
		01 45 10	SD-11 Closeout Submittals														
			QC PLAN	1.6													
		01 50 00	SD-03 Product Data														
			Backflow preventers	2.1													
			SD-06 Test Reports														
			Backflow Preventer Tests	3.1													
			SD-07 Certificates														
			Backflow Tester Certifications	1.3													
			Backflow Preventers Certificate	1.3.1													
		01 57 19	SD-01 Preconstruction Submittals														
			Environmental protection plan	1.6.1													
			Preconstruction survey	1.6.4													
			Permit for storm water discharge	1.7													
			Notice of Intent	1.7													
			Notice of Intent	1.7.1													
			Notice of Termination	1.7													
			Pollution Prevention Plan	1.7													
			SD-11 Closeout Submittals														

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CONTRACT NO.

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	DATE RCD FRM APPR AUTH	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19	Solid waste disposal permit	1.4.1													
			Disposal permit for hazardous waste	1.4.2													
			Environmental training documentation	1.2													
			Permit to transport hazardous waste	1.4.3													
			Hazardous waste certification	1.4.4													
			Erosion and sediment control inspection reports	1.4.5													
			Environmental Plan Review	1.6.3													
			Annual Report of Products	2.1													
			Containing Recovered Materials														
		01 78 00	SD-10 Operation and Maintenance Data														
			Equipment/product warranty list	1.3.1													
			SD-11 Closeout Submittals														
			As-built drawings	1.2.1													
			Record of materials	1.2.2													
			Complete Submittal Package	1.4													
			Equipment/product warranty tag	1.3.2													
		01 78 30.00 22	SD-11 Closeout Submittals														
			GIS Data Deliverables	1.3.6	G												
		02 41 00	SD-01 Preconstruction Submittals														
			Demolition Plan	1.2.2													
			Existing Conditions	1.9													

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(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02 41 00	SD-07 Certificates														
			Notification	1.6													
		03 30 53	SD-03 Product Data														
			Air-Entraining Admixture	2.2.3.1													
			Water-Reducing or Retarding Admixture	2.2.3.2													
			Curing Materials	2.2.10													
			Expansion Joint Filler Strips, Premolded	2.2.6													
			Conveying and Placing Concrete	3.2													
			Formwork	2.2.7													
			Mix Design Data	2.3													
			Ready-Mix Concrete	2.3													
			Mechanical Reinforcing Bar Connectors	2.2.5													
			SD-06 Test Reports														
			Aggregates	2.2.2													
			Concrete Mixture Proportions	2.1.3													
			Compressive Strength Testing	3.8.3													
			Slump	3.8.3													
			Air Content	3.8.3													
			Water	2.2.4													
			SD-07 Certificates														
			Cementitious Materials	2.2.1													
			Pozzolan	2.1													
			Aggregates	2.2.2													

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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)
		03 30 53	Delivery Tickets	2.3													
		03 31 30	SD-01 Preconstruction Submittals														
			Concrete Curing Plan	1.8.2.2													
			Concrete Qualification Program	1.7.4													
			Concrete Quality Control Program	1.6													
			Concrete Placement and Compaction	1.8.2.3													
			Concrete Pumping	1.8.2.3													
			Curing Concrete Elements	1.8.2.1													
			Laboratory Qualifications	1.6.2													
			Quality Control Personnel	1.6.1													
			SD-02 Shop Drawings														
			Expansion Joints	3.2.7													
			Reinforcing Steel	1.6.1.2													
			SD-03 Product Data														
			Admixtures	1.8.5.5													
			Air Entraining	2.4.1													
			Aggregates	1.8.5.4													
			Corrosion Inhibitors	1.2													
			Joint Filler	2.8.2													
			Joint Sealants	2.8.3													
			Materials for Curing Concrete	2.8.1													
			Safety Data Sheets	1.8.2.6													
			Non-Shrink Grout	2.5													
			Preformed Joint Filler	3.2.7													
			Reinforcing Bars	2.7.1													

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		03 31 30	Reinforcement and Protective Coating	2.7.1.1													
			Reinforcement Supports	3.2.2													
			Welded Wire Fabric	2.7.2													
			SD-05 Design Data														
			Concrete Mixture Requirements	1.8.5.1													
			Mixture Designs	1.8.2.7													
			SD-06 Test Reports														
			Air Entraining	2.4.1													
			Aggregates	1.8.5.4													
			Admixtures	1.8.5.5													
			Cement	1.8.5.6													
			Concrete Mixture Proportions	1.7.1													
			Concrete Test Reports	1.8.5													
			Fresh Concrete Properties	1.7.4.1													
			Hardened Concrete Properties	1.7.4.2													
			Reinforcing Bars	2.7.1													
			Reinforcement and Protective Coating	2.7.1.1													
			Silica Fume	1.8.5.3													
			Supplementary Cementing Materials	1.8.5.2													
			Water	2.3													
			SD-07 Certificates														
			Admixtures	1.8.5.5													
			Cementitious Materials	2.1													

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		03 31 30	Cementitious Material Mill	1.8.3.1													
			Certificates														
			Field Testing Technician and	1.6.1.2													
			Testing Agency														
			SD-11 Closeout Submittals														
			Aggregate Moisture Content	1.8.3.1													
			Aggregate Sampling	1.8.3.1													
			Concrete Test Reports	1.8.5													
			Quality Control Charts	1.8.4.3													
			Daily Inspection Reports	1.8.4.1													
			Quality Team Meetings	1.8.4.4													
			Sampling Logs	1.8.4.2													
		09 97 13.26	SD-05 Design Data														
			Containment System	1.4.4.1													
			SD-06 Test Reports														
			Coatings Qualification Test	1.4.5.1													
			Reports														
			Non-metallic Abrasive	1.4.5.4	G												
			Qualification Test Reports														
			Metallic Abrasive Qualification	1.4.5.2													
			Test Reports														
			Coating Sample Test Reports	3.1.3													
			Abrasive Sample Test Reports	3.1.4													
			Inspection Report Forms	3.8.2.2													
			Daily Inspection Reports	3.8.2.3													

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		09 97 13.26	Recycled Metallic Abrasive Field	1.4.5.3													
			Test Reports (Daily and Weekly)														
			SD-07 Certificates														
			Contract Errors, Omissions, and	1.4.1													
			Other Discrepancies														
			Corrective Action Procedures	1.4.2.1													
			Implement Corrective Action	1.4.2.2													
			Coating Work Plan	1.4.3													
			Coating Materials	1.4.6.12													
			Non-metallic Abrasive	1.4.6.13													
			Metallic Abrasive	1.4.6.14													
			Qualifications of Certified	1.4.6.1													
			Industrial Hygienist (CIH)														
			Qualifications Of Individuals	1.4.6.5													
			Performing Abrasive Blasting														
			Qualifications of Certified	1.4.6.2													
			Protective Coatings Specialist														
			(PCS)														
			Qualifications of Individuals	1.4.6.6													
			Applying Coatings														
			Qualifications of Individuals	1.4.6.7													
			Operating Plural Component														
			Equipment														
			Qualifications of Coating	1.4.6.3													
			Inspection Company														

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		09 97 13.26	Qualifications of QC Specialist	1.4.6.4													
			Coating Inspector														
			Qualifications of Testing	1.4.6.8													
			Laboratory for Coatings														
			Qualifications of Testing	1.4.6.9													
			Laboratory for Abrasive Media														
			Qualifications of Coating	1.4.6.10													
			Contractors or Shop														
			Joint Sealant Materials	1.4.6.11													
			Pre-Application Meeting	1.4.8													
			SD-08 Manufacturer's Instructions														
			Joint Sealant Instructions	1.5.1													
			Coating System Instructions	1.5.2													
			SD-11 Closeout Submittals														
			Disposal of Used Abrasive	3.5.6													
			Inspection Logbook	3.8.2.4													
		31 11 00	SD-03 Product Data														
			Tree Wound Paint	2.1.1													
		31 23 00.00 20	SD-01 Preconstruction Submittals														
			Shoring and Sheeting Plan	1.7.1													
			SD-03 Product Data														
			Filter Fabric	2.4													
			SD-06 Test Reports														
			Borrow Site Testing	1.6													
			Select material	3.13.2.1													
			SD-07 Certificates														

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		31 23 00.00 20	Filter Fabric	2.4													
		31 41 16	SD-01 Preconstruction Submittals														
			Installation Procedures	3.3.1.1	G												
			Contractor's Geotechnical Consultant	1.3.1	G												
			Testing Agency Qualifications	3.3.5													
			SD-02 Shop Drawings														
			Metal Sheet Piling	2.1													
			Pile Splicing	3.3.2													
			Pile Placement	3.3.1.1													
			As-Driven Survey	3.3.6													
			SD-03 Product Data														
			Driving	3.3.1.2													
			Pile Driving Equipment	2.4													
			Delivery, Storage, and Handling	1.6													
			Pulling and Redriving	3.3.4													
			SD-05 Design Data														
			Procedure for Insufficient Pile Length	3.3.2	G												
			SD-06 Test Reports														
			Materials Tests	2.3.1													
			SD-07 Certificates														
			Welding Certifications	3.3.2													
			Steel Plant Certificate	2.3													
			SD-11 Closeout Submittals														
			Pile Driving Record	3.7													

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		31 68 13	SD-01 Preconstruction Submittals														
			Fabricator Qualifications	1.7.2													
			Installer Qualifications	1.7.3													
			SD-02 Shop Drawings														
			Fabrication and Installation	1.1.1													
			Drawings														
			SD-03 Product Data														
			Equipment	2.3													
			Designer Qualifications	1.7.1													
			Installation Plan	1.1.1													
			SD-05 Design Data														
			Design Computations	1.1.2													
			Anchor Design	1.1.3													
			Design Schedule	1.1.3.2													
			SD-06 Test Reports														
			Prestressing Steel	2.1.1													
			Cement Grout Mixture	2.4.5.1													
			Proportions														
			SD-07 Certificates														
			Prestressing Steel	2.1.1													
			Cement	2.4.1													
			Bearing Plate	2.2.1													
			Corrosion Inhibiting Compound	2.1.11													
			SD-11 Closeout Submittals														
			Driller Logs	3.4.4													
			Anchor Records	3.4.5													

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SECTION VERIFICATION REPORT

=====
This report lists all Sections that are referenced in other Sections, but
that are not in the Job or Master.

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double-clicking a Section number will open the Section in the Editor.
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SECTION	SUBPART	SECTION REFERENCED
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ALL SECTIONS HAVE BEEN VERIFIED

SUBMITTAL LIST

=====

This report lists all the submittal numbers and descriptions found in the Section Submittal Articles, along with the Section and subpart in which the descriptions appear. The explanatory text immediately below each submittal description is for information only, and appears in the Submittal Procedure Section, but does not appear in the Sections listed in this report.

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SD-01 Preconstruction Submittals

Certificates of insurance

SECTION:	01 14 00	SUBPART:	1.1
SECTION:	01 20 00	SUBPART:	1.2
SECTION:	01 30 00	SUBPART:	1.1
SECTION:	01 32 16	SUBPART:	1.1
SECTION:	01 35 29	SUBPART:	1.2
SECTION:	01 50 00	SUBPART:	1.2
SECTION:	01 57 19	SUBPART:	1.4
SECTION:	02 41 00	SUBPART:	1.5
SECTION:	03 31 30	SUBPART:	1.3
SECTION:	31 23 00.00 20	SUBPART:	1.3
SECTION:	31 41 16	SUBPART:	1.5
SECTION:	31 68 13	SUBPART:	1.6

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.

SECTION:	03 31 30	SUBPART:	1.3
SECTION:	31 41 16	SUBPART:	1.5
SECTION:	31 68 13	SUBPART:	1.6

SECTION: 32 31 13.53 **SUBPART:** 1.2

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.

SECTION: 01 50 00 **SUBPART:** 1.2

SECTION: 03 30 53 **SUBPART:** 1.3

SECTION: 03 31 30 **SUBPART:** 1.3

SECTION: 31 11 00 **SUBPART:** 1.1

SECTION: 31 23 00.00 20 **SUBPART:** 1.3

SECTION: 31 41 16 **SUBPART:** 1.5

SECTION: 31 68 13 **SUBPART:** 1.6

SECTION: 32 31 13.53 **SUBPART:** 1.2

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SECTION: 31 11 00 **SUBPART:** 1.1

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SECTION: 03 31 30 **SUBPART:** 1.3

SECTION: 09 97 13.26 **SUBPART:** 1.3

SECTION: 31 41 16 **SUBPART:** 1.5

SECTION: 31 68 13 **SUBPART:** 1.6

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. (Testing must have been within three years of date of contract award for the project.)

SECTION:	01 35 29	SUBPART:	1.2
SECTION:	01 50 00	SUBPART:	1.2
SECTION:	03 30 53	SUBPART:	1.3
SECTION:	03 31 30	SUBPART:	1.3
SECTION:	09 97 13.26	SUBPART:	1.3
SECTION:	31 23 00.00 20	SUBPART:	1.3
SECTION:	31 41 16	SUBPART:	1.5
SECTION:	31 68 13	SUBPART:	1.6
SECTION:	32 31 13.53	SUBPART:	1.2

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.

SECTION:	01 35 29	SUBPART:	1.2
SECTION:	01 50 00	SUBPART:	1.2
SECTION:	02 41 00	SUBPART:	1.5
SECTION:	03 30 53	SUBPART:	1.3
SECTION:	03 31 30	SUBPART:	1.3
SECTION:	09 97 13.26	SUBPART:	1.3
SECTION:	31 23 00.00 20	SUBPART:	1.3
SECTION:	31 41 16	SUBPART:	1.5
SECTION:	31 68 13	SUBPART:	1.6
SECTION:	32 31 13.53	SUBPART:	1.2

SD-08 Manufacturer's Instructions

Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data sheets concerning impedances, hazards and safety precautions.

SECTION:	09 97 13.26	SUBPART:	1.3
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SECTION: 32 31 13.53 **SUBPART:** 1.2

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SECTION: 32 31 13.53 **SUBPART:** 1.2

SD-10 Operation and Maintenance Data

Data intended to be incorporated in operations and maintenance manuals.

SECTION: 01 78 00 **SUBPART:** 1.1

SD-11 Closeout Submittals

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

SECTION: 01 31 50 **SUBPART:** 1.1

SECTION: 01 33 00 **SUBPART:** 1.3

SECTION: 01 45 10 **SUBPART:** 1.2

SECTION: 01 57 19 **SUBPART:** 1.4

SECTION: 01 78 00 **SUBPART:** 1.1

SECTION: 01 78 30.00 22 **SUBPART:** 1.2

SECTION: 02 41 00 **SUBPART:** 1.5

SECTION: 03 31 30 **SUBPART:** 1.3

SECTION: 09 97 13.26 **SUBPART:** 1.3

SECTION: 31 41 16 **SUBPART:** 1.5

SECTION: 31 68 13 **SUBPART:** 1.6

SUBMITTAL VERIFICATION REPORT

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Search for "Submittal Formatting Requirements" in SpecsIntact help for more information about the contents of this report.

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Section Submittal Discrepancies

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Sections that do not cite Submittal Items in both the Submittal Article and elsewhere in the text, that cite invalid Classifications, or that contain Submittal Descriptions, Classifications, or multiply-defined Submittal Items outside the Submittal Article:

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SECTION	SUBPART	SUBMITTAL DISCREPANCY
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Discrepancies Between Submittal Articles and Submittal Procedures Section

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Submittal Descriptions from Section Submittal Articles that differ from Descriptions in the Submittal Procedures Section (01 33 00, 01330, or 01300), or that are missing from the Submittal Procedures Section:

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March 2016



Marine Corps Base (MCB) Camp Lejeune Contractor Environmental Guide

Prepared For:

Marine Corps Installations East-Marine Corps Base Camp Lejeune

Version Number 3



Michael Baker
INTERNATIONAL



Prepared By:
Michael Baker International, Inc.

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Training for Contractors & Vendors

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RECORD OF CHANGES

Date	Description of Changes	Page #	Name/Initials

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CERTIFICATION PAGE

I certify that I have read, understood, and accept this document and all attachments, and that all those within my party working on a job site within Marine Corps Base Camp Lejeune and/or Marine Corps Air Station New River will comply with the environmental policies and regulations herein. I am aware that there are penalties for not complying with this Guide.

Signature

Date

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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	Asbestos-Containing Material
AHERA	Asbestos Hazard and Emergency Response Act
AHPA	Archaeological and Historic Preservation Act
ARPA	Archeological Resource Protection Act
ASHARA	Asbestos School Hazard Abatement Reauthorization Act
ASD	Accumulation Start Date
ASO	Air Station Order
BMP	Best Management Practice
BO	Base Order
C&D	Construction and Demolition
CAA	Clean Air Act
CAMA	Coastal Area Management Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability
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
DHHS	Department of Health and Human Services
DLADS	Defense Logistics Agency Disposition Services
DM	Decision Memorandum

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DMM	Discarded Military Munitions
DoD	Department of Defense
DoN	Department of Navy
DOT	Department of Transportation
DRMS	Defense Reutilization and Marketing Service
EA	Environmental Assessment
EAD	Environmental Affairs Department
ECON	Environmental Conservation Branch
EISA	Energy Independence and Security Act
EHS	Extremely Hazardous Substances
ELLAP	Environmental Lead Laboratory Accreditation Program
EMD	Environmental Management Division
EMS	Environmental Management System
EO	Executive Order
EOD	Explosives and Ordnance Disposal
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
EPCRA	Emergency Planning and Community Right- to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
FAR	Federal Acquisition Regulation
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSC	Facilities Support Contracts
FWS	Fish and Wildlife Service
GIS	Geographic Information System
GP	Green Procurement
HAP	Hazardous Air Pollutants

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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
HQW	High Quality Water
HVAC	Heating, Ventilation, and Air Conditioning
HW	Hazardous Waste
HWMP	Hazardous Waste Management Plan
IGI&S	Installation Geospatial Information & Services
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
LBP	Lead-Based Paint
LDA	Land-Disturbing Activities
LQG	Large Quantity Generator
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
MRF	Materials Recovery Facility
MS4	Municipal Separate Storm Sewer Systems
MSW	Municipal Solid Waste
NAPL	Non-Aqueous Phase Liquid

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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
NCDMS	North Carolina Division of Mitigation Services
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
ODS	Ozone-Depleting Substance
OPA	Oil Pollution Act
ORW	Outstanding Resource Water
OSHA	Occupational Safety and Health Administration
OWS	Oil-Water Separator
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

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PPV	Public-Private Venture
PWD	Public Works Division
QRP	Qualified Recycling Program
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
SAA	Satellite Accumulation Area
SARA	Superfund Amendments & Reauthorization Act
SDS	Safety Data Sheet
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention Control and Countermeasures
SSPP	Strategic Sustainability Performance Plan
SWDA	Solid Waste Disposal Act
SWPPP	Stormwater Pollution Prevention Plan (Also referred to as SPPP in NC)
T&P	Treatment and Processing
TCLP	Toxic Characteristic Leaching Procedure
TSD	Treatment, Storage, and Disposal
TSI	Thermal System Insulation
ULCP	Unit Level Contingency Plan
USC	United States Code
USACE	United States Army Corps of Engineers
USMC	United States Marine Corps
UW	Universal Waste

CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

UXO Unexploded Ordnance

XRF X-Ray Fluorescence

CONTRACTOR’S PHONE DIRECTORY

In the event of an emergency, refer to the emergency numbers below. All non-emergency contractor inquiries regarding the operations at Marine Corps Base (MCB) 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 (Outside MCB Camp Lejeune).....	(202) 372-2428
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) 451-5725
Environmental Management Division.....	(910) 451-5003
-Environmental Compliance Branch.....	(910) 451-5837

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Asbestos Management	
Resource Conservation and Recovery Section	(910) 451-1482
Hazardous Material Consolidation Site/Free Issue	(910) 451-1482
Recycling Center, Building 982	(910) 451-4214
-Environmental Conservation Branch	(910) 451-5063
Fish & Wildlife	
Forestry Management	
NEPA	
Conservation Law Enforcement	(910) 451-2196/5226
-Environmental Quality Branch	(910) 451-5068
Air Quality	
Underground Storage Tanks	
Water Quality	
Explosives and Ordnance Disposal	(910) 451-0558
Public Works Division	(910) 451-5307
-Construction Project Managers	(910) 451-2583
-Contracts Branch	(910) 451-2582
-Officer In Charge of Construction (Main)	(910) 451-2581
-Public Works Base Utility Director	(910) 451-5024
Water Line Break/Wastewater Line Break	(910) 451-7190 (x225)
-Public Works Solid Waste Division/Landfill	(910) 451-2946
Range Control	(910) 451-3064
Regional Geospatial Information & Services (Installation Manager)	(910) 451-8915
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) 449-4531/4533

Environmental Affairs Department
(Director).....(910) 449-5441

-Environmental Affairs Department (Environmental
Manager).....(910) 449-5442

-Environmental Affairs Department (GIS
Manager).....(910) 449-6144

-Environmental Affairs Department (Hazardous
Waste).....(910) 449-5997

-Conservation Law Enforcement.....(910) 449-0108

Explosives Safety Officer.....(910) 449-5443

Military Police (Non-Emergency).....(910) 449-4248/4249

Public Works Division.....(910) 449-6506

-Officer In Charge of Construction.....(910) 449-5587

Safety Department.....(910) 449-4527

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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 the MCB Camp Lejeune 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) P5090.2A and designed to answer many of the environmental questions that arise, as well as to provide pertinent information on environmental topics and training requirements.

This document should be used only as a *guide* to the environmental issues contractors may face while working aboard MCB Camp Lejeune and MCAS New River.

NOTE: This document should be used only as a guide to the 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 Environmental Affairs Department (EAD) at MCAS New River, and Contract Representatives regarding environmental management issues, concerns, and/or questions. Should the need arise, this guide provides

**Contact the ROICC
or Contract
Representative
with any
questions.**

contractors with EMD, EAD, and emergency response points of contact (POCs). 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.

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. If you have any questions about these definitions or concepts, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is 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.
- **Environmental Affairs 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 decisionmaking 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 MCB Camp Lejeune real property and contracts for work performed at MCAS New River and all outlying fields associated with MCB Camp Lejeune.
- **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, State, 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, nonhazardous 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 H-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 Environmental Affairs Department

MCB Camp Lejeune's EMD, within the Installation and Environment Department, is responsible for all natural resource and environmental matters aboard the installation. EMD works closely with MCB Camp Lejeune personnel, educating and training them to comply with environmental laws while accomplishing the military mission.

The EAD 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 Figure 1-1 and Figure 1-2 for organization charts of EMD and EAD.

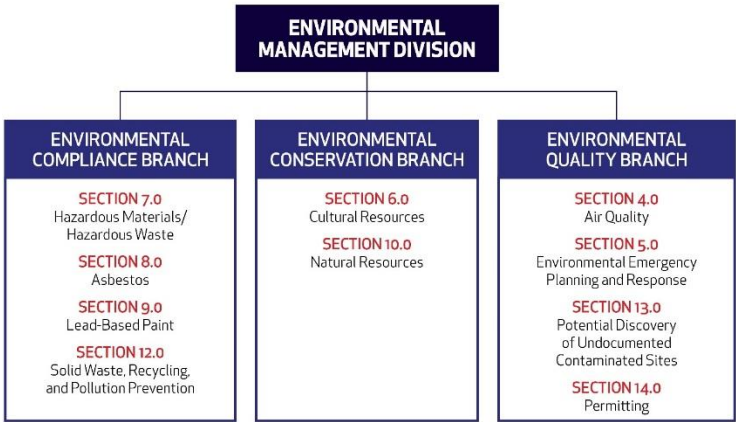


Figure 1-1. Environmental Management Division (MCB Camp Lejeune) Organization Chart



Figure 1-2. Environmental Affairs Department (MCAS New River) Organization Chart

1.2.2. Expectations

Contractors aboard the installation, which are committed 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 the following:

- **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 13423, Strengthening Federal Environmental, Energy, and Transportation Management.** Requires Federal agencies to comply with applicable Federal, State, local, and host nation environmental laws and regulations. Additionally, requirements include more widespread use of EMSs as the framework for sustainability management.

- [EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance.](#) Requires Federal agencies to meet various sustainability goals, to include the reduction of greenhouse gas emissions. Applicable provisions for meeting these goals are to be included in acquisition and service contracts.
- [MCO P5090.2A, Environmental Compliance and Protection Manual \(26 August 2013\).](#) 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
 - o EMS overview and requirements
 - o 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.

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/EAD when environmental concerns or issues arise.

1.3.2. Environmental and EMS Training

In accordance with Department of Defense (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.

All contractors are required to receive both EMS and general environmental awareness training at the level necessary for their job function. This guide satisfies these training requirements (See the Appendix).

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 pages xv and xvi of this Guide. All initial inquiries regarding an environmental issue should be directed to the ROICC or Contract Representative, who will either directly contact or refer the contractor to 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 a Spill

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 POL or Hazardous Material	911	Spill Report
Material that reaches stormwater inlets or waterways	911	
Nonhazardous waste	(910) 451-1482	911

1.5. OVERVIEW MAP

Figure 1-3 provides an overview map that displays the locations of installation facilities discussed throughout this Guide.

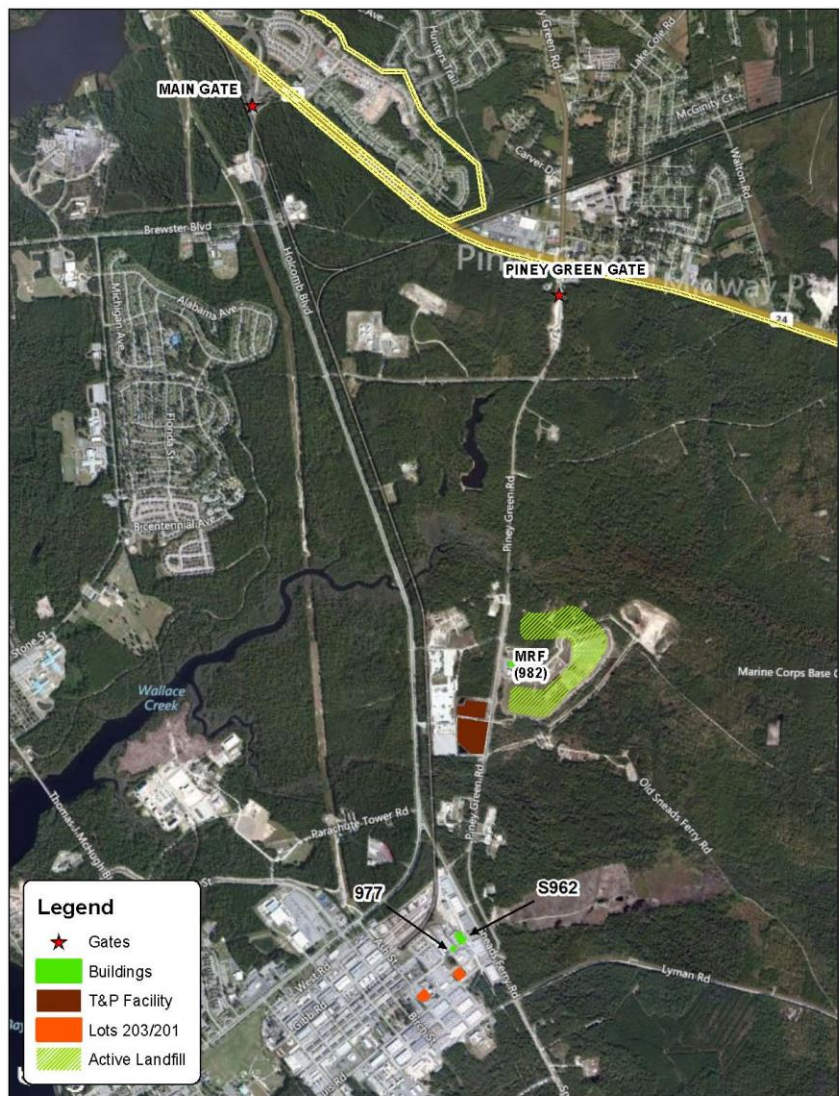


Figure 1-3. Overview Map

2.0 ENVIRONMENTAL MANAGEMENT SYSTEM

Three key principles of the Environmental Policy are to comply with relevant environmental laws and regulations, prevent pollution, and continually improve our EMS.

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.

2.1. KEY DEFINITION AND CONCEPTS

The following key definitions and concepts are associated with an EMS. Please consult the ROICC or Contract Representative with any questions about these definitions or concepts.

**Please consult the
ROICC or Contract
Representative
with any
questions.**

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 decisionmaking and long-term planning processes across all missions, activities, and functions. The EMS institutionalizes processes for continual environmental improvement and for 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.

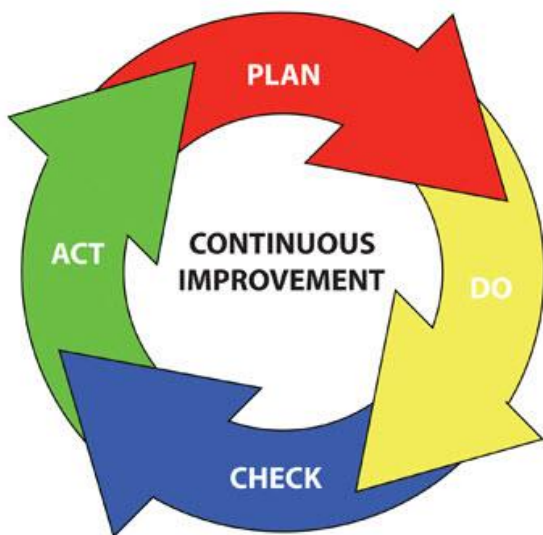


Figure 2-1. Plan, Do, Check, Act Cycle

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 the following:

- **EO 13148, Greening the Government Through Leadership in Environmental Management.** Mandates that environmental management considerations must be an integral component of Federal Government policies, operations, planning, and management, with the primary goal for each agency to promote the sustainable management of Federal facility lands through the implementation of cost-effective, environmentally sound practices, and programs to reduce adverse impacts to the natural environment.
- **EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management.** Establishes the EMS as the primary management approach for addressing environmental aspects, including energy and transportation aspects, and as the reporting mechanism for communicating progress on meeting performance goals.
- **EO 13514, Leadership in Environmental, Energy, and Economic Performance.** Requires continuing implementation of formal EMSs at all appropriate organizational levels to support the sustainability performance requirements of the Order.

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. Figure 2-2 illustrates the 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 the potential to impact 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.

Contractors are expected to understand that the activities performed on the installation may interact with the environment and have the potential to impact the environment.

2.5. CONTRACTOR ENVIRONMENTAL GUIDE AND EMS

The sections of this Contractor Environmental Guide 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.

CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

**Table 2-1. Practices Identified Under MCB Camp Lejeune's
EMS**

MCB Camp Lejeune 2015 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
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			●				●					●	
Applicable to All Practices Conducted Aboard MCB Camp Lejeune			●		●			●					
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CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

MCB Camp Lejeune 2015 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
Fueling and fuel mgt./ 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		●		●	●						●	
Land clearing						●	●		●			●
Landfill gas energy recovery system						●						
Landscaping		●				●						
Laundry		●										
Live fire range operation		●				●					●	●
Livestock operation						●	●					
Metal working		●					●				●	
Non-destructive inspection		●										
ODS/ halon management		●									●	
Packaging/unpack-aging							●					
Applicable to All Practices Conducted Aboard MCB Camp Lejeune												
Applicable to All Practices Conducted Aboard MCB Camp Lejeune												
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CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

MCB Camp Lejeune 2015 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
Paint booth	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				
Paint gun cleaning		●									●	
Paint removal		●			●		●				●	
Painting		●					●				●	
Parts replacement		●		●			●					
Pesticide/herbicide mgt. 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							●				●	
Storage tank management		●					●				●	

CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

MCB Camp Lejeune 2015 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
Stormwater collection/ conveyance	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				
Surface washing													
Swimming pool operation and maintenance			●										
Timber management													
Universal waste storage/ collection			●										
Urban wildlife 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				●
UXO/EOD operations			●										
Vehicle maintenance			●					●				●	
Vehicle parking							●						
Wash rack							●						

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Attachment 2-1
MCB Camp Lejeune's Environmental
Policy Statement

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COMMANDING GENERAL'S ENVIRONMENTAL POLICY STATEMENT

The protection and enhancement of our natural environment is a valuable tool in sustaining the training and support mission of Marine Corps Installations East-Marine Corps Base Camp Lejeune (MCIEAST-MCB CAMLEJ). As MCIEAST-MCB CAMLEJ prepares for the increasing demands on facilities, training areas, ranges, and quality-of-life services that support the readiness of our forces, we are committed to protecting human health, conserving natural and cultural resources, and complying with regulatory requirements.

The MCIEAST-MCB CAMLEJ Environmental Management System (EMS) promotes sustained mission readiness through actively identifying and implementing solutions and opportunities for efficient resource use. Through the EMS, MCIEAST-MCB CAMLEJ will continually assess daily operations in order to identify and implement improvements to its practices that will ensure compliance with governing regulations and meet the sustainability objectives of Executive Orders 13514 and 13423. In this endeavor, MCIEAST-MCB CAMLEJ will:

- Continue proactive compliance with all environmental laws, regulations, and U. S. Marine Corps policies.
- Integrate natural and cultural resource management with the military mission whenever practical.
- Incorporate sound environmental practices into all of our operations and business decisions.
- Implement pollution prevention initiatives, waste diversion, recycling, and waste minimization programs.
- Assess and remediate contaminated sites aboard the Base that are the result of past disposal practices or spills and leaks of hazardous materials.
- Implement energy efficiency and water conservation management projects.
- Procure sustainable products, including biobased, environmentally preferable, energy efficient, water efficient, and recycled-content products.
- Collaborate with local communities and regulatory agencies to enhance stewardship of the environment, create goodwill and build trust.
- Educate our Marines, Sailors, and Civilian Marines about their responsibility to protect our natural environment, stressing the important role each individual plays in an effective EMS.

Join me in applying these environmental management principles to protect and enhance our natural environment, while strengthening the combat readiness of our forces and the quality-of-life services to our warriors and their families.

R. F. CASTELLVI
Brigadier General, U.S. Marine Corps
Commanding General
Marine Corps Installations East-Marine Corps Base Camp Lejeune

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3.0 TRAINING

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.

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 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. Use of the Contractor Environmental Guide satisfies these training requirements. A training presentation is provided in the Appendix.

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.

3.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with contractor training. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

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. The training presentation is included as an Appendix to this document.

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, which include but may not be limited to the following:

- [Executive Order 13423](#). Strengthening Federal Environmental, Energy, and Transportation Management. Requires implementation of an EMS at all appropriate organizational levels.

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

Prior to or within 30 days of beginning work onsite, all contractors are required to receive both EMS and general environmental awareness training.

MCB Camp Lejeune must receive general environmental awareness training.

3.3.2. Environmental Management System

In addition to CETEP requirements, MCB Camp Lejeune has implemented an installation-wide EMS per EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and 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 training materials included in the Appendix of the Contractor Environmental Guide, each employee must sign the Training Roster. 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.

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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. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

4.1.1. Key Definitions

- **Criteria Pollutants.** Pollutants that the U.S. Environmental Protection Agency (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 an excess level of 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.** Air pollutants, as identified within 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 adverse environmental and ecological effects.
- **Ozone-Depleting Substance.** Chemicals, such as certain refrigerants, that cause depletion of the stratospheric ozone layer—primarily chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) 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.** Before beginning any emitting activity, please have the ROICC or Contract

Representative contact EMD 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

Contractor activities associated with air quality include the following:

- Boat operation/maintenance
- Boiler operation
- Chlorination
- Degreasing
- Engine operation and maintenance
- Fueling and fuel management/storage
- Hazardous material (HM) storage/transportation
- Hazardous waste (HW) satellite accumulation area/HW transportation
- Live fire range operations
- Metal working
- Ozone-depleting substance (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)/explosives and ordnance disposal (EOD) operations
- 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 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, 02H, 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, which 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 is 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

A permit is required for the construction of any emission source. Timely submittal of the permit application is necessary to ensure the permit is available before commencing construction.

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 (BMPs) during refrigerant management activities. All Heating, Ventilation, and Air Conditioning (HVAC) technicians will maintain their appropriate State-specific licenses and present them to the ROICC or Contract Representative upon request.
- **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 be 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:

- o 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.
- o The location of the burning is at least 500 feet from any dwelling, group of dwellings, commercial or institutional establishment, or other occupied structure not located on the property on which the burning is conducted, unless an air curtain burner is used. If an air curtain burner is used, the regional office supervisor may grant exceptions to the setback requirements.
- o 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.
- o Initial burning must begin between 0800 and 1800. After 1800, no material may be added to the fire until 0800 the following day.
- o No fires may be started, and no vegetation may be added to existing fires, when the North Carolina Division of Forest Resources has banned burning for that area.
- o Burners that have the potential to burn more than 8,100 tons per year may be subject to Title V air quality permitting requirements.

Situations that require a regulatory exemption evaluation by the NCDAQ Regional Office

Supervisors 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: http://daq.state.nc.us/enf/openburn/ob_firetrain.pdf.

Before the training exercise, an accredited North Carolina Asbestos Inspector must inspect any structure to be burned to ensure that it is free from asbestos. 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 hour

5.0 ENVIRONMENTAL EMERGENCY PLANNING AND RESPONSE

Environmental 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. If an environmental emergency is identified, contact 911 immediately. Additional inquiries should be directed to the ROICC or Contract Representative.

5.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with environmental emergency response and spill response requirements. If you have any

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

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

For spills of:	Call:	Follow-up:
Any amount of a POL or Hazardous Material	911	Spill Report
Material that reaches stormwater inlets or waterways	911	
Nonhazardous waste	(910) 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 the following:

- **Clean Air Act 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 (CERCLA) Act of 1980.** Authorizes a Federal response to any release or threatened release of a hazardous substance into the environment. This act defines hazardous substances by reference to substances that are listed or designated under other environmental statutes.
- **Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, Section 304.** Establishes requirements for reporting 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 hazardous waste handling, generation, transportation, treatment, storage, and disposal. Subtitle C of the RCRA requires owners and operators of hazardous waste facilities to develop comprehensive management plans that address spill prevention and cleanup.

5.3. SPILL NOTIFICATION

5.3.1. POL/Hazardous Materials 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.

MCB Camp Lejeune maintains a Spill Prevention, Control, and Countermeasures (SPCC) Plan that establishes procedures to prevent oil spills 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 hazardous materials must develop a Unit-Level Contingency Plan (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.

Contractors must develop a Unit-Level Contingency Plan that addresses the spill response for their specific sites and potential spill types.

In the event of a spill, contact the ROICC or Contract Representative (after contacting emergency responders) 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 report 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.

Wastewater Spills

In the event of a wastewater spill, report the incident to the Public Works Base Utilities at (910) 451-7190 (x225). In addition, report the incident immediately to the ROICC or Contract Representative. The following information must be provided:

- 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

Water Line Breaks

In the event of a water line break, report the incident to the Public Works Base Utilities at (910) 451-7190 (x225). In addition, report the incident immediately to the ROICC or Contract Representative. The following information must be provided:

- 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; the RCRS will provide concurrence for temporary containment areas and removal of contaminated runoff.

If solid or hazardous waste was generated as the result of a spill, refer to Sections 12.0 and 7.0 of this guide for disposal requirements.

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Attachment 5-1

Spill Reporting Form

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MARINE CORPS INSTALLATIONS EAST MARINE CORPS BASE CAMP LEJEUNE UNIT LEVEL SPILL FORM



Spill Date: Spill Time:

RESPONDERS

Response Initiator: Major Command:

Phone Number: Unit Name:

Fire Department Response: Responder Name:

EMD Respond? Responder Name:

GPS Coordinates: X: Y:

SPILL IDENTIFICATION

Spilled Substance: State:

Source (Vehicle, drum, etc.): Building:

Estimated Amount:

Cause of Spill:

Containment/Clean-up Action Taken:

Parties Performing Spill Clean-up/Removal (EMD Turn-in Date):

Additional Assistance Required:

REPORT CERTIFICATION

Printed Name/Rank: Signature:

E-mail: Date:

All releases must be reported to the Base Fire Department by calling 911. The Environmental Management Division can be reached by calling (910) 451-1482. Units are required to maintain a copy of all completed spill forms, preferably in their ESOP Binder.

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6.0 CULTURAL RESOURCES

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 they encounter suspected archaeological sites, artifacts, or human remains.

6.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with cultural resource management. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

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 built within the past 50 years can achieve significance 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 P5090.2A](#).
- **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 U.S. history, architecture, archaeology, engineering, or culture and included, or eligible for listing in, the NRHP, per the [NHPA](#) and [MCO P5090.2A](#).
- **State Historic Preservation Officer.** 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 they encounter any cultural resources.
- **Policy.** DoD policy is to preserve significant historic and archaeological resources.

6.1.3. Environmental Management System

Contractor practices associated with cultural resources include the following:

- 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 the following:

- [**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, 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.

- **National Historic Preservation Act of 1966 (16 USC 470 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.

**Notify the ROICC
or Contract
Representative
immediately
concerning any
encounter with
suspected
archaeological
sites, artifacts, or
human remains
during contractor
activities.**

Be particularly aware of surroundings when working in a designated historic area. The Camp Lejeune Installation Geospatial Information & Services 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 mapping.

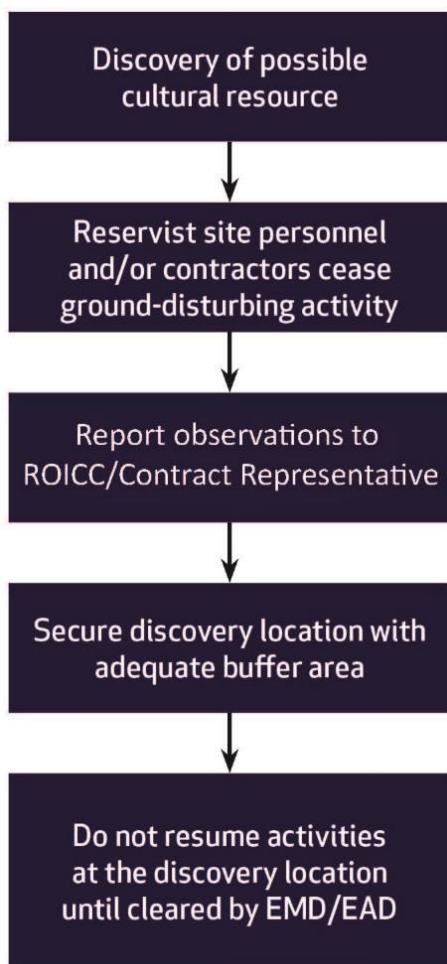


Figure 6-1. Possible Cultural Resource Discovery Flow Chart

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 EPA regulates hazardous wastes through the RCRA, which provides specific regulatory definitions for hazardous waste and its management. The RCRA governs all hazardous waste from the point of generation to ultimate disposal, including hazardous waste 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 the EPCRA. Additionally, the North Carolina Department of Environmental Quality (NCDEQ) has issued more stringent rules and regulations governing hazardous materials and hazardous waste management that also apply to contractors.

7.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with hazardous materials (HM), hazardous wastes (HW), and their management. If you have any questions or concerns about the information in this section,

**Direct questions
or concerns about
the information in
this section to the
ROICC or Contract
Representative.**

please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

7.1.1. Key Definitions

- **90-day Accumulation Area.** These areas are used to store 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 up to 90 days in these areas. MCB Camp Lejeune's 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:
 - o Cause or significantly contribute to an increase in mortality or cause a serious irreversible or incapacitating reversible illness; or

- o 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 HW manifests for waste generated aboard MCB Camp Lejeune must be reviewed and released by personnel from the Resource Conservation and Recovery Section, EMD, who can be contacted 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 (SAA).** 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 for an indefinite amount of time. 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 90-day site or long-term HW storage facility within 72 hours. EMD authorization for an SAA must be obtained and posted at the site. 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, HW in an SAA should not be stored longer than 365 days, even if the container is not full.

- **Safety Data Sheet (SDS).** 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 hazardous chemical products. The 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 nonhazardous 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).** UW regulations streamline HW management standards for batteries, pesticides, mercury-containing equipment, 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, 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 reducing 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 U.S. trade association that creates and maintains private, copyrighted standards and codes, including the diamond hazard label in Figure 7-1, which is used by emergency personnel to quickly and easily identify the risks posed by hazardous materials.

CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

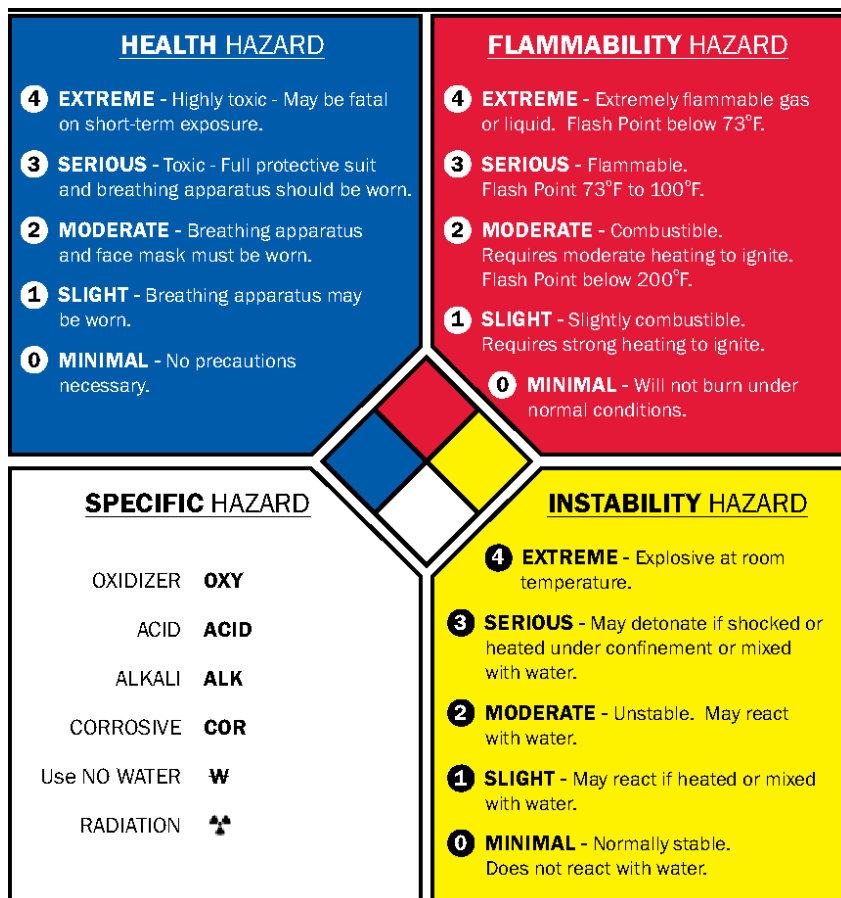


Figure 7-1. Diamond Hazard Label

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 the following:

- [**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 use.
- [**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 a 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 authority to access 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, 90-day, and permitted. Typically, HW is accumulated at an SAA and later transferred to a 90-day or permitted storage area.

Both MCB Camp Lejeune and MCAS New River maintain Hazardous Waste Management Plans (HWMPs) 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 may be required to submit a Hazardous Waste Management Plan to the ROICC or the Contract Representative prior to beginning work.

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/EAD 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.

- 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:

Do not store large quantities of materials. Keep on hand only what can be used.

- o *Corrosives* (e.g., batteries, stripping and cleaning compounds containing acids or bases) *and* *Flammables* (e.g., fuels, oils, paints, and adhesives)
 - o *Corrosives and Oxidizers* (e.g., peroxide, perchlorates, sodium hypochlorite/bleach, or calcium hypochlorite)
 - o *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 (OWSs), or storm drains, or onto the ground.

Stop work immediately if a project unearths a hazardous material (such as MEC/DMM/UXO) and report the situation to the ROICC or Contract Representative.

- 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 unexploded ordnance [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 EAD for turn-in procedures upon completion of the contract.

7.4. UNIVERSAL WASTE REQUIREMENTS

The NCDEQ allows thermostats, obsolete agricultural pesticides, lamps, and certain types of batteries to be managed as UW. UW has less stringent requirements for storage, transport, and collection, but it must still comply with full HW requirements for final recycling, treatment, or disposal. Federal UW requirements are outlined in [40 CFR 273](#). Contact the ROICC or Contract Representative regarding any additional direction or questions on the handling of UW.

All UW must be properly containerized, stored, and labeled when the waste is first generated. Containers/areas for accumulating UW must be labeled as follows:

- Words: UNIVERSAL WASTE.
- Content: Noun name found on the specific Hazardous Waste Profile Sheet (DRMS Form 1930), which is available from EMD (e.g., *batteries*,

fluorescent lamps, pesticides, mercury-containing equipment).

- Accumulation Start Date (ASD): The ASD must be marked on the subject container as soon as the UW item is placed in the container. Storage of UW cannot exceed 365 days.
- Number of Containers: The number of containers marked reflects the total number of containers disposed of within the current document (i.e., 1 of 1, etc.).

Contractors who need UW accumulation areas should contact the ROICC or Contract Representative, who will contact RCRS or EAD personnel to help contractors establish an accumulation area for UW. Key points for this process:

- The containers must be under the control of the contractor generating the waste and must be closed at all times except when waste is being adding.
- Per installation policy, UW containers/areas must be inspected weekly using the *Weekly Hazardous Waste (HW) Site Inspection Form*, included as Attachment 7-1 and Attachment 7-2. Written records noting discrepancies and corrective actions must be maintained onsite for 3 years. Copies of inspection reports should be provided to the ROICC or Contract Representative.
- When the ASD reaches 1 year, or when the container is full, the waste generator has 72 hours (3 days) to arrange for the transportation of the UW to an RCRA

Part B permitted storage area. Contact the ROICC or Contract Representative to coordinate the removal of the UW when the container is full or the contract is finished.

7.5. 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 EAD with questions regarding whether or not a waste meets the definition of HW. Installation personnel must approve all regulated waste and HW storage locations.

The appropriate environmental office must be notified before any hazardous waste is generated on projects managed by the ROICC or the FSC.

If a project generates HW:

- Minimize generation through waste minimization and P2 techniques.
- Have the ROICC or Contract Representative contact RCRS or EAD 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 EAD 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 EAD prior to creating a new SAA.

7.5.1. 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 DOT specifications. 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 Hazardous Waste Profile Sheet (DRMS Form 1930) provided by RCRS or EAD.
- 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.
- 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 SAA. Contractors who need an SAA should contact the ROICC or Contract Representative, who will contact RCRS or EAD 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 waste is being added.
- HW containers must be inspected weekly using the *Weekly Hazardous Waste (HW) Site Inspection Form*, included as Attachment 7-1 and Attachment 7-2. 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 must 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 EAD 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.

7.5.2. Manifesting and Disposal

All disposal of HW generated by contractors must be coordinated with the installation. HW and UW 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

Only personnel from EMD who have been designated in writing by the MCB Camp Lejeune Commanding General can sign the hazardous waste manifest.

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 EAD 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.

7.6. 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 wastes containing Polychlorinated Biphenyl (PCB), asbestos, and batteries not managed as UW.

7.6.1. 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 a hazardous waste 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 a 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 determine if the drained used oil filters can be given to RCRS or EAD.

7.6.2. 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 Characteristics 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 EAD.

7.6.3. 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 EAD.

7.6.4. 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 EAD for proper handling and/or turn-in procedures.

7.6.5. New and Used Batteries (Not Regulated as Universal Waste)

- Store compatible batteries together (i.e., 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 EAD for proper handling and/or turn-in procedures.

Attachment 7-1
Weekly Hazardous Waste (HW) Site
Inspection Form
MCB Camp Lejeune

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CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

MCB Camp Lejeune Weekly Hazardous Waste (HW) Site Inspection Universal Waste (UW)/Satellite Accumulation Area (SAA)

Building Number/location of HW Site: _____

Unit Evaluated: _____

Evaluation Date: ____/____/____

Evaluation By (Site Manager): _____

Evaluation Time: _____

QUESTION	YES	NO	Location of Discrepancy <i>and</i> Proposed Corrective Action
1. Is housekeeping maintained in acceptable manner?			
2. Is any HW present at the site?			
3. Are HW containers properly marked?			
4. Are HW containers in serviceable condition?			
5. Are container bungs, caps, and openings properly secured?			
6. Is a unit spill plan/activation prominently posted?			
7. Is 911 spill response sign posted?			
8. Are " Danger-Unauthorized Personnel Keep Out " signs posted so they may be seen from any approach?			
9. Are " No Smoking " signs posted?			

CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

QUESTION	YES	NO	Location of Discrepancy <i>and</i> Proposed Corrective Action
10. Does the site have emergency communication system or two-man rule in effect? If the two-man rule is implemented, is a sign posted with the legend " Two-Man Rule in Effect "?			
11. Are properly charged fire extinguishers, as well as eye wash stations, present and inspected at least monthly?			
12. Is the post indicator valve in good operating condition and secured in the closed position, and are there any structural defects such as cracked concrete?			
13. Is the proper spill response equipment readily available?			
14. Is the site designated and recognizable, and is the EMD Authorization posted within the site as to be visible to personnel placing waste into the container? (SAA site only)			
15. Are all HWs properly segregated and stored in the designated site?			
16. Are any hazardous materials being stored in the Satellite Accumulation Area or < 90-day storage site?			

Attachment 7-2
Weekly Hazardous Waste (HW) Site
Inspection Form
MCAS New River

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CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

Weekly Hazardous Waste Storage Area Inspection Form

Squadron: _____

Inspector: _____

Date: _____

Signature: _____


















<u>Question</u>	<u>Yes</u>	<u>No</u>	<u>Corrective Actions or N/A</u>
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?			

CAMP LEJEUNE CONTRACTOR ENVIRONMENTAL GUIDE FINAL

<u>Question</u>	<u>Yes</u>	<u>No</u>	<u>Corrective Actions or N/A</u>
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 90 th 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?			



NAVOSHENVTRACEN COMPATIBILITY CHART

HAZID NUMBER	HCC 800 note 2	GROUP NAME	EXAMPLES	INCOMPATIBLE MATERIALS	EXAMPLES	REACTION IF MIXED
1	01, 02, 03, 04	ACIDS	Battery Acid Paint Removers Car-Rust Spray	FLAMMABLES/ COMBUSTIBLES ALKAL/ BASES/CAUSTICS OXIDIZERS (IMUG Groups 2,3,4,6,7,8,10,11, 12,13, 14, 15, 17, 18, 19, 20, 22)	Degreasers, Carbon Removers, Anti-Fog Compounds	HEAT VIOLENT REACTION Gas Generation 
2	P1 to P7, T1 to T4, V1 to V6	ADHESIVES	Epoxy Isocyanates Chloride Resins	ACIDS ALKAL/ BASES/CAUSTICS OXIDIZERS (IMUG Groups 1, 3, 18)	Battery Acid Paint Removers, Car-Rust Spray, Rusts, Solvents	HEAT FIRE HAZARD 
3	W1, W2	ALKALIS/ BASES/ CAUSTICS	Ammonia Sodium Hydroxide Cleaners	ACID/ OXIDIZERS FLAMMABLES/ COMBUSTIBLES (IMUG Groups 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22)	Battery Acid Paint Removers, Car-Rust Spray, Rusts, Solvents	HEAT Gas Generation VIOLENT REACTION 
4	01-04, 05-08, P1 to P7, T1 to T4, V1 to V6	CLEANING COMPOUNDS	Degreasers Carbon Removers Anti-Fog Compounds	DETERGENT/ SOAPS OXIDIZERS (IMUG Groups 1, 7, 18)	Calcium Hypochlorite, Sodium Hypo, Hydrogen Peroxide	HEAT FIRE HAZARD 
5	01 to 04	COMPRESSED GASES	Anesthetics, Propanes, Nitrogen, Argon, Helium, Oxygen	HEAT SOURCES Corrosive paragraph C23 for specific handling and storage guidance (IMUG Groups 1, 9, 10, 11, 12, 13, 14, 15)		FIRE/HAZARD EXPLOSION HAZARD 
6	P1 to P7, T1 to T4, V1 to V6	CORROSION PREVENTIVE COMPOUNDS	Corrosion Inhibitors Chemical Conversion Compounds	ACID/ BASES OXIDIZERS IGNITION SOURCES (IMUG Groups 1, 3, 18, 20)		FIRE/HAZARD 
7	W1	DETERGENTS/ SOAPS	Trisodium Phosphate Souring Products Chlorine Bleach	ACID/ CORROSION COMPOUNDS (IMUG Groups 1, 4, 18)	Battery Acid Paint Removers Car-Rust Spray	VIOLENT REACTION HEAT 
8	01 to V4, V5	GREASES	Universal Grease Silicone Molybdenum	OXIDIZERS ALKAL/ BASES/CAUSTICS (IMUG Groups 3, 5, 18)		FIRE/HAZARD HEAT 
9	W1 to V4, V5, V7	HYDRAULIC FLUIDS	Petroleum Based Synthetic Fire-Retardant	COMBUSTIBLES, OXIDIZERS (IMUG Groups 1, 3, 5, 18)		VIOLENT REACTION 
10	P1 to P4, T1 to V6	INSPECTION PENETRANTS	Petroleum Based Dyes	COMBUSTIBLES, OXIDIZERS (IMUG Groups 1, 3, 5, 18)	Battery Acid Caustic Soda Chlorine Bleach/ Touch Calcium Hypochlorite Hydrogen Peroxide Cadmium Chloride Rust Cleaners	FIRE/HAZARD EXPLOSION HAZARD 
11	01 to 04, 05, 06, W1, W2	LUBRICANTS/ OILS	General Purpose, Gear, Turbo, Wagon			
12	P1 to P7, T1 to T4, V1 to V6	PAINT MATERIALS	Primers, Enamels, Undercoats, Lacquers, Varnishes, Non-SAG, Thinner	ACIDS, OXIDIZERS (IMUG Groups 1, 5, 18)		HEAT FIRE HAZARD 
13	01-04, 05-08, 09	PHOTO CHEMICALS	Developers, Stopbath, Toners, Bleaches, Reducers	HEAVY METALS (IMUG Groups 1, 18, 20)		HEAT FIRE HAZARD 
14	P4	POLISH/WAX COMPOUNDS	Buffing Compounds Metal Polishes General Purpose Waxes	COMBUSTIBLES OXIDIZERS (IMUG Groups 1, 3, 18)		HEAT, FIRE HAZARD VIOLENT REACTION 
15	P1 to P4, T1 to T4, V1 to V6	SOLVENTS	Methyl Ethyl Ketone (MEK) Toluene, Xylene, Acetone	COMBUSTIBLES OXIDIZERS BATTERIES (IMUG Groups 1, 3, 18, 20, 22)	Battery Acid Calcium Hypochlorite Sodium Hypo Sulfuric Acid	HEAT FIRE HAZARD 
16	T1 to T1, 21	THERMAL INSULATION	Adhesives Fiberglass Glass Wool	MATERIAL IS NOT REACTIVE KEEP DRY		NO REACTION
17	01-04, 05-08, 09	WATER TEST/ TREATMENT CHEMICALS	Nitric Acid Mercuric Nitrate Caustic Soda	COMBUSTIBLES OXIDIZERS HEAVY METALS (IMUG Groups 1, 3, 18, 20, 22)		HEAT VIOLENT REACTION 
18	01 to 04	OXIDIZERS	Calcium Hypochlorite Laundry Bleach OBA Catalysts	PETROLEUM BASED MATERIALS FUELS, SOLVENTS, COMBUSTIBLES, HEAT (IMUG Groups 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22)		FIRE/HAZARD VIOLENT REACTION TOXIC GAS GENERATION 
19	P1 to P4, W1 to V6	FUELS	Jet A, Jet Gasoline Diesel Fuel	COMBUSTIBLES OXIDIZERS (IMUG Groups 1, 3, 5, 18)	Battery Acid Calcium Hypochlorite Sodium Hypo Sulfuric Acid	FIRE/HAZARD TOXIC GAS GENERATION
20	T1 to V1, 23	HEAVY METALS	Mercury Lead Barium	COMBUSTIBLES OXIDIZERS WATER TREATMENT/PHOTO CHEMICALS (IMUG Groups 1, 3, 8, 13, 17, 18, 20)		VIOLENT REACTION GENERATION OF TOXIC AND FLAMMABLE GAS
21	26 to 27	BATTERIES	Lead-Acid Dry-Cell Alkaline	SOLVENTS HEAVY METALS OXIDIZERS (IMUG Groups 15, 17, 18, 20)	Sulfuric Toluene Acetone	HEAT VIOLENT REACTION TOXIC GAS GENERATION 
22	T2 to T8	PESTICIDES	Insect Killers, Fungicides Rodent Killers Fertilizers	COMBUSTIBLES OXIDIZERS (IMUG 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 NT) are listed.

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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 projects.

8.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with asbestos and its management. If you have any questions or concerns about the information in this section, please consult the ROICC or

Contract Representative, who will contact the appropriate EMD program if additional clarification is necessary.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

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 is 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, degradation of water quality and 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 the following:

- [Asbestos General Standard, 29 CFR 1910.1001 – Asbestos.](#) Applies to all occupational exposures to asbestos in all industries covered by the Occupational Safety and Health Administration (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, 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, renovation, and 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 the 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.

The ROICC or Contract Representative is required to notify Camp Lejeune's Asbestos Program Manager of all work involving asbestos removals, including glove bag projects.

8.3.1. Identification of ACM and PACM

Form DHHS 3768 must be posted onsite during all permitted projects.

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 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 the Installations and Environment Department, 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.

A demolition/renovation notification form, DHHS 3768, must be submitted to the NC HHCU 10 working days before demolition activities, regardless of whether asbestos is present.

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: at least 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

During a renovation or demolition project, a contractor who suspects additional ACM is present must immediately report the suspected area to the ROICC or Contract Representative.

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.

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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.

9.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with LBP activities. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, 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 6 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 Toxic Characteristic Leaching Procedure (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.** A 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 the following:

- [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 (daycare center, pre-school, 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, child care 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

**Buildings
constructed prior
to 1978 are
assumed to
contain LBP.**

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 Carolina 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. In addition, it mandates that contractors provide the owner and occupants with *The Lead-Safe Certified Guide to Renovate Right* information pamphlet, which is 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, a LBP survey must be completed by an inspector certified in North Carolina, 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 provided 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 structures (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

If the LBP survey determines that LBP will be abated as part of a renovation or demolition project, analytical samples must be taken to determine whether the material is hazardous.

The laboratory conducting the sample analysis must be accredited by the Environmental Lead Laboratory Accreditation Program. 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 before initiating any work aboard MCB Camp Lejeune.

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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 within the project boundaries and outside the limits of permanent work, restoring work sites to an equivalent or improved condition after the work is complete, and confining construction activities to the limits of the work indicated or specified. The contractor is advised that the installation is subject to strict compliance with Federal, State, and local wildlife laws and regulations. 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.

10.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with natural resources management. If you have any questions or concerns

**Please consult the
ROICC or Contract
Representative
with any
questions or
concerns about
the information in
this section.**

about the information in this section or require assistance regarding any wildlife matters (snakes, nesting birds, nuisance wildlife, etc.) on the site or within the project area, please consult the ROICC or Contract Representative, who will contact the Environmental Conservation Branch.

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.** Soil, water, air, plants, and animals, according to the Natural Resources Conservation Service.
- **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.

- **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.

10.1.2. Key Concepts

- **Coastal Zone Management Act (CZMA) of 1972.** Requires each installation to ensure that its operations, activities, projects, and programs affecting the coastal zone in or on coastal lands or waters are consistent with the federally approved Coastal Zone Management Plan of the State.
- **Ecosystem Management.** A goal-driven approach to managing natural and cultural resources that supports present and future mission requirements; preserves ecosystem integrity; is at a scale compatible with natural processes; is cognizant of natural processes' time scales; recognizes social and economic viability within functioning ecosystems; is adaptable to complex, changing requirements; and is realized through effective partnerships among private, local, State, tribal, and Federal interests. Ecosystem management is a process 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.

- **Integrated Natural Resources Management Plan (INRMP).** A planning document using ecosystem management principles to direct the management and conservation of installation natural resources, which includes all elements of natural resources management applicable to the installation.
- **National Environmental Policy Act.** 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.
- **Threatened and Endangered Species.** Specific requirements regarding protected areas on the installation apply to contractor activities. Eight 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, and American alligator. In addition, as of March 25, 2015, the U.S. Fish and Wildlife Service lists six species as threatened and nine as endangered for Onslow County, NC. Consult the ROICC or Contract Representative to determine if there are any project

requirements regarding threatened or endangered species.

- **Timber.** Contractors must ensure that the ROICC or Contract Representative notify the EMD's Forest Management Program prior to conducting site work. Timber will not be released to contractors without the approval of the Forest Management Program.
- **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; interstate waters; the territorial seas; impoundments; tributaries; adjacent waters including wetlands, ponds, lakes, oxbows, and impoundments; waters determined to have a significant nexus; Carolina bays; Pocosins; and waters within the 100-year floodplain or within 4,000 feet of the high tide line or ordinary high water mark; per 33 U.S.C. 1251 *et seq.* Section 328.3.
- **Wetlands.** Any work in installation waters or wetlands requires a permit prior to the start of an activity.

10.1.3. Environmental Management System

Contractor practices associated with natural resources include the following:

- Erosion/runoff control
- Fish stocking
- Habitat management

- Land clearing
- Live fire range operations
- Road construction and maintenance
- Soil excavation/grading
- Timber management
- Urban wildlife management

The potential impacts of these activities on the environment include air emissions, sedimentation, eutrophication of surface waters (addition of nutrients that stimulate aquatic plant growth and depletes oxygen), degradation of habitat, impacts to marine mammals, damage to commercial and noncommercial timber, impacts to endangered species and natural resources, and degradation of soil quality.

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 the following:

- [**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.** Establishes the basic structure for regulating wastewater discharges and placing fill materials into the waters of the United States.
- **CZMA of 1972 (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 all Federal agencies to carry out programs to conserve federally listed endangered and threatened species of plants and wildlife.
- **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 P5090.2A, 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.
- **NEPA 1969 (42 U.S.C. 4321 *et seq.*)**. Requires Federal agencies, including the USMC, to consider the environmental impacts of projects before the decisionmaker proceeds with the implementation. All projects that support military training, major and minor military construction, maintenance, and natural resources management actions are reviewed for potential environmental impacts.
- **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.

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 environmental impacts (or lack thereof) for projects before implementation.

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 or 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. Some contracts may include stipulations from the NEPA document that must be implemented prior to the onset of work to

**Consult the ROICC
or Contract
Representative to
obtain or review
any NEPA
documentation
associated with
the project.**

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

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 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.

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 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

Protect existing trees that are to remain in place and that may be injured, bruised, defaced, or otherwise damaged by construction operations.

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. THREATENED AND ENDANGERED SPECIES

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.

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 5090.11A 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.
- Fish and wildlife must not be disturbed.
- 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.

10.6. WETLANDS

10.6.1. Avoidance

In accordance with MCO P5090.2A, all facilities and operational actions must avoid, to the maximum degree feasible, wetlands destruction or degradation, regardless of the wetlands size or legal necessity for a permit. Prior to the onset of

Contractors must incorporate avoidance and minimization measures to comply with the national policy to permit no overall net loss of wetlands.

construction, coordination with the Environmental Conservation Branch 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 comply with the national policy to permit no overall net loss of wetlands, as well as meeting concept design criteria while incorporating avoidance and minimization measures to protect wetlands, streams, and waters of the United States. Any proposed action that would significantly affect wetlands must be coordinated with the CG of MCB Camp Lejeune.

The contractor must ensure that construction of all buildings, facilities, and related amenities, including earthwork, grading, landscaping, drainage, stormwater management, parking lot and paved roadway, sidewalks, site excavation, sanitary sewer system extensions, and domestic water extensions, avoids, to the maximum degree feasible, wetlands destruction or degradation.

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 (if available) and included in all design products, including drawings, plans, and figures.

10.6.2. Permits

All unavoidable potential impacts to wetlands or waters of the United States require prior coordination as described in this section. Failure to acquire written authorization for

If work in wetlands is required, know who is responsible for obtaining permits, and what the terms and conditions of the permits require.

impacts to wetlands and/or waters of the United States may result in significant project delays or design modifications.

No discharge of fill material, mechanized land clearing, or any other activity is allowed in jurisdictional wetlands or waters of the United States without the proper approvals. The contractor

may be responsible for obtaining the following permits (including pre-permit coordination, preparation, and submission of all permit applications after review and concurrence by the installation) and complying with all regulations and requirements stipulated by the State of North Carolina as conditions upon issuance of the permits:

- U. S. Army Corps of Engineers (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.)
- North Carolina Division of Water Resources (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.)
- North Carolina Division of Coastal Management (NCDQM), 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 will not perform any work in waters of the United States or wetlands without an approved permit (even if the work is temporary).

Contractors working on the installation will not perform any work in waters of the United States or wetlands 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, and work areas.

10.6.3. Impacts

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 hydrology of an area. Discharges of fill material generally include the following, without limitation:

- Placement of fill material that is necessary for the construction of any structure or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; and causeways or road fills
- Dams and dikes
- Artificial islands
- Property protection or reclamation devices such as riprap, groins, seawalls, breakwaters, revetments, and beach nourishment
- Levees
- Fill for intake and outfall pipes and subaqueous utility lines
- Fill associated with the creation of ponds
- Any other work involving the discharge of fill or dredged material

10.6.4. Mitigation

Any facility requirement that cannot be sited to avoid wetlands must be designed to minimize wetlands degradation and must include compensatory mitigation as required by wetland regulatory agencies (USACE and NCDWR) in all phases of project planning, programming, and budgeting.

The contractor may be required to develop onsite mitigation, consisting of wetland/stream restoration or creation, for all unavoidable wetland and stream impacts, whenever possible and feasible.

The contractor may be required to develop onsite mitigation, if appropriate, consisting of wetland/stream/buffer restoration or creation, for all unavoidable wetland, stream, and buffer impacts, whenever possible and feasible. Use of USMC lands and lands of other entities may be permissible for mitigation purposes for USMC projects when consistent with EPA and USACE guidelines or permit provisions. Land within the project area suitable for

establishment of mitigation may be evaluated by the contractor and used for mitigation where compatible with mission requirements and approved by the CG. Proposals for permanent resource areas must be approved by the Assistant Secretary of the Navy (Installations and Environment) or his/her designee.

Offsite mitigation is preferred and should be coordinated through the North Carolina Division of Mitigation Services or an approved private mitigation bank.

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.

11.0 STORMWATER

MCB Camp Lejeune 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 MCB Camp Lejeune for all of the contractor activities on the installation. In essence, all contractors for the installation need to know and implement the

necessary measures to prevent stormwater runoff and pollution runoff from land-disturbing activities (LDAs) 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.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

11.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with stormwater. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the

appropriate environmental office if additional clarification is necessary.

11.1.1. Key Definitions

- **Best Management Practices.** 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). See the following website for more information: <http://deq.nc.gov/about/divisions/energy-mineral-land-resources/stormwater>
- **Certificate of Stormwater Compliance.** A document providing 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, or SPPP) for a construction site.* See the following website for more information:

<http://deq.nc.gov/about/divisions/energy-mineral-land-resources/stormwater>

- **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 cannot be attributed to a discernible, confined, and discrete conveyance. (*See also point source discharge, 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. (*See also nonpoint source discharge, above.*)

- **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. The practices include procedures to reduce the possibility of mishandling materials or equipment. Good housekeeping practices benefit stormwater quality and also provide for a clean, safe place for employees and clients. *Note that good housekeeping is one of the six minimum control measures (MCMs) of the 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.** LDAs that disturb 1 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 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. *Note that construction site runoff control is also one of the six MCMs of the Municipal Separate Storm Sewer Systems (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 I 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.

- o **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 State Stormwater Management Program sets forth requirements for post-construction stormwater runoff control. *Note that 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. *Note that the terminology for this plan (and associated acronym) varies somewhat from State to State.*

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

The potential impacts of these activities on the environment include degradation of water quality and damage to public and private property due to flooding.

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.
 - o Identify critical areas
 - o Limit exposure areas
 - o Limit time of exposure
 - o Control surface water

- o Control sedimentation
- o Manage stormwater runoff

More information can be found at:

<http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environmental%20Quality\Chapter%2004%20-%20Sedimentation%20Control>

- **15A NCAC 02H.1000 Stormwater Management.**

The State Stormwater Management Program requires all persons conducting LDAs 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 BMPs.

11.3. PRIOR TO SITE WORK

Contractors are required to address the following in the below section prior to beginning site work.

11.3.1. Construction Notifications

Any project involving LDAs 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

Any project involving LDAs aboard the installation must be reviewed by the installation's NEPA Review Board prior to the onset of work.

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 Stormwater Phase I Industrial Permit

Discharges of industrial stormwater have the potential to contain contaminants from industrial activity. Because of this, MCB Camp Lejeune holds a Stormwater Phase I industrial permit. This type of discharge is defined and regulated in 40 CFR 122, the EPA final rule regarding NPDES stormwater permitting.

Contractors are responsible for preparing project-specific permit applications and related plans and for coordinating the permit review schedule with the ROICC or Contract Representative.

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 Section 11.4 for more information on contractor responsibilities associated with this permit.

11.3.3. Familiarity with the Stormwater Phase II Municipal Permit

Discharges of municipal stormwater have the potential to contain contaminants from municipal activity. Because of this, MCB Camp Lejeune holds a Stormwater Phase II municipal permit. This type of discharge is defined and regulated in 40 CFR 122, the EPA final rule regarding NPDES stormwater permitting.

Daily municipal operations discharging stormwater aboard MCB Camp Lejeune and MCAS New River are covered under an NPDES permit. In accordance with the permit, the installation maintains a municipal Stormwater Plan to address the six MCMs of the permit, as well as other requirements. Refer to Section 11.4 for more information on contractor responsibilities associated with this permit.

11.3.4. 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. MCB Camp Lejeune is the responsible party for all project-specific stormwater permits

All permit-required plans and applications must go through internal approval before being submitted to the appropriate State agency.

located outside of Public-Private Venture (PPV) housing. All permit-required plans and applications must be submitted to the appropriate MCB Camp Lejeune 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 MCB Camp Lejeune.

Permit coverage is required under the North Carolina General Permit No. NCG010000 (General Permit) for construction activities that disturb 1 acre or more of land. Three copies of a proposed Erosion and Sedimentation Control Plan must be prepared and submitted to the NCDEQ 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. A copy of the plan will be kept on file at the job site at all times while the site is active. **Coverage under the permit becomes effective when a plan approval is issued. No LDAs may take place prior to receiving the plan approval.** 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.

A State Stormwater Management Permit, issued in accordance with 15A NCAC 02H.1000, is required for all development activities that require a CAMA Major Development Permit or an Erosion and Sedimentation Control Plan and that meet any of the following criteria:

- Development within the 20 coastal counties
- Development within 1 mile of and draining to any waters classified as High Quality Water (HQW) and rated “excellent” based on biological and physical/chemical characteristics through the NCDWR monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission
- Development that drains to an Outstanding Resource Water, which is a subset of HQW that is intended to protect unique and special waters having excellent water quality and being of exceptional ecological or recreational significance to the State or Nation

A State Stormwater Management Permit is required for all activities that will disturb 1 acre or more of land.

Because the installation is in a coastal county, any project that disturbs greater than 1 acre of land (requiring coverage under the General Permit for construction activity) will also require a State Stormwater Management Permit. A State Stormwater Management Permit application must be submitted and filed with the NCDEQ, Division of Water Quality, after the construction plans and specifications are complete and before construction activities begin. Additional information is available on the NCDEQ website:

<http://deq.nc.gov/about/divisions/energy-mineral-land-resources/stormwater>

State Stormwater Management Permits typically specify design standards for conveyance systems and structural BMPs, a schedule of compliance, and general conditions to which the permittee must adhere.

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 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. Inspection results shall be maintained by the designated contractor throughout the duration of an 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.
- No POL products (e.g. fuels, lubricants, hydraulic fluids), coolants (e.g., antifreeze), or any other substance shall 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 the 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 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 best management practices to prevent stormwater pollution. EPA Industrial Fact Sheet Series for Activities Covered by EPA's multi-sector general stormwater permit: <http://www.epa.gov/npdes>

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12.0 SOLID WASTE, RECYCLING, AND POLLUTION PREVENTION (P2)

Contractors should minimize the amount of solid waste requiring disposal in a landfill.

The installation has a proactive P2 and recycling program, and 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 construction and demolition (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. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

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 11350.1, 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 could 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 the following:

- [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 and calls for GP.
- **EO 13423, Strengthening Federal Environmental, Energy and Transportation Management.** Integrates prior practices, strategies, and requirements to further enhance the environmental and energy performance and compliance requirements. The EO sets goals in several environmental areas, including recycling.
- **EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance.** Expands on the environmental performance requirements for Federal agencies, to include setting goals for solid waste diversion.
- **Pollution Prevention Act 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 must 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.

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Table 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: <ul style="list-style-type: none">• Scrap lumber (unpainted)• Embark boxes (broken down)• Pallets (broken/untreated) The following products must be separated and delivered to the landfill: <ul style="list-style-type: none">• Trees (cut to 10 feet or less and free of soil)• Leaves and scrubs Serviceable pallets	
Lead Based Painted Wood Products	
<ul style="list-style-type: none">• 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)	
<ul style="list-style-type: none">• Appointment needed (910-451-5011 / 2946)• Delivered by 1000 (Mon – Thurs.)• Not accepted on Friday• Double wrapped in 6-millimeter plastic bags	

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<ul style="list-style-type: none">• Sealed with duct tape• Labeled and manifested prior to delivery
Organic Products
<ul style="list-style-type: none">• 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
<ul style="list-style-type: none">• Delivered separately from other items• Wire and rebar must be cut off flush with exposed surfaces• Concrete and culverts• 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)
<ul style="list-style-type: none">• Wood pallets (delivered separately)• White paper (mixed flat or shredded)• Newspaper• Magazines• Military publications (binders removed)• Phone books• Plastic and glass (containers or bottles)• Toner cartridges• Cardboard (delivered separately if in bulk)

<ul style="list-style-type: none"> • Vinyl siding (delivered separately, in less than 6-foot lengths) • Asphalt shingles (delivered separately)
Scrap metals
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 a DD Form 1348, with a classification of rejected by the Base Property Office AND downgraded to scrap by Defense Logistics Agency Disposition Services (DLADS).
All other Base or USMC property must be accompanied by a DD Form 1348 and downgraded to scrap by DLADS.
Scrap materials related to ordinance, ammunition or dangerous items , including containers, tubes, and packing, must also be accompanied by Ammunition, Explosives, and Other Dangerous Articles (AEDA) certifications and copies of the certifier and verifier's appointment letters.
<p>Phone Numbers: (area code 910)</p> <ul style="list-style-type: none"> • Landfill Manager 451-4998 • Recycling Manager 451-4214 • Landfill Fax 451-9935 • Landfill Clerk 451-2946 • EMD 451-5837 • EOD 451-0558

Unacceptable Items

- Hazardous Waste
- Liquid Waste
- Useable Appliances
- Paint and Paint Cans
- Appliances
- Electronics
- Computer Equipment
- Batteries
- Wire (Communication/Barbed/ Concertina)
- 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 13514, the

DoD Strategic Sustainability Performance Plan, and the EMS.

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 Thursday, 0700–1500, and Friday, 0700–1400. 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. Call Recycling Coordinator at (910) 451-4214 for specific types and categories of materials accepted.

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, but excludes brass casings above .50 caliber; please call the Recycling Coordinator at (901) 451-4214 for details and documentation requirements)
- Copper and copper wire
- Aluminum (plate, sheet, scrap) and aluminum cans
- Paper (white, news, magazine)
- Cardboard

- Glass bottles (no window, windshields, or drinking glass)
- Plastic bottles
- Toner cartridges

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 11350.1 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 DLADS disposal area in Lot 201, following the guidelines of BO 5090.17.

- **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 HM Free Issue Point, 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 rag recycling 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:

- Products made from recovered materials
- 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 standards
- Products that do not contain toxic chemicals, hazardous substances, or other pollutants targeted for reduction and elimination by the DoD
- Products with 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, effective November 4, 1989. To ensure the protection of human health and the environment, a proactive Installation Restoration Program has been established to assess and remediate 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 OSHA standards in 29 CFR 1910.120(e). If intrusive activities are planned for 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.

**Contact the ROICC
or Contract
Representative
with questions or
concerns about
the information in
this section.**

13.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with unforeseen site conditions. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, 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 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 the following:

- [**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 (1) any 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 most frequently encountered condition that requires EMD assistance is the presence of a POL odor while excavating. If an odor or any free product is encountered during 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.
- ---

If there is an odor, stop work and immediately clear the area of all personnel to a safe distance upwind of the suspected area.

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 soil is 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

Recognize

Retreat

Report

Recognize

Retreat

Report

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).

Stop work immediately if a project unearths a hazardous material, such as MEC/DMM/UXO, and report the situation to the ROICC or Contract Representative.

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 Explosive Ordnance Disposal (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.

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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 permits related to the environment are provided in Section 14.3.

14.1. KEY DEFINITIONS AND CONCEPTS

The following key definitions and concepts are associated with contractor permitting requirements. If you have any questions or concerns about the information in this section, please consult the ROICC or Contract Representative, who will contact the appropriate environmental office if additional clarification is necessary.

Please consult the ROICC or Contract Representative with any questions or concerns about the information in this section.

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 on the following webpage: <http://deq.nc.gov/about/divisions/environmental-assistance-customer-service/deacs-permit-guidance/environmental-permit-assistance>

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

The NCDEQ website (<http://deq.nc.gov/>) is a useful reference for determining required permits and obtaining necessary forms.

Prior to work being awarded, EMD's NEPA Section should have performed an environmental review of the installation-associated action proponent to comply with NEPA 1969. The outcome of this review would be either 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 (<http://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 LDAs 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 (waters classified as SA are tidal salt waters that are

used for commercial shellfishing or marketing purposes) that disturb less than 1 acre if adding more than 10,000 square feet of built-upon area that will result in a built-upon area greater than 12 percent of the total project area.

- **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 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 of the total project area when adjacent to non-SA waters or less than 12 percent of the total project area when adjacent to SA waters.

14.3.2. Asbestos (Section 8.0)

- **Asbestos Permit Application and Notification for Demolition/Renovation.** DHHS Form 3768, available at the following website (under *Forms & Applications*):

<http://epi.publichealth.nc.gov/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:
 - o Boilers
 - o Generators
 - o Engine test stands
 - o Surface coating/painting operations
 - o Refrigerant recovery and recycling operations for other ozone-depleting substances, such as industrial chillers, refrigerators, air conditioning compressors, or cleaning agents.
 - o Chemical or mechanical paint removal, abrasive blasting, grinding, or other surface preparation activities
 - o Fuel storage and fuel dispensing
 - o Woodworking shops

- o Welding shops
- o Bulk chemical or flammables storage
- o Open burning
- o Fire training
- o 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 the 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. See the following website for more information:

<http://www.epa.gov/laws-regulations>

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.
- **Wastewater Extension Permit.** NCDEQ Form FTA 02/03 – Rev. 3 04/05. Applicants submitting Form FTA 02/03 should plan to allow the State approximately 90 days to issue the permit. The Wastewater Extension Permit must be obtained prior to onset of work.

